



Facilities Planning & Management
Strategic & Capital Project Delivery
Campus Planning & Design

Technical Guidelines for UW-Madison Facilities

Revised 04/10/2023



PROJECT DELIVERY

Division of Facilities Planning & Management

Guidelines Divisions

- 1 General Requirements
- 2 Existing Conditions
- 3 Concrete
- 4 Masonry
- 5 Metals
- 6 Wood, Plastics, and Composites
- 7 Thermal and Moisture Protection
- 8 Openings
- 9 Finishes
- 10 Specialties
- 11 Equipment
- 12 Furnishings
- 13 Special Construction
- 14 Conveying Equipment
- 21 Fire Suppression
- 22 Plumbing
- 23 HVAC
- 26 Electrical
- 27 Communications
- 28 Electronic Safety and Security
- 31 Earthwork
- 32 Exterior Improvements
- 33 Utilities
- 34 Transportation

Appendices

04/10/2023

- 01A BIM for Architects and Engineers
- 01B BIM for Contractors
- 01C BIM Floor Naming Standards
- 01D Facility Information Requirements
- 01E Drawing Checklist
- 01F Key Request Forms
- 08A Details
- 09A Interior Finish Standards & Guidelines
- 09B Finish Solutions over Glazed Block Walls
- 10B Interior Signage
- 11 Fume Hood Policy
- 12A Site Furnishings
- 26A Power Outage Planning Form
- 27A Communications
- 32A Site Details
- 32B Planting Details



Division 01 General Requirements

01 10 00 Summary

01 10 10 Introduction

These Guidelines provide requirements and establish parameters related to the design and construction of facilities on the campus of the University of Wisconsin–Madison (UW-Madison). The requirements of these Guidelines pertain to all campus projects, whether administered/managed by the State’s Division of Facilities Development (DFD) or administered/managed by UW-Madison.

The DFD *Policy and Procedure Manual for Architects/Engineers and Consultants* establishes the general framework for architectural and engineering work on State of Wisconsin facilities and is also intended to provide the model for architecture/engineering (A/E) work on UW Managed Projects when DFD is not involved.

DFD has additional technical guidelines and provides model specifications which address various building elements or trades. It is the intent that all projects on the UW-Madison campus incorporate those guidelines and specifications when applicable.

UW-Madison’s Facilities Planning & Management (FP&M) provides these *Guidelines for Planning and Design of UW Madison Facilities* to provide additional guidance with regard to particular requirements, standards, or preferences established by UW-Madison for facilities on campus. Where the requirements of these UW Guidelines differ from the DFD guidelines and specifications, the UW Guidelines will take precedence, however, the A/E shall discuss each of these discrepancies or differences with the UW Project Manager & the DFD Project Manager.

The latest version of the DFD guidelines and specifications should always be used. The most recent versions are available from the DFD website. Likewise, A/Es should regularly check FP&M’s Capital Planning & Development’s (CP&D) website at <https://cpd.fpm.wisc.edu/> to obtain the latest version of these Guidelines. The A/E shall include the requirements established in these Guidelines in the construction documents that are advertised for bid.

The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.

01 12 00 Code Requirements

01 12 20 Building Codes

The design and construction of UW-Madison facilities are subject to the provisions of Chapters SPS 361 to 366 of the Wisconsin Administrative Code, which constitute the Wisconsin Commercial Building Code. SPS 361.05 incorporates by reference the 2015 editions of the International Building Code (IBC), the International Energy Conservation Code (IECC), the International Mechanical Code (IMC), the International Fuel Gas Code (IFGC), and the International Existing Building Code (IEBC), as amended by SPS 361 to 366. SPS 361.03 (14) requires compliance with design and construction related provisions of certain sections and chapters of the 2015 International Fire Code (IFC).



Plumbing in UW-Madison facilities is regulated by Chapters SPS 381 to 387 of the Wisconsin Administrative Code and Electrical work is regulated by SPS 316, which adopts by reference the 2011 edition of the National Fire Protection Association's NFPA 70 National Electrical Code (NEC).

Chapter SPS 314 of the Wisconsin Administrative Code regulates the use, operation, and maintenance of UW-Madison facilities related to fire prevention. SPS 314.001 requires compliance with the City of Madison's model fire code, which is the 2018 IFC. The Madison Fire Department also uses Madison Municipal Code Chapters 34 and 40.

01 13 00 Documentation Requirements

01 13 20 CAD/BIM

The University of Wisconsin-Madison requires that the A/E firm for each project provide the construction drawing set in either Computer Aided Design (CAD) format or Building Information Modeling (BIM) format in addition to the PDF and hardcopy drawing sets required by the State of Wisconsin Division of Facilities Development (DFD). All sitework related construction drawings shall be provided in CAD format. CAD files shall be in AutoCAD format per DFD's standards for record drawing submittal. BIM files shall be in Revit format per the UW-Madison FP&M's Architecture & Engineering Group's guidance documents, *BIM for Architects & Engineers*, *BIM for Contractors*, and *BIM Naming Standards*, which are found in the Division 1 Appendix. These drawings, in all three formats listed above, shall be submitted to the UW-Madison project manager shortly after a project enters into the construction phase. These drawings offer an opportunity for campus offices to plan and prepare for ownership and maintenance of the facilities within the project. This process often begins before construction takes place and well before the project is completed and record drawings are submitted. Bid drawing set submissions shall be designated as such, recognizing that changes are probable and will be superseded by record drawings.

01 13 40 Record Documents

Record documents are typically submitted to FP&M by the contractor and serve as the permanent record of construction for the facilities and landscapes built. The University of Wisconsin-Madison requires that we receive final record documents in AutoCAD or Revit formats in addition to PDF format. The submittals in both formats shall include the UW-Madison building number, the UWSA Number, and the DFDM Project Number (when applicable) for reference as well as:

- Drawings which document what was built inclusive of all construction bulletins, field orders, known field changes, etc.
- Specifications inclusive of all construction bulletins, field orders, known field changes, etc.
- All test data, reports, air balance schedules, etc
- All sitework related construction drawings shall be provided in CAD format.

01 13 50 Facility Information Requirements

UW-Madison's requirements related to floor level numbering, vertical passage numbering, door numbering, and workstation numbering; and associated design and drawing requirements can be found in the Space Management Office's *Facility Information Requirements* establishes criteria for facility naming and room numbering for campus. This document can be found in the Division 1 Appendix .



01 13 60 O&M Manuals

Operations and Maintenance (O&M) manuals must be organized to include a Table of Contents and be inclusive of all submittals, confirmed materials selected including finishes, list of contact numbers for all used materials, and dated warranty information. The format of O&M manuals can be electronic in searchable PDF format.

01 13 80 Drawing Checklist

A Drawing Checklist has been provided at the end of this division to assist A/Es and reviewers with checking requirements for the 35% and 100% drawing review packages.

This list is not comprehensive and does not include all the requirements of a given project, nor are all elements in the checklist pertinent to all projects. The list represents some elements that reviewers may want to look at as is appropriate for the given project. Confer with the UW-Madison Project Manager if items are deemed not pertinent to a specific submittal.

Consult other divisions of these Guidelines for additional drawing requirements for project reviews. Incomplete drawings will require resubmittal if deemed inadequate by FP&M.

01 14 00 Work Restrictions

01 14 11 Access Keys

The Lead Contractor shall fill out an Access Key form and return it to the UW-Madison Lock Shop to obtain keys needed to perform required work. The UW-Madison Lock Shop is located at 30 N. Mills St. All keys, under control of the lead contractor, shall be kept secure and shall not be duplicated or shared with other persons. Any lost keys shall be reported to the UW-Madison Lock Shop immediately.

The *Single Key Request Form*, *Multiple Keys Request Form* and *Utility Key Request Form* are provided in the Division 1 Appendix.

01 14 12 Security Procedures

All workers shall at all times wear a visible identification badge with photo ID that contains their name and the name of their employer.

01 14 13 Site Access Restrictions

There may be restricted access to the site during resident move-in/move-out. Contractors may work normal hours, but construction access in or out of the site may be restricted and prohibited at times due to heavy pedestrian and vehicular traffic on all four move-in/out days. The specific days have yet to be determined, but will occur during the following approximate time periods (A/E shall insert appropriate dates in the format shown below):

- Fall Move-In: August XX through Sept. XX, 20XX.
- Spring Move-Out: May X-XX, 20XX.
- Fall Move-In: August XX through Sept. XX, 20XX.
- Spring Move-Out: May 20XX.
- Football Games – Fall of 20XX and 20XX
- Other Sporting Events

01 14 14 Work Hours

Contractor work hours shall comply with the City of Madison construction noise ordinance and the following:

City of Madison Noise Restrictions:



All contractor work hours shall be limited per Madison General Ordinance 24.08. In general, this ordinance does NOT allow the use of any equipment used in construction between the hours of 7:00 P.M. and 7:00 A.M. (Monday through Saturday) in such a manner as to unreasonably interfere with the peace, comfort and quality of life of the neighboring persons of ordinary sensibilities. On Sunday, no person shall operate or permit the operation of any equipment used in construction work before 10:00 A.M. and after 7:00 P.M. The intent here is to not allow the use of equipment, i.e. hammers, power saws, compressors, pneumatic tools, etc. during the hours when construction noise is regulated. Work outside of these times shall require prior approval from the DFD Construction Representative and University as well as appropriate approvals by the Contractor from the City. Refer directly to the City's ordinances for the official language.

Noise Restrictions During Final Exams – the contractor may have noise restrictions imposed during various periods throughout the academic year. These times may include but are not limited to (A/E shall insert appropriate dates in the format shown below):

- Final Exams and Study – Dec XX, thru XX, 20XX
- Final Exams and Study – May X thru 8, 20XX
- Final Exams and Study – Dec XX thru XX, 20XX

01 14 15 Shutdowns

The A/E shall include the following procedure regarding shutdowns:

1. Design Phase

- a. The UW-Madison Project Manager, Building Manager and Users are to be informed by the A/E of potential shutdowns.
- b. The A/E is to incorporate a list of potential major shutdowns in the front end of the Construction Documents.
- c. Environmental Health and Safety (EH&S) is to be informed of anticipated shutdowns during design reviews.
- d. A/E shall instruct the GC to follow EH&S Fire & Life Safety's Life Safety Impairment procedures and Hot Work procedures in their documentation.

2. Construction Phase

- a. The GC shall provide a list of anticipated shutdowns at each construction progress meeting.
- b. The GC shall incorporate the shutdowns in the project schedule.
- c. The GC shall formally notify campus of upcoming shutdowns no less than 10 working days prior to the shutdown.
 - GC shall fill out the UW's "Project Impairment/Shutdown Form" and email that form to campus stakeholders shown on the form as well as the UW's Project Manager and UW's Construction Rep. UW's Project Manager will then request a Work Order from Physical Plant for assistance if needed.
- d. The appropriate Campus Shops supervisor coordinates the shutdown with the GC and UW Madison Project Manager
- e. The GC shall set up pre-installation meetings.
- f. Environmental Health & Safety shall be informed of all anticipated shutdowns throughout all phases of construction.
- g. The Contractor is responsible to know and follow the UW Madison policies and procedures for Fire Protection Impairments and Hot Work Permits including submitting the appropriate submittal forms and notices. See the following websites for pertinent information.



FIRE PROTECTION IMPAIRMENTS

Fire Protection UW Impairment Form - Website

<https://ehs.wisc.edu/fire-life-safety/fire-protection-uw-impairment-form/>

FIRE PROTECTION IMPAIRMENT PROGRAM - document

<https://ehs.wisc.edu/wp-content/uploads/sites/1408/2020/09/EHS-FLS-GUI-003.pdf>

Fire Protection UW Impairment Fire Watch Form

<https://ehs.wisc.edu/fire-life-safety/fire-protection-uw-impairment-fire-watch-form/>

Fire Protection Impairment FAQ's

<https://ehs.wisc.edu/wp-content/uploads/sites/1408/2020/09/Fire-Protection-Impairment-FAQ-update-10->

HOT WORK PROGRAM

Hot Work Permit Program

<https://ehs.wisc.edu/wp-content/uploads/sites/1408/2020/08/HotWorkProgram.pdf>

Hot Work Permit Scheduling Form

<https://ehs.wisc.edu/hot-work-permit-scheduling-form/>

Hot Work Fire Watch Form

<https://ehs.wisc.edu/fire-life-safety/hot-work-fire-watch-form/>

01 14 16 Work by Owner

1. Access Control System
 - a. Card readers are provided by the Owner and installed by the Prime Contractor (wiring and installation of units and the equipment)
2. Security cameras
3. DoIT switches and network gear
4. Door hardware lock cylinders
5. Fire extinguishers
6. Any operational accessories
7. UW-Madison Shops involvement
 - a. Obtain quote / estimate for the anticipated work
 - b. Labor
 - c. Meetings
 - d. Design
 - e. CA (inspection, reviews, commissioning, submittals)
 - f. Shutdowns
 - g. Equipment
 - h. Schedule coordination
8. UW-Madison Digital Controls Group (DCG) of the Electrical Shop
 - a. Specifications for Direct Digital Controls (DDC) shall be based upon the DFD Master Specifications sections for automated control systems.
 - b. Any deviations from the DFD Master Specifications must be approved by the UW-Madison Project Manager.
 - c. In preliminary design, engage the UW-Madison DCG group to determine if they have the capacity to perform the programming of the project.
 - d. If the DCG group has the capacity to perform the programming of the digital controls for the project, a general scope should be explained and if there are



stringent controls required, the DCG group should be engaged early in the process

- e. If the DCG group doesn't have the capacity, then Johnson Controls International (JCI) will need to perform the programming for the project. A Class 1 notice will need to be issued for this work.
- f. In either scenario above, the DCG group should be involved in the review and commissioning of the project.
- g. UW-Madison DCG group and JCI should only be providing the tie-in panel and the programming of the controls via specification. Controls should be furnished and installed by the mechanical sub-contractor.
- h. All DDC equipment shall be compatible with Johnson Controls and comply with DFDM standard specifications.
- i. DCG group / JCI will not be providing the DDC equipment, however, their review of these specifications is crucial.
- j. DDC Group / JCI should be aware and attend periodic construction meetings throughout construction.

01 50 00 Temporary Facilities and Controls

01 51 00 Temporary Construction Measures

01 51 16 Temporary Fire Protection

Bagging of smoke detectors is not allowed in UW-Madison Facilities.

01 56 16 Temporary Dust Barriers

Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise and to prevent damage to existing materials and equipment. Partitions shall be constructed of fire resistant poly sheeting.

01 55 00 Vehicular Access and Parking

01 55 05 Operations Confinement

Confine all operations, equipment, apparatus and storage of materials to the immediate area of work to the greatest possible extent and within the assigned project limits. Contractor shall ascertain, observe and comply with all rules and regulations in effect on the project site, including but not limited to parking and traffic regulations, use of walks, security restrictions and hours of allowable ingress and egress. Any special traffic control during construction involving lane closures shall be in accordance with the federal standard, Manual of Uniform Traffic Control Devices (MUTCD). Fire lanes, fire access roads, Fire Department Connections (FDC) and hydrants shall remain unobstructed and accessible.

01 55 19 Construction Parking

All contractors and others involved with the project shall comply with the parking policies of UW-Madison Transportation Services. See www.transportation.wisc.edu/rates-and-policies/.

In general, construction staging areas shall be used only for equipment and vehicles involved directly in the construction project. Personal vehicles used for commuting to the worksite are not permitted in staging areas. Parking permits in campus parking lots may be purchased from any UW-Madison Transportation Services customer service office, subject to availability and compliance with stated policies.



See www.transportation.wisc.edu.

All personal vehicles used for commuting to campus (including the construction project site) must display a valid UW-Madison Transportation Services parking permit and park in a designated lot/ramp.

1. A personal vehicle is defined as any vehicle not owned by a licensed construction company.
2. Personal vehicles displaying a temporary company sign or logo do not qualify as a construction vehicle.
3. Personal vehicles used for commuting may not park at the construction site or inside the staging area.
4. Temporary permits for workers commuting to a project site are available for sale in various locations across campus based on available space.
5. All vehicles must follow UW - Madison Transportation Services parking policies.

01 55 26 Traffic Control Plan

The A/E consultants shall provide a complete traffic control and mitigation plan for the construction period that includes motor vehicles, bicycles, and pedestrians as part of the 35% review documents. The University experiences unusually large numbers and concentrations of both pedestrians and bicyclists nearly every day when classes are in session and these must be accommodated. Questions about this plan should be directed to the campus transportation planner, and the plan should include the following:

1. Construction Detours:
 - 1.1. Two-way traffic for motor vehicles shall be maintained unless otherwise approved after consultation with the University transportation planner.
 - 1.2. Accommodations shall be made for bicyclists and pedestrians just as they are for motor vehicles, including bike parking and safe, well-marked detours when needed if sidewalks, bicycle lanes, or bicycle paths must be temporarily blocked. Any blockages of sidewalks, bicycle lanes, or multi-use paths should be minimized in extent and in time.
 - 1.3. Pedestrian accommodations shall comply with Americans with Disabilities Act Accessibility Guidelines (ADAAG) and ANSI 117.1 standards.
 - 1.4. Temporary paths for bicyclists, pedestrians, and wheelchair users shall be paved smoothly and designed to accommodate bicycle and wheelchair tires.
2. Construction Traffic Signs/Visibility:
 - 2.1. Existing signs, posts, meters, bike racks, and any other transportation equipment belonging to the University that must be removed shall be returned to Transportation Services via the campus transportation planner or stored carefully by arrangement to be re-installed. The contractor assumes responsibility for any lost or damaged devices and equipment.
 - 2.2. Provide plans indicating a complete system of the correct transportation related signs, in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), shall be identified and provided equally for motor vehicles, bicyclists, and pedestrians.



- 2.3. Signs shall be placed so as to not block pedestrian and bicycle routes unless the intention is to take the route out of service.
- 2.4. Warnings shall be placed a sufficient distance from a blockage or problem to allow a motorist, bicyclist, or pedestrian time to react safely. If a bicycle lane or path must be blocked temporarily or narrowed, signs indicating “End Bike Lane,” “Share the Road/Sidewalk,” or “Sidewalk Closed – Use Other Side,” etc., must be provided.
- 2.5. Sufficient lighting shall be provided along detours and roadways, bicycle paths, and sidewalks near construction sites to allow for the safe travel of all persons during night-time hours.
- 2.6. Signing shall otherwise follow the guidance of Wisconsin Department of Transportation (WisDOT), American Association of State Highway and Transportation Officials (AASHTO), and City of Madison standards. When guidance of the proper response to a specific condition during the construction period is not clear, the University transportation planner should be consulted.
3. Accessible Route Signage around Construction Areas Policy:
 - 3.1. Ensure that proper notification is given relating to any disruptions and/or routing/access revisions or closures especially around construction sites. If routing/access for people with disabilities in and through the construction area is closed, provide a temporary new fully accessible route with appropriate directional signage to available accessible routes.
 - 3.2. New construction area signs addressing construction and parking, traffic revisions, road closures, pedestrian detours, and accessible route detours must be made in accordance with ADAAG, ANSI, and UW-Madison signage standards and in adequate quantity to address the obvious need. The sign for accessible routing shall be 12 inches wide by 18 inches high, made of metal, with white international disability symbol. The symbol shall have a minimum dimension of 8 inches wide by 8 inches high, on blue background. One acceptable example is Tapco sign model DA-13. The sign may also have wording such as “Accessible Route” or other short relevant messages (Note: message might be location specific and should be verified by FP&M Facilities Access Specialist). The sign shall have appropriate directional arrow (8 inches long by 1 inch wide) to indicate the direction of the route. All new construction-type signage shall be installed in logical, safe and strategic locations, in accordance with existing directives and signage manuals. For More Information: contact the FP&M Facilities Access Specialist.

01 55 29 Staging Areas

The A/E consultants shall provide a complete site plan identifying the construction limits and staging area boundaries proposed for construction as part of the 35% review documents for all projects, including those where the proposed work is all interior. Any parking proposed to be lost during construction shall be approved by UW-Madison Transportation Services. Also noted in the construction documents shall be phasing or specific sequencing of construction that will be required as well as a site restoration plan (if site will be disturbed). Staging areas may not be used for parking personal vehicles used for commuting to the worksite. Equipment or vehicles which will be exhausting fumes in the staging area shall not be positioned near intakes or other building openings.



01 55 30 Snow Removal

The contractor shall remove snow as needed in a timely fashion within and around any staging area or as needed to allow for access to University properties, including parking lots, loading docks, egress routes, and entrances to other facilities. Snow removal must also include the outside perimeter of staging area fences where UW-Madison Grounds equipment might otherwise be able to clear snow. Contractors should consult with UW-Madison Grounds about snow removal to ensure good coordination of removal activities around project sites and their staging areas.

01 55 70 Fire Safety Safeguards

Safeguards shall be taken by the GC to ensure all aspects of a project (construction, alteration, or demolition) conform to standards outlined for Fire Safety During Construction and Demolition within NFPA 241 and the International Fire Code. For example, the use of non-flame retardant tarpaulins shall not be allowed within a UW-Madison facility.

01 56 00 Temporary Barriers

01 56 26 Temporary Fencing

1. Contractors shall employ 8 foot high chain link fencing for construction perimeters. All openings shall be gated so that they can be secured after hours. During demolition, dust control fabric may be added to the interior of the fencing to reduce the spread of dust and to assist with safety and security.
2. The construction fences shall provide enough setback between the fence and surrounding sidewalks to allow the maneuvering of snow removal equipment.
3. When emergency egress paths from any adjacent buildings extend through the construction limits, additional fencing shall be provided to direct and safeguard occupants exiting in an emergency.
4. GC to install sign on fencing noting location of the fire department connection (FDC) if the FDC is located within the construction fencing or work area.

01 56 39 Temporary Tree and Plant Protection

1. See Division 1 Appendix for standard tree protection detail.
2. Contractors shall take steps to prevent damage to existing tree root systems, trunks, and branches prior to entering the site. Existing trees to be preserved may need to be pruned, watered, and fertilized by a licensed arborist prior to any construction. All such work shall be coordinated with UW-Madison Grounds.
3. Trees, shrubs and other plants to be protected during construction shall be fenced with chain link fence sections. No trenching or digging shall be done within the critical root radius of the vegetation to be saved. All protection material shall be specified on the plans. Wood snow-fence may be used when approved by the UW-Madison Project Manager. Plastic fencing is not acceptable.
4. The area to be fenced around existing trees shall be determined by the Critical Root Zone (CRZ) or the tree canopy drip line, whichever is greater. CRZ is calculated at 1.5 feet x DBH (Trunk Diameter at Breast Height of 4.5 feet) of the tree. Example: a tree that has a 2 inch DBH, $2 \times 1.5 \text{ feet} = 3 \text{ feet}$, this tree will be fenced 3 feet out in all directions from the base of the tree trunk, unless the drip line is a greater distance.



5. No vehicles, heavy equipment, construction material, tools or equipment shall be parked, stored, or used within the CRZ or tree protection area at any time.
6. All trees shall obtain adequate water during the construction process. The construction company shall allow UW-Madison Grounds access into the site to water trees either by hose or by water truck.
7. Tree protection shall be required whenever there will be activity that could result in compaction within the critical root radius and drip line of a tree to be saved or whenever there is potential for damage to branches/limbs of plants to be saved and protected during construction.
8. If existing trees on site must be worked around or under, precautions shall be taken to prevent root, trunk and branch damage as well as soil degradation within the CRZ and drip line. All such work shall be coordinated with UW-Madison Grounds.
9. If heavy equipment must be driven within the CRZ or drip line of the tree, wooden bridging, or 12 inches of shredded hardwood mulch shall be placed under trees with the CRZ to prevent compaction and root damage. All such work shall be coordinated with UW-Madison Grounds and approved by UW-Madison Campus Planning & Landscape Architecture
10. Soil compaction or chemical contamination of soil is not acceptable.
11. All roots over ½ inch in diameter that need to be removed shall be cut with a sharp, clean hand pruner or pruning saw. Roots torn by construction equipment shall not be left without a clean cut.
12. If utilities are to go under tree root systems, an auger shall be used to bore under the roots rather than trenching through the root system. See standard detail in Division 1 Appendix
13. Silt fence shall not be trenched within the CRZ and drip line of any tree. Use silt socks as an alternative.
14. Contractors shall be responsible for setting up tree maintenance programs to maintain trees within construction boundaries. This includes watering, preconstruction pruning, and clearance pruning during construction. Coordinate work with UW-Madison Grounds.
15. 8' Chain link fence shall be used for tree and vegetation protection. Establish criteria for protection of branches versus removal of limbs for vegetation with high potential for damage during work. All such work shall be coordinated with UW-Madison Grounds.
16. Trees damaged during construction shall be attended to and/or pruned. Contact the UW-Madison Project Manager when damage occurs and coordinate remediation work with UW-Madison Grounds.



01 57 00 Temporary Controls

01 57 23 Temporary Storm Water Pollution Controls

1. Riprap stone at stormwater outflow points is required wherever concentrated flow is leaving the site.
2. Existing stormwater drainage paths shall be diverted around the work site.
3. The water from these diverted paths, as well as water from the disturbed work site, will result in increased water volume in some drainage ways, or may mandate creation of new drainage ways; this has such effects as increased flow velocity and larger flow area subject to erosion—these effects shall be mitigated with check dams, straw bales, etc.
4. Filter sediments from drainage water before it reaches the sewer system or the lake. This can be done with silt fence, inlet protection, and other best management practices used by City of Madison, WI DNR, and/or approved by UW-Madison Project Manager.

01 70 00 Execution and Closeout Requirements

01 74 00 Cleaning and Waste Management

01 74 19 Construction Waste Management and Disposal

This Section specifies requirements for salvaging, recycling and disposing of construction waste.

1. Preconstruction and Pre-bid Meetings: The Pre-bid and Preconstruction Meetings will include discussion of construction waste management requirements. Prior to the commencement of the work, the Lead Contractor should schedule and conduct a meeting with the A/E, DFD, and the UW-Madison Project Manager to discuss the proposed Construction Waste Management Plan to develop a mutual understanding regarding details of construction waste management implementation.
2. Specifications for waste management should be based upon the DFD Master Specification Section 01 74 19 Construction Waste Management
3. Waste Management Goals: The diversion goal to be achieved at Substantial Completion of the Project shall be at least 75 percent by weight. Include materials destined for alternative daily cover (ADC) in the calculations as waste (not diversion). Any materials sent to a commingled recycling facility for processing must take the facility average recycling rate and must include any ADC as waste (not diversion). Hazardous waste and land clearing debris are not included.
4. The Contractor shall provide monthly progress reports of the waste generated, including disposal and diversion rates of the project. The monthly progress reports should use disposal records such as tickets and manifests that indicate the following: material type, amount/quantity, and processing type (landfilled, recycled, reused/salvaged, etc.).
5. The Contractor shall provide a final waste management report detailing all waste generated, including disposal and diversion rates for the project.



01 80 00 Performance Requirements

01 80 00 Facility Performance Requirements

01 81 13 Sustainable Design Requirements

1. The UW-Madison Office of Sustainability is developing its Green Building Standards & Guidelines for use in designing sustainable facilities. Consult the Office of Sustainability for their Standards & Guidelines..
2. Use non-toxic, renewable, durable, locally sourced, and sustainable finishes to the greatest extent possible.

01 81 22 Crime Prevention

1. Crime Prevention Through Environmental Design (CPTED) is a multi-disciplinary approach for reducing crime through urban and environmental design and the management and use of built environments. UW-Madison promotes and encourages CPTED principles to create safer communities and environments. The International CPTED website can be found at <http://www.cpted.net/>.



Division 02 Existing Conditions

02 05 00 Common Work Results for Existing Conditions

02 05 10 General Requirements for Existing Conditions

1. The design for all UW-Madison facilities shall comply with all of the provisions of the latest version of the Division of Facilities Development (DFD) *Guidelines for Asbestos Effected* (sic) *by Building Renovation and Demolition*, and *Guidelines for Lead (Pb) Bearing Surfaces in State Buildings* which are available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison managed projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The A/E shall discuss and resolve all conflicts between the *Guidelines for Planning and Design of UW-Madison Facilities* and DFD guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material selection for every project.
7. The A/E shall verify any information derived from building plans, as-built drawings, or other information obtained from the University.

02 05 19 Geosynthetics for Existing Conditions

1. Geosynthetics, fabric weed barriers; Typar, etc. shall not be used in planting beds unless stone mulch is used.
2. Polypropylene (plastic) weed barriers in planting beds and landscape areas are prohibited. They restrict air and water transfer to the soil.
3. Geosynthetics are appropriate for use in controlling soil erosion on steep slopes and providing silt fencing for erosion control.
4. Paving or stone mulch (less than ¾ inch diameter) shall be placed a minimum of 2 feet directly adjacent to the building foundation to reduce maintenance issues and to enhance drainage away from the building. The material shall slope away from the building at ¼ inch per foot.
 - 4.1. Stone mulch shall be a local sourced and quarried material.
5. Under no circumstances shall any type of geosynthetics be used around a tree. As the tree grows, the fabric girdles the tree trunk.



6. Silt fence and woven silt fabric shall be trenched into the soil, however, under no circumstances shall it be trenched into soils within a tree's Critical Root Zone (CRZ) and drip line. Silt socks shall be used as an alternative.
7. Under no circumstances shall silt fence, woven silt fabric, or non-woven fabrics be used as inlet protection. Monofilament, FF type fabric shall be used for inlet protection unless an inserted inlet basket is used.

02 20 00 Assessment

02 21 00 Surveys

02 21 13 Archeological and Historic Surveys

All projects shall consult with UW-Madison Campus Planning & Landscape Architecture to determine if the project requires an archeological, historic, or cultural property review and/or survey. Any communication with the Wisconsin Historical Society shall be coordinated by UW-Madison Campus Planning & Landscape Architecture staff.

02 24 00 Environmental Assessment

1. Site shall be tested for contaminated soils or any other contamination. If contamination is found, proper remediation shall be included in project.
2. Site shall be evaluated for environmental sensitive areas. Any environmentally sensitive areas found shall be protected.
3. Refer to the Environmental Impact Statement or Environmental Impact Assessment for design restrictions and parameters.

02 40 00 Demolition and Structure Moving

02 41 00 Demolition

02 41 13 Selective Site Demolition

1. Project specifications for demolition shall be based upon the DFD *02 41 00 Demolition* model specification section, modified as needed for the project.
2. All trees on the registered campus tree inventory shall be preserved and protected from all damage during construction unless approved for removal UW-Madison Campus Planning & Landscape Architecture and coordinated through the UW Project Manager as part of the scope of work.
3. Relocation of any trees and shrubs shall be coordinated with UW-Madison Campus Planning & Landscape Architecture and UW-Madison Grounds before 35 percent review and prior to the start of demolition and/or construction.
4. Grubbing: This term is defined by UW-Madison as the removal of all tree roots and stumps from site soils. Grubbing is required prior to excavation and preparation for footings. It is not required where stump grinding or a similar procedure may already prepare the ground for the installation of sod or similar material. The need for grubbing shall be reviewed and coordinated through the UW-Madison Project Manager.



5. Tree and Shrub Transplanting Guideline: Trees larger than 2 inch caliper shall not be considered for transplanting unless they are of superior quality and are a rare specimen on campus. Any request for transplanting a tree specimen shall be coordinated with UW-Madison Campus Planning & Landscape Architecture and UW-Madison Grounds.

02 41 16 Structure Demolition

1. The complete foundation support for the building shall be removed to whatever depth the footings extend, except for structural pilings. No foundation walls or fragments shall be left beneath the soil.
2. Removal of any extraneous structures, utilities, or materials such as foundations, rocks, roads, and roadbeds requires coordinated approval obtained through the UW Project Manager to excavate.

02 42 00 Removal and Salvage of Construction Materials

1. The Contractor is required to provide a construction waste management (CWM) plan for all materials removed during the project, including site demolition and construction debris during the construction phase.
2. The contractor will coordinate with the UW-Madison Project Manager regarding any building or site materials to be salvaged and returned to owner. Include this in 35% plan review and the CWM plan.
3. Existing site furnishings, including but not limited to all signs, benches, outdoor tables, bike racks, waste and recycling containers, ash urns, parking meters, public art, plaques, memorials, etc. shall be protected throughout construction. If they are to be removed per the construction documents, the contractor shall coordinate removal and salvage with the UW-Madison Project Manager. Items to be stored and reinstalled shall be clearly noted on the drawings and protected by the contractor until they are reinstalled. Bike racks and parking meters shall be removed by UW-Madison Transportation Services.
 - 3.1. The storage and/or relocation of any existing site furnishings shall be paid for by the project.
4. All site furnishings damaged during construction or while in storage shall be replaced by the contractor at contractor's expense.
5. All planters, rocks/boulders, benches, sculptures, plaques, or other memorials shall be protected from construction damage or loss by placing them in a secured area during construction. The protected site shall be set up to prevent repeated moving of these properties. Relocation to their final site and reinstallation shall be coordinated with the UW-Madison Project Manager and Campus Planning & Landscape Architecture. Include in the 35 percent review plan set.



Division 03 Concrete

03 01 00 Maintenance of Concrete

Any repair, patch, or replacement of existing concrete shall match existing in strength, color, visible aggregate (if applicable), and texture. Exceptions may occur based on design considerations.

03 05 00 Common Work Results for Concrete

03 05 10 General Requirements for Concrete

1. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
2. DFD Standard Specification 32 13 00 is to be used for exterior cast-in-place concrete sidewalks, flatwork, and pavement.
3. Deviations from the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
4. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
5. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material selection for every project.

03 20 00 Concrete Reinforcing

1. All reinforcement for utility vaults, tunnels and conduits underlying pavement prone to salt applications in winter, shall be epoxy coated.
2. Reinforcing not permitted in nose of cast-in-place concrete stairs.

03 30 00 Cast-In-Place Concrete

It is intended that DFD Standard Specification *Section 03 30 00* provide specifications for concrete materials and installation. *Section 32 13 00* is intended to provide specifications for exterior cast-in-place concrete sidewalks, curb & gutter, and pavement.

03 30 90 Cast-In-Place Concrete for Utilities

There is a DFD Standard Specification although it may not be available on their website. Use this specification section for all applicable utility concrete work. It can be obtained from UW-Madison FP&M.

03 38 00 Post-Tensioned Concrete (PTC)

1. Post-Tensioned Concrete is not a desired method of construction for slabs above grade due to reduced flexibility for the future.
2. Post-Tensioned Concrete is acceptable for above grade beams and spandrels.



Division 04 Masonry

04 05 00 Common Work Results for Masonry

04 05 10 General Requirements for Masonry

1. Masonry work for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) *Minimum Requirements and Guidelines for the Exterior Building Envelope*, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material selection for every project.
7. The campus does not permit the use of shelf relief angles to support exterior masonry on a building with less than 4 or 5 stories.
8. Water-resistant sealer shall not be used on the face of brick or stone. Use of water-resistant sealer on the face of any concrete shall be approved by UW-Madison Civil Engineer.
9. Paint shall not be used on the face of exterior brick or stone.
10. Weep holes in brick shall be fitted with louvered inserts with fine stainless mesh to prevent insects from entering and infesting the building interior. Inserts are not permitted in open head joints.
11. Cavity drainage material is not permitted.
12. A complete recycling plan is required for stone and brick on demolition projects. The contractor shall provide the means and methods for storing the stone and brick for the campus (within the project limits or off campus) and shall verify with the UW-Madison Grounds Department where the stone or brick will be stored.
13. Concrete Masonry Units with water resistant filler is recommended to be used on animal areas. Gypsum Wall Board is not recommended.



14. Brick and CMU walls shall not extend below grade or below the surface of the adjacent pavements and sidewalks. At least 2 inches of the foundation shall be exposed above the level of the grade / pavement / sidewalk.
15. Locate anchors and fasteners at mortar joints. Avoid installations into the masonry.
16. New metal fasteners installed in existing exterior masonry shall be stainless steel.
17. Mortar repair shall match existing mortar mix type, color, texture, and tooling.
18. Sealants shall not be used to repair mortar joints, except at sky joints.
19. In the construction documents, provide details of the mockup and show its location on the site plan. Also, describe if the mockup is to be for constructability, or aesthetics, or materials or all the above or if the contractor can just provide samples of materials.



Division 05 Metals

05 05 00 Common Work Results for Metals

05 05 10 General Requirements for Metals

1. Handrails and guardrails for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) *Guideline for Exterior Stair Handrail or Retaining Wall Guardrail Post Anchorage*, which is available from the DFD website.
2. Metal Cladding for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development & Management (DFD) *Minimum Requirements and Guidelines for the Exterior Building Envelope*, which is available from the DFD website.
3. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
4. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
5. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
6. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
7. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material selection for every project.

05 50 00 Metal Fabrications

05 50 90 Miscellaneous Metal for Utilities - based on DFD specifications

05 50 93 Products for Miscellaneous Metals for Utilities

1. Structural Steel Stanchions for Pipe Anchors, Guides, and Supports:
 - 1.1 Structural and Miscellaneous Steel: W-shaped members shall conform to ASTM A992 fy = 50 KS1. Structural tubing shall conform to ASTM A500 Grade B. Angle plates and channels shall conform to ASTM A36. Piping supports, guides and anchor steel for steel piping as shown on drawings, will be furnished under Division 23.
 - 1.2 Priming for Steam, Condensate and Air Pipe: Shop-primed painting of structural steel shall be one coat of ethyl silicate inorganic zinc-rich equal to TNEMEC Tneme-zinc 90-96. Primer shall be suitable for temperature to at least 500° F. Shop surface prep shall be SSPC-SP6 Commercial Blast Cleaning.



-
- 1.3 High strength bolts, nuts and washers shall be made of heat-treated steel; and shall conform to requirements of ASTM A325. Provide interference body bearing type where indicated.
 - 1.4 Headed welded studs shall conform to ASTM A307.
 - 1.5 Epoxy anchors shall be HIT HY150 as manufactured by Hilti, Inc., or approved equal.
 - 1.6 Anchors rods, anchor bolts, nuts and washers shall be stainless steel.
 2. Floor Supports:
 - 2.1 Fabricated steel channels, plates, etc. as detailed on drawings. Hot dip galvanize all steel members.
 3. Lintels Structural Steel:
 - 3.1 Hot dip galvanized ASTM A36 angles, shapes, and plates.
 4. Utility Tunnel Grating:
 - 4.1 Sump Pit Grate: 1 inch hot dip galvanized grating with cast in fabricated steel frame. Frame hot dip galvanized.
 5. Utility Tunnel Frames and Covers:
 - 5.1 Furnish manhole entrance covers and frames as shown. Frames shall be installed as shown on drawings.
 - 5.2 Cover: ¼ inch thick aluminum diamond plate, 300 psf live load rating, mill finish, stainless steel hold open arm with aluminum release handle hinges, stainless steel hardware, recessed lock box with keyed cylinder lock and underside release knob and bitumastic coating on surfaces contacting concrete.
 - 5.3 Cover and frames shall be Halliday, WIR, Bilco or approved equal.
 - 5.4 Frame: 1/4inch thick extruded aluminum with continuous concrete anchor, with 1-1/2 inch aluminum coupling for drain.
 - 5.5 Guarantee: 10-year material.
 6. Chilled Water Vent Manhole Casting:
 - 6.1 Manhole Frames and Covers: ASTM A48; Class 30B; gray cast iron; machine finished with flat bearing surfaces. ALL applications – heavy duty frames and covers: Neenah Foundry Catalog No. R-1792-HL.
 7. Signal and Power Vault Castings:
 - 7.1 Manhole Frames and Covers: ASTM A48; Class 30B; gray cast iron; machine finished with flat bearing surfaces.
 - 7.2 ALL applications - heavy duty frames and covers:



- 7.2.1 Power Manholes: Neenah Foundry Catalog No. R-1792-JL (Lettering “FACILITIES INITIALS - POWER”)
- 7.2.2 Signal Manholes: Neenah Foundry Catalog No. R-1792-HL (Lettering “FACILITIES INITIALS- Signal”)
- 7.3 Sump Pit Grate: ASTM A48; Class 30B, gray cast iron; light duty sized to fit sump pit, with frame.
- 8. Utility Tunnel – Steam Pit / Ladders:
 - 8.1 Construct ladders of 3/8 x 2-1/2 inch steel bar side rails with 3/4 inch diameter twisted bar steel rungs, headed into rails, approximately but not over 12 inch o.c. Ream holes in side rails, plug weld solid and grind smooth.
 - 8.2 Anchor ladder at bottom and top and at intermediate points not over 5 feet o.c. with brackets secured to wall with expansion or toggle bolts. Bolts shall be Red Head stainless steel bolts and washers. Ladders shall be hot dip galvanized.
 - 8.3 Provide ladders with steel “safety post”. Manufacturer: Okeeffe, or Halliday.
- 9. Air Vent Screens:
 - 9.1 Provide 1/4 inch stainless steel rodent screen mounted to inside face of masonry venting units. Fastened in vent opening with stainless steel clip angles and stainless steel bolts and expansion shields.
- 10. Air Vent Grating:
 - 10.1 Grate shall be swaged aluminum rectangular bar grating, 15/16 inch spacing, 1 1/2 inch depth, mill finish, angle frame mounting, as manufactured by Ohio Gratings, Inc. (800-321-9800) or equal. Color: Black
 - 10.2 Grate frame shall be cast into concrete vent opening. Fasten grating to cast in frame per manufacturer’s specification.
- 11. Louvers:
 - 11.1 Provide aluminum louver panels with stationary narrow profile blades. Louvers shall have a high free area and low air flow resistance as manufactured by Greenheck model ESU-130 or approved equal, phone (715) 359-6171.
 - 11.2 Louver shall have a standard channel frame with max width of 1.5 inch and frame and blade thickness shall be min. of 0.63 inch, color black, fastened in vent opening with stainless steel bolts and expansion shields.

02 50 97 Execution for Miscellaneous Metals for Utilities

- 1. Fabrication:
 - 1.1 Mechanical Contractor shall furnish anchor bolts, one piece shop fabricated and shop painted main structural steel (including embedment plates, vertical and horizontal steel) used for the support of steam, condensate, air and chilled water piping.



Mechanical Contractor shall turn over the anchor bolts, one piece shop fabricated embed plates, and main pipe support steel to the General Contractor to cast in place. Mechanical Contractor shall provide anchor steel, supports and guides that attach to the steel piping in the tunnel. Anchor bolts shall be cast in place stainless steel bolts. Turn over the one-piece shop fabricated steel with embedment plates and anchor bolts to the General Contractor to form into the concrete tunnel walls. See drawings for details.

- 1.2 Work shall be made and erected square, plumb, straight and true, smooth, accurately fitted joints and intersections. Work shall be adequately reinforced and anchored in place. Shearing and punching shall leave clean, true lines and surfaces. Weld permanent connections. Insofar as possible, work shall be fitted and shop assembled, ready for erection. All materials exposed to skin welds shall be ground smooth. Grind off sharp areas of exposed steel including sheared edges.
- 1.3 Do cutting, fitting, drilling, welding, tapping, etc., as may be required to complete this work and to join or accommodate work of other trades.
- 1.4 New steel pipe anchors, guides and supports shall be shop primed and intermediate coat applied in accordance with paint requirements of Section 09 90 00 Painting.
- 1.5 Welding shall be in accordance with code of American Welding Society. Before welding, clean surfaces of loose scale, rust, paint or other foreign matter and properly align. After welding, brush welds with wire brushes. Welds shall show uniform section, smoothness of weld metal, weather edges without overlaps and freedom from porosity and clinkers. Where necessary to achieve smooth connections, joints shall be dressed smooth. All welding shall be done by certified welders.

2. General:

- 2.1 Include fabrication and erection of all metal work complete, including all required shapes, clip angles, bolts, hangers, and accessories to complete metals work. Grind off sharp areas of exposed metals including sheared edges.
- 2.2 Except as amended herein, materials and workmanship shall be in accordance with each applicable and appropriate standard practice issued by National Association of Architectural Metal Manufacturers.
- 2.3 Fabricate structural steel connections, parts, and accessories in accordance with current edition of Specifications and Code of Standard Practice adopted by AISC.
- 2.4 Metals shall be made with structural properties to safely sustain and withstand stresses and strains to which normally subjected, true to detail, clean, straight, with sharply defined profiles, lines, and angles and unless otherwise noted, with smooth finished surfaces.
- 2.5 Contractor shall be responsible for location and levels of work of this Section, except such parts as may be delivered to others and set by them. In such cases, this Contractor shall assist others in properly locating those parts.
- 2.6 Coating of aluminum utility tunnel frames, clips, and louvers: Coat aluminum frames, clips and louvers that come into contact with concrete with bitumastic coating.



- 2.7 Coat bolts of bolted manhole covers with “Never-Seize”.

05 51 33 Metal Ladders

1. Permanently installed roof access ladders shall be provided on every level of roofing.
2. Alternating tread ladders are not to be used without approval by the UW-Madison Project Manager.
3. Ships ladders are to be used in lieu of alternating tread ladders.

05 52 00 Exterior Metal Railings

1. Reference UW-Madison standard handrail and guardrail details. See Division 5 Appendix.
2. Method of anchoring shall apply a surface mounting plate to the vertical concrete surface and then attach the railing support to the mounting plate. In doing so, the railing posts will not be susceptible to water pooling and rust which would cause the railing and adjacent concrete to fail. Surface mounting can also be easily updated or replaced should the building code require, or maintenance be needed.
3. If side mounting is not an option, the railings shall be surface mounted on the treads.
4. Wherever a plate touches the concrete, a plastic shim shall be placed so the metal will not touch the concrete directly and will not cause rust to develop from underneath.
5. If embedding the railing supports within the concrete is the only viable option, a pocket shall be detailed whereby the railing can be set in non-shrink grout. In using this method, a detail shall also be designed such that a bead of high quality, long life exterior caulk will be applied at the metal rail, designed to reject water.
6. Fully welded connections shall be used. If approved by UW-Madison Project Manager, a sleeve detail can be used with recessed locking anchors.
7. All new or refurbished exterior railings shall follow DFD guidelines including roof access ladders. These ladders shall be powder coated to match caps and copings but can also be finished in matte black.
8. New railings for existing buildings shall be designed to match existing railings unless there is a compelling reason for change and approved by UW-Madison Project Manager and Campus Planning & Landscape Architecture.
9. The preferred finish for new exterior handrails on campus is a non-corrosive metal finish (i.e. bronze or 316 stainless steel) or galvanized. If a painted finish is desired, they shall be fabricated from galvanized steel, primed, and powder coated matte black
10. All anchors, no matter from what material the railing is made, shall be stainless steel.
11. Railing supports at the top and bottom of stairs shall be designed and located to minimize the potential of snow removal damage and not create a protruding object hazard by extending into adjacent pedestrian circulation.



-
12. Design exterior railings to discourage use by skateboarders. This may be done through appropriate site design or railing details.



Division 06 Wood, Plastics, and Composites

06 05 00 Common Work Results for Wood, Plastics, and Composites

06 05 10 General Requirements for Wood, Plastics, and Composites

1. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
2. Wood, Plastic, and Composite Cladding for all UW Madison facilities shall comply with all of the provisions of the latest version of the Division of Facilities Development (DFD) *Minimum Requirements and Guidelines for the Exterior Building Envelope*, which is available from the DFD website.
3. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW Project Manager on UW-Madison managed projects.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material selection for every project.
7. National Green Building Standard (NGBS) Green-Certified Products are preferred.

06 40 00 Architectural Woodwork

06 41 00 Architectural Wood Casework

1. All cabinetry shall be lined with plastic laminate or melamine. Plastic laminate casework shall be neutral in color and not heavily patterned or textured. Products shall have a 10-year warranty, meet or exceed NEMA LD3 grade, and be GREENGUARD Certified.
2. Plastic laminate faced casework fabricator shall be a certified participant in AWI's Quality Certification Program.
3. Plastic laminate faced casework installer shall be a certified participant in AWI's Quality Certification Program.
4. Plastic laminate is not generally acceptable for the edges of open storage shelves and cubbies, but can be determined by the occupants of the building. PVC edging is the campus standard.



5. All window sill stools shall be stone, solid surface, or other material to resist moisture. Plastic laminate is not acceptable. Products shall have a 10 year warranty and be GREENGUARD Certified.

06 45 00 Exterior Site Wood Applications

1. Shall be FSC certified. Provide documentation.
2. Use of exotic hardwoods is prohibited.
3. Do not use plastics and composite plastics.
4. Natural wood finishes shall be used instead of paint, stain, or oils which require continual maintenance.
5. Source local wood where and whenever possible.
6. Explore options to reuse wood from project on-site tree removal.

06 60 00 Plastic Fabrications

06 61 00 Cast Polymer Fabrications

1. All countertops in kitchens, restrooms and other wet areas shall be made of solid surface material. Plastic laminate countertops are only acceptable in dry areas.
2. All restroom counter tops shall be well-supported to withstand the weight of someone sitting on them.
3. Avoid dark tones when using solid surface finishes. Medium and dark tones shall not scratch white.
4. All solid surface materials shall have a 10-year warranty and shall be GREENGUARD Certified.



Division 07 Thermal and Moisture Protection

07 05 00 Common Work Results for Thermal and Moisture Protection

07 05 10 General Requirements for Thermal and Moisture Protection

1. The roofing system design for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development & Management (DFD) *Minimum Design Guidelines for Roofing and Waterproofing Systems*, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.

07 05 12 Inspections and Testing

1. On projects replacing or adding a total 2,000 sq. feet of roofing/waterproofing or more, the AE shall hire a subconsultant for inspection and testing of the installation of the new roofing system (unless directed otherwise by the UW Project Manager). The subconsultant shall provide qualifications showing their knowledge of the installation of the proposed roofing installation.
2. AE shall coordinate the level and frequency of testing and inspections with the UW project manager.

07 10 00 Dampproofing and Waterproofing

07 10 90 Waterproofing and Insulation for Utilities

1. This is a DFD Standard Specification although it may not be available on their website. Use this specification section for all applicable utility work. It can be obtained from DFD or UW-Madison Facilities Planning & Management.

07 18 00 Traffic Coatings

1. All parking ramp driving or parking surfaces above grade and of poured-in-place type construction shall have a traffic membrane applied to the top surface to protect the structure underneath. The membrane shall be thicker at the corners and driving lanes than in the parking stalls.

07 33 63 Vegetated Roof (Green Roofs)

1. Consider green roofs during preplanning phase. Make decision as early as possible in the design process whether there will be a green roof or not. Ensure proper budget is provided and structural considerations of the building/structure are considered as early as possible.



2. Design

- a. Landscape Architect and Architect shall coordinate type of windows to be specified adjacent to green roof.
 - i. Ensure glare from windows is minimized and does not burn or kill nearby plants.
 - ii. Specify windows that are bird friendly and minimize bird fatalities. Green roofs will become wildlife habitat (birds and pollinators).
 1. Consider UV patterned glass, translucent glass, opaque glass, fritted glass patterns, and other best practices
 - iii. See Division 08 80 00
- b. Use transparent guardrails to maximized views from green roof.
 - i. Raised planters integrated into the building parapet is an alternate to guardrails along the building edge. (Example: School of Human Ecology).
- c. Intensive green roofs with a monolithic growing media volume have provided the best results for green roof and plant success on campus. Do not use tray systems.
- d. Install green roofs in locations that maximize their benefits and functionality:
 - i. Accessible by students and staff as outdoor gathering places, outdoor classrooms, and/or outdoor seating.
 - ii. Visible from either the ground level and/or from windows around and above the building to maximize mental wellbeing benefits and views to vegetated “natural” spaces.
 - iii. One or two large green roofs on a building is easier to maintain and more functional than numerous smaller green roof sections.
 1. Avoid narrow green roof “slivers” along building edges where the maintenance person has to “hug” the edge of the roof.
 - iv. Locate green roofs on building sides that affords the best views when possible and appropriate. Views of the lake, Wisconsin State Capitol, Lakeshore Nature Preserve, sweeping views of campus, etc.
 - v. Consider solar access patterns on green roof throughout the year.
- e. Consider how the green roof will be used in the winter, if at all. Are there opportunities for winter use?

3. Green Roof Access

- 1.1. Architect and Landscape Architect shall coordinate ADA compliant access to the green roof whether it is occupiable space or not. Maintenance staff always need to access the roof.
- 1.2. For green roofs not designated as occupiable space, maintenance staff access to the green roof shall be clear of obstructions, not have overhead hazards, provide flexibility for maintenance equipment to get through, and be easily accessible.
- 1.3. Consider elevator locations and how the public and maintenance staff access the building and the green roof. Minimize travel through secured areas to access green roof.



- 1.4. Maintenance access to green roof shall not be through a window(s).
- 1.5. Access through HVAC rooms has proven problematic. Think through room design and access points carefully. Ensure there is enough room for maintenance staff to move through with small equipment (ex: push mower). Consider storage place for maintenance equipment.

4. Green Roof Plants

- a. Plant selection, especially with sedum mixes, shall be diverse to account for the high microclimate variability on a green roof and ensure there are plant species that can fill gaps where others did not survive.
- b. Plant species selected shall support native pollinators, birds, and endangered species.
- c. Do not use plants from the Regulated and Non-Regulated Wisconsin DNR Invasive species lists.
- d. Do not use cultivars or varieties of plants found on the Regulated and Non-Regulated Wisconsin DNR Invasive Species List.
- e. Do not use aggressive natives that may take over the green roof or escape onto the ground plane.
- f. Priority is for Wisconsin native perennials and plants when appropriate.
- g. Sedum plugs take a long time to fill in, if at all. Instead use sedum sod rolls.
 - i. Sedum rolls with native perennial plugs worked well at the DeJope Hall. The sedums held the growing media, suppressed weeds, while the natives established.

5. Green Roof Amenities

- a. Site furnishings shall be surface anchored or heavy enough such that they will not be lifted off the roof by wind.
- b. A mix of material types can make a green roof more hospitable, more comfortable, and more desirable to occupy.
- c. Consider shade structures on roof (excluding umbrellas affixed to tables) to provide comfortable seating during the summer months.
- d. On occupiable green roofs, provide electrical outlets and Wi-Fi for outdoor events and for students/staff to plug in electrical devices.
- e. Ensure outlets for maintenance equipment are provided.

6. Maintenance

- a. Understand the ability and resources of the maintenance staff and client before the green roof design process begins. A well taken care of green roof will maximize its benefits, longevity, and resiliency.
- b. Green roofs with public access also benefit maintenance staff. Harness hook ups are not needed, and maintenance staff do not have to go up in pairs for safety protocol.



- c. Place hose bibs along building to ensure good coverage if temporary irrigation is needed for maintenance or the establishment of new plants.
- d. Multi-tier green roofs shall have built in ladders to facilitate maintenance staff safety accessing the different levels (Example: Gordon Dining & Event Center).
- e. Water does not move in 90-degree angles. Plan water movement to scuppers and down spouts accordingly.
- f. Ensure vents and other roof utilities have stone mulch areas surrounding them to keep plants away and ensure easier maintenance access.
- g. The Landscape Architect and Architect shall collaborate and design a way for maintenance staff to get plant debris and duff off the green roof.
 - i. Can a “snow chute” type system, or the ability to attach a temporary chute system to the building, be included?
 - ii. Is there a way for a lift or other equipment to pull up alongside the green roof on the ground level to facilitate maintenance?
 - iii. How do maintenance staff move through the building? How do they carry the debris and equipment in and out?
 - iv. For perennial heavy green roofs on campus, plant debris is typically removed every other year because of the time and labor needed.

07 50 00 Membrane Roofing

07 50 00 General Requirements for Membrane Roofing

- 1. The top of roof drain shall be at the level of the roof membrane and not the level of the ballast so water can enter the drain.

07 53 00 Elastomeric Membrane Roofing

- 1. Pavers shall be utilized and installed per DFD Master Specification.

07 55 63 Vegetated Protected Membrane Roofing

- 1. See 07 33 63 Vegetated Roof

07 70 00 Roof Specialties and Accessories

07 72 00 Roof Accessories

- 1. Pavers shall be utilized to access all roof top equipment.
- 2. All roof top equipment shall be set on a curb, pad, or stand; sleepers are not permitted.



Division 08 Openings

08 05 00 Common Work Results for Openings

08 05 10 General Requirements for Openings

1. Fenestration for all UW Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) *Design Requirements and Guidelines for Fenestration in Building Exterior Enclosures*, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The *Guidelines for Planning and Design of UW-Madison Facilities* shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.

08 10 00 Doors and Frames

08 11 00 Metal Doors and Frames

1. Contractors shall remove all rating labels from doors/frames that are not installed in rated wall assemblies. If the wall is not rated, the door/frame shall appear as non-rated.
2. When applicable, exterior, and interior pairs of doors shall have a removable mullion.
3. All metal frames and doors shall be reinforced for door closers.
4. All interior metal frames shall have face trim 2" in width except where matching existing.
5. All metal frames shall be 16 GA in thickness. Exception: 3-sided frames > 48" to be 14 GA minimum. Exterior metal frames shall be 14 GA galvanized.

08 14 00 Wood Doors

1. Wood doors shall be of standard manufactured size. Either 3'-0" x 6'-8" or 3'-0" x 7'-0". Doors 3'-0" x 6'-8" are recommended only when matching existing for a remodel or addition. Exceptions may occur based on design considerations.
2. Wood doors shall be of a common species, with matched cut, throughout the project.
3. All wood doors shall have 3/4" solid, species-matched wood edges the full length of the door.



4. Wood doors shall not be installed within the vicinity of loading docks where heavy cart action or pallet jack usage occurs.
5. When installing pairs of wood doors, all wood door corners using corner mount flush bolt(s) shall be equipped with sleeve reinforcement (flush bolt end caps).

08 30 00 Specialty Doors and Frames

08 31 00 Access Doors and Panels

1. The campus standard for access control is the Lenel Onguard.
2. Refer to *Division 28 11 05 Electronic Access Control for New Construction* and *Division 08 71 13 Automatic Door Openers* for the typical location of proximity card readers for added convenience and security.
3. Prior to 35% review documents, there shall be a coordination meeting with the A/E, and UW-Madison Police Department (UWPD) and EH&S. The contractor shall design and the UWPD provide the primary components for the access control system.
4. The contractor shall pull all the cables/wires to the IDF.
5. The UWPD purchase all Access Control components including enclosures and panels at the cost of the project. The contractor is responsible for installing the closures in the electric closets and the UWPD or designee will install panels and terminate the system.
6. The contractor shall purchase and install all the card readers and/or rough-ins for future card readers.

08 32 00 Sliding Glass Doors

Sliding glass doors shall be supported on top and have a bottom guide(s) to help secure the door in the locked position.

08 33 00 Coiling Doors

An airlock should be provided between the loading dock (where an overhead coiling door is used) and the main building.

08 36 00 Sectional Doors

An airlock should be provided between the loading dock (where an overhead sectional door is used) and the main building.

08 70 00 Hardware

08 71 00 Door Hardware

Prior to the start of hardware installation, the contractor shall schedule and conduct pre-installation meeting with the hardware supplier, and the lock, exit device, and door closer manufacturers' representative(s). The installer and related trades shall coordinate materials and techniques, and sequence complex hardware items and systems installation. Proper and correct installation and adjustment of hardware shall be reviewed, and criteria for punch list review shall be established. A coordination meeting shall occur at least one week prior to the commencement of hardware installation. Written documentation of the date and attendees/participants shall be provided to the architect and the UW-Madison Project Manager.



08 71 01 Locks

1. All mortise locksets shall be able to be re-handed in the field without removing the cover.
2. All locksets shall be provided with a lever handle and mounted at the appropriate height per ADA standards.
3. Escutcheon trim is strongly preferred for flexibility of future hardware changes. Sectional trim is acceptable when approved by the UW-Madison Project Manager.
4. Standard finishes for the campus include US26D (626) and US10 (612). Stainless steel finish US32D (630) shall be specified for high moisture or caustic areas.
5. All lock cylinders and keying shall be provided by the UW-Madison Lockshop along with the cost of re-keying. The installation of the lock cylinders shall be the responsibility of the general contractor.
6. Latch guards or astragals on all appropriate exterior doors shall be provided. This creates additional safety against doors being pried open.
7. Specifications state that the General Contractor shall be responsible for signing out keys and shall be financially responsible if keys are not returned.
8. Electric strikes are not allowed.
9. Where deadbolts must be used, specify a mortise version with appropriate pull(s).

08 71 02 Hinges

1. Continuous hinges shall be used on exterior doors.
2. Non-removable hinge pins shall be used on lockable out-swinging doors.
3. Aluminum doors shall have continuous hinges.
4. Heavy duty ball bearing or continuous hinges shall be used on openings with high traffic.
5. Standard ball bearing hinges shall be used on interior and moderately used openings.

08 71 04 Fire Door Hold Open Devices

Hold-open devices shall be 12 or 24 volt, hard wired.

08 71 13 Automatic Door Operators

1. Operators shall be electro-mechanical hard wired (not wireless). For certain applications where hard wired is not feasible (for example, glass doors), then wireless shall be acceptable. Each wireless push plate shall have separate input through a radio receiver. The campus standards are Stanley Magic Force (exterior), Stanley Magic Access (interior), and LCN Senior Swing.



2. Push plates shall be located per standard accessibility details in the Division 8 Appendix. Push plates shall not be placed on a mullion without approval from the UW-Madison Project Manager. Bollard mounted push plates need to be approved by UW-Madison Facilities Planning and Management. The operator shall be fitted with a lockout device that allows exterior push plate/radio controls to be turned off, leaving the interior switch mechanism operable. The operator shall be compatible with electronic security devices.
3. Automatic Door Opener Locations: For all new buildings, the accessible main entrance on each grade level shall have at least one door with an automatic door opener. Actuators shall be 48" from any perpendicular obstruction or door frame to allow sufficient clear floor space to open the door and installed per ADA standards.
4. A sign that identifies automatic doors shall include the international accessibility symbol. Standard adhesive backed signs shall be installed on the power assist door surface at 53 inches on center A.F.F., 5 inches from door hinge side. (Note: this placement might be door specific and should be verified by UW-Madison FP&M). See accessibility details in Division 08 Appendix.
5. For existing buildings, the push plate for the door opener shall be installed in accordance with ADA guidelines.
6. Push plates, proximity card readers, and bollard locations: If a proximity card reader is needed, along with a push plate, the reader shall be 32 inches on center A.F.F., alternate height with permission from UW-Madison project manager. The push plate shall be in close proximity and follow the reader in a sequence to allow the user to swipe their card before approaching the push plate; for accessibility. If the site has a bollard with both a push button and a proximity card reader, the mounting height shall be 32 inches on center A.F.F. less Collar (LC), alternate height with permission from UW-Madison project manager.

08 71 20 Institutional Door Hardware Standards

1. All lock cylinders and keying shall be provided by the UW-Madison locksmith shop along with the cost of keying.
2. Interchangeable Construction Cores: For all key-locked doors in new construction, the contractor shall provide the lock cylinder with a full-size interchangeable construction core. These cores are temporary for the construction period with the contractor in control of keying. These temporary construction cores are for securing the facility, elevator equipment rooms, IT rooms, high voltage rooms, and other spaces as required. At the end of construction, the temporary cores are replaced with the permanent cores. The core replacement shall be the responsibility of the contractor. Temporary construction cylinders/cores shall remain supplier's property. Supplier shall furnish construction keys and construction control keys as needed to UW-Madison Lock Shop. All interchangeable cores shall be furnished as follows:
 - 2.1. Zero bitted key blanks less collar.
 - 2.2. The cores shall be keyed by the UW-Madison Lock Shop
 - 2.3. All permanent cores to be purchased by UW-Madison.
 - 2.4. All permanent cores shall be installed by the contractor.
 - 2.5. Construction keying: Furnish temporary keyed alike cylinders/cores.
3. Exit Devices: All Exit Devices shall be Sargent 80 series or Von Duprin 99 series.
4. Removable Mullion: Shall match exit device manufacturer. Keyed mullions are preferred.



5. Door Closers: All closers shall be LCN 4040XP or Sargent 281 with plastic covers.
6. Power Operators: All power operators shall be Stanley Magic Force (exterior), Stanley Magic Access (interior), or LCN Senior Swing.
7. Hardware Installation: A pre-installation meeting which includes the Manufacturer's representatives, DFD construction rep and the UW-Madison Lock Shop shall be coordinated by the contractor.
8. All electric power transfers shall be EPT, not thru-wire hinges. EPT must have a minimum of ten 24AWG wires with max. rating of 24V dc, 1 amp.
9. At multi-stall restrooms, closers shall have hold open ability. Single use toilet rooms shall have occupancy indicators on privacy locks.



Door Hardware – Approved Manufacturers (in alphabetical order):

| Description | Manufacturer | Model/Series |
|--|-----------------------|---|
| Hanging Device: | | |
| Butt Hinges | Ives | 5BB1, 5BB1HW (stainless steel at wet/corrosive areas) 3CB1, 3SP1 |
| | McKinney | TA2714, T4A3786 (TA2314, T4A3386 at wet/corrosive) TA314, 1502 |
| Continuous Hinges | Ives | 112HD, 224HD EPT option (power transfer prep) |
| | Pemko | FM-SLF-HD1, FMHD1 PT option (power transfer prep) |
| | Markar | FM300, FS-302, HG305 |
| Pin & Barrel | Ives | 700, 702, 705 |
| Securing Devices: | | |
| Cylinders by GC | | Furnished and keyed by UW-Madison Locksmith, installed |
| Mortise Lock * | Sargent | 8200 Series |
| | Schlage | L9000 Series *Escutcheon trim preferred, owner to determine lever style/design. |
| Cylindrical Lock | Sargent | 10 Line |
| | Schlage | ND Series |
| Exit Device | Sargent | 80 Series 19- prefix = less Lexan touch pad 59- prefix = delayed egress (use with caution) 56- prefix = electric latch retraction 53- prefix = latchbolt monitoring 55- prefix = request to exit in push bar |
| | Von Duprin | 99 Series -CX = delayed egress (use with caution) -QEL = electric latch retraction -LX = latchbolt monitoring -RX = request to exit in push bar |
| Removable Mullion | Sargent or Von Duprin | Match manufacturer of exit devices |
| Electric Strike * *use with caution | HES | 1500/1600 (locksets) 9400/9500/9600 (rim exits) |
| | Von Duprin | 6210/6211 (locksets) 6300/6400 (rim exits) |
| Flush Bolts | Ives | FB358/458 (manual) FB31P (automatic) |



| | | |
|---|------------------------------------|--|
| | | FB41P (constant latching) DP1 (dustproof strike) |
| | Rockwood | 555/557 (manual) 2842 (automatic) 2942 (constant latching) 570 (dustproof strike) |
| Magnetic Locks (use with extreme caution) | Schlage or Securitron | Approved only as required |
| Closing Devices: | | |
| Mechanical Door Closers | LCN | 4040XP Series, EDA arms, CUSH/SCUSH for push side |
| | Sargent | 281 Series, PD arms, PS/CPS for push side |
| Low Energy Operator | LCN | Senior Swing 9500 Series |
| | Stanley | Magic Force – Exterior Magic Access – Interior |
| Stops and Holders: | | |
| Overhead Stops and Holders | Glynn-Johnson, Hager, or Rixson | *Stop arm closers preferred. Overhead stops to be used only where necessary. |
| Wall and Floor Stops | Hager, Ives, or Rockwood | |
| Other Hardware: | | |
| Coordinator | Ives | COR x FL |
| | Rockwood | 2600 Series |
| Push/Pull Plate | Ives | 8200, 8303 |
| | Rockwood | 70C, 111 x 70B |
| Kick/Armor Plate | Ives | 8400 |
| | Rockwood | K1050 |
| Power Transfer Device | Securitron | EL-CEPT |
| | Von Duprin | EPT-10 |
| Power Supply* *coordinate with GC & Electrical Contractor | Securitron | BPS Series |
| | Von Duprin | 914 with appropriate card |
| Magnetic Door Holder | LCN | SEM Series |
| | Rixson | 990 Series |
| Threshold, Weather- Strip, Sweeps, etc. | National Guard, Pemko, or Reese | *No vinyl seals allowed. |
| Access Control System | Lenel | |



08 71 30 Door Hardware Installation

To ensure proper installation and adjustment of hardware items, the architect shall include the following verbiage within the Finish Hardware Section of the project specifications:

Prior to the start of hardware installation, the contractor shall schedule and conduct a pre-installation meeting with the hardware supplier, lock, exit device, and door closer manufacturers' representative(s), installer, owner's representative, and related trades, to coordinate materials and techniques and to sequence complex hardware items and system installation. Proper and correct installation and adjustment of hardware shall be reviewed and the criteria for the punch list review shall be established. All parties shall convene at least one week prior to commencement of hardware installation. Written documentation of the date and attendees/participants shall be provided to the architect and owner for record.

08 71 40 Parking Structure Locking Requirements

1. All doors and locks shall meet the criteria set up by UW-Madison Transportation Services before final completion of the ramp. UW-Madison Transportation Services can supply contractor with a spare key for them to make appropriate locks.
2. All stairwell doors shall have a blank cylinder so they cannot be locked.
3. All snow chutes shall have a master lock padlock with key #2027.
4. Padlocks shall not be used to secure gate.
5. All restrooms and storerooms shall be keyed with a Schlage A7S key.
6. All electrical rooms shall be keyed with a Schlage Primus AAA57 key.
7. Gate equipment shall have an APD 1 key.

08 80 00 Glazing

1. Clear, low-e, insulated window units shall be preferred by the University. The context of specific project shall be taken into consideration with the final selection of glass types.
2. Mock-ups for all exterior building materials, including all window, glazing, and spandrel types shall be required.
3. If glazing or door lights are provided for secured areas (along public hallways) laminated glass shall be used. Pattern glass can be used when necessary for privacy.
4. Door lights shall be acceptable in public and shared spaces such as conference rooms, lounges, etc.
5. Where operable windows are allowed, hoppers, awning or casement windows shall be preferred. A connection between these windows and the air handling system shall be provided for greater energy efficiency.
6. Windows adjacent to green roofs shall have low glare glass to prevent intense sun light from reflecting off the windows and killing the green roof plant material.
7. Any glazing needing replacement, shall be replaced in kind and associated details shall match existing. Exceptions may occur based on design considerations.



Division 09 Finishes

09 05 00 Common Work Results for Finishes

09 05 10 General Requirements for Finishes

1. Project Specifications shall be based on appropriate sections of the latest edition of the DFD Master Specifications when applicable.
2. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW Project Manager.
3. The A/E shall discuss and resolve all conflicts between the *Guidelines for Planning and Design of UW-Madison Facilities* and DFD guidelines and specifications with the UW-Madison Project Manager.
4. When selecting finish materials, note that Cradle to Cradle certified products, and Declared or Red List Free products are preferred. GREENGUARD certified products shall be used when available.
5. UW-Madison generally does not require attic stock, but Facility Managers with adequate space may prefer attic stock included in the project. Finish materials, when requested and supplied, shall generally not exceed 2% or as deemed appropriate by the UW Project Manager. A/E shall consult with the UW-Madison Project Manager to confirm what attic stock is to be provided prior to the release of bid documents.

09 05 20 Finish Standards

1. UW Facilities Planning & Management has developed Campus Interior Finish Standards & Guidelines for use on Physical Plant work orders and maintenance work. The current version of the Physical Plant Finish Standards is available here: <https://d1cjb8q1w2lzm7.cloudfront.net/wp-content/uploads/sites/22/2021/09/Campus-Interior-Finish-Standards.pdf>. This document contains information on often used finishes on campus, which can provide a starting point when considering materials for a project. The current Campus Interior Finish Standards and Guidelines can be found in Appendix – Division 09 of these Guidelines.
2. New work in existing buildings shall maintain the established color palettes.
3. Refer to Appendix – Division 09 of these Guidelines for the campus standard for finish solutions over existing glazed block walls.

09 30 00 Tiling

1. Tile products shall meet the certification standards in ANSI A138.1 - Green Squared - American National Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials.
2. Tile products shall comply with the provisions of ANSI A137.1 - Standard Specifications for Ceramic Tile.
3. Tile installation shall comply with the provisions of ANSI A108/118/136 - Standard Specifications for the Installation of Ceramic Tile.



4. Light colored tiles with medium to dark grout are preferred when deemed appropriate by the designer.

09 30 30 Floor Tiles

1. Ceramic tile sizes shall be as large as is practical for the specific installation, yielding a minimum of grout joints. At a minimum, tile shall meet Class 4 ASTM C1027. Review tile sizes with the UW Project Manager.
2. At a minimum, tile shall be provided on toilet room floors.
3. Use epoxy grout on washroom floors.
4. Seal all grout on washroom floors and at least 4" up wall or wall base.

09 30 60 Wall Tiles

1. Ceramic tile sizes shall be as large as is practical for the specific installation, yielding a minimum of grout joints. At a minimum, tile shall meet Class 4 ASTM C1027. Review tile sizes with the UW Project Manager.
2. At a minimum, tile shall be provided as a wainscot on fixture walls and behind hand dryers. Full height tile shall be the campus preferred wall finish for these spaces.
3. Whenever possible, use full tile shapes without cutting.
4. Wall tile edges shall have appropriate manufacturer's standard trim tile or metal termination.

09 50 00 Ceilings

The design standard in bathrooms and other areas with moisture is either a hard ceiling or the Genesis tiles mentioned below.

09 51 00 Acoustical Ceilings

1. The campus design standard ceiling tile is USG Radar Climaplus, 2'x2', white, square edge, larger tiles are discouraged. Deviations should be discussed with the UW-Madison Project Manager.
2. The campus design standard ceiling tile for wet areas is Genesis, Standard Series, Smooth Pro, 2'x2', white.
3. The campus design standard ceiling grid is Chicago Metallic 200 Series, white.
4. The grid color for acoustical ceiling systems shall be white or a standard neutral color to match existing conditions, and not a special order.
5. Ceiling grid to be at least 15/16" width.

09 60 00 Flooring

1. Flooring VOC's: must meet the limits set by California Department of Public Health (CDPH) Standard Method 1.1-2010 (or later).
2. Products shall be FloorScore certified when applicable.



3. Hard surface flooring shall be slip resistant in accordance with ANSI A326.3.
4. Minimal maintenance required (no-wax).
5. Flooring products shall contain no Ortho-Phthalates.
6. Follow the requirements in DFDM's Floor Drains Guide, which is available from the DFDM website.
7. Hard surface floors requiring a sealer or wax shall be sealed/waxed for the first time by the installing contractor, using the same sealants/waxes UW-Madison custodians will use. Contractors shall contact UW Project Manager for specifications of current finishes as needed. All sealer or wax materials and methods shall conform with flooring manufacturer's recommendations.

09 64 00 Wood Flooring

1. Wood flooring shall not be specified near water, in high traffic areas, in building entrances or in stairs unless it is required to match existing conditions.
2. Products shall be produced from wood obtained from FSC (Forest Stewardship Council) certified forests by a manufacturer that is certified for chain of custody by an FSC accredited certification body.
3. Hardwood flooring shall comply with applicable NWFA/NOFMA standards and grading rules for species, grade, and cut. Provide flooring that carries the NWFA/NOFMA grade stamp on each bundle or piece.
4. Maple flooring shall comply with applicable MFMA standards and grading rules for species, grade, and cut. Provide flooring that carries the MFMA mark on each bundle or piece.
5. Use non-toxic adhesives and finishes.
6. Pre-finished products are preferred.
7. The design standard for wood flooring is solid wood flooring. Engineered hardwood can be used when approved by the UW-Madison Project Manager.

09 65 00 Resilient Flooring

1. Rubber base is required; vinyl base is unacceptable.
2. A minimum 4" wall base is preferred for maintenance purposes.
3. Rubber stair treads are required; vinyl stair treads are unacceptable.
4. LVT is to have a minimum 20 mil or .5 mm wear layer.
5. Avoid VCT as it is more costly and time-consuming to maintain according to comparable product Life-Cycle Assessments.
6. Products shall have a 20-year Commercial Warranty.
7. Environmental Product Declarations and Health Product Declarations shall be provided.



8. Products shall meet NSF 332 Resilient Flooring Certification.
9. Rubber floor tile shall meet the provisions of ASTM F1344-15 - Standard Specification for Rubber Floor Tile.
10. LVT tiles shall comply with the provisions of ASTM F3261-17 - Standard Specification for Resilient Flooring in Modular Format with Rigid Polymeric Core.
11. Linoleum Floor Tile shall comply with the provisions of ASTM F2195-18 Standard Specification for Linoleum Floor Tile.
12. Linoleum Sheet Flooring shall comply with the provisions of ASTM F2034-18 Standard Specification for Sheet Linoleum Floor Covering.

09 66 00 Terrazzo Flooring

Terrazzo is the campus preferred flooring material for all lobbies and primary circulation areas at the entrance level.

09 66 13 Portland Cement Terrazzo Flooring

1. Products shall comply with the National Terrazzo & Mosaic Association's (NFMA) "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.
2. Acceptable Suppliers: A firm experienced in manufacturing products in accordance with NTMA standards and with a record of successful performance, as well as sufficient production capacity to produce required materials.
3. Acceptable Terrazzo Contractor: A Contractor Member of NTMA whose work has resulted in construction with a record of successful performance. Installer shall have completed terrazzo installations within the past 5 years of scale and complexity similar to the proposed installation.
4. Source Limitations for Aggregates: Terrazzo Contractor shall obtain each color, grade, type, and variety of granular materials from sources capable of providing materials of consistent quality in appearance and physical properties.
5. All terrazzo flooring shall be specified to have 2 coats of a water-based and water soluble polyurethane coating applied after it is completely installed to protect it from contractor wear and tear. This finish shall be able to be chemically removed (stripped) once the building is turned over to the University and final finish coats applied by UW-Madison Custodial. The protective coating shall not require mechanical means to remove.
6. If applicable, a container of the matching concrete mix shall be provided for repair purposes to the building manager when the project is complete. Confirm project requirements with UW Project Manager.

09 66 16 Terrazzo Floor Tile

Terrazzo floor tile shall not be used on campus unless approved by the UW Project Manager.



09 66 23 Resinous Matrix Terrazzo Flooring

1. Products shall comply with the National Terrazzo & Mosaic Association's (NFMA) "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.
2. Acceptable Resin Manufacturer: An Associate Member of the NTMA, experienced in manufacturing epoxy resin in accordance with NTMA standards and with a record of successful performance as well as sufficient production capacity to produce required materials.
3. Acceptable Terrazzo Contractor: A Contractor Member of NTMA whose work has resulted in construction with a record of successful performance. Installer shall have completed terrazzo installations within the past 5 years of scale and complexity similar to the proposed installation.
4. Source Limitations for Aggregates: Terrazzo Contractor shall obtain each color, grade, type, and variety of granular materials from sources with resources to provide materials of consistent quality in appearance and physical properties.
5. All terrazzo flooring shall be specified to have 2 coats of a water-based and water soluble polyurethane coating applied after it is completely installed to protect it from contractor wear and tear. This finish shall be able to be chemically removed (stripped) once the building is turned over to the University and final finish coats applied by UW-Madison Custodial. The protective coating shall not require mechanical means to remove.
6. If applicable, a container of the matching concrete mix shall be provided for repair purposes to the building manager when the project is complete. Confirm project requirements with UW Project Manager.

09 68 00 Carpeting

1. Texture Appearance Retention Rating (TARR) shall be Heavy Traffic 3.0 minimum per ASTM D 3770.
2. Carpet tiles are preferred to broadloom.
3. Flame and Smoke Properties:
 - 3.1. DOC-FF-1-70 Pill Test: Passes.
 - 3.2. Floor Radiant Panel: Meets NFPA Class 1 when tested per ASTM-E-648 glue down.
 - 3.3. NBS Smoke Chamber NFPA 258: Less than 450 Flaming Mode.
4. Color Fastness:
 - 4.1. Light fastness - AATCC 16.3 - Dark color: Gray scale rating of 4 or better after 160 standard fading hours as compared to AATCC Gray Scale for evaluation change in color.
 - 4.2. Ozone and Gas - AATCC 129 - Rating 3 or better per color AATCC transference scale.
5. Stain Resistance:
 - 5.1. Stain resistant properties shall be permanent and not removable by commercial cleanings



or abrasive wear. Shall Pass AATCC 175, scoring no less than 8.0 (10.0 is the best) on the AATCC Red 40 Stain Scale after performing AATCC 171, minimum of 4 hot water extractions process. Test sample shall first be exposed to 100 revolutions on the Taber Abrader (1,000-gram weight per H-18 wheel) and then abraded area shall be stain tested using AATCC test method 175. Stain resistant properties shall be inherent. Topical stain resistant treatments will not be acceptable. No applied anti-microbial finishes or flame retardants.

6. Environmental Attributes:

- 6.1. Environmental claims by the manufacturer shall comply with FTC guidelines.
- 6.2. Recycled Content: Carpet shall contain a minimum of 15% post-consumer recycled content.
- 6.3. End of Life Reclamation: Carpet must have an existing methodology actively in place to achieve landfill diversion. Cradle-to-Cradle certified is preferred over Waste-to-Energy life cycle.
- 6.4. Environmentally Preferred Product – Carpet shall have third party certification (such as Scientific Certification Systems) in accordance with Executive Order 13101 as an Environmentally Preferred Product (EPP).
- 6.5. Low Emitting Materials: Carpet and all installation components including adhesives, sealers, seam welds and seam sealers shall meet the *Low Emitting Materials* standards as outlined in current U.S. Green Building Council LEED criteria.
- 6.6. Adhesives: Waterproof, non-flammable carpet adhesive recommended and approved by carpet manufacturer in writing for compatibility with carpet backing. All floor sealers, seam sealers, and adhesives shall contain no calculated solvents per OSHA Regulation 29 CFRE 1910.1200, have no calculated VOC's, be non-flammable, and meet the criteria of the CRI Green Label Plus Certification Program. MSDS and samples required on product used. Adhesives shall meet VOC emissions standards per South Coast Air Quality Management District Rule #1168. Adhesiveless or "TacTile" installations are not acceptable in areas of high traffic or areas with rolling traffic.
- 6.7. Indoor Air Quality: Manufacturer shall demonstrate that carpet is certified under the CRI Green Label Plus Program.
- 6.8. Meets or exceeds NSF-140 Sustainability Assessment for Carpet

09 68 13 Performance Specifications for Tile Carpet

1. Product: Must be approved by the UW Project Manager prior to specification.
 - 1.1. Construction: Tufted.
 - 1.2. Surface Texture: Textured loop pile or tip sheared. Tip shear may be used in border application use.
 - 1.3. Face Yarn: Nylon with a modification ratio of 1.6 or less.
 - 1.4. Dye System: 100% Solution Dye, unless using a small % of space dyed yarn for esthetics or 100% Yarn Dye that meets stain resistant properties listed above.



-
- 1.5. Primary Backing: Reinforced synthetic.
 - 1.6. Secondary Backing: Fiberglass reinforced thermoplastic composite or open cell poly cushion.
 - 1.7. Bonding Agent: Premium Vinyl.
 - 1.8. Static Control: 3.0 KV when tested under Standard Shuffle test (70 degrees, 20% RH).
 2. Warranties:
 - 2.1. Manufacturer's Lifetime Warranty minimum 15 years, non-prorated, against product failure covering all costs including freight, labor, and material for the following:
 - 2.1.1. Edge Ravel/Tuft Bind
 - 2.1.2. Back lamination
 - 2.1.3. Static protection as stated above
 - 2.1.4. Wear - No more than 10% Face Yarn Loss
 - 2.1.5. Cup, Dome, Dish
 - 2.1.6. Dimensional stability
 - 2.1.7. Adhesive bond to the floor.

09 68 16 Performance Specifications for Broadloom Carpeting

1. Product: Must be approved by the UW Project Manager prior to specification.
 - 1.1. Construction: Tufted.
 - 1.2. Surface Texture: Multilevel or level loop pile with maximum height variation of 1/32".
 - 1.3. Face Yarn: Nylon with a modification ratio of 1.6 or less.
 - 1.4. Dye System: 100% solution dye unless using a small % of space dyed yarn for esthetics or 100% yarn Dye that meets stain resistant properties listed below.
 - 1.5. Primary Backing: Woven polypropylene. Non-woven synthetic.
 - 1.6. Secondary Backing: Woven polypropylene. Non-woven synthetic.
 - 1.7. Width: 12 feet. 6 foot roll goods.
 - 1.8. Tuft Bind: 20 pound Avg. tuft bind wet or dry per ASTM D-1335-67.
 - 1.9. Static Control: 3.0 KV when tested under Standard Shuffle test (70 degrees, 20% RH).
2. Warranties:
 - 2.1. Manufacturer's Lifetime Warranty minimum 15 years, non-prorated, against product failure covering all costs including freight, labor, and material for the following:



- 2.1.1. Edge Ravel – wet or dry.
- 2.1.2. Back delamination - wet or dry.
- 2.1.3. Loss of 20 pound average tuft bind - wet or dry.
- 2.1.4. Static protection as stated above.
- 2.1.5. Wear - No more than 10% Face Yarn Loss.
- 2.1.6. Adhesive failure.
- 3. Color and pattern shall be selected for durability and low maintenance. Color and pattern should be timeless and coordinate with the Campus Standard palette.
- 4. No sculptured carpet shall be permitted.

09 70 00 Wall Finishes

09 72 00 Wall Covering

- 1. The use of wall coverings in high traffic areas shall be discouraged. Use as an accent in non-high traffic areas should be reviewed with the UW-Madison Project Manager.
- 2. When wallcoverings are used, they shall be GREENGUARD Certified.

09 90 00 Painting and Coating

- 1. When applicable, all painting and coating products shall be GREENGUARD Certified.
- 2. The preferred interior wall paint products are Sherwin Williams ProMar 200 Zero VOC Interior Latex or Hallman Lindsay Wonder Kote 270.
- 3. A satin or higher gloss finish is preferred for interior walls.
- 4. Steel doors and frames and steel windows should have a semi-gloss or gloss sheen for durability.
- 5. When available, zero VOC products shall be used. When zero VOC products are unavailable, products must meet the limits set by California Department of Public Health (CDPH) Standard Method 1.1-2010 (or later).
- 6. Campus standard white: Sherwin Williams SW 6147 “Panda White” shall be the base white for all projects unless matching existing finishes requires otherwise.

09 91 16 Painting for Utilities

- 1. Use DFD Master Specification Section 09 91 16 for specifying painting for utilities.

09 93 00 Staining and Transparent Finishing

- 1. New woodwork (such as trim, doors, casework, etc.) shall preferably be minimally stained and finished with polyurethane when recommended by the design team.



2. At existing buildings, finishes shall match existing finishes or similar elements. Woodwork shall be finished with polyurethane (not lacquer). Minimal staining is acceptable when applicable.

09 96 00 High-Performance Coatings

09 96 56 Epoxy Coatings

1. Epoxy paints shall be used in areas where durability and ease of cleaning are issues, such as toilet rooms, food service areas, etc.
2. Epoxy paints are preferred in stairwells.



Division 10 Specialties

10 05 00 Common Work Results for Specialties

10 05 10 General Requirements for Specialties

1. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.

10 10 00 Information Specialties

10 11 00 Visual Display Surfaces

1. The type of visual display boards used throughout a specific project shall be determined during the design phase and reviewed with the UW-Madison Project Manager. Interior chalkboards are not acceptable unless specifically requested by the users.
2. Document cameras should be used whenever possible in large teaching spaces to increase the legibility of written images at a distance and to reduce the need for both writing and projection surfaces. In this situation, the qualities of the projection surface supersede those of the writing surface.
3. Electronic display boards and directory kiosks shall consider accessibility and meet all ADAAG requirements. Contact the UW-Madison FP&M Facilities Access Specialist for Electronic Information Display Guidelines and Specifications.

10 14 00 Signage

10 14 16 Plaques

1. Exterior or interior plaques and engraved surfaces identifying the architect, engineer, landscape architect, or other members of the design team are not permitted on or in UW-Madison buildings. The only plaque, of a similar nature, allowed in UW-Madison buildings is the state plaque denoting the name of the governor and others, coordinated through DFD and specified by using the DFD Master Specifications Section 10 14 16.
2. A/E consultants should coordinate with user groups during the design phase on any interior donor recognition plaques or donor walls, if required.
3. For LEED certified projects, the A/E team is expected to identify various appropriate locations for the plaque, review suggested locations with campus, and ensure proper wall blocking is available.
4. All exterior plaques or engraved objects shall have their design and location approved by UW-Madison Campus Planning and Landscape Architecture.

10 14 17 Exterior Building Identification

1. The building name and address to be used in the construction documents shall be approved by UW-Madison Project Manager prior to its inclusion. If a new building name is needed or modification to an existing facility name is desired for any reason, it



will require UW Board of Regents approval. The UW-Madison approved full name and address shall be used for building identification.

2. All exterior signage and displays shall follow campus design standards, policies, and guidelines. Coordinate all exterior signage design, details, sign copy, and locations with the Office of Campus Planning & Landscape Architecture. The cost of this and all other signage shall be borne by the project.
 - 2.1. Signs will follow the UW-Madison Exterior Graphics, Wayfinding, and Signage Policy and the most current version of the companion standards document.
 - 2.1 Each building shall have one campus standard building identification sign. The campus standard signs are especially important near campus boundaries and edges. Building mounted lettering shall only function as secondary signage.
 - 2.2 The campus standard exterior building signs and direction signs are a sole source item and should be purchased through vendor(s) on UW-Madison's exterior sign contract. Poblocki Sign, Badger State Industries, and Michael's Signs are three vendors that have historically been on contract and have all the necessary details, specifications, and experience. DFD requires a Class 1 notice to be included in the specifications.
 - 2.3 Coordinate purchase of campus standard signs with Office of Campus Planning and Landscape Architecture.
 - 2.4 Signs shall be located to avoid vandalism.
 - 2.5 Signs shall be placed in planting beds to protect against lawn mower and snow removal damage. If the sign is in a lawn area, a shredded bark mulch bed shall be placed around the sign. Bark mulch shall extend at least 2 feet from all sides of the sign and have 2-foot radii corners.
 - 2.6 Signs shall be placed at least 3 feet from any sidewalk or surface that receives snow removal maintenance.
3. Building-mounted lettering, if used, shall be approved by the UW-Madison Project Manager and Campus Planning & Landscape Architecture. Approval is also required for the specific location, copy, color, and lettering size before its inclusion in the construction documents. This will not replace or duplicate the standard Building Identification Sign.
 - 3.1 Lettering material shall have good visual contrast to background material. ADAAG requires a minimum of 70% contrast.
 - 3.3 All building mounted lettering shall be placed at a height not readily reachable from grade. Anchors shall be drilled and epoxied into place to deter vandalism.
 - 3.4 Lettering material shall be anchored into façade material joints whenever and wherever possible.
4. The application of any non-standard signage on a building's windows, doors, or site requires approval from UW-Madison Project Manager and Campus Planning & Landscape Architecture.



5. All exterior signage, including anything on the building, the building windows/doors, and the building site shall be included in the 35 percent documents for review and approval.
6. Interior signage that can be viewed from the exterior is discouraged. Adhere to the UW-Madison Policy for Exterior Signage. Any proposed exemptions shall be approved by the UW-Madison Project Manager and Campus Planning & Landscape Architecture.
7. All campus street name signs shall follow campus standards. See the UW-Madison Exterior Graphics, Wayfinding, and Signage Policy and the most current version of the companion standards document.
8. Signage identifying the building completion date may be incorporated in a cornerstone near the entrance to the building if approved by the UW-Madison Project Manager. The signage shall be engraved with the date only.
9. A complete package of proposed exterior building, site, and wayfinding signage (including the design, color choice, proposed locations, and sample mock-up) shall be submitted prior to 100% review document approval.

10 14 18 Interior Signage

1. All interior signage is to be specified by the A/E and provided and installed by the general contractor, including, but not limited to, room names, room numbers, office occupant name holders, lab safety sheet holders, restroom identification, elevator signage, fire stairs identification as required by code, and way finding. Materials and colors for signage shall be determined by the design team with building occupant input and coordinate with the architecture and interior design team.
2. The UW Campus Standard Interior Signage Guidelines are in the Appendix – Division 10 and are available in PDF and CAD formats from the Architecture and Engineering Office at FP&M. The latest version will be consulted when specifying signage.
3. UW-Madison FP&M's Space Management Office (SMO) is responsible for final review and approval of all room numbering on campus. Prior to the 35% review document approval, it is recommended to provide SMO with a set of floor plans with the A/E's suggested room numbering, for review. Any room rearrangements and renumbering that happens after this review shall be resubmitted for review and comment.
4. The Space Management Office's *UW-Madison Facility Information Requirements for Capital Projects & Development* establishes criteria for facility naming and room numbering for campus. This document can be found in the Appendix – Division 01.
5. A complete signage package of proposed interior, way finding, directory signage, interior stairwell signage and exterior stairwell signage, including the design, color choice, proposed locations, and sample mock-up, must be presented to the campus prior to 100% review document approval.
6. All signs must have integral and tactile Braille lettering and raised pictograms made of a solid material. Taped-on Braille is not acceptable.



7. Generally, non-public rooms such as telecommunications closets, janitor's closets, storage rooms, etc. shall be denoted by the room number only.
8. Design and installation of signs shall meet ADAAG requirements.
 - 8.1. Signs shall be designed to handle the amount of Braille needed. Everything in Standard English text must be in Braille for those signs requiring Braille.
 - 8.2. A sign shall be provided in the corridor adjacent to every stairwell door with the words "stairwell (letter)" and "floor (number)" in raised letters and Braille. These signs will be mounted per ADA requirement on the latch side of the door. Within stairwells, a sign with the words "floor (number)" will be provided, with raised letters and Braille, and mounted per ADA requirement at the latch side of the door. When a stair has one-way traffic (i.e. When you enter the stairwell, you cannot re-enter the floor but must go to the level of exit discharge), that information must be provided in raised letters and Braille and incorporated into the floor designation sign.
 - 8.3. When stairwell identification signs are to be placed on the same sign placard as floor level signs (or on a separate sign at, or near, the stairwell door's location) the lettering and numbering of the stairwell identification shall be no more than ½ the size of the lettering and numbers on the sign that indicates the floor level.
 - 8.4. Directional signage shall include symbols for Assistive Listening Devices, TTY's, Volume Control Phones, and other ADA symbols when needed.
9. Dedicated or Specially Named Rooms:
 - 9.1. Conference rooms, department offices, libraries and other rooms determined by UW-Madison FP&M as spaces deserving of additional information shall have a space title (e.g. Art Department Office, Biology Library, Conference Room A, John D. Doe Seminar Room) as part of accessible room signage. Refer to the Technical Requirements section above for required approval process prior to sign purchase and installation.
10. Area of Refuge (AOR) Signage:
 - 10.1. Every Area of Refuge is required to have signage above the two-way communication device. The sign should be a 12 inch wide by 12 inch high, blue sign panel with raised white letters. The sign should have the 3-1/2 inch International Symbol of Accessibility raised pictograph centered with 5/8 inch upper case text reading "Area of Refuge: In case of fire, press button to indicate your location." The appropriate Braille (Grade 2) translation should also be included. Signs shall be installed square, plumb and level on the wall, directly above the two-way communicator unit and no further than 12 inches away. See Division 10, Detail 4 at end of this division.
 - 10.2. Additional signs are required to indicate the locations of the Areas of Refuge. The signs may include the following text: "Area of Refuge in Stairwell" or "Area of Refuge outside, through this Door". The signs shall be accessible per ADA requirements. Contact the UW-Madison FP&M Facilities Access Specialist and EH&S Fire and Life Safety for additional information on all Areas of Refuge related signs.



11. Interior Classroom Signage:

- 11.1. Assistive Listening Device Signage: It is required to post at least one sign in the room where an Assistive Listening Device (ALD) is available. The sign should be a 7 inch wide by 8 inch high white sign panel with raised black letters. The sign should have a 4 inch black assistive listening device pictograph centered with 5/8 inch upper case text reading "Assistive Listening Device Available." Appropriate Braille (Grade 2) translation should also be included. Signs will be installed square, plumb and level on the visual display wall; the specific location will be determined by the UW-Madison FP&M Space Management Office. Contact the UW-Madison FP&M Facilities Access Specialist for additional information and drawings regarding the details of this sign.
- 11.2. Fixed aisle seats that are armless (or have removable arms or fold down arms) must be signed as accessible. An International Symbol of Accessibility decal must designate each seat.
12. Occupancy Signage: Room occupancy signs must be posted in classrooms, lecture halls, auditoriums, theaters, and other rooms required by the IBD and Madison Fire Department.
13. Business Hours Signage: Per the direction of the UW-Madison Police Department, business hours must be posted in highly visible locations (main entrances) at the exterior of all UW-Madison Madison buildings using campus standard signage. The hours posted are not necessarily the only hours the building can be open, but provide a framework for enforcement of any violations. This information can be provided as a decal on the glass.
14. No smoking, no solicitation, and no firearms decal locations shall be coordinated with UW-Madison Project Manager. The decal designs shall follow UW-Madison standards.
15. In compliance with the City of Madison Fire Department, all interior stairway floor number signs must meet the requirements of the International Fire Code, 2015 Edition, Section 1023.9.1. It is suggested that a stair signage mockup is reviewed on-site with the City of Madison Fire Department prior to the submittal of the signage package.
16. Interior signage and graphics visible from the exterior (i.e. through windows or glass doors) are strongly discouraged and shall require approval by UW-Madison Campus Planning and Landscape Architecture.

10 14 53 Traffic Signage and Sign Posts

1. See Section 32 05 30 *Design Parameters for Exterior Improvements* for more information on signs for parking areas and roadways.
- 2.1. Sign posts shall be 2 inch x 2 inch 4 hole steel posts, 7/16 inch diameter holes, 1 inch on center. Hot-dip galvanized zinc coating, 14 gauge, powder coat matte black.
 - 2.1.1 Signpost lengths for non-traffic signs shall be determined by sign purpose and be approved by UW-Madison Campus Planning & Landscape Architecture. Typically, there should be 5 feet between bottom of top sign and grade but will vary depending on the sign function, number of signs on post, and location.



Regulatory signs shall follow the Manual on Uniform Traffic Control Devices (MUTCD).

2.2. 36 inch galvanized post sleeves shall be used to place signposts in ground.

2.2.1 Use a precast concrete footing for all signposts that have full size traffic signs or have more than one sign. Concrete footing shall be below grade and incorporate a 36 inch galvanized post sleeve, powder coated matte black so the sign post can be easily replaced if damaged.

2.3 All hardware to attach signs to posts shall be tamper proof and 316L stainless steel.

10 14 55 Parking Structure Signage

1. All directional and regulatory signs shall be approved by UW-Madison Transportation Services before documents go to bid. Directional signage shall include traffic way-finding and pedestrian wayfinding to exits and elevators. Vehicle way-finding signs shall be white letters on a blue background and white on green for pedestrian-oriented signs such as for entrances.
 - 1.1.1. All parking structure exterior signs shall also be approved by Campus Planning & Landscape Architecture.
2. Signs shall identify the floors of the structure, including numbers on the doors to stairs and elevator lobbies using a font size no smaller than 24 inches tall.
3. Hanging signs in parking structures must be 6-9 inches wide by 36 inches long and mounted directly to the concrete ceiling or other structural member.
4. Regulatory vehicle signs should conform to the size and/or color scheme described in the MUTCD.
5. Signs for accessible stalls shall be provided by UW-Madison Transportation Services to be installed by the contractor in consultation with UW-Madison Transportation Services.
6. Two campus standard lot identification signs shall be provided by UW-Madison Transportation Services to be installed by the contractor at all vehicle entrances to the facility. Signs shall be posted before final completion.
7. Clearance height bars shall be displayed at each entrance and 50 feet before any change in height within the structure.
8. All parking structures shall have electrical conduit run out to the street area near the entrance to support a campus standard kiosk sign if such a sign is planned. The contractor shall be responsible for running electricity, pouring the foundation, and the installation for the kiosk per manufactures guidelines. UW-Madison Transportation Services and Campus Planning & Landscape Architecture shall approve the sign location. UW-Madison Transportation Services shall provide the kiosk sign.
 - 1.8.1. Parking Ramp Kiosk shall follow campus standards and be approved by UW-Madison Transportation Services and Campus Planning & Landscape Architecture.



10 20 00 Interior Specialties

10 21 00 Compartments and Cubicles

10 21 13 Toilet Compartments

1. All toilet partitions shall be ceiling mounted and fully braced above the ceiling to ensure stability.
2. For durability all partitions shall be made of stainless steel, solid plastic, phenolic, or other material, Painted metal and plastic laminate partitions are not acceptable.

10 26 00 Wall and Door Protection

10 26 13 Corner Guards

Projects shall include corner guards in high traffic areas, especially where damage is expected to occur due to carts or other mobile equipment in order to protect gypsum wallboard corners. The type of corner guard shall be left to the discretion of the design team.

10 28 00 Toilet, Bath, and Laundry Accessories

10 28 13 Toilet Accessories

1. Toilet Paper Dispensers:
 - 1.1. The campus standard for all toilet paper dispensers is Tork 56TR in smoke gray, holding two 9 inch rolls of toilet paper. In standard stalls, the dispensers shall be mounted at 32 inches minimum/48 inches maximum above finished floor to the operable portion of the unit. The dispenser has a translucent cover which helps with maintaining adequate stock.
 - 1.2. Toilet paper dispensers in accessible stalls with vertical grab bars require a special arrangement. The unit must be mounted 7-9 inches from the front of the water closet to the centerline of the dispenser and a minimum of 1 foot, 3 inches above finished floor to the operable portion of the unit. The unit shall be mounted below the horizontal grab bar. An additional dispenser unit is also required; it can be mounted as noted above to allow the stall to be more universally accessible for all users. Refer to ANSI A117.1 section 604.7 for detailed mounting dimensions.
 - 1.3. Tork 66TR can be specified in single occupant toilet rooms. It holds one 9 inch roll.
2. Soap Dispensers:
 - 2.1. One soap dispenser for each lavatory shall be provided if at all possible. These can be mounted to the wall, mirror over the sink.
 - 2.2. The campus standard wall mounted soap dispenser is SCJ Professional Deb Proline Curve Dispenser Product Code 91128 and it also supports the campus standard foam soap. The SCJ Professional logo typically seen on the cut sheet can be replaced by a custom design logo at your request. Please review this option with the campus user group and contact the rep for details on providing artwork.



-
- 2.3. Provide at least 13 inches of space for wall mounted soap dispensers between the back splash and the mirror.
 - 2.4. Soap dispensers shall use the one liter foam soap refill cartridge.
 3. Air Dryers and Paper Towel Dispensers:
 - 3.1. The campus would like to reduce paper clutter in toilet rooms by prioritizing the use of air dryers and reducing the use of paper towel dispensers. The campus standard for air dryers are the Dyson Airblade V and the XLerator by Excel Dryers. Care should be taken when making selections as to the proximity of noise-sensitive areas. These units shall be mounted to meet accessibility requirements. The top of the unit shall be mounted at 32 inches above the finished floor.
 - 3.2. Air dryers and paper towel dispensers shall be installed in all multiple occupancy/high use toilet rooms. When paper towels are present, adequate waste receptacles are needed to minimize the amount of trips that are necessary to empty the receptacles.
 - 3.3. The campus standard paper towel dispenser is Tork 84TR 8 inch diameter hard wound roll towel dispenser. As an alternative, the Tork 86ECO with electronic touch free sensor can be used. The unit takes (4) D-cell batteries which would be the facilities occupant's responsibility to purchase.
 4. Toilets, Lavatories, and Urinals:
 - 4.1. Install electronic sensor flush valves on all urinals.
 5. Sanitary Napkin Disposal Receptacle and Dispenser:
 - 5.1. Recessed toilet compartment accessories are not acceptable. Campus standard is surface mounted. Combination toilet paper/sanitary napkin or partition disposal units are not acceptable. All should be surface mounted. All wall mounted sanitary napkin dispensers shall be surface mounted. Recessed or semi-recessed are not desirable.
 - 5.2. Machines shall dispense both sanitary napkins and tampons and the coin mechanism shall be at FREE. Machine needs to be able to dispense Gards size #147 and Tampons T-500.
 - 5.3. The unit shall meet ADA/ADAAG requirements.
 - 5.4. An acceptable dispenser is Bobrick B-2706 Series. Other series with the same operating mechanism are also acceptable.
 6. Built in waste receptacles are encouraged and shall be specified to be provided with the liner.
 7. A shelf with a maximum depth of 4" and/or coat/bag hooks shall be provided in all toilet rooms.
 8. Shelves for small handheld items shall be installed at an accessible height above all sinks, urinals and in toilet stalls. These can be provided as wall mounted equipment or



architecturally designed as a recess. All shelves above accessible sinks and in accessible stalls shall meet ADAAG requirements.

9. In addition to these smaller shelves, an area capable of supporting multiple larger and heavier items such as backpacks shall be designed within the shared open area of all toilet rooms. This surface shall meet ADA/ADAAG requirements.

10 40 00 Safety Specialties

10 41 00 Emergency Access and Information Cabinets

1. Background: The UW-Madison Police Department (UWPD) provides 24/7 service to The University of Wisconsin-Madison. All emergency calls and alarms (including all fire alarms) on the campus report to the UWPD Communications Center. Personnel in this center respond to these calls for service and dispatch the appropriate personnel (MFD, EMS, and UWPD). It is UWPD's Standard Operating Procedure to dispatch UWPD staff to all calls including fire and EMS calls.
2. UWPD maintains keys to all buildings and all areas on the UW-Madison campus. UWPD utilized security staff that patrols the campus responding to all calls that may require entry to locked areas. All campus buildings shall include the installation of an emergency access key box (Knox Box 4400 series recess with tamper switch) as required by the International Fire Code. A Knox Box 4400 series box shall be installed whenever a fire alarm system, access control and/or sprinkler system is added to or modified.
3. Policy Statement as recommended by UW-Madison Police Planning and Development Division: The UW-Madison requires that an Emergency Access Key Box be provided at the main entrance to every new building. The A/E shall coordinate specific location with the MFD. All boxes will contain a mechanical key for perimeter entry to the building and no grand masters. This recessed box will also hold a mechanical key to the fire command room or to the area where the main fire panel exists. The campus standard box is Knox 4400, fully recessed, with tamper resistant switch to be monitored through Metasys. The model shall have "normally closed" contacts and shall be wired directly to the DDC field controller. The reporting verbiage to the system shall read, "Unauthorized entry to Knox Box key." The finish can be selected by the architect. It is recommended that they are mounted 4 feet above grade.
4. Knox Box inventory is managed by EH&S Fire & Life Safety in conjunction with other campus stakeholders (UWPD, UW Lock Shop, Madison Fire Department). EH&S Fire & Life Safety shall be responsible for coordinating testing and functionality of Knox Box tamper switch as well as verification of keys and access control FOB's function. Three sets of building keys and three UWPD FOBs will be needed for placement within each campus Knox Box install.

10 43 00 Emergency Aid Specialties

10 43 10 Emergency Safety Appliances

1. All projects shall include a minimum of one Automated External Defibrillator (AED) to be located such that it is easily seen and accessed. Coordinate location with UW Project Manager and UW-Madison Environment, Health and Safety (EH&S). The preferred design standard is a Zoll AED plus.



2. When applicable, locate emergency equipment in a consistent area from lab to lab and floor to floor.
3. A swing-arm and deck-mounted eyewash will preferably be located within reach of a sink to facilitate weekly flushing. Alternatively, an ADA compliant pull-down eyewash may be used, but shall capture full water flow in a plumbed drain. This is required for weekly flushing specified by ANSI Z358.1. Eye wash push pedals shall be metal, not plastic.
4. Eye wash stations that mechanically recess into the wall are not permitted. Eye wash, Showers, and Eye wash/Shower Safety Stations must be physically and readily accessible for use without unfolding from a wall or releasing from an enclosed space. Alternative designs shall be reviewed by Environment, Health and Safety, prior to acceptance and installation.
5. Where chemicals may be used, eyewashes shall be provided in all mechanical spaces as requested by UW-Madison EH&S.
6. Height and placement of all eyewashes shall meet ADAAG standards.
7. If a vacuum breaker is required in an eyewash or shower line, it shall be located after the shutoff valve (normally not pressurized). Refer to *Division 22 Plumbing*.
8. Emergency showers shall be provided with a floor drain per the manufacturer's recommendations.

10 43 13 Defibrillator Cabinets

1. Public Access Defibrillation. Automatic external defibrillators (AED's) are lightweight, portable devices that provide an electrical shock capable of restoring the normal heart rhythm of cardiac arrest victims. Immediate, on-site access to this device for people who suffer a cardiac arrest has been found to greatly improve their chance of survival. Wisconsin Statutes allow for the purchase, maintenance and use of AED's in the public setting. Such places may include, but are not limited to, long-term care facilities, rural health or dental clinics, athletic facilities, schools, factories, churches, day care centers and other community facilities.
2. The purchase, placement, use and maintenance of AEDs at the University of Wisconsin-Madison shall conform to the requirements established in the policy established by EH&S Fire and Life Safety. No work unit is permitted to purchase or install an AED without approval by the process established therein.
3. The appropriate procedures for a work unit to place an AED unit in a building, department or vehicle are:
 - Determine whether the placement meets the criteria.
 - Designate a Work Unit AED Coordinator to administer and maintain the program.
 - With the assistance of EH&S, select an AED unit, an appropriate location and complete a "Work Unit Plan to Use an AED".
4. Placement criteria for AEDs at UW-Madison are established by the EH&S Fire and Life Safety using the information listed below. In general, funding for AEDs including installation and signage will be the responsibility of the work unit.
 - Work units are encouraged to contact EH&S to obtain more specific information on AEDs as applicable to their operations.



- The selection of manufacturer and model of AED will be based on standardization of units by campus location whenever possible. EH&S in consultation with UW-Madison University Health Services, will specify an appropriate model for consistency. However, the work unit will be responsible to purchase the AED model.
 - Zoll AEDPlus is the standard AED for use on campus.
5. Maintenance and Inspection Requirements for AEDs:

Continuous equipment maintenance is an important element in ensuring a successful program. Equipment is maintained through the following processes:

- At UW-Madison campus locations, Physical Plant (PP) will be responsible to conduct initial installation of all AED wall mounted storage boxes in accordance with manufacturer's recommendation. An AED wall mounted sign shall also be installed at this time.
- For Non-University campus locations, the AED coordinator will coordinate the installation of the AED wall mounted storage box and wall mounted sign.
- AED monthly inspections shall be performed by EH&S Fire & Life Safety. All inspection records of inspections shall be maintained by EH&S Fire & Life Safety.

10 44 00 Fire Protection Specialties

10 44 13 Fire Extinguisher Cabinets

1. All fire extinguisher cabinets shall be furnished and installed by GC.
2. UW-Madison Environment, Health and Safety Department shall provide all fire extinguishers for campus buildings, purchased from the project's moveable equipment fund. All designs shall be reviewed by the Madison Fire Department.
3. A/E shall verify, with EH&S Fire & Life Safety, the size of extinguishers to be provided and then to specify the cabinet size and style accordingly. At a minimum, cabinet must be 6" deep and 24" high. Include label reading "Fire Extinguisher" for the exterior of the cabinet. All cabinet locations should be shown on 35% review documents. All designs shall be reviewed by MFD and EH&S Fire & Life Safety.
4. The operable portion of all fire extinguishers is to be no higher than 48 inches above the finished floor in order to be compliant with ADA. Mounting height of cabinets shall be adjusted accordingly. In no case shall the clearance between the bottom of the fire extinguisher and the floor be less than 4 inches.
5. Recessed fire extinguisher cabinets are preferred, but if they cannot be accommodated, semi recessed cabinets can be used; however cabinets shall not protrude further than 4 inches from the wall in accommodation with ADAAG.



10 44 16 Fire Extinguishers

1. The UW-Madison Environment, Health and Safety Department provides all fire extinguishers for campus buildings, purchased as OFOI from the project's moveable equipment budget.
2. The UW-Madison's most used fire extinguisher is Amerex 441, which is 20 inches tall with the operable handle at the top.

10 44 43 Fire Extinguisher Accessories

No fire axes are allowed in UW-Madison buildings.

10 50 00 Storage Specialties

10 51 00 Lockers

1. All lockers shall have sloped tops unless recessed into the wall.
2. Locker size shall be specified by the building occupants to meet their needs. It is suggested that they be able to accommodate both a bike helmet and a backpack. Depending on the needs of the users, they may be purse size, half height or full height. Check with the campus on specifics needs of the building occupants.
3. 5% of lockers shall be accessible per ADAAG.

10 70 00 Exterior Protective Covers

10 73 00 Protective Covers

10 73 13 Awnings

1. Exterior awnings on UW-Madison campus buildings are prohibited.

10 80 00 Other Specialties

10 86 00 Mirrors in Parking Structures

1. Parking structures shall be outfitted with mirrors in corners and other "blind spot" areas where oncoming vehicles in two-way traffic may not be adequately visible to each other.
2. Underground and lower-level areas of parking structures shall be outfitted with mirrors in areas where visibility around corners is poor and persons would otherwise be hidden.
3. Floors shall have directional mirrors at the ends of the drive lanes and at any obstructed corners.



Division 11 Equipment

11 05 00 Common Work Results for Equipment

11 05 10 General Requirements for Equipment

1. Equipment design for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) *Equipment Design Standards*, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW Project Manager on UW Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW Project Manager.
5. The Guidelines for Planning and Design of UW-Madison Facilities take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW Project Manager.

11 10 00 Vehicle and Pedestrian Equipment

11 13 00 Loading Dock Equipment

1. All loading docks shall be provided with scissors lifts and/or dock levelers to accommodate a variety of campus and other non-standard bed height delivery vehicles.
2. Scissors lifts shall be flush with ground when lowered and raised to a height of approx. 4 feet at the dock to accommodate trucks. The campus standard for Scissor lifts is Autoquip model # PLT-6080 S. Provide a small curb in the recess in the pavement base to reduce debris accumulation under the lift and provide skirt protection.
3. Buildings with greater delivery demands, as determined by the campus, shall be provided with 2 bays, as well as a person-door, which includes a laminated glass vision panel and is secured with an access control device. Single bay designs should also provide a person-door.
4. A large and open interior area shall be required for staging delivered materials with support rooms around the perimeter for other needs.
5. Adequate turnaround area shall be provided for appropriate standard delivery vehicles. Refer to *Section 11 82 26 Waste Compactors* for required clearance for waste removal vehicles.
6. A minimum of one appropriately signed service vehicle parking stall shall be provided adjacent to dock area. Coordinate through the UW Project Manager as to the needs of campus.



7. Communication between the delivery person and the building's receiving staff shall be provided. This can be accomplished via telephone or intercom.
8. A hose bib shall be provided on the dock to facilitate wash down of the dock and adjacent exterior areas, such as where compactors and waste containers are located. A trench drain shall provide a means to keep this area free of ponding water. Hose bib and trench locations shall be reviewed with the UW Project Manager.
9. Secured storage shall be provided when biological and radioactive wastes need to be picked up.
10. Secure space shall be provided for cylinder storage as needed with required tie backs.
11. Bollards used in loading dock areas shall be the color black or red with two or three horizontal reflective white stripes at the top. Identify all bollard locations on the 35% plans and include a detail drawing. See *Section 32 39 13 Manufactured Metal Bollards* for more information.

11 15 00 Security, Detention, and Banking Equipment

11 18 00 Security Equipment

1. All exterior doors of new buildings shall have electric locks for the purpose of remote locking and unlocking. In addition, a maximum of two doors shall be provided with access control devices for programmed after-hours access by the building occupants and other authorized persons. Ensure exterior door for MFD point of response has a keyway installed. The keyway is required for emergency response incase access control fails.
2. Access control devices shall be provided on interior doors as noted in *Division 28 11 00 Electronic Access Control for New Construction* or as determined by the building occupants, the UW Project Manager, and approved by UW-Madison Police. These are OFCI with the FF&E budget. If access control is added, a 4400 series recessed Knox Box with tamper switch shall be installed.
3. Access control systems for all UW-Madison buildings shall be by Lenel, the campus standard.
4. Refer to *Section 27 05 05 General Requirements for Communications* for supportive electrical requirements regarding the above and the campus "Code Blue" emergency phone system. Code Blue phone locations shall be determined by UW-Madison Police Department (UWPD) during the design phase. These will be primarily within parking ramps.
5. Install OFCI security cameras purchased from UWPD with the FF&E budget, or at a minimum, the infrastructure to support them, at all exterior doors of new buildings and point of sale locations, as well as all loading docks.



11 20 00 Commercial Equipment

11 24 00 Maintenance Equipment

11 24 13 Floor and Wall Cleaning Equipment

All floor and wall equipment shall be coordinated with UW-Madison Custodial Staff and the UW Project Manager.

11 24 23 Window Washing Equipment

1. All interior and exterior glass shall be made accessible for window washing either by a lift or through the use of commercial window washing equipment.
2. If lifts are required, doorways and halls shall be sized to accommodate the movement of the lift and a storage space shall be determined during the design phase.
3. If windows cannot be reached from the ground, davits shall be provided on the roof to secure whatever equipment will be used.
4. A Bosun's chair is the campus preferred method of equipment used for window washing, although, at times, this work will be bid out to commercial firms. Tie downs shall be designed to accommodate this range of apparatus. Spacing of davits shall be determined during the design phase and coordinated with the UW-Madison Project Manager and Campus Services.
5. Any mechanized scaffold system (swing stage) required, shall be provided by the project and stored within the building.
6. In addition to lifts or scaffolds, all other equipment required for the cleaning of glass shall be provided as part of the project and stored within the building.
7. Access to power and domestic cold water shall be provided at the rooftop for window washing. In addition, exterior grade convenience outlets shall be provided at rooftop for auxiliary uses.
8. The first operation of the window washing equipment shall be completed by the installing contractor with the owner's selected representatives present for training.
9. All interior and exterior windows shall be cleaned by the contractor prior to the turn-over of the building.

11 50 00 Educational and Scientific Equipment

11 51 00 Library Equipment

The existing UW-Madison standard for stack areas in libraries shall be 92 inch high shelving units with 36 inch wide aisles. For greater accessibility the standard for reference and current periodical areas/reading rooms shall be 42 inch wide aisles. Overall height for these areas shall be determined by occupant needs. All size and spacing for new facilities shall be reviewed with UW-Madison Library staff.



11 52 00 Audio-Visual Equipment

Refer to *Section 13 05 02 Auditoriums and Lecture Halls* and *Section 27 05 05 General Requirements for Communications* for additional information regarding design of these spaces. Specification of audio visual equipment shall be written in such a way as to allow for upgrades/changes in selection during the construction period. In this way, the most current equipment is installed at the time of move in. Such equipment may include: digital audio, video cameras, video projectors, projection screens, video source and signal processing equipment, among others. The selection of all equipment shall be thoroughly reviewed and approved prior to specification and shall be reviewed again at the shop drawing stage to determine that the specified equipment is still required and if an upgrade is available within the budget. A/V equipment requires full installation, training, and debugging to occur prior to the turnover of the building.

11 52 13 Projection Screens

1. Mechanized projection screens are preferred as a projection surface.
2. The room size and use patterns shall determine whether they are manual or motorized. The AE team shall prepare a sight-line drawing in plan and elevation to show projector locations to the screen(s) and cone(s) of sight from areas within the room, ensuring room obstacles, such as columns, are avoided.

11 53 00 Laboratory Equipment

11 53 13 Laboratory Fume Hoods

1. This is a DFD Standard Specification. Use this specification section for all applicable laboratory fume hoods. It can be obtained from the DOA website or from UW-Madison Facilities Planning & Management.
2. Follow requirements of the Division 11 Appendix – Fume Hood Program. Any deviations require written approval from EHS Fume Hood Committee and the Campus Project Manager.

11 53 53 Biological Safety Cabinets (BSC)

1. Use standard UW-Madison specifications for biological safety cabinets and animal transfer stations. Care shall be given to consult with UW-Madison Environmental Health and Safety (EH&S) Biocontainment Program to be sure the specs are in their most current form.
2. All BSCs shall be purchased using the UW contract #21-5770, or the most current version.
3. EH&S Biocontainment Program shall be responsible for all certification of BSCs and HEPA filter systems.
4. Reference NIH Design Requirements Manual in Appendix A “Biological Safety Cabinet (BSC) Placement Requirements for New Buildings and Renovations”. EH&S Biocontainment Program shall be contacted for guidance on all BSC placements within a campus laboratory space. EH&S Biocontainment Program shall also be included in all design phases, including 35% and 100% reviews.



11 80 00 Facility Maintenance and Operation Equipment

11 81 00 Facility Maintenance Equipment

11 81 29 Facility Fall Protection

The contractor shall provide an OSHA compliant horizontal cable lifeline system on steel posts complying with all applicable regulatory requirements. This shall be required on all flat roofs that do not have a parapet of at least 42 inches high..

11 82 00 Solid Waste Handling Equipment

11 82 13 Solid Waste Bins

The following are specifications for campus building dumpsters.

Dumpster Bid Specifications:

| Quantity | Description |
|----------|--|
| 1 EACH | Sloped rear loading rubbish container with poly lids Capacity (Cubic yards): 2 Lids: 2 Sidewall Steel Gauge: 12 Bottom Steel Gauge: 12 Dimensions (inches) Height: 52 ½ Length: 43 ½ Width: 77 ½ Weight (pounds) with poly lids: 390 Color: Dunes Tan |
| 1 EACH | Sloped rear loading rubbish container with poly lids Capacity (Cubic yards): 4 Lids: 4 Sidewall Steel Gauge: 12 Bottom Steel Gauge: 12 Dimensions (inches) Height: 52 ½ Length: 90 ½ Width: 77 ½ Weight (pounds) with poly lids: 695 Color: |
| 1 EACH | Sloped rear loading rubbish container with poly lids Capacity (Cubic yards): 6 Lids: 6 Sidewall Steel Gauge: 12 Bottom Steel Gauge: 12 Dimensions (inches) Height: 52 ½ Length: 126 ½ Width: 77 ½ Weight (pounds) |



with poly lids: 955
Color:

11 82 26 Waste Compactors

1. Provide adequate clearance for compactors to be raised and emptied by UW-Madison Waste and Recycling trucks. Typical clearance required is between 17 feet and 18 feet. Caution shall be taken to include low hanging beams in the overall clearance.
2. Consider ease of access to compactors for all custodial staff. Staff collects recyclables inside the buildings and needs clear access to compactors from the loading dock area.
3. Provide a hard hydraulic line from pump exit through the wall with a quick disconnect (Minimum two feet clearance) on the outside of the building. Hydraulic pump and controls shall be inside the loading dock area.
4. Provide dedicated power for the compactor and an appropriate location for the control panel.
5. Compactor Units: Current standards are rear-loading 6-yard compactors with detached power units as specified in the Compactor Unit Specifications below.

Compactor Unit Specifications:

New compactor units shall be interchangeable with the existing units on campus. Existing units are Galbreath PM 6R and Parker WM-6R. Interchangeability in this context means that any of the existing compactors can be used with any of the new power units and that any of the new compactors can be used with any of the existing power units.

Provide rear loading 6-yard compactors with the following specifications:

- 5.1. Detached power units.
- 5.2. Thermostat control heater for the power unit.
- 5.3. Hopper loading height of 36 inch.
- 5.4. Compactor hopper:
 - 5.4.1. Mfg. Rating: 1.0 cubic yards.
 - 5.4.2. NSWMA rating: .90 cubic yards.
- 5.5. Loading chamber opening:
 - 5.5.1. Width: 53 ½ inch.
 - 5.5.2. Length: 28 inch.
- 5.6. Ram penetration: 0 inch to 12 inch.
- 5.7. Packing force:
 - 5.7.1. Normal: 20,600 lbs.
 - 5.7.2. Maximum: 24,100 lbs.



5.8. Ram face:

5.8.1. Width: 53 inch.

5.8.2. Height: 45 inch.

5.9. Motor: 3hp, 1750 rpm, TEFC, 3phase 60 hertz, 208 volts with UL listed control panel.

5.10. Pump: 2.8 gpm.

5.11. Cycle time: 36 seconds.

5.12. Packing cylinder: two–three inch.

5.13. Oil reservoir: 5 gallon.

5.14. The opening handle shall be located on the opening lid.

5.15. Overall size:

5.15.1. Length: 153 $\frac{3}{4}$ inch.

5.15.2. Height: 54 inch.

5.15.3. Width: 85 $\frac{3}{4}$ inch.



Division 12 Furnishings

12 00 00 Furnishings

12 00 03 General Provisions

1. The Architect/Engineer (A/E) shall provide layouts of both fixed and freestanding furnishings/moveable equipment as identified in the project pre-planning documents and include them as part of the 35% review documents. These plans provide an important means to confirm function and space usage for each room or space within the project.
2. The A/E shall coordinate all required power/voice and data services leading to fixed and furnishings/moveable equipment locations as shown within these documents and make corrections and updates as needed based on review comments. In addition, the A/E shall provide any details and/or drawings necessary to preserve critical dimensions and locations for the furnishings.
3. The construction documents released for bidding shall include furnishings plans, noted as being for informational purposes only, so that the contractors are given as much information on the use of each space as possible and understand the reasoning behind locations of outlets, etc.
4. Care shall be taken to coordinate furniture locations with window locations, perimeter mechanicals, door swings, thermostat, outlet, and switch locations, behind-the-door elements such as coat hooks, floor boxes, and ceiling based light fixture locations.
5. The A/E shall coordinate the height of outlets with any modesty or structural panel related to furnishings to the extent known by the design team so that outlets do not become inaccessible. This includes power base feed connections and data locations related to systems furniture. Access to the wall receptacles must be possible without disassembly of any or all the workstation panels.
6. The A/E shall be responsible for the location of all needed wall blocking and therefore shall confirm with the building occupants, their known needs and locations for blocking to support wall mounted items such as coat hooks, mirrors, wall mounted furnishings i.e. storage, tack boards, marker boards, etc.
7. Private offices shall be designed in such a way as to be able to be turned into multi-person offices at some point including provisions for voice, data, power, and fire alarm.
8. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
9. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
10. Ensure all furnishings meet International Building Code and International Fire Code for interior finish, decorative materials, and furnishings.



12 05 00 Common Work Results for Furniture Selection

12 05 05 General Requirements for Furniture Selection

1. It is the goal of the University of Wisconsin – Madison to use sustainable (green) and locally sourced products to the greatest extent possible. Locally sourced shall be defined as products which are harvested or manufactured within a 500-mile radius of the campus.
2. All specified furniture shall meet the mandates set forth by the State of Wisconsin. Per an agreement with the Wisconsin Department of Corrections, the UW-Madison has a Memorandum of Understanding (MOU) regarding the purchase of Badger State Industries (BSI) furnishings to purchase product as specified by State of Wisconsin mandate. See UW-Madison Purchasing Services web page for furniture purchasing guidelines.
3. Purchasing
 - 3.1. UW-Madison shall buy exclusively from BCE:
 - 3.1.1. Metal Book Shelves.
 - 3.1.2. Metal Files and Storage.
 - 3.1.3. Fixed Base Tables with Laminate Tops.
 - 3.2. UW-Madison shall either purchase from BCE or include BCE in the process to competitively price the following items:
 - 3.2.1. Private office desking systems (metal base/laminate tops).
 - 3.2.2. Open office furniture / panel-mounted workstations.
 - 3.2.3. Non-ergonomic seating.
 - 3.2.4. Custom designed office furniture.
 - 3.2.5. Parking wayfinding signs.
 - 3.3. UW-Madison shall have automatic waivers from BCE for the following products:
 - 3.3.1. Wood veneer or other custom material tables.
 - 3.3.2. Tables with power/data, flip top, or mobile capabilities.
 - 3.3.3. Private office desking systems (wood veneer).
 - 3.3.4. Wood veneer furniture (i.e. file cabinets, tables).
 - 3.3.5. Ergonomic seating.
 - 3.3.6. Bicycle racks, lockers and other storage.
 - 3.4. Additional Situations on Auto Waiver:



-
- 3.4.1. BCE confirms they cannot meet delivery dates.
 - 3.4.2. BCE declines to provide quote.
 - 3.4.3. Cost of BCE items exceeds cost for similar products.
 - 3.4.4. Product being purchased will match existing furniture installations.
 - 4. Ergonomic chairs are considered “customer choice” and will be evaluated individually by the projects’ design team, typically through a “chair fair” process.
 - 5. The following UW-Madison furniture contracts are designed to offer users a variety of manufacturers and distributors from which they can purchase furniture and furniture related accessories. There are also DOA and UW System Contracts which can be used. See this link for an index of contracts. <https://businessservices.wisc.edu/purchasing/contracts/>
 - 5.1. MISCELLANEOUS EDUCATION RELATED FURNITURE (18-5665)
 - 5.2. MISCELLANEOUS FURNITURE STORAGE (18-5843)
 - 5.3. LABORATORY FURNITURE (18-5846)
 - 6. The goal of the campus is to purchase a minimum of 5% of the total furniture package from minority business enterprises (MBE), when available. See <http://www.bussvc.wisc.edu/purch/contract/furncont.html>
 - 7. Process: When included in the A/E contract, the UW-Madison Project Manager shall direct the design/procurement process on all projects and will work directly with the design team representative (if the contract for design services includes) and/or user group representatives from the School or College on the selection of furniture, finishes, and equipment (FF&E). When contracted for services, the design team shall:
 - 7.1. Develop a complete schedule for the FF&E design process, coordinated with the main project schedule
 - 7.2. Develop the departmental programming needs for the project’s FF&E.
 - 7.3. Provide the user groups with a variety of options and styles for each category of furnishings.
 - 7.4. Develop a preliminary budget package for review and options for items that exceed the budget if it becomes necessary.
 - 7.5. Develop a full package of specifications and coded furniture plans for distribution to vendors for pricing and procurement by UW-Madison Facilities Planning and Management (FP&M) staff.
 - 7.6. Work closely with the UW-Madison Project Manager to develop a well-coordinated delivery and installation schedule.
 - 7.7. Develop a complete punchlist after installation is complete, facilitate vendor follow-up and sign off.
 - 7.8. Provide two sets of the complete record of all purchased and installed products including specifications, coded plans, cost information, vendor and manufacturer



contact information, and images of each component, organized by product type, in binders for future reference by the building occupants.

8. Installation Responsibilities:

- 8.1. All vendors/installers shall wear an ID badge while on campus with photo, name, and company name.

The UW-Madison shall no longer permit access to trucks over 30 ft. in length on several designated streets on this campus. The exceptions are trucks necessary for the delivery or pick up of perishable commodities, private construction vehicles, vehicles carrying radioactive materials, and campus service vehicles. For specific policy language, a campus map and restrictions go to the UW-Madison Transportation Services website.

- 8.2. Vendor Parking. The University parking is very limited. Each vendor and/or employee(s) shall make their own arrangements for parking through UW-Madison Transportation Services in Room #120 WARF Building, 610 Walnut Street, Madison, WI (608) 263-6666. No additional costs shall be allowed for parking fees or violations. Unauthorized vehicles parking in University lots or loading docks without permits will be ticketed and or towed.
- 8.3. All debris shall be removed from University premises and properly disposed of by the vendor/installer at the end of each work day per UW-Madison and State contract. Dumpsters shall be placed within the construction fence or coordinated with UW-Madison Transportation Services.
- 8.4. The telecom/electrical contractor shall install power and data lines to the location where panel systems will be installed. They shall also order the data jacks and notify the furniture installer of the model/ size of outlets.
- 8.5. The electrical contractor hardwires the base power feed whips to the junction box in the floor or wall. The furniture installer shall be responsible for providing the whips to the Electrical Contractor in a timely manner ahead of the delivery of the panels systems so that all infrastructures are in place prior to installation of the furniture.

12 05 20 General Requirements for Non-Furniture Moveable Equipment

1. There are items other than furniture that shall be purchased with “Moveable Equipment” funds. Non-Furniture Moveable Equipment shall be purchased for project:
- 1.1. Fire extinguishers as determined by UW-Madison Environment, Health and Safety (EH&S).
- 1.2. Janitorial/Maintenance equipment as determined by UW-Madison Custodial.
- 1.3. Aerial lift if required to clean/maintain windows, clerestories, skylights and lighting.
- 1.4. Freestanding waste and recycle bins for public and personal use.
- 1.5. Under counter refrigerators.
- 1.6. Dumpsters.



- 1.7. UW-Madison standard exterior building and direction signs (relocation and disposal of existing signs) and commissioned art recognition plaques
- 1.8. Bio-safety cabinet certification, if required
- 1.9. Access control system equipment, one line documents and commissioning determined by UW-Madison Electric Shop.
- 1.10. Network electronics for MDF/IDF determined by UW-Madison DO-IT.
- 1.11. Wireless network access points
2. Equipment to be designed by the A/E, purchased by owner, and installed by contractor:
 - 2.1. Compactors determined by UW-Madison Custodial.
 - 2.2. Keys, keying, and cylinders shall be determined by UW-Madison Lock Shop with contractor to install. See *Division 08 – Doors and Windows* for hardware details.
3. The following is a list of equipment sometimes thought to be “furnishings,” but which need to be specified by the A/E and purchased and installed by the contractor:
 - 3.1. Bio-Safety cabinets.
 - 3.2. Wall mounted brochure or other type racks (blocking required).
 - 3.3. Coat hooks/racks (blocking required).
 - 3.4. Display cases.
 - 3.5. Interior and Way-Finding Signage. See *Division 10* for requirements.
 - 3.6. Digital Signage and building directories as required. This can include a connection to the campus-wide “green screen” project which affords the department an opportunity to visually display their utility usage and sustainability goals.
 - 3.7. Computer systems for teaching podiums.
 - 3.8. Ice machines (water connection required).
 - 3.9. Residential stoves with required commercial exhaust hoods are discouraged. When required, they shall be approved by the UW-Madison Project Manager and then furnished and installed by the contractor.
 - 3.10. All Type 1 kitchen hood ventilation systems shall be equipped with an approved fire suppression system. All fire suppression system designs shall be shared with EH&S Fire & Life Safety for review.
 - 3.11. Tack boards and marker boards (blocking required).
 - 3.12. Dishwashers (water/waste connections required).
 - 3.13. Window coverings (blocking and/or architectural “pocket” required).



-
- 3.14. Electronics racks in MDF/IDF rooms.
 - 3.15. Site furnishings including benches, outdoor tables, waste/recycle/ash containers, and bike racks. See *Division 12 93 00 Other Furnishings*.
 4. Items not covered under FF&E and are the responsibility of each Department:
 - 4.1. Move Coordination with Space Management. Consult Relocation Guide found at address below:
<https://fpm-www3.fpm.wisc.edu/SpaceManagementOffice/LinkClick.aspx?fileticket=OJmoFCa7tmg%3d&tabid=78&mid=460>
 - 4.2. Phone Activation and/or transfer.
 - 4.3. Equipment: Fax machines, copiers, scanners, or leasing of equipment.
 - 4.4. Parking access control equipment.
 5. All thermostats shall be located directly adjacent to light switches in private offices and conference rooms. These shall be placed next to the latch side of the door or side light so the remainder of the wall is open for furniture placement. Coordinate furniture plans with electrical and control plans.

12 20 00 Window Treatments

1. The A/E shall provide treatment to all windows applicable to the building design and user functions. All window treatments, interior and exterior, are integral to the energy management of the building as well as the control of light and comfort of the occupants.
2. All proposed manufacturer's products and hardware shall be rated for extra heavy duty commercial use.
3. A/E shall include all structural requirements, blocking, services and construction coordination for the installation of all window treatments.
4. All product specifications including accessories, colors, finishes, applications, and details shall be approved by the UW-Madison Project Manager prior to the final development of the construction documents.
5. All window treatments specified with operating hardware shall include the necessary power and electrical controls for proper installation.
6. Bird Strike Mitigation. Window treatments shall be considered in the context of the building envelope design to mitigate bird collisions. Architectural glazing (type, quantity, and orientation), awnings, overhangs, exterior screens, grilles, sunshades, and visual markers are methods of bird collision deterrence. Consider products which have been tested and evaluated by the American Bird Conservancy.
7. For windows near a green roof, the glass type and glazing shall be considered to minimize sunlight reflection burning plants.



12 21 00 Window Blinds

1. All window blinds shall be considered fixed equipment and are funded within the construction budget.
2. In existing buildings there may be a desire to match existing window blinds. Consult with the UW-Madison Project Manager to determine if this is appropriate.
3. All colors, finishes, applications and details shall be approved by UW-Madison Project Manager prior to the final development of the construction documents.

12 22 00 Curtains and Draperies

1. All curtains and draperies shall be considered fixed equipment and are funded within the construction budget.
2. In existing buildings there may be a desire to match existing curtains and draperies. Consult with the UW-Madison Project Manager to determine if this is appropriate.
3. All colors finishes applications and details shall be approved by UW-Madison Project Manager prior to the final development of the construction documents.

12 24 00 Window Shades

1. All Window Shades shall be considered fixed equipment and are funded within the construction budget.
2. In existing buildings there may be a desire to match existing window shades. Consult with the UW-Madison Project Manager to determine if this is appropriate.
3. All colors finishes applications and details shall be approved by UW-Madison Project Manager prior to the final development of the construction documents.

12 30 00 Casework

1. The A/E shall specify all utility fittings and fixtures for casework equal to that specified for the plumbing, HVAC, electrical and data connections.
2. All Casework shall be considered fixed equipment and are funded within the construction budget, all colors, finishes applications and details shall be approved by UW-Madison Staff prior to the final development of the construction documents.

12 40 00 Furnishings and Accessories

12 46 00 Furnishing Accessories

12 46 33 Waste Receptacles

1. Preferred personal sized waste/recycling containers for offices are from Rubbermaid.
2. Public areas have the option to either purchase waste and recycling containers with FF&E or coordinate with the architecture as a built-in.
3. All built-in waste/recycling receptacles shall be specified with a liner.



12 48 00 Rugs and Mats

12 48 13 Entrance Floor Mats and Frames

1. Campus buildings with heavy student or public traffic shall incorporate walk-off mats, recessed in the floor, at building entries. They shall be easily removable for cleaning and the texture shall be selected to clean shoes quickly. The type of walk-off mat is left to the discretion of the design team, working in collaboration with UW-Madison Facilities Planning & Management staff. Sections of the mat material should be run opposite to the flow of traffic. It shall be expected that despite the best efforts of the design team, there may be seasons where additional mats are placed over these by UW-Madison Custodial.
2. If project funds allow, it shall be suggested that seasonal walk-off mats be designed and purchased specific to the building. Campus standards for these types of mats are governed by UW-Madison Custodial and the mats are presently available from Mats, Inc. through Kleenmark. From their available products, the campus standard is to use “Supreme Nop” with all four edges bound and base color charcoal #07. It shall be acceptable to specify the solid color mat or to have a custom UW-Madison crest logo cut into the mat. If the logo is cut in, Mats, Inc. will provide the mats with a solid backing sheet added to secure the cut logo. Approved UW-Madison Crest logo colors are as follows: #05 Natural shall be used for the “Gold” and #49 Autumn Red shall be used for the “Red” portions of the crest.
3. The pile height and edge of an area rug shall not cause a trip hazard and shall be easily removable for cleaning.

12 50 00 Furniture

12 50 05 Furniture Quality Standards

1. Durable/low maintenance finishes shall be required.
2. Lecture hall chairs shall be ergonomic and armless unless otherwise approved.
3. Use of tablet armchairs shall be reviewed by UW Project Manager and the Space Management Office in the design of new facilities. In renovation projects, where replacement of existing tablet armchairs is required, tablets shall be finished with high pressure laminate, of an appropriately large size, and supported by a structure able to withstand a 200 pound load.
4. It is preferred but not required to have all office and other furniture be self-supporting, not attached to walls to facilitate changes without wall repair.
5. Fabrics for lounge and other high use furniture shall be a minimum of 90,000 double rubs. Other seating fabrics must meet 40,000 double rubs. Fabric patterns and colors should be selected for their ability to hide soiling and wear.

12 56 00 Institutional Furniture

12 56 53 Laboratory Furniture

1. Laboratory equipment may be purchased out of the moveable equipment budget after furniture requirements are satisfied. Service agreements cannot be paid for using project funds.



2. All casework shall be provided and installed by the contractor. The required utility connections make casework unworkable as a separately purchased item.
3. All bench tops shall be epoxy. Gray is the campus standard, but if user needs require, black can be specified.
4. Reagent racks and shelves are to be supported above the countertop and fully adjustable.

12 61 00 Audience Seating

The A/E shall indicate complete specifications showing manufacturer, product number, materials and details from a select product and at least two additional manufactures, product numbers, materials and details showing equal capability.

12 90 00 Other Furnishings

12 91 00 Parking Structure Furnishings

1. Trash receptacles and ash urns shall be bracketed and mounted to the wall near all stairwells on each floor and any pedestrian ground level exit/entry point.
2. Receptacles shall be Brown, Rubbermaid 35 gallon, hinged (on one side) top containers without liners. Receptacles shall match the ones currently used by UW-Madison Transportation Services.
3. Ash Trays shall be brown stone panel wall mounted urn – approximately 10 inches square x 13 inches high and be mounted interior to the facility.
4. All trash receptacles and ash urns located outside the parking facility shall match current campus standards. See *Section 12 93 23 Waste, Recycling, and Ash receptacles*.
5. Supply of cans and installation shall be the responsibility of the contractor and shall be done before final completion.
6. Animal waste receptacles should be provided at all parking structures. Color shall be matte black. Black if matte is not available.

12 93 00 Site Furnishings

1. All site furnishings, also referred to as site amenities, shall meet current campus standards and be reviewed by UW-Madison Campus Planning & Landscape Architecture (CPLA). Furnishings include but are not limited to: benches, trash/recycle/ash receptacles, tables, cluster seating, bicycle racks, bollards, lighting, bus shelters, plant containers, signage, plaques, and memorials.
2. Site furnishing locations shall be identified in the 35% and 100% review documents. Detail drawings and specifications for each shall be provided in the plan set.
3. Site furnishings shall be located such that they do not limit access to accessible door hardware or key access pads at entrances.



4. UW-Madison Campus Planning & Landscape Architecture shall review all exterior site furnishing submittals to ensure campus standards are followed.
5. Existing nonstandard site furnishings within a project boundary shall be replaced with the current respective campus standard and paid for by project.
6. Consult UW-Madison Campus Planning & Landscape Architecture regarding existing historically significant, donor, or inscribed memorial site furnishings within the project scope and boundary.

12 93 13 Bicycle Racks

1. The campus standard bicycle rack is the UW-Madison Duckbill rack. Galvanized finish, single sided or double sided, surface mounted. See Appendix- Division 12 for details.
2. The campus standard high density bicycle rack is the UW-Madison Regent rack. Galvanized finish, single or double sided, surface mounted. Consult UW-Madison Transportation Services and Campus Planning & Landscape Architecture on their use. See Appendix- Division 12 for details.
 - 2.1. The Regent bicycle rack is manufactured by Madrax. Typical lengths are 5 foot double-sided racks (8 stalls) and 10 foot single-sided racks (8 stall).
 - 2.2. In situations where a project requires Regent racks, include a small quantity of Duckbill racks to accommodate bicycles with components or accessories that may not fit in the Regent racks.
3. The Duckbill and Regent bicycle racks are customized, sole source items. No product substitutions or alternates will be approved. DFD requires a Class 1 notice to be included in the specification.
4. All bicycle racks shall be surface mounted.
 - 4.1. All bicycle racks shall be surface mounted to concrete using 316L stainless steel or galvanized 3/8" x 3" self-threading concrete anchors."
5. Each bicycle parking stall shall be accessible without having to move another bicycle and its placement shall not result in a bicycle obstructing a required walkway.
6. Project and project contractor shall furnish, assemble, and anchor all bicycle racks.
7. Bicycle parking at UW-Madison is determined at a "campus district" level and not per each individual building or site, project boundary, and/or destination. Consideration is given to the type, use, and location of buildings, sites and/or destinations within the entire campus context. Bicycle parking shall be provided at each campus building, site, and/or destination in a quantity determined by UW-Madison Transportation Services. This may require projects to provide additional bicycle parking spaces if there is a determined deficiency within the area.
 - 7.1. The minimum number of spaces per a destination shall adhere to the Campus Master Plan. The baseline quantities are:
 - 7.1.1. One (1) space per five (5) student seats in classroom.



- 7.1.2. One (1) space per 20% of non-classroom student occupancy space (i.e. study rooms, flex space, etc.)
 - 7.1.3. One (1) space per six (6) employee workstations.
- 7.2. At UW-Madison Residence Halls, campus standard bicycle racks shall be provided one (1) space per two (2) beds.
- 7.3. Site locations for the required number of bicycle parking spaces shall be included in the 35% review documents along with detail drawings and specifications.
- 7.4. Include nearby large lecture halls within the scope when determining bicycle rack quantities for the project.
- 7.5. Buildings shall include provisions for bicyclists to shower and change.
- 8. Bicycle Parking Layout
 - 8.1. See Appendix- Division 12 for Bicycle Parking Layout details.
 - 8.2. Bicycle racks should be conveniently located to destinations and should be sited within clear view of building entrances most people will want to use.
 - 8.3. Avoid pedestrian/bicycle conflicts in pedestrian spaces. Coordinate with locations of outdoor gathering places and seating areas.
 - 8.4. Consider site design and arrival sequence to create welcoming entry spaces at building entrances when locating bicycle racks.
 - 8.5. Bicycle parking shall not impede or conflict with pedestrian and bicycle circulation, vehicle and moped circulation, snow clearing operations, and other site amenities.
 - 8.6. Bicycle parking layout shall consider site security, including lighting accommodations.
 - 8.7. Incorporate shade trees, planting beds, and pervious pavers/surfaces within and along edges of bicycle parking areas to break up large massings of racks, reduce urban heat island effect, and manage stormwater.
 - 8.7.1. Bicycle rack areas receive considerably less snow removal, no heavy equipment traffic, and little to no direct application of deicing agents (at time of guideline update). This creates opportunities regarding surface material, detailing, and vegetation section.
 - 8.8. The landscape and site design shall consider future growth for bike racks.
 - 8.9. The provision of covered bicycle parking is encouraged. Techniques may include under a building canopy, using a covered architectural element, or within a storage locker.
 - 8.10. Bicycle parking areas shall be accessible to bicyclists via curb cuts, curb ramps, rolled curbs, etc.



8.11. Bicycle parking spaces shall have vertical clearance of at least 6 feet and an accessible aisle that is at least 5 feet wide.

8.12. Where appropriate, exterior stairs will have bicycle ramps to accommodate pedestrians accessing bicycle facilities.

8.13. Bicycle racks will not be located in areas solely accessible by stairs.

9. Bicycle Parking in Parking Structures

9.1. Above ground and underground parking structures/ramps shall provide bicycle parking. A minimum of twenty-two (22) spaces near the entrance is required.

9.2. Bicycle parking can be level with adjacent grade, assuming slopes accommodate for drainage and water is not directed into the structure.

9.3. Refer to Division 32 for moped parking requirements.

12 93 23 Waste, Recycling, and Ash Receptacles

1. The project contractor shall assemble, purchase, and install all waste, recycling, and ash receptacles.

1.1. If anchoring is needed, use tamperproof 316L stainless steel or galvanized anchor sleeves and bolts. Follow manufacturer's specifications for installation.

2. Waste, recycling, and ash receptacles purchased with funds outside of project shall follow campus standards and be reviewed and approved by UW-Madison Campus Planning & Landscape Architecture.

3. The campus standard for trash receptacles is Wausau Tile #MF3200, 36 gallon unit, Metal Armor finish, textured black color.

3.1. The campus standard trash can is a sole source item. No product substitutions will be approved. DFD requires a Class 1 notice to be included in the specifications.

4. The campus standard ash urn is the Rubbermaid Commercial Products Metropolitan Smokers' Station. Model number R93400BK, color textured black.

4.1. The campus standard ash urn is a sole source item. No product substitutions will be approved. DFD requires a Class 1 notice to be included in the specifications.

4.2. The old campus standard ash urn is the Wausau Tile, #MF4005, Metal Armor finish, textured black color. It may be used with approval from Campus Planning and Landscape Architecture.

4.3. Ash Urns shall be placed a minimum of 25 feet away from building entrances, building windows that open, and building air intakes. Each ash urn should be paired with a waste receptacle, and a recycling container.



5. The campus standard recycling receptacle is Wausau Tile #MF3252, 36-gallon unit, Metal Armor finish, matte black color. Lid color (blue) and labels identified in MF3252 detail. Each recycling unit shall be paired with a waste receptacle.
 - 5.1. The campus standard recycling receptacle is a sole source item. No product substitutions will be approved. DFD requires a Class 1 notice to be included in the specifications.
 - 5.2. See Appendix- Division 12 for MF3252 detail.

12 93 43 Site Seating and Tables

1. Project contractor shall assemble, purchase, install, and anchor all site seating, benches and tables.
 - 1.1. All site seating, benches, and tables shall be anchored to concrete or other hardscape using tamperproof 316L stainless steel or galvanized anchor sleeves and bolts. This will allow for temporary removal or relocation without drilling new holes into the concrete or pavers.
2. Site seating, benches, and tables purchased with funds outside of project shall follow campus standards and be reviewed and approved by UW-Madison Campus Planning & Landscape Architecture.
3. Skateboards, roller blades, and BMX bikes cause damage to site seating, benches, and tables. All projects shall include features to deter such damage. See Division 32 32 00, Item 9.
4. The campus standard bench (excluding the Lakeshore Nature Preserve, which has its own standards) is Wausau Tile #MF2207 (5-foot bench, arched back). Metal Armor finish, textured black color.
 - 4.1. #MF2204 (6 foot bench, arched back with center arm rest), Metal Armor finish, textured black color may be considered in certain situations.
 - 4.2. The campus standard exterior benches are sole source items. No product substitutions will be approved. DFD requires a Class 1 notice to be included in the specifications.
 - 4.3. Bench layout design shall include companion seating per ADA requirements. See Appendix- Division 12 for detail.
5. The campus standard outdoor table is the Landscape Forms, Inc. Carousel table series with attached seating.
 - 5.1. The campus standard outdoor table is a sole source item. No product substitutions will be approved. DFD requires a Class 1 notice to be included in the specifications.
 - 5.2. Table details and locations shall be approved by UW-Madison Campus Planning & Landscape Architecture.
 - 5.3. The Carousel table product line has a growing list of various component details which may be considered but require approval from Campus Planning & Landscape Architecture. The standard table details are identified below.



- 5.4. Standard color is matte black.
 - 5.4.1. The color can be coordinated with the site and adjacent building architecture. Requires approval by UW-Madison Campus Planning & Landscape Architecture.
- 5.5. The standard seat type is metal grid and match color with rest of table unit. There is the option for backed or backless seats.
- 5.6. The standard tabletop is steelhead perforated with umbrella hole.
- 5.7. The number of accessible tables shall follow ADA guidelines.
- 5.8. Tables w/ umbrellas shall be anchored to concrete or hard surface.
- 5.9. Tables shall be located on an accessible surface and not within lawn areas unless on concrete or paver surface.
- 5.10. Tables shall be anchored to concrete, other hard surface, or concrete footing. Use tamperproof 316L stainless steel or galvanized anchor sleeves and bolts. Follow manufacturer's specifications.
- 6. All site amenities on roof tops and green roofs shall be approved by Campus Planning & Landscape Architecture.
 - 6.1. Follow manufactures specifications and instructions regarding placement on a rooftop.
 - 6.2. Specify site amenities that will anchored in place or heavy enough to prevent amenities from being blown off rooftop by wind.



Division 13 Special Construction

13 05 00 Common Work Results for Special Construction

13 05 10 General Requirements for Special Construction

1. Project Specifications for Audio-Visual Systems shall use as their basis *Section 27 40 00 Audio-Visual Systems* of the latest edition of the DFD Master Specifications when applicable. Consult with the UW Project Manager as to applicability.
2. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
3. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
4. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.

13 05 30 Architectural Mock Up

1. Unless there are extenuating circumstances, agreed upon during the design phase by all parties, including the UW-Madison University Architect, an architectural mock up is required to be constructed for each project to confirm major building material selections including all masonry, metal panel, sealants and mortars, vision and spandrel glass, metal copings, sills, headers, and trim, among others. The mock up not only ensures that the materials work well with each other, but confirm they will work well in their larger context as applied to the new building. In addition, the mock up provides an excellent opportunity for testing how materials come together via design details, and constructability overall.
2. Architectural mock ups shall be prioritized to be constructed soon after the site is cleared for construction. There must be ample time allocated such that any delays in obtaining materials or any rejected materials will be able to be reordered and applied to the mock up for additional review and approval **prior** to there being any construction schedule impacts.
3. The architectural mockup must be reviewed and approved by the design team, including the UW-Madison University Architect, **prior** to the order of any large quantities of materials for the new building.

13 20 00 Special Purpose Rooms

13 22 00 Academic Spaces

13 22 20 Laboratories

1. A/E Design Teams shall utilize the services of qualified laboratory planners for the design of all new laboratory buildings.



2. Consultants shall be current with NIH (National Institutes of Health) guidelines for laboratory design.
3. Laboratory doors shall be self-closing and lockable and have access control.
4. Surface mounted sliding doors should not be used in a laboratory. Pocket doors, bifold doors, and accordion doors are not permitted in a laboratory.
5. Laboratory windows that open to the exterior are not recommended. If the laboratory has windows that open to the exterior, windows shall be fitted with fly screens.
6. Open ceilings are not recommended in a laboratory.
7. Acoustical tile ceilings shall be hydrophobic, smooth surfaced, and able to be cleaned.
8. Carpets and rugs are not permitted in a laboratory. Carpeting is not recommended in office and administrative spaces that can only be accessed by passing through laboratory areas.
9. Laboratory floor finishes shall be non-absorbent and allow for decontamination with liquid disinfectants.
10. Laboratory finishes shall be non-porous and resistant to degradation from disinfectants commonly used in the laboratory.
11. Laboratory wall finishes shall be smooth and able to be easily cleaned and decontaminated. Laboratory finish requirements are recommended for office and administrative spaces that can only be accessed by passing through laboratory areas.
12. Laboratory shall have a sink for handwashing. The sink should be located near the exit door.
13. An eyewash station shall be readily available in the laboratory.
14. An autoclave on each floor where research with biological materials is performed is recommended.
15. In general, floor drains are not permitted in the laboratory. Environment, Health & Safety must be consulted regarding floor drains or floor sinks in the laboratory.
16. Benchtops must be smooth, impervious to water and resistant to heat, organic solvents, acids, alkalis, and other chemicals.
17. Laboratory furniture shall be sturdy and able to support anticipated loads and uses.
18. The laboratory shall be designed so that it can be easily cleaned. Spaces between benches, cabinets, and equipment shall be accessible for cleaning.
19. Chairs used in laboratory work shall be covered with a non-porous material that can be easily cleaned and decontaminated.
20. All surfaces and furniture shall be non-porous for effective disinfection. The use of wood and wood veneer for cabinetry or shelving should be avoided.



21. The Office of Biological Safety must be consulted regarding requirements or recommendations for laboratory facilities (e.g., research laboratory, teaching laboratory, animal facility, greenhouse) in which activities with biological materials will be performed. Requirements and recommendations for laboratories are based on the biological materials handled and the procedures performed in the facility.
22. The Office of Biological Safety must be consulted regarding BSL3 or ABSL3 laboratory facilities as these facilities will have additional requirements.
23. Biosafety in Microbiological and Biomedical Laboratories (BMBL), NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules, and NIH Guidelines Design Requirements Manual are used by the Office of Biological Safety when determining requirements or recommendations for laboratory facilities.
24. Ventilation systems shall provide an inward flow of air without recirculation to spaces outside of the laboratory.

13 22 40 Auditoriums and Lecture Halls

1. Design Criteria:
 - 1.1. In new construction, auditoriums and lecture halls shall contain fixed continuous tables and moveable ergonomic chairs (on casters appropriate for the flooring). The appropriate number of accessible seating with companion seats shall be provided. Wheelchair spaces and designated aisle seats shall be dispersed to provide a choice of admission prices (if applicable) and lines of sight comparable to that provided to other spectators.
 - 1.2. In new construction and to the extent possible in renovation projects, each seat should be wired for power with one duplex outlet serving two seats. Data outlets are not needed as wireless shall be used.
 - 1.3. The floor shall be tiered or sloped to allow for best sight lines. Transitions between ramped aisles and stepped rows shall be beveled, well designed, and coordinated for safety.
 - 1.4. Aisles shall be ramped (not stepped) to meet ADA requirements.
2. Audio/Visual Requirements:
 - 2.1. Rear screen projection is only permitted on a specific case need. The A/E shall consult with the UW-Madison Project Manager if a specific need is required.
 - 2.2. The A/V design shall be discussed early in Programming to determine equipment needs. Some system inputs may include:
 - 2.2.1. Blu Ray player accommodating DVD/laser discs - unlocked
 - 2.2.2. CD, MP3 or equivalent Audio
 - 2.2.3. Document Cameras (multiple in large lecture halls)
 - 2.2.4. Video camera for the recording of lectures
 - 2.2.5. Laptop input HDMI
 - 2.2.6. Code compliant Assistive Listening Devices
 - 2.3. Some system outputs may include:



-
- 2.3.1. Video projectors (multiple)
 - 2.3.2. Recording devices
 - 2.3.3. Overflow classroom
 - 2.3.4. Distance learning technology
 - 2.3.5. Video windows in touch control screen and video based interactive educational smart boards
3. A/V Podium Control System shall include:
- 3.1. The A/V control system shall use a touch color screen with video window for monitoring document camera, videos, cameras, window shades, and lighting scenes.
 - 3.2. The A/V Control System shall use an easy to understand icon based graphical user interface (GUI).
 - 3.3. The A/V Control System shall contain automation software to trigger by user actions, system events, or timed events.
 - 3.4. A/V Control Systems and podiums shall be made accessible.
 - 3.5. A well-labeled telephone shall be provided for technical assistance when needed.
4. Integration of the Control System:
- 4.1. Video system and equipment control
 - 4.2. Window shades control
 - 4.3. Lighting system control
 - 4.4. Sound system and equipment control
 - 4.5. The sound system shall include a podium as well as UHF wireless microphones and a high quality multi-speaker system.

13 24 00 Special Activity Rooms

13 24 10 Single Occupancy Toilet Rooms

- 1. A minimum of one (1) single occupancy toilet room shall be included within each new or significantly renovated building and more than one if programmatically desired.
- 2. The most publicly located single occupancy toilet room shall contain a floor-mounted urinal in addition to standard lavatory and toilet. It should also include a menstrual product dispenser.
- 3. The room shall be ADA accessible and unisex in nature and shall be located on the floor and/or near spaces designed for general public use and gathering. At the discretion of the building occupants, it may also be fitted with an infant changing table to enable the room to serve as a family restroom.
- 4. The single occupancy toilet room shall be signed “Restroom” to be consistent with other room signs within the same facility. The term “Unisex” shall not be used. The pictogram associated with the sign, shall indicate that it is accessible and whether or not it includes an infant changing table.



13 24 20 Commuter Showers/Changing Rooms

1. As biking is an important mode of transportation on our campus, it is desirable to include shower/changing facilities within each new or significantly renovated building. The quantity of showers shall be determined by the occupants of the building.
2. The rooms shall be located near a building point of entry and near bicycle parking.
3. The rooms shall be ADA accessible and unisex in nature. The shower shall incorporate a trench drain across the entrance to the shower to capture as much water as possible. It shall also include a toilet and sink with appropriate accessories including mirror, robe hooks, etc.
4. The room shall be accessed by card reader and also have a deadbolt for privacy as part of the hardware group.

13 24 40 Wellness Rooms

1. A minimum of one (1) room designated for lactation and/or personal health treatments shall be included within each new or significantly renovated building and more than one if programmatically desired. These spaces shall be located in staff rich zones, such as on floors occupied primarily by offices and workstations to encourage their use, yet removed from the direct public domain for privacy and quiet.
2. The room shall be accessible with a minimum of 50 ASF and include a built-in counter at table height along one wall – minimum 48 inches long – with knee space and a single base cabinet for storage. Power shall be provided above the counter for easy access.
3. A task chair with arms and casters shall be provided at the counter.
4. A small wall mounted sink with gooseneck faucet and mirror shall be included.
5. The room shall be accessed by card reader and also have a deadbolt for privacy as part of the hardware group.
6. Refrigeration will not be provided inside the room for security and access reason, but should be made available nearby.
7. Confirm Wellness Room requirements with UW Project Manager prior to design.

13 24 60 Animal Containment Rooms

1. Consultants should be current with regulatory guidelines (USDA, The Guide for the Care and Use of Animals) for animal housing.
2. Doors should be large enough (approximately 42 × 84 in.) to allow the easy passage of racks and equipment and they should fit tightly in their frames. Both doors and frames should be appropriately sealed to prevent vermin entry or harborage. Doors should be constructed of and, where appropriate, coated with materials that resist corrosion. Self-closing doors equipped with recessed or shielded handles, sweeps, and kickplates and other protective hardware are usually preferable. Hospital or terminated stops are useful to aid in cleaning. For safety, doors should open into animal rooms; if it is necessary that they open toward a corridor, there should be a recessed vestibule.



- a. Where room-level security is necessary or it is desirable to limit access (as with the use of hazardous agents), room doors should be equipped with locks or electronic security devices. For personnel safety, doors should be designed to open from the inside without a key.
 - b. Doors with viewing windows may be needed for safety and other reasons, but the ability to cover these windows may be considered if exposure to light or hallway activities would be undesirable (e.g., to avoid disturbing the animals' circadian rhythm). Red-tinted windows, which do not transmit specific wavelengths of visible light between corridors and animal rooms, have proved useful for mouse and rat holding rooms as both species have a limited ability to detect light in the red portions of the spectrum.
3. Floors should be moisture resistant, nonabsorbent, impact resistant, and relatively smooth, although textured surfaces may be required in some high-moisture areas and for some species (e.g., farm animals). Floors should be easy to repair and resistant to both the action of urine and other biologic materials and the adverse effects of hot water and cleaning agents. They should be capable of supporting racks, equipment, and stored items without becoming gouged, cracked, or pitted. Depending on their use, floors should be monolithic or have a minimal number of joints. Some materials that have proved satisfactory are epoxy resins, hard-surface sealed concrete, methyl methacrylate, polyurethane, and special hardened rubber-base aggregates. The latter are useful in areas where noise reduction is important. Correct installation is essential to ensure the long-term stability of the surface. If sills are installed at the entrance to a room, they should be designed to allow for convenient passage of equipment.
4. Where floor drains are used, the floors should be sloped and drain traps kept filled with liquid. To minimize prolonged increases in humidity, drainage should allow rapid removal of water and drying of surfaces. Drainpipes should be at least 4 in. (10.2 cm) in diameter, although in some areas, such as dog kennels and agricultural animal facilities, larger drainpipes (≥ 6 in.) are recommended. A rim- and/or trap-flushing drain or an in-line comminutor may be useful for the disposal of solid waste. When drains are not in use for long periods, they should be capped and sealed to prevent backflow of sewer gases, vermin, and other contaminants; lockable drain covers may be advisable for this purpose in some circumstances.
 - a. Floor drains are not essential in all animal rooms, particularly those housing rodents. Floors in such rooms can be sanitized satisfactorily by wet vacuuming or mopping with appropriate cleaning compounds or disinfectants. But the installation of floor drains that are capped when not in use may provide flexibility for future housing of nonrodent species.
5. Walls and ceilings should be smooth, moisture resistant, nonabsorbent, and resistant to damage from impact. They should be free of cracks, unsealed utility penetrations, and imperfect junctions with doors, ceilings, floors, walls, and corners. Surface materials should be capable of withstanding cleaning with detergents and disinfectants and the impact of water under high pressure. The use of curbs, guardrails or bumpers, and corner guards should be considered to protect walls and corners from damage, and such items should be solid or sealed to prevent access and harborage of vermin.
6. Ceilings formed by the concrete slab above are satisfactory if they are smooth and sealed or painted. Suspended ceilings are generally undesirable in animal holding rooms unless they are sealed from the space above with gaskets and clips. When used, they should be fabricated of impervious materials, have a washable surface, and be free of imperfect junctions. Exposed plumbing, ductwork, and light fixtures are undesirable unless the surfaces can be readily cleaned.



-
7. A properly designed and functioning HVAC system is essential to provide environmental and space pressurization control. Areas for quarantine, housing and use of animals exposed to hazardous materials, and housing of nonhuman primates should be kept under relative negative pressure, whereas areas for surgery or clean equipment storage should be kept under relative positive pressure with clean air.
- a. HVAC systems should be designed for reliability (including redundancy where applicable), ease of maintenance, and energy conservation; able to meet requirements for animals per regulatory guidelines
 - b. They should be capable of adjustments in and ideally maintain dry-bulb temperatures of $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$). Relative humidity should generally be maintained within a range of 30-70% throughout the year. Ideally relative humidity should be maintained within $\pm 10\%$ of set point; however, this may not be achievable under some circumstances.
 - c. Constant-volume systems have been most commonly used in animal facilities, but variable-volume (VAV) systems may offer design and operational advantages, such as allowing ventilation rates to be set in accordance with heat load and other variables.
 - d. Temperature is best regulated by having thermostatic control for each holding space. Use of zonal control for multiple spaces can result in temperature variations between spaces in the zone because of differences in animal densities and heat gain or loss in ventilation ducts and other surfaces within the zone. Individual space control is generally accomplished by providing each space with a dedicated reheat coil. Valves controlling reheat coils should fail in the closed position; steam coils should be avoided or equipped with a high-temperature cut-off system to prevent space overheating and animal loss with valve failure.
 - e. Humidification is typically controlled and supplemented on a system or zone basis. Control of humidification in individual holding spaces may be desirable for selected species with reduced tolerance for low relative (e.g., nonhuman primates) or high humidity (e.g., rabbits).
 - f. Consideration should be given to measures that minimize fluctuations in temperature and relative humidity outside the recommended ranges due to extremes in the external ambient environment. Such measures can include partial redundancy, partial air recirculation, altered ventilation rates, or the use of auxiliary equipment. In the event of an HVAC system or component failure, systems should at the minimum supply facility needs at a reduced level, address the adverse effects of loss of temperature control, and, where necessary, maintain critical pressurization gradients. It is essential that life-threatening heat accumulation or loss be prevented during mechanical failure. Temporary needs for ventilation of sheltered or outdoor facilities can usually be met with auxiliary equipment.
 - g. Air handling system intake locations should avoid entrainment of fumes from vehicles, equipment, and system exhaust. While 100% outside air is typically provided, when recirculated air is used its quality and quantity should be in accord with recommendations in Chapter 3 of The Guide. The type and efficiency of supply and exhaust air treatment should be matched to the quantity and types of contaminants and to the risks they pose. Supply air is usually filtered with 85–95% dust spot efficient filters. In certain instances, higher efficiency filters (e.g., HEPA) may be beneficial for recirculated supply air and air supplied to or exhausted from specialized areas such as surgical and containment facilities.



8. The electrical system should be safe and provide appropriate lighting, a sufficient number of power outlets, and suitable amperage for specialized equipment. In the event of power failure, an alternative or emergency power supply should be available to maintain critical services (e.g., the HVAC system, ventilated caging systems [Huerkamp et al. 2003], or life support systems for aquatic species) or support functions (e.g., freezers and isolators) in animal rooms, operating suites, and other essential areas.
9. Light fixtures, timers, switches, and outlets should be properly sealed to prevent vermin access. Recessed energy-efficient fluorescent lights are commonly used in animal facilities. Spectral quality of lights may be important for some species when maintained in the laboratory; in these cases full spectrum lamps may be appropriate.
 - a. A time-controlled lighting system should be used to ensure a uniform diurnal lighting cycle. Override systems should be equipped with an automatic timeout or a warning light to indicate the system is in override mode, and system performance and override functions should be regularly evaluated to ensure proper cycling. Dual-level lighting may be considered when housing species that are sensitive to high light intensity, such as albino rodents; low-intensity lighting is provided during the light phase of the diurnal cycle, and higher-intensity lighting is provided as needed (e.g., when personnel require enhanced visibility).
 - b. Light bulbs or fixtures should be equipped with protective covers to ensure the safety of the animals and personnel. Moisture-resistant switches and outlets and ground-fault interrupters should be used in areas with high water use, such as cage-washing areas and aquarium-maintenance areas.
10. Noise control is an important consideration in an animal facility and should be addressed during the planning stages of new facility design or renovation. Masonry walls, due to their density, generally have excellent sound-attenuating properties, but similar sound attenuation can be achieved using many different materials and partition designs.
 - a. Experience has shown that well-constructed corridor doors, sound-attenuating doors, or double-door entry vestibules can help to control the transmission of sound along corridors. An excellent resource on partition design for sound control is available in *Noise Control in buildings: A Practical Guide for Architects and Engineers* (Warnock and Quirt 1994). Attention should be paid to attenuating noise generated by equipment.
 - b. Fire and environmental-monitoring alarm systems and public address systems should be selected and positioned to minimize potential animal disturbance. The location of equipment capable of generating sound at ultrasonic frequencies is important as some species can hear such high frequencies. Selecting equipment for rodent facilities that does not generate noise in the ultrasonic range should be considered.
11. Vibration may arise from mechanical equipment, electrical switches, and other building components, or from remote sources (via ground borne transmission). Regarding the latter, special consideration should be given to the building structure type especially if the animal facility will be located over, under, or adjacent to subways, trains, or automobile and truck traffic. Like noise, different species can detect and be affected by vibrations of different frequencies and wavelengths, so attempts should be made to identify all vibration sources and isolate or dampen them with vibration suppression systems.



12. Monitoring of environmental conditions in animal holding spaces and other environmentally sensitive areas in the facility should be considered. Automated monitoring systems, which notify personnel of excursions in environmental conditions, including temperature and photoperiod, are advisable to prevent animal loss or physiologic changes as a result of system malfunction. The function and accuracy of such systems should be regularly verified.

13 24 80 Custodial Equipment Storage Rooms

1. All new buildings on campus shall provide convenient, code compliant storage space for larger equipment such as snow blowing equipment, leaf blowers, and mowers, accessible from the exterior of the building. The storage rooms must store at least 4 gallons of gas and two 20 pound LP tanks, approximately 50 square feet of space and a floor drain. An early review of the building-specific requirements is suggested during Programming. LP shall be stored outside the building.
2. All new buildings on campus shall provide a code compliant room to allow for charging and storing of large pieces of battery powered custodial equipment. Size depends on building configuration and floor materials to be cleaned. There shall be at least 150 square feet with proper ventilation for three 36 V and three 24 V machines, 18 inch deep shelf at 54 inch above floor to put chargers on, and outlets 12 inches above shelves (average hall machine 52 inches high, 38 inches wide, and 60 inches long). For a detailed plan, please contact the UW-Madison FP&M Project Manager. Provide an ANSI Z358.1 code compliant eyewash in the room.
3. Rooms shall be located close to loading docks or building entries, where equipment is most frequently needed.
4. Custodial closets must include:
 - 4.1. 42 inch doors on 180 degree hinge opening out
 - 4.2. There shall be one outlet on each wall with no more than 8 feet between the outlets
 - 4.3. Outlets shall be mounted 24 inches above the floor to handle two 12 amp chargers
 - 4.4. Shelves shall be provided for custodial cleaning supplies. An early review of the building-specific requirements is suggested during Programming.
 - 4.5. Sufficiently sized space for ladder storage and at least one custodial cart (50 inches long, 22 inches wide, and 39 inches high) shall be provided.
 - 4.6. Mop sink shall be provided with no higher than 6 inch sides for ease in emptying buckets and equipment. A hose bib with flex connection is required. The wall area behind the sink area shall be covered with a water resistant material such as ceramic tile, FRP panel, or similar.

13 40 00 Integrated Construction

13 41 00 Built-In Waste and Recycling Units

1. Freestanding waste and recycling containers shall be coordinated with FF&E per Division 12. It may also be desired to include built in waste and recycling units for this purpose in highly visible public spaces. The following guidelines shall apply to these:



-
- 1.1. Materials for the enclosure units shall be coordinated by the design team as appropriate to the space in which they occur. The units may be fully recessed or semi-recessed, built into alcoves.
 - 1.2. Separated units shall be included to manage the streams which UW-Madison Waste and Recycling collect: Waste, comingled recycling of glass, plastic & aluminum, and mixed paper. Additionally, office paper is collected, but collection points for this stream are not typically located in public areas, rather they are located in copy and work areas where this type of waste paper is generated.
 - 1.3. The enclosure units shall include an opening in the top or on the front for each stream large enough to enable items to be tossed in without congestion. There shall be no flipper doors over the opening. These tend to break and are difficult to keep clean.
 - 1.4. Labels shall be associated with each compartment and can be created using an applied plaque or the words can be engraved directly into the surface near the openings. The proper language per UW-Madison Waste and Recycling is as follows:
 - 1.4.1. Trash
 - 1.4.2. Mixed Paper
 - 1.4.3. Glass, Plastic, & Aluminum (ampersand and commas are optional, text can be on 3 lines)
 - 1.5. The enclosure units shall be designed with front doors that open to remove the liner so less lifting is required. The inside of the units sized to fit a large, standard size Rubbermaid container, whose model number shall be called out in the details. The Rubbermaid containers can be purchased either by the contractor or via FF&E.



Division 14 Conveying Equipment

14 05 00 Common Work Results for Conveying Equipment

14 05 10 General Requirements for Conveying Equipment

1. Both machine room-less (MRL) and traditional traction elevators as well as hydraulic elevators are acceptable for use in UW-Madison campus buildings.
2. Commissioning of elevators is to be specified using the latest version of DFD Master Specifications Section 14 08 00, which can be found at the DFD website.
3. The elevator controller shall be of a non-proprietary, open source design that can be serviced by at least three local contractors.
4. Project specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
5. Deviations from the DFD Master Specifications shall be made only upon approval from the UW Project Manager.
6. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Master Specifications, however the A/E shall discuss any discrepancies between the two with the UW Project Manager.

14 20 00 Elevators

14 20 50 General Requirements for Elevators

1. Traction Elevators are to be specified using the latest version of DFD Master Specification Section 14 21 20, which can be found at the DFD website.
2. Hydraulic Elevators are to be specified using the latest version of DFD Master Specification Section 14 24 20, which can be found at the DFD website.

14 20 51 Provisions for Penthouse Access

All mechanical penthouses shall be accessible by a hospital sized elevator, which can handle an emergency stretcher. This is usually, but does not have to be, a cab designated for freight which is provided with cab pads.

14 20 52 Materials

1. Wall panels within elevator cabs may be specified to meet the needs and preferences of building occupants and blend with the architecture of the building, however care shall be taken to select materials that are durable, resistant to cart damage, and can be easily cleaned.
2. Flooring within elevator cabs may be specified to meet the needs and preferences of the building occupants however thought shall be given to slip resistance, durability, and cleanability. If elevators are near the building entrance, it is likely the floors of the cab will come in contact with water and salts.
3. Materials to be used for padded protective wall pads or “cab pads” shall conform to ASME A17.1, Rule 204.2a (1) or (2). Cab pads shall be provided for a minimum of



one elevator cab in each building. This shall be the elevator designated to go to the penthouse.

4. The floors of all machine rooms and pits shall be either painted with a light color coating or sealed concrete.

14 21 00 Electric Traction Elevators

1. Elevator doors shall be a minimum of 40 inches wide and 6 feet-6inches high. The needs of the building occupants shall dictate the requirements for larger or taller opening sizes and/or increased cab heights. In addition, the General contractor shall provide a clear and plumb hoist-way. All freight elevators shall have steel C-channel jambs with steel angle sills. Jambs shall have solid metal extensions 4 feet above and 4 feet below door opening for door track mounting.
2. A list including the location and identification of all over-current devices that feed circuits for elevators or related equipment shall be provided to the UW-Madison Electric Shop for review. In addition, an over-current coordination study shall be provided.
3. For an elevator renovation project, the contractor shall notify the UW-Madison Electric Shop at least 5 working days before starting the project. The UW-Madison Electric Shop will determine which materials and equipment from the original installation shall be returned to the owner. Equipment that will be retained by the owner shall be tagged by the UW-Madison Electric Shop, removed by the contractor, and returned to the owner in good working condition unless other arrangements are made. A/Es shall include clear direction to the contractor for the above within the construction documents.
4. A minimum of 4 hours of training, including all that is required to service, adjust, and maintain the equipment, shall be provided for UW-Madison Physical Plant personnel prior to substantial completion. Two complete sets of Operations and Maintenance manuals, including parts manuals, shall be provided to the UW-Madison Electric Shop prior to the start of training. On multiple building projects, the O&M manuals shall be separate per building. The mechanical O&M manuals shall also be per building.
5. All equipment shall be furnished with one-line wiring diagrams that are indexed and cross referenced for all coils and contacts. One set of drawings shall be mounted on rigid board inside the machine room. These drawings shall be made available to the owner at the time of final inspection.
6. The elevator controller shall be of a non-proprietary, open source design that can be serviced by at least three local contractors. Current acceptable manufacturers include: Galaxy (GAL), Motion Control (MCE), Smart Rise controls corporation, and Vertitron (VMI). All equipment monitors and interfaces that are required to interact with the controller shall be provided to the owner at the time of final inspection. This equipment shall become the property of the owner and shall not require renewal by the vendor or manufacturer. The controller information shall include all trouble shooting, start up, fault coding, full system descriptions, and all test procedures. The controller shall include LED indicators and at a minimum, a 32 character alphanumeric display.
7. For energy conservation purposes, install regenerative drives whenever possible. Drives must be made compatible with emergency generators.
8. A heavy duty closed loop design door operator shall be provided for each elevator.



9. At the time of the pre-installation meeting, the contractor shall provide sufficient information to satisfy the owner's representative that the controller design is non-proprietary. If this issue is not adequately resolved by the information that is submitted, the contractor shall demonstrate to the owner's representative on an existing installation that the proposed controller meets the requirements of the specifications.
10. Specification of the campus standard emergency key box, Supra #7199 shall be required and will be provided by UW-Madison Physical Plant Electric Shop.
11. Specification of the campus standard emergency phone, Adams #936-P2 or equivalent, shall be required. It shall be programmed to dial 9-1-1 (Campus Police). Use of a pre-recorded voice message shall be a programmable option although this option is not currently used on campus. Phones shall provide verification of a successful alarm report without requiring special response by Campus Police such as pressing a special button sequence on the dispatcher's phone.
12. Hoistway Lighting - 3-way and 4-way light switches shall be provided in all enclosed shafts and at each floor. One switch that is accessible at the lowest landing and one that is accessible at the highest landing shall also be provided. In addition, a 4 foot fluorescent fixture shall be provided at every other floor and additional lighting and switching as needed for multiple car hoistways and to meet code for Machine room-less (MRL) Elevators. For installations with multiple hoistway openings on each floor, a switch shall be accessible from each opening. Any 4 foot fluorescent light fixtures used shall be specified with T-8 lamps.
13. A complete package of building elevator keys shall be turned over to the UW-Madison Electric Shop at the time of the COM/Safety inspection. This includes 3 complete sets of keys for each elevator. On modernization projects, all elevators in the building shall be keyed to FEOK 1 fire service keying.
14. An infrared curtain is required for all new construction. A mechanical safe edge or photocell system is not acceptable. If infrared curtains are added to existing installations, the control relay contacts shall be rated to handle the voltage and amperage of the safety circuit. If not, a properly rated auxiliary relay shall be added.
15. The ladder in the pit shall be installed such that no junction boxes or other equipment can be installed behind it in a manner that would interfere with its function. No partial extension ladders or retractable ladders shall be installed.
16. Hoist way equipment: Each elevator shall use 6 inch spring tensioned rollers. Slide guides are not acceptable. Suspension means shall not require replacement at pre-determined intervals. Elevator rails shall have T rail design.
17. A minimum of four spare conductors or 10% of the total count, whichever is greater, shall be run between the controller and the push button station in the car. The conductors shall be tested for shorts, opens, and grounds. They shall be clearly identified on both ends as spares.
18. Each disconnecting means for equipment associated with the elevator shall be legibly marked as required by NEC 110-22 and shall be marked with the location and the source that feeds it. Where the machine room is sprinklered, busman style shunt trip/power modules shall be used. The shunt trip power monitor shall not be wired off the load side of the disconnecting means and shall not put the fire alarm system into supervisory trouble when the disconnect is manually operated.



19. Maintenance during warranty: Warranty service and maintenance work shall be performed by qualified elevator mechanics that are trained to service the equipment on which they will be working. Maintenance services by a helper or apprentice will be allowed only if under the direct supervision of a qualified mechanic. The contractor shall be capable of responding to an emergency call within one hour. The frequency of visits shall be based upon the type of elevator and its usage.
20. Warranty coverage shall begin at the date of substantial completion, rather than the date the elevators received their State inspection approval. Provide one year warranty service with two years parts and labor warranty.
21. A means shall be provided to monitor and interpret the output of the load-weighing sensor on the car. At a minimum, a digital position indicator on the main egress floor shall be installed. Load weighers shall be cable tension type.
22. The controller shall have the means to initiate floor calls from the machine room for diagnostic purposes.
23. A list of all programmable functions and variables shall be provided.
24. Information that describes the part number, function, and location of all circuit boards shall be provided. Provide all software updates that become available from the manufacturer.
25. A list of all points that are connected through terminal blocks shall be provided along with a description of the function of each point.
26. Startup and adjustment information shall be provided.
27. A means to examine and modify computer memory shall be provided as well as the adjustable parameters for parking features which allow the owner to enable or disable this function. A means to examine and modify car call and hall call security functions shall be provided.
28. A list of all computer memory locations and functions shall be provided.
29. A list of all abbreviations and/or mnemonics shall be provided.
30. Serviceable LED cab lighting shall be provided.
31. All cabs shall be provided with a standard GFCI convenience outlet as a part of the operating panel for use by custodians and others.
32. All Class I security key switching shall have separate and unique keying. Key switching for independent service, fan and light, run/stop, fire service, and access shall be installed.
33. All hall and car buttons shall be specified as vandal resistant.
34. All car exhaust fans shall be specified as commercial duty Morrison type.
35. All MRL elevators shall be designed to have at a minimum, a separate control room or space. This space shall be directly adjacent to the hoistway and can be located on any level including the penthouse. Hoist-way or door frame controllers shall not be allowed.



36. An electrical sub-panel shall be installed in each elevator equipment room that will have lockable breakers and will service all of the equipment room, car, and hoistway branch circuits.
37. All existing elevator related equipment shall be protected against damage, dust and debris during construction.
38. All elevator mechanical areas shall be accessible through normal doorways without requiring the use of hatchways.
39. All parts required to service or maintain this equipment shall be available for purchase without restriction by the owner or any contractor hired by the owner to perform service.
40. The UW-Madison Electric Shop shall be advised of the time and date of any and all inspections.
41. All software furnished with the project shall become the property of the owner.
42. Fire alarm modules that supply signals to the elevator controller shall offer a visual indication of both a normal and an alarm condition in the elevator machine room. Refer to *Division 27* for additional information.
43. The elevator machine room shall have both heating and cooling capability in order to maintain a temperature of between 40 and 95 degrees F (non-condensing).
44. If multiple copies of an individual circuit board (such as an I/O card) are used in a controller, at least one spare board of that type shall be supplied as attic stock to the project.
45. A drain or sump pump in the pit shall be provided if the hoistway is to be sprinklered.
46. All equipment must be listed and labeled by the appropriate testing laboratory.
47. 60 days prior to the completion of warranty service, the installer shall contact the UW-Madison Electric Shop to inform them that the warranty period is about to end.
48. The header which is used to support the car door operator shall not be used as a raceway unless it is listed by an approved testing laboratory for this purpose.
49. The system shall be free of counters or timers which are designed to disable or interfere with the operation of the car after a certain count or period of time has been reached.
50. All fire alarm detectors shall be rated for the temperature that they can be expected to experience (especially important for parking ramp detectors.)
51. Elevator exhaust fans shall be capable of continuous long-term operation. Fans that are intended for residential use are not acceptable.
52. The Elevator Contractor shall be responsible for all maintenance, service, and callbacks on the equipment covered by the contract from the time that work begins until the end of the warranty period. This includes existing equipment that is to be remodeled.
53. Elevator access shall be provided to the main roof areas. Remote roof areas can be provided with a scuttle and ladder access except for elevator machine room access.



14 24 00 Hydraulic Elevators (in addition to comments in the above section)

1. For hydraulic elevators, battery powered lowering during loss of AC power shall be provided if the elevator is not connected to the building's emergency power system.
2. Hydraulic cylinders shall not be inverted. Hydraulic oil line full flow shut offs in both the pit and machine-room shall be provided.
3. All hydraulic control valves shall be Maxton or approved equal.
4. Hydraulic elevators shall be designed such that the controller and pumping unit shall be installed in the machine room only.
5. Provide and install an oil return pump in addition to an oil return line. The oil return line shall be a minimum of 5/16 inch inside diameter.
6. The oil return pump shall be secured in such a fashion that it will not be able to float in the event of a flood.
7. Submersible motor/pump combinations, similar to Dover EP, are unacceptable. No submersible motors in excess of 40 hp are permitted.
8. All water shall be removed from the space between the PVC liner and the metal casing of the ram. The space between the PVC liner and the ram shall be left as empty as possible and not be backfilled with sand. The top of the liner shall be sealed. A leak detection system shall be installed between the hydraulic cylinder and the PVC liner to monitor hydraulic oil leaks.
9. After construction is completed, the hydraulic cylinder packing shall be replaced.

14 28 00 Elevator Equipment and Controls

14 28 19 Elevator Equipment

1. Elevator Phones:
 - a. The emergency phone shall be located behind a door rather than out in the open where it is susceptible to vandalism and pranks.
 - b. The location of the phone shall meet ADAAG requirements.
 - c. Include instructions in the event of an emergency open doors and use telephone to dial 911. Ensure building name, building number and building address are provided within the elevator car.
 - d. The Elevator Contractor and Electrical Contractor shall work together to pull the cable to the controller for the phone line and provide the Division of Information Technology (DoIT) with IDF, jack, and elevator numbers for each line. Contractors shall use the DoIT telephone installation request template, provided at the end of this section.
 - e. The Electrical Contractor shall install the data jacks for emergency phones, which shall be located in a 4 sq box with face plate adjacent to the controller in coordination with the Elevator Contractor. Lines shall be tested for opens, shorts, and grounds and a separate cable for each emergency phone with the data jack terminated



in the faceplate shall be provided. The traveling cable for the emergency phone should terminate in the same faceplate in a jack; this will be the service demarcation point. This work shall be coordinated with the Elevator Contractor who shall notify the UW Electric Shop when the work is complete. Please allow at least 2 weeks for phones to be activated.

- f. The contractor, working through the UW Project Manager, shall enter a request to the UW Electric Shop to provide a dial tone. UW Electric Shop will coordinate the request with DoIT directly.
- g. Elevator phones must be installed and be available for testing by the UW Electric Shop a minimum of 10 working days before the City of Madison Fire Department inspects the elevators. When the phone has been installed and is ready for testing, the UW Electric Shop shall be contacted at 263-3333.
- h. The following form (Elevator Phone Installation Request Form) shall be completed by the contractor in order to activate a phone line in the elevator cabs.
- i. Provide hoistway lighting in all elevators.
- j. Provide elevator pads and mounting studs for all elevators.
- k. Contractor shall provide all required signage including machine room door signage.

Elevator Phone Installation Request

Building Name:
Building Number/Address:
Elevator Equipment Room:
Elevator Number:
Elevator Shaft Location (Rm Num):
Telephone Jack Number:

DoIT Tech Provided Info:
Phone Num
SNI
Riser

Building Name:
Building Number/Address:
Elevator Equipment Room:
Elevator Number:
Elevator Shaft Location (Rm Num):
Telephone Jack Number:

DoIT Tech Provided Info:
Phone Num
SNI
Riser

Information filled in by UW Madison-DoIT

- 2. Access Control in Elevators:



-
- a. Where elevator card readers are installed, the Elevator Contractor shall install a security panel and wire in each car call to a terminal strip inside the installed panel. This is in preparation for card reader installation, which will be completed by the Electrical Contractor.
 - b. It is typical for each elevator cab to include a card reader or at the very least, include the infrastructure for its future installation.
 - c. Provide 3 additional twisted shielded pairs for the elevator card readers in the elevator traveling cable. Provide 2 additional twisted shielded pairs for elevator cameras.



Division 21 Fire Suppression

21 00 00 Fire Suppression

For campus projects that require either a UTILITY SHUTDOWN (electrical, plumbing, steam, DDC etc.) or a shutdown of a LIFE SAFETY SYSTEM (water-based fire protection, fire alarm, alternative fire suppression system, etc.) the GC shall work with the PM to obtain and submit proper notifications as outlined within the UTILITY SHUTDOWN FORM AND LIFE SAFETY SYSTEM IMPAIRMENT ONLINE REQUEST FORM.

21 05 00 Common Work Results for Fire Suppression

21 05 05 General Requirements for Fire Suppression

1. The fire suppression system design for all UW Madison facilities shall comply with all of the provisions of the latest version of the Division of Facilities Development (DFD) Plumbing and Fire Protection Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW Project Manager.
5. The Guidelines for Planning and Design at UW-Madison shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. It shall be specified that the Operation and Maintenance manuals contain calculations and flow test specifications for fire pump and sprinkler systems and include user acceptance testing forms.
7. Owner training shall be included for all equipment and systems and training shall be scheduled and take place. Provide a copy of the original acceptance testing form to the UW-Madison Shops.
8. As-built record drawings shall be kept up to date on the job site and turned over to the A/E prior to final pay requests. The drawings must be prepared by the A/E in a clear AutoCAD format and turned over to the UW-Madison Project Manager at Close Out.
9. Make all pre-action systems double interlock type, with one action being electric and the other action being pneumatic.
10. Determine with the architect if center-of-tile head placement shall be a requirement. If yes, specify and note on the fire protection drawings (in addition to notes on RCP's).
11. Whenever possible, a fire hose standpipe valve shall be installed on the roof of new buildings on the top of each fire hose standpipe, with a drain valve and isolation valve below the roof. The drain riser should be connected to this drain valve. This fire hose



valve is used for NFPA acceptance testing and for NFPA required standpipe flow testing. Drain valve shall be connected to auxiliary drain.

12. Assurances shall be made that drain receivers accepting discharge from fire system main drain valves and inspector's test stations can handle high flow discharge of fire systems with fire pumps running. Alternatively, the discharge can be piped to grade where this will not create a nuisance.
13. Coordination of the test drain locations to grade shall occur with the A/E to minimize rust staining on building facades and flatwork.
14. All requests for inspections, acceptance tests, review, or consultation shall include UW-Madison Departments and Divisions as requested. All inspections, tests, and inquiries involving any personnel from the Madison Fire Department shall be witnessed and attended by EH&S Fire & Life Safety.

21 10 00 Water Based Fire Suppression Systems

1. Tee-drilling of water supply piping in building shall not be allowed.
2. Building water services shall terminate in building with a threaded flange on the ductile iron service pipe, bolt on or quick flanges shall not be allowed.
3. Buildings with dual water services for domestic and fire supply shall have additional valve installed on the water main between the dual services, so either service can supply the building sprinkler system in event of an interruption of water supply.
4. UW-Madison may consider adding valves to the water main on each side of the water service of smaller buildings, if the building requires non-interruptible water supply.
5. All drum drips in areas subject to freezing shall include a tee, 90, and plug just after the upper valve for the addition of antifreeze.
6. The University prefers Viking air maintenance devices on all dry pre-action systems.
7. The University prefers all fire pump circulation valves to be Cla-Val.
8. Ball valves 3" and smaller should be bronze body with stainless steel ball and stem.
9. Fire pump shall be horizontal split case that is 1800 RPMs or slower.
10. All system checks shall have a removable cover.
11. Fire pump and fire pump controllers shall be placed within a rated room. The room shall only be used to house fire pump and controller. The room shall also be in a climate-controlled room that will meet the requirements set forth by the manufacture.

21 12 50 Fire Suppression in Parking Structures

1. All stairwells shall have at least one 1 ½ inch fire hose bib (coupling) and one floor drain-independent from #2 & #3 requirement listed below.
2. A 1 ½ inch hose bib (coupling) will be located every 50 feet around the exterior walls, inside of the facility.



-
3. Grading and inlets shall be designed according to a stormwater drainage plan and system that adequately evacuates all water from the floor of the structure or lot during heavy rainfall.
 4. A sanitary sewer inlet shall be in a convenient location near a source of water to accommodate the emptying and refilling of mobile floor washing equipment.
 5. The first operation of the wash down for each floor shall be completed by the primary contractor with the owner's selected representatives present for training.
 6. Sprinkler system inside parking structure shall follow NFPA standards for water-based fire protection systems.
 7. For structures built below the water table, drains shall have sump-pumps with an alarm system that will alert UW-Madison Physical Plant when the pump is malfunctioning.



Division 22 Plumbing

22 00 00 Plumbing

22 05 00 Common Work Results for Plumbing

22 05 05 General Requirements for Plumbing

1. The plumbing design for all UW Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development & Management (DFD) Plumbing and Fire Protection Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
7. Owner training shall be included for all equipment and systems and training shall be scheduled and take place.
8. As-built record drawings shall be kept up to date on the job site and turned over to the A/E prior to final pay requests. The drawings must be prepared by the A/E in a clear AutoCAD format and turned over to the UW-Madison Project Manager at Close Out.

22 05 23 Valves for Plumbing Piping

1. Ball valves 2" and smaller should be two-piece bronze-body with stainless steel ball and stem.
2. The use of gate valves should be avoided, if necessary they should be of the resilient seat / resilient wedge type.
3. The preferred RPZ backflow preventer is the Wilkins #975.
4. Butterfly valves of the grooved and lug type may be used. Lug valves require that solid flanges be used; grooved flange adapters are not approved for this type of valve. Butterfly valves 6" and larger must be provided with geared hand wheel operation; smaller valves may use lever handles.



5. Ball and butterfly valves that are used for flow balancing service must have handle locking devices.
6. The use of water pressure reducing valves should be avoided. Booster pump systems with VFDs and without PRVs are the preferred systems.
7. Balance valves shall have shutoff valves on both sides of the valve. These should be threaded fittings and pipe with a union included between the shut off valves.

22 10 00 Plumbing Piping and Pumps

22 11 00 Facility Water Distribution

22 11 05 General Requirements for Facility Water Distribution

1. A drain shall be provided under recessed walk-off mats only in very heavily used entries. The need for an indirect drain or trap primer shall be considered in this instance. The drain shall be sufficiently sized and includes a sediment basket to retain the sandy debris that will accumulate. In most campus buildings, it is preferred to provide a recessed mat with no drain in the pan.
2. Acid dilution basins shall be used for new buildings, do not use acid neutralization basins on acid waste piping systems. Acid neutralization basins shall only be used in rare circumstances with unusually heavy acid use, and then, only after a review by UW-Madison Safety and Plumbing.
3. Tee-drilling of water supply branches shall not be allowed.
4. 1 ½ inch meter test pipe shall be installed to outside of building, this can also be used to supply building with water during main interruptions.
5. The contractor shall turn over, to the UW-Madison Project Manager, the initial registration and testing report required for backflow preventers and other cross connection control devices regulated by the Wisconsin Department of Safety and Professional Services.
6. Frost-proof hose bibs shall be provided where there is need for watering of landscaping including green roof areas, near a loading dock, and at roof level for window washing equipment.
7. Hose bibs shall be located such that the need to run hoses across sidewalks to water planting beds is avoided.
8. All parking ramps shall be designed with 1 1/2 inch female connection and the valves shall be marked NON-POTABLE WATER or UNSAFE WATER. Connections shall be in areas accessible for semi-annual flushing of concrete coatings. Connections shall be spaced no more than 100 feet for coverage with a 50 foot hose.
9. Galvanized steel shall not be used.
10. CPVC shall not be used.
11. Anything Type L copper 2 1/2" and larger use mechanical grooved pipe connections; no solder.



12. System dead legs and long capped branches that could encourage bacterial growth are not allowed, particularly on hot water systems.
13. At pump panel controls mount the HOA switch on the outside of the panel.

22 11 16 Domestic Water Piping

1. For 4 inch diameter or greater underground domestic water, ductile iron piping shall be used. For less than 4 inch diameter, copper piping shall be used. PVC shall be used only in very rare circumstances where there is a proven history of corrosive soil conditions.
2. Refer to *Division 21 Fire Suppression* for dual water service and dual valve requirements for entry piping.

22 13 00 Facility Sanitary Sewerage

22 13 16 Sanitary Waste and Vent Piping

1. PVC is the preferred material for underground drainage systems. Locations where high temperature discharge could occur such as mechanical rooms and kitchens must be either cast iron or high temperature rated CPVC chemical waste piping material.
2. PVC may be used for above ground portions of systems but must be evaluated on a case by case basis. Locations where sound transmission is an issue must use cast iron No Hub material.
3. Heavy duty No Hub couplings should be used at the lowest levels and base of drain stacks and roof conductors where higher pressures could occur. Standard couplings should be used for the balance of these systems.

22 14 00 Facility Storm Drainage

22 14 29 Sump Pumps

1. Detail and install sewage ejection pumps and other sump-mounted equipment so that isolation valves check valves, etc. are located above the sump or in a dry well next to the sump in an area where they are more serviceable.
2. All utility pits are to be provided with a sump pump basin to receive a sump pump when needed. A GFI outlet for the pump and an additional convenience outlet, as well as appropriate lighting for work shall be provided.

22 40 00 Plumbing Fixtures

22 42 00 Commercial Plumbing Fixtures

22 42 05 General Requirements for Commercial Plumbing Fixtures

1. Black fixtures shall not be used, as they are difficult to keep clean.
2. A minimum of one mop sink shall be provided on every floor, preferably near toilet rooms. The mop sink rim shall be a maximum of 6 inches high to allow for ease of use by custodians to drain equipment.
3. At least one bottle filler shall be included within each campus building.



4. Plumbing connections shall be coordinated for all owner furnished specialty equipment such as water polishers, ice machines, etc.
5. Point of use hot water heaters should not be used.
6. The use of thermostatic mixing valves should be avoided or minimized as much as possible.

22 42 13 Commercial Water Closets and Urinals

1. Battery operated or low voltage infrared sensors shall be provided on all urinals. The power source shall be determined on a project by project basis. Sloan SMO (side mount operator) or similar battery operated flush valves shall be provided on urinals only. The campus preferred faucet is the Chicago Faucets, for ease of repair. Dual handle models that meet ADAAG shall be provided. Sensor faucets are high maintenance and not preferred, but can be discussed for use in specific situations. Urinals shall be wall hung with one floor mounted urinal per building.
2. Metered or sensor faucets and flush valves should not be used with the exception of battery operated flush valves.
3. Urinal flow rates should be a minimum of .25 GPF.
4. 1.28 GPF toilets may be used if they are the flush valve type toilets.
5. 1.28 GPF tank type toilets may only be used if they are the flush valve/power flush type.

22 42 16 Commercial Lavatories and Sinks

Lavatory flow rates should be a minimum of .5 GPM.

22 45 00 Emergency Plumbing Fixtures

22 45 13 Emergency Showers

Drains under all emergency showers shall be provided. In large spaces, where multiple showers are required, one drain shall be centrally located. All emergency showers shall meet ANSI Z358.1 standards.

22 45 36 Emergency Fixture Water-Tempering Equipment

Emergency eyewash and showers must supply tempered water in a temperature range of 60-100 degrees Fahrenheit. Tempered water shall be provided using a pumped loop and fail-safe tempering valve. Campus recommends using the same loop to supply hand washing water to restrooms to keep water fresh. Individual tempering valves that serve a single eyewash or shower shall be prohibited.

22 47 00 Drinking Fountains and Water Coolers

22 47 13 Drinking Fountains

Drinking fountains shall comply with ADA requirements and campus standards, if bottle filler is used, the unit must be installed on the “Low” fountain. The bottle filler mechanism shall be hands free operation, and shall not require the use of an activation button. The campus preferred brand is Elkay.



Division 23 Heating, Ventilating and Air Conditioning (HVAC)

23 00 00 Heating, Ventilating, and Air Conditioning (HVAC)

23 05 00 Common Work Results for HVAC

23 05 05 General Requirements for HVAC

1. The HVAC system design for all UW-Madison facilities shall comply with all of the provisions of the latest version of the Division of Facilities Development (DFD) HVAC Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
7. Owner training shall be included for all equipment and systems and training shall be scheduled, take place, and be videotaped.
8. Record drawings shall be kept up to date on the job site and turned over to the A/E prior to final pay requests. The drawings shall be prepared by the A/E in a clear AutoCAD format.
9. If a project is being carried out in an existing building the new equipment will follow existing similar building equipment naming scheme. Contact owner agency to confirm equipment tag naming to be used.
10. Pitch air intake plenum bottoms shall drain out louver.
11. Louvers shall be sized for low velocity (<300 fpm) through free area.
12. Pans shall be required to be water-proof.
13. All primary heating systems shall require redundancy.
14. All AHU's with return air shall be required to have air blenders.
15. Unconditioned spaces shall be required to have sealed PVC jackets on all piping.



16. All roof caps shall be required to be painted with factory finish.
17. Standing seams shall be required on coping.
18. HVAC units shall be located either on the roof or within the building. HVAC units shall not be placed outside the building on the site.
19. Do not provide both a pot feeder and water filter on heating water systems. The water filter can be used as a pot feeder.
20. UW-Madison prefers Parker water filters.
21. Fans should not be provided with grease lines extending outside the fan housing.
22. All rooftop duct work shall be insulated and well-waterproofed.
23. All thermostats shall be located directly adjacent to light switches in private offices and conference rooms. These shall be placed next to the latch side of the door or side light so the remainder of the wall is open for furniture placement. Coordinate furniture plans with electrical and control plans.

23 05 29 Hangers and Supports for HVAC Piping and Equipment

Specifications *Section 23 05 29 90 Hangers and Supports for Utility Piping and Equipment* is a Division of Facilities Development and Management (DFD) Standard Specification although it may not be available on their website. Use this specification section for all applicable utility work. It can be obtained from UW-Madison FP&M.

23 05 93 Testing, Adjusting, and Balancing for HVAC

1. Copies of the balance report shall be turned over to the UW-Madison Project Manager as soon as they are available.
2. Operating static pressure set points, on direct-digital control systems, during the time of balancing, shall be indicated.

23 08 00 Commissioning of HVAC

UW DDC Metasys Head End Database to have project specific User Views built out by controls vendor prior to any Functional Testing activities occurring by the Commissioning Agent. The CxA should be testing and verifying equipment sequences utilizing the same interface the end user UW DDC interacts with the BAS.

23 09 00 Instrumentation and Control of HVAC

23 09 10 Direct-Digital Control System for HVAC

1. Specifications for Direct Digital Controls shall be based upon the DFD Master Specifications sections for DDC systems
2. Any deviations from the DFD Master Specifications must be approved by the UW-Madison Project Manager
3. A permanent copy of control drawings and sequence of operation document shall be placed inside or next to the control cabinets.



4. High turn-down steam and chilled water meters shall be provided on all campus buildings. Specific meter selections shall be coordinated with UW-Madison Physical Plant.

23 09 14 Pneumatic and Electric Instrumentation and Control Devices for HVAC

1. Individual thermostats for offices shall be reviewed on a per project basis. As a general rule, all private offices occupied by principal investigators or by faculty shall receive individual controls since their work hours can be irregular. Some staff or supporting offices, sharing the same building exposure and with occupancy consistent across an 8 hour work day, may be zoned.
2. Freeze protection sensors shall be included on heating and cooling coils.
3. In buildings where an air dryer is to be installed for a lab/house air system, the control air shall be tied in after, rather than having another air dryer installed just for control air.
4. All control devices in the system shall be identified with a tag or marker beside the device and not on the device. As devices get replaced in time, identification disappears.
5. Sequencing of air handling units and exhaust fans shall allow reasonable ability for a small adult to open doors of buildings during an alarm condition.
6. All thermostats shall be located directly above light switches in private offices and conference rooms. These shall be placed next to the latch side of the door or side light. Coordinate with the electrical and furniture plans.
7. All new and replacement HVAC control components will be electric (actuators & controllers).
8. All TCP must have at least 3 foot uninterrupted clearance in front of panel.
9. Communicating Thermostats and ASC are not allowed to be integrated onto the campus BAS.
10. Control Vendors Point to Point wiring checkout reports shall be shared with owner/UW DDC prior to or during As Built Submittal handover for proper record sharing.
11. For remodel project scopes affecting terminal units planned to be reused that are deemed >10years old from original install requires a functional checkout at beginning of project construction to confirm proper operation of the following components: All actuators, VAV box flow stations, all sensors, valve & air damper seals. If these components checkout to be in suitable working order they can be reused if deficiencies are found fully replace components in kind. Coordinate with agency DDC group to assist with pre device checkout as needed.
12. Owner related training needs to be performed after approved As Built submittal is provided to owner. Training to include a walkthrough of the project area lead by the control contractor lead pointing out physical locations of all controls related devices that aren't easily found within an open mechanical room. As Built submittal should corroborate with the walkthrough tour.



13. Specifications for Direct Digital Controls shall be based upon the DFD Master Specifications sections for DDC systems.
14. All installed DDC hardware & communication protocol will be implemented per manufacturers specifications otherwise instructed by the owner agency.
15. All project Control Vendors shall submit final as built drawings to owner/UW DDC in 'PDF' and 'MS Visio/other editable file format' for future owner editing internally as needed.
16. Valves serving animal and animal related (i.e. feed rooms, storage...) areas must have Fail Position of Closed.
17. All Minimum Outside Air flow stations must have filters installed upstream of them with a filter differential pressure sensor wired to DDC.
18. Probe sensor data shall match DFD specification.
19. Fume hoods that are greater than 8 feet must have two presence sensors for presence detection.
20. All steam valve actuators should have a 6-inch copper whip on the valve for the pneumatic air signal to prevent the poly from heat stress that causes the poly to become brittle over time.
21. Each Control Damper operator shall serve a maximum damper area of 25 square feet and not 36 square feet. Where larger dampers are used, provide multiple operators.

23 09 15 Direct Digital Control Input/Output Point Summary Tables

1. The UW DDC Points Guide naming standard will be used as principle document by the DDC contractor while creating the programing as a reference for best practices used on campus.
2. For existing buildings where existing control systems are being touched/demolished as part of new work a I/O Point demo table should be provided for the contractor to follow. The A/E will need to coordinate with UW DDC when this applies to help flush out all existing points on the BAS that will need to be demoed as part of intended project work.

23 09 23 & 23 09 24 Direct Digital Control System for HVAC

1. All bid set and as built set control drawings submitted for a project must be reviewed and accepted by the UW DDC shop to help confirm for accuracy and proper UW DDC standards are being followed in the submittal.
2. A dedicated team of control techs will be established before the beginning of the project. The dedicated team must be available throughout the project through commissioning phases to owner training.
3. Every effort should be made to segregate Zone level control devices and major mechanical systems (i.e. AHU's, HWS, HRUs...) across different communication trunks.
4. No split control layout is allowed on the BAS for the same equipment (i.e. NO partial pneumatic and DDC layout, NO OEM and main project controls intermixing, NO splitting of multiple controllers to control the same equipment).



5. Prior to final owner handover all supervisory level devices (aka engines) should be upgraded to the latest firmware revision available and be set within manufacturer published communication network standards.
6. Venturi valves installed with the intent of being controlled by a DDC field controller, shall have actuators controlled by an analog output from the DDC Controller. A LOM (Linearization Output Module) shall be installed to provide volume feedback to the DDC field controller.
7. Where possible, when integrating 3rd party vendor devices (i.e. VFD's, Meters) efforts should made to segregate them to individual MSTP trunks.
8. UW DDC Metasys Head End Database to have project specific User Views built out by controls vendor prior to any Functional Testing activities occurring by the Commissioning Agent. The CxA should be testing and verifying equipment sequences utilizing the same interface the end user UW DDC interacts with the BAS.
9. All installed DDC hardware & communication protocol will be implemented per manufacturers specifications otherwise instructed by the owner agency.
10. All project Control Vendors shall submit final as built drawings to owner/UW DDC in 'PDF' and 'MS Visio/other editable file format' for future owner editing internally as needed.
11. Room flow matrixes shall be included in the design/record documents for all lab spaces with setback fume hood controls. Room Flow matrix template can be provided by owner agency DDC group by request.

23 09 93 Sequence of Operations for HVAC Controls

1. For all projects that interact with new/updated system level equipment control sequences, the A/E shall plan to arrange a Control Submittal page turn between the controls vendor, Engineer, & UW DDC shop.
2. Outdoor lighting control must be operated through a dedicated contactor. The contactor coil shall be energized indirectly by use of a 24V relay controlled from the BAS field controller. The 24V relay shall have a hand/off/auto switch to facilitate local override control.
3. Owner Training needs to include a recorded session with the lead control tech demonstrating the key operational control sequences portion to owner agency. Key control sequences to be demonstrated to be identified by UW DDC shop.
4. Individual spaces requiring 24/7 cooling (IT Rooms, Elec. Vaults, etc...) or specific pressure requirements to be maintained shall be designed and sequenced to be satisfied in a standalone state not reliant on larger AHU systems so as to allow the AHU system to go into unoccupied scheduling/setback for energy savings opportunities.
5. The UW DDC Points Guide naming standard will be used as principle document by the DDC contractor while creating the programing as a reference for best practices used on campus.



23 20 00 HVAC Piping and Pumps

23 22 00 Steam Condensate Piping and Pumps

1. Campus steam usually has a fair amount of superheat. Provisions shall be made for proper venting of flash steam from condensate. Receivers and vents shall be directed to discharge well away from outside air intakes and other areas susceptible to vapor freezing damage. Returns shall not be insulated in Mechanical rooms, for sub cooling.
2. Campus superheated steam tends to have its condensate flash in the return piping. Provisions shall be made for proper condensate cooling, particularly on large steam heating coils.

23 26 00 Valves

1. All valves shall have a method of determining position – either rising stem or pointer. Do not use non-rising stem valves.
2. Valves in campus steam and chilled water systems shall be specified to handle the higher than usual operating pressures and temperatures found in the central systems.

23 30 00 HVAC Air Distribution

23 31 00 HVAC Ducts and Casings

1. Flammable storage cabinets shall be vented with low volume exhaust (10-20 cfm) to prevent accumulation of vapors. Use only metal duct or pipe. Include a blast gate to adjust air volume. The opening from the cabinet to the duct must have a flame arrestor, usually provided with the cabinet. Flammable liquid cabinets shall be vented from the bottom with make-up air supplied to the top.
2. Corrosive storage cabinets shall be vented with low volume exhaust (10-20 cfm) to prevent accumulation of vapors. Use corrosion-resistant metal or appropriate not-metal duct. Include a blast gate to adjust air volume.
3. Duct lining shall be limited to un-powered short transfer ducts for noise control.
4. If fibrous lining is used for noise control in laboratory fume hood exhausts, the fibrous material shall not be exposed to the exhaust stream. (Rationale: Exposed fibrous material could pick up contamination over many years and require disposal as hazardous waste).

23 33 00 Air Duct Accessories

1. The mixed air section in air handlers shall be properly designed for air blending. Return air and outside air shall enter mixing box very close to each other and in a position that forces the two streams into each other, preferably with the cold outside air on the top. Ideally the two air streams shall be forced together at a higher velocity in the duct upstream of the mixing box. Air blenders alone do not solve the problem of poor entering duct arrangements. Be careful when using multiple air blenders side by side.
2. Screens in air intakes shall be mounted in such a way that they can be easily removed and cleaned. If the intake is in an area well, the grating sections shall be sized so one person can remove them. If the intake is not in an area well, sufficient space (about 3')



inside of intake plenums shall be provided where a person can get inside, remove and clean the screens. If this is not possible, the screens shall be placed on the exterior.

3. Air intakes shall be designed to prevent problems with plugged frozen filters. Intakes shall be kept as high off horizontal surfaces as possible. Low intake velocities shall be used. Ducts shall be attached high on intake plenums and plenums shall be deep enough to prevent high velocity concentrations near intake duct.
4. Filters shall be at least 4 feet from any outside louver and have added duct section on exterior of louver if the filters are less than 8 feet from the exterior to prevent precipitation from saturating the filters. Entering velocities shall not exceed 300 fpm.

23 36 00 Air Terminal Units

Variable flow devices shall not be used on biological safety cabinets.

23 40 00 HVAC Air Cleaning Equipment

23 40 50 General Requirements for Filters

Each filter type shall have its own separate filter bank.

23 70 00 Central HVAC Equipment

23 72 00 Air-to-Air Energy Recovery Equipment

1. All heat recovery units for critical systems where system shutdown is dangerous or difficult to schedule (e.g. fume exhaust) shall have tight dampers and a bypass arrangement so coils can be cleaned and maintained. Seal shall also lock into damper blades. Dampers shall be sized for full face.
2. Heat wheels shall be used anywhere possible to reduce heating and cooling loads. Where contaminated air streams might be present, UW-Madison Environment, Health and Safety shall be contacted.
3. Heat recovery coils shall be protected by filters.

23 80 00 Decentralized HVAC Equipment

23 82 00 Convection Heating and Cooling Units

23 82 16 Air Coils

Chilled water coils have a history of freezing problems. Individual coils shall be blown out with 90 psi air then the air dry shall be turned on. Coils shall be installed properly. Coils shall be leveled so they do not hold water in the return bends.



Division 26 Electrical

26 00 00 Electrical

For campus projects that require an electrical system shut down, a Power Outage Planning Form, found in Appendix – Division 26, must be completed and filed seven days prior to activity so it can be reviewed, approved, and coordinated with UW-Madison FP&M. If an electrical shutdown will affect a life safety system, UW-Madison Environmental, Health & Safety *Fire and Life Safety Impairment procedures* shall be followed.

26 05 00 Common Work Results for Electrical

26 05 05 General Requirements for Electrical

1. The electrical system design for all UW-Madison facilities shall comply with all of the provisions of the latest version of the Division of Facilities Development (DFD) Electrical System Standards & Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager. A qualified Electrical Expert should concur with any changes to the specifications.
5. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
7. Record drawings shall be kept up to date on the job site and turned over to the A/E prior to final pay requests. The drawings shall be prepared by the A/E in AutoCAD or Revit format in accordance with *Section 01 13 00*. The campus shall receive two paper copies as well as a CD for record drawings.
8. When ground fault protection is required on the main breaker, fully adjustable LSIG circuit breakers with electronic trip units shall be provided for feeder circuit breaker frame sizes 200A and greater. This second level of ground fault protection will improve the ability to coordinate the feeder breakers with the main breaker. The consultant shall identify all electronic trip circuit breakers on the one-line diagram.
9. All thermostats shall be located directly above light switches in private offices and conference rooms. These shall be placed next to the latch side of the door or side light. Coordinate with both mechanical and furniture plans.



10. The DFD lamp recycling specification should be used on UW-Madison managed projects as well as DFD projects.

26 10 00 Medium-Voltage Electrical Distribution

All buildings larger than 20,000 square feet or over 250 kVA of load on campus shall be provided with a looped primary feed.

26 13 00 Medium-Voltage Electrical Switchgear

1. Electrical Switching Protocol: A UW-Madison Physical Plant electrical engineer shall be involved in all electrical switching activities. Only UW-Madison Physical Plant electricians shall operate medium voltage switches (4,160 volt and 13,800 volt). To arrange electrical switching activities, the contractor shall send a date-stamped request to UW-Madison Physical Plant Customer Service.
2. Indoor Metal Enclosed Air Interrupter Switch: All efforts shall be made to serve each building on campus with a looped primary feed to allow building to remain in service when an outage must take place.

26 30 00 Facility Electrical Power Generating and Storing Equipment

26 32 00 Packaged Generator Assemblies

26 32 13 Engine Generators

1. All emergency generator installations shall comply with local noise ordinances.
2. Provisions shall be made for year-round access to the fuel port by a standard truck and gravity-fill hose at a distance no greater than 100 feet.
3. When determining generator locations, the possibility of soot staining of nearby building surfaces and cross contamination to nearby air intakes shall be considered.
4. All emergency generators shall be located inside buildings whenever possible.
5. On the rare occasion when the project supplies the UPS systems, they shall be designed for the specific application of use on emergency generators. Frequency shift of emergency generators, when loads are placed “on” or “off” the system, shall be considered. UPS systems installed by the project shall be able to tolerate this frequency shift without short-cycling the UPS.
6. Large generators shall require synchronizing switches and their related shunt trip protection. Refer to *Division 26 36 00 – Transfer Switches*.
7. Contractors shall test emergency generators under full load (load bank.) Generator shall be refueled upon turn over to the University.
8. Generator fill pipes shall be located above grade and external to the building. No pressurized filling to the generator shall be permitted. Use gravity feed with remote fuel level monitoring when necessary.
9. Generator installations shall be designed and located to incorporate air transfer for makeup air without the need to be fan motor driven, i.e. use area wells or dampers without fans. Generator rooms shall also be designed to not freeze the sprinkler



protection system when the generator is running. Modulate return air dampers for generator radiator exhaust shall be used to maintain room temperature when outside ambient temperature is too low.

10. Makeup air dampers shall be sized to be 1.5 times the size of the radiator. This is the industry standard.
11. Generator controls shall be installed at no more than 6 feet above finished floor. Proprietary controls shall not be permitted.
12. An extra set of filters and belts shall be supplied. Oil and oil filters and fuel filters shall be changed at the end of the first year warranty period by the contractor.
13. Emissions and fuel consumption data over varying loads shall be provided.
14. Provide 2 hard copies of the complete O&M parts and service manuals. All wiring diagrams and as-built drawings shall be included.
15. Engine block heaters shall have isolation shut off valves installed at the block. Heaters shall be controlled not to exceed 105 degrees Fahrenheit.
16. Radiators on generators that exceed 350 kW shall have sight glasses or sight bubble installed.
17. Air dampers for intake and exhaust air shall follow UW-Madison DDC protocol for sequence and function.
18. All diesel fuel tanks shall have fuel gauges and a threaded port for manual tests of fuel levels.
19. Provide 2 year parts and labor warranty.
20. Rooms and fuels tanks shall be properly marked with correct NFPA 704 diamond.

26 36 00 Transfer Switches

1. It shall be preferred to have multiple transfer switches in place of single higher amperage transfer switches. Switches shall be maximum 400 amps whenever possible. This will reduce the liability when and if an equipment failure occurs.

26 37 00 Photovoltaic Systems

1. Photovoltaic systems shall comply with all provisions of the UW Madison – MGE memorandum of understanding document.
2. Photovoltaic systems shall comply with the latest published NEC article 690.
3. Photovoltaic systems shall not be installed on buildings which are a subfeed from another building (for instance Ramp 67 which is supplied from Meat Science).
4. Photovoltaic system interconnections shall connect to an overcurrent device on the load side of a buildings main switchboard breaker.
5. A lockable interconnection fused disconnect switch with a visual open shall be located as close as possible to the building's main switchboard. All photovoltaic inverters shall be consolidated onto a single feeder which terminates into this single switch.



6. A campus standard power quality and demand meter package shall be installed on the load side of the interconnection switch. The meter shall be connected to the campus Metasys system by the installing project.
7. The following shall not be used on the UW Madison campus:
 - 7.1. Single panel micro-inverters.
 - 7.2. PV equipment and manufacturers which have less than 5 years of proven reliable service.
 - 7.3. Equipment which is proprietary and has no equivalent from a second manufacture.
 - 7.4. Building integrated photovoltaics which combine a photovoltaic surface and structural elements such as roofing or glazing.
8. Inverters for building mounted PV systems shall be in a weather protected location which includes walls and a roof. For buildings with maintenance funded 100% by program revenue, this is only a guideline.
9. Solar array design shall take into consideration building maintenance: roofing and access to roof mounted mechanical equipment. PV systems shall not be installed on roofs which are approaching end of life.
10. Electrical and structural design documents and calculations shall be sealed by an engineer licensed in the State of Wisconsin.

26 40 00 Electrical and Cathodic Protection

26 41 00 Lightning Protection Systems

26 41 13. Lightning Protection for Structures

The project design team shall consult with the campus electrical engineer for input.

26 50 00 Lighting

26 51 00 Interior Lighting

Interior Lighting is to be specified using DFDM Master Specification Section 26 51 13.

26 55 00 Special Purpose Lighting

26 55 30 Emergency Wall Packs

1. Emergency wall packs to be Lithonia ELM2L M12 LED Emergency Lights, Exit signs to be red-only Lithonia EXRG EL M6 LED exit sign or red-only Lithonia ECRG RD M6 exit and emergency combination light, and exterior remote lamp heads for exterior emergency egress lighting shall be Exitronix MLED2-G-WP fixtures. For fixtures in locations with emergency power generators or other approved backup power systems exit sign fixtures shall be Lithonia LQM s W 3 R 120/277 M6 red only, A/C only.



26 55 60 Parking Structure Lighting

1. Floors inside parking structures shall be lit by an average of 5 foot candles using a 4:1 minimum/maximum ratio on the average lighting levels.
2. Roof top floors of structures shall be lit with a 2 foot candle standard on average. Use campus standard lights. See Division 26 56 00.
3. All perimeter lights shall be regulated by photo cell devices so they can be turned off during daytime hours.
4. Exterior perimeter lighting shall follow campus standards. See *Section 26 56 05 Exterior Lighting Fixtures*.

26 56 00 Exterior Lighting

26 56 05 Exterior Lighting Fixtures

1. Site Lighting is to be specified using DFD Master Specification Section 26 56 29.
2. Provisions for control of exterior lighting circuits shall be made through the campus building control system (Johnson Controls METASYS).
3. Exterior spaces shall be lit with a 0.5 foot candle standard on average.
4. All exterior lights shall be LED.
5. Exterior lighting fixtures shall be the campus standard Kim Archetype as identified below. These are a sole source item. No substitutions. DFD requires a Class 1 notice to be included in the specifications.
 - 5.1. The Archetype Model SAR LED on 14 foot poles and the Archetype Model AR LED on 25 foot poles are the campus standards.
 - 5.2. Lamps shall be LED 4100K. Use PicoPrism or PicoEmitter.
 - 5.3. The Kim standard arm to connect light fixture to pole shall be used with vertical slipfitter.
 - 5.4. The vertical slipfitter mount shall be round 2 3/8" x 4".
 - 5.5. Exterior lighting shall be controlled from Metasys VTG lighting contactor. Metasys to be hooked up by the UW-Madison Electric Shop.
 - 5.6. Color of the light fixtures, light poles, arms, vertical slipfitter mounts, and base covers shall be smooth black.
 - 5.7. Poles shall be aluminum, round, smooth (no flutes) and straight (non-tapered).
 - 5.8. The 14 feet tall, 4 inch diameter pole is the campus standard for pedestrian areas. Standard 20 foot and 25 foot poles are 5 inch diameter, and some 30' poles are 6 inch diameter. All poles with accessories added to them need to be designed/approved by the manufacturer.
 - 5.9. Base cover shall be the Kim Standard Base Cover (Round) and sit on a concrete base of 5 inch larger diameter.



6. The campus standard exterior “Historic” light fixtures are the Sternberg Main Street, Model MS805LED and MS605(A or B, with or without spikes, for both). Use of these fixtures shall be identified and approved by UW-Madison Campus Planning & Landscape Architecture (CPLA). These are a sole source item. No substitutions. DFDM requires a Class 1 notice to be included in the specifications.
 - 6.1. Lamps shall be LED 4100K.
 - 6.2. Fixture may have decorative spikes (A); consult with UW-Madison CPLA.
 - 6.3. Lens shall be clear seeded acrylic (CSA) unless there are glare concerns. Frosted acrylic may then be used. Any deviations shall be approved by UW-Madison CPLA.
 - 6.4. Post top (PT) mounted fixture shall be used.
 - 6.5. Color of light fixture, pole and all components shall be black, except on Bascom Mall, where concrete poles to match existing shall be used.
 - 6.6. Poles shall be 14 feet tall, 4 inch or 6 inch diameter
 - 6.6.1. The pole and base shall be one of the following with consultation and approval by UW-Madison CPLA. Selection will depend on location, scale of space, and existing adjacent light poles.
 - 6.6.1.1.1. Oxford Series 6200, tapered, fluted shaft
 - 6.6.1.1.2. Leesburg Series 3800, straight, fluted shaft
 - 6.7. Single fuse and holder (SF) shall be included.
7. Concrete pedestals/footings for light poles shall be 36 inches above grade in parking lots and 6 inches above grade in all other areas.
 - 7.1. The base shall have a 1 inch chamfer at a 45 degree angle and rubbed finish. The top of the base shall have a circular broom finish.
 - 7.1.1. Provide construction detail in 35% plan set.
 - 7.2. Diameter of concrete bases/footings shall be kept to a minimum but also provide required structural support and be larger than base cover (shroud) for the lamp base. The base cover shall not overhang the concrete pedestal/footing.
 - 7.3. The base cover shall sit flush on the concrete base without any gap.
 - 7.4. The concrete pedestals/footings of multiple light poles in proximity to one another, typically, shall have consistent heights. Light poles in proximity to one another, both existing and proposed, shall have the same pole diameters and same top of pole height (length of pole + height of concrete base).
8. Exterior lighting shall be limited to what is required for security and safety.



9. Recessed wall lighting, step lights, handrail lights, and bollard lights (LED and non-LED) are strongly discouraged because of maintenance challenges. Do not use in-ground or in-concrete fixtures.
10. Control of light pollution continues to be an important issue on the campus. Up-lighting and/or building accent lighting shall not be specified. All lights shall have sharp cut offs and be Dark Sky Compliant.
11. Wall mounted light fixtures shall be avoided. Pole mounted lights are the campus preferred method of illumination and shall be used whenever possible.
12. All exterior light fixtures within the project boundary shall be updated to meet current campus standards. Non-standard lights shall not be reinstalled.
13. An exterior lighting plan with schedule that identifies location and type of all exterior lights including pole mounted and building mounted fixtures shall be provided.
 - 13.1. The light schedule for exterior lights shall be on the same sheet as the lighting layout plan.



Division 27 Communications

27 00 00 Communications

27 05 00 Common Work Results for Communications

27 05 05 General Requirements for Communications

1. The communications system design for all UW Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) Communications Structured Cabling System Standards & Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW Project Manager on UW Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW Project Manager.
5. The UW Guidelines take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW Project Manager.
6. The UW is primarily all VOIP service; in rare cases where analog service is needed, consult with the UW-Madison Division of Information Technology (DoIT).
7. The following color scheme for cable jackets shall be followed:
 - 7.1. Blue – data non plenum
 - 7.2. Pink – data, plenum
8. The following color schemes for inside plant (ISP) fiber cable jackets shall be followed:
 - 8.1. Yellow – single mode
 - 8.2. Orange – multi-mode 62.5 micron data (not typically installed. Consult DoIT for recommendations) (No longer used on Campus)
 - 8.3. Aqua – multi-mode 50 micron (not typically installed. Consult DoIT for recommendations) (No longer used on Campus)
9. Flush mounted data jacks shall be specified for wall installation in lieu of angle mounted data jacks.
10. Data jacks shall have removable dust covers installed during construction.



27 05 29 Area of Refuge Communications

1. Two-way communication systems shall provide communication between each required location and the fire command center or a central control point location approved by the fire department. Where the central control point is not a constantly attended location, a two-way communication system shall have a timed automatic telephone dial-out capability to a monitoring location or 9-1-1. The two-way communication system shall include both audible and visible signals. The devices are tied to the fire command center and reported via Metasys. Review the campus ADA coordinator's policy on AOR communication devices. Area of rescue assistance communication shall comply with 2015 International Building Code (IBC) Chapter 10 Section 1009 Accessible Means of Egress.
2. Emergency phones are different than the communication devices for AORs. These phones dial 911. Review with UW Safety and UW Police and Security as to where these may be required. Each phone needs to have a unique phone line and likely needs a power supply. Currently the standard product for this type of phone is Code Blue. Exterior phones (post mounted outdoors or those in parking structures) need to be capable of withstanding severe cold.
3. The selected system must be UL Listed and shall be comprised of an Internal Call System and an External Call System. The internal call system shall be utilized to inform an emergency responder of an occupied area of rescue location. It is located at the fire command center and each lighted signal shall be clearly labeled to indicate the location from which the signal is being sent. Contact the UW FP&M Facilities Access Specialist for proper labeling details. The external call system shall be utilized by building occupants to call for assistance (per IBC). The AOR communication device shall be programmed to simultaneously connect with the fire panel and UW Police Department (UWPD) via the building automation system (BAS). Design coordination for this system shall be with both UW Electric Shop and UWPD.
4. The communication device shall be provided with an automatic voice location identifier in case the person calling is incapable of speaking.
5. All equipment choices must be thoroughly reviewed and approved by DDC, EH&S Fire & Life Safety, UW Electric Shop, Facility Access Specialist, and UWPD staff prior to finalizing the system selection.

27 05 53 Identification for Communications

1. Please refer to the UW Division of Information Technology (DoIT) Infrastructure Labeling Standards for voice/data jack labeling: [UW Division of Information Technology \(DoIT\) Infrastructure Labelling Standards](#).

27 10 00 Structured Cabling

27 11 00 Communications Equipment Room Fittings

27 11 05 UW Network Telecommunications Room Standards

1. For new UW-Madison buildings, major remodeling, and renovation projects, please refer to the UW standard telecommunication room specifications, i.e. 27.11.05.04.
2. For existing buildings, upgrade existing telecommunications rooms to conform as closely as possible to the standards established for new buildings.
3. Background:



-
- 3.1. At UW-Madison, buildings are designed using the structured cabling method. Telecommunication rooms are used as cross-connect facilities to:
 - 3.1.1. Cross-connect outside plant cable pairs/strands to building riser pairs/strands.
 - 3.1.2. Cross-connect inside plant riser cable pairs to horizontal cable pairs.
 - 3.1.3. Terminate communication cables (fiber, copper, coaxial and special purpose).
 - 3.1.4. House active electronic equipment such as campus network switches and routers which are mounted in data racks, and alarms and security related equipment. These rooms are typically secured via high security keyway (Primus) and preferably a card reader (campus standard Andover.)
 - 3.1.5. Environmental sensor controls or building automation systems may be co-located in the telecom rooms or may be located elsewhere at the direction of the UW Physical Plant. If both network and building automation system equipment is co-located, both DoIT and Physical Plant must be consulted in the design and the size of the room must be adequate to support both functions.
 - 3.1.6. Audio system controls and campus clock synchronization electronics also need space, but are to be located outside of the above referenced equipment rooms.

4. Standards:

- 4.1. Size of Rooms: [UW Division of Information Technology \(DoIT\) Equipment Room and Telecommunications Room Minimal Configurations.](#) A formula that is used to compute telecommunication room size is: Nationally, a standard work area is defined as 10 square meters. The formula to calculate the telecommunications room size is: 0.07 square meters times the number of 10 square meter work areas. For a floor with 200 work areas the room size would be 14 square meters. On campus we specify room sizes of 180 square feet for a new or renovated building. For the main telecommunications room, the minimum size would be 180 square feet, but the size may be larger depending on the size of the building and the role the building assumes in the campus network topology. For instance, if a main telecommunication room serves as a supernode or node, then more space will be required for additional network equipment racks. (See Division 27 Detail 1 at the end of this section for UW Division of Information Technology (DoIT) Equipment Room and Telecommunications Room Minimal Configurations.)
- 4.2. Geographic: Locations within a building should be:
 - 4.2.1. Vertically stacked with access directly from corridor, not accessible via another room.
 - 4.2.2. Have sufficient telecommunication rooms to meet the horizontal cable distance limitations.
 - 4.2.3. Easily accessible to cable pathways (internal and external to Telecom Room)



- 4.2.4. Conveniently located for the delivery and/or removal of equipment
- 4.2.5. Avoid areas of electromagnetic interference
- 4.2.6. Not be located near or under areas subject to water or steam infiltration or excessive heat such as mechanical, kitchens, shower, or toilet rooms.
- 4.2.7. Not be located in a corrosive atmosphere

4.3. Locating Storage in Telecommunication Rooms:

- 4.3.1. For new buildings and/or significant renovations, the telecommunication rooms shall be designed for this single purpose. There is to be no sharing with other facilities such as server rooms, building maintenance/custodial, and electrical rooms.
- 4.3.2. For existing telecommunication rooms that are to be upgraded to this standard, every effort will be made to eliminate sharing. If this is not physically possible, the telecommunications portion of the room should be segregated by means of a secured physical barrier such as a wire cage or partition. All requirements as stated shall be applied.

4.4. The following items shall not be stored in telecommunication rooms:

- 4.4.1. Cleaning chemicals and cleaning equipment
- 4.4.2. Office and computer supplies, especially toner and printer paper
- 4.4.3. Grounds keeping chemicals and equipment
- 4.4.4. Petroleum or other fuels
- 4.4.5. Hazardous materials such as asbestos

4.5. Telecommunications Room Arrangements:

- 4.5.1. A telecommunications room must include sufficient space for wall mounted blocks and racks with a minimum of 42" clearance in front and 72" clearance from front of rack to back wall or nearest obstruction and 36" side clearance on one side of the rack for rear access by maintenance technicians.

4.6. Electrical Power:

- 4.6.1. The telecom rooms shall be fed by dedicated power. The equipment shall be on a feeder separate from the feeder for the room's lights, HVAC, and other utilities.
- 4.6.2. Individual branch circuits to large telecommunication electronics equipment shall be provided.
- 4.6.3. Power conditioning and backup power shall be provided only where required. The building occupants can request to place the network equipment on uninterruptible power supplies or at the discretion of DoIT, place these racks on the building's emergency generator. In this case,



commercial power must be provided in addition to the emergency power connections.

4.6.4. A dedicated grounding and bonding system tying together all the telecommunication rooms to the building grounding electrode system shall be installed.

5. HVAC/Plumbing:

- 5.1. The room temperature should be in the range of 64 to 75 degrees Fahrenheit. If this range can be maintained by the incorporation of adequate ventilation means, then mechanical cooling is not required. If this temperature range cannot be maintained by ventilation alone, then mechanical cooling will be required. A 20% growth factor for cooling/ventilation shall be included in the design.
- 5.2. The relative humidity shall range from 15% to 55% adjusted to the outside temperature.
- 5.3. The heat dissipation per rack shall range from 750 to 5000 BTU. The heat dissipation of the uninterruptible power supply(s) shall also be calculated.
- 5.4. If mechanical cooling equipment is installed, it is desired they be located remotely. If they must be installed within the room, they shall be installed on the wall at 4'-0" AFF or less, with adequate distance from the voice wall field to remove the chance for condensation.
- 5.5. All piping and ductwork that do not serve the telecommunications room shall be routed such that they do not pass through or over the room. Likewise, fittings and/or valves shall not be located over or adjacent to racks.

6. Room Infrastructure Characteristics:

6.1. Walls:

- 6.1.1. Paint with two coats of light colored paint.
- 6.1.2. Include 3/4" plywood installed onto which hardware shall be mounted. The plywood can either be fire retardant or painted with two coats of fire retardant paint.

6.2. Floor:

- 6.2.1. Has a smooth surface that does not raise dust or produce static electricity. Sealed concrete or VCT are acceptable.
- 6.2.2. No floor drains are permitted in telecommunication rooms. If the space is below grade, other accommodations shall be made to ensure the room is not subject to moisture or water.
- 6.2.3. Has distributed floor load rating of 4.8 kPa (100 lbf/ft²).
- 6.2.4. Has a concentrated load rating up to 12.0 kPa (250 lbf/ft²).

6.3. Ceiling:

- 6.3.1. Height – at least 8' - 6".



6.3.2. No protrusions that will preclude a minimum clear height of 8' – 0".

6.3.3. Painted in a light color with non-dust producing paint.

6.3.4. No ceilings of any type shall be installed. Leave the area exposed to structure.

6.4. Doors/Security:

6.4.1. At least 3' wide x 6'-8" high with sweeps to keep dust out.

6.4.2. A double door is recommended for large equipment rooms 6' wide x 7'- 6" high.

6.4.3. Doors shall be secured by the access control system and a high security keyway (Primus.)

6.4.4. Access is limited to DoIT certified authorized agents and a restricted set of Physical Plant personnel (e.g. electricians).

6.4.5. Video surveillance cameras may also be installed to cover key telecommunication rooms.

6.5. Fire Protection:

6.5.1. If dry sprinklers are required by code, protect the sprinkler head to reduce the possibility that the head could accidentally discharge.

6.5.2. Fire stop all room penetrations (e.g. cables pathways, trays, conduits, slots) as required by code and DFD specifications.

6.6. Lighting:

6.6.1. Adequate and uniform lighting measuring 50 foot candles at 3' above finished floor (AFF), especially at the front and back of racks.

6.6.2. Emergency lighting is required within the room.

6.7. Equipment Racks:

6.7.1. For main telecommunication room, provide at least three which are 7'-0" high by 19" racks. More may be required if the room is also a supernode or node.

6.7.2. All racks shall include 6" wide, double sided wire managers on both sides of the rack.

6.7.3. Two double duplex receptacles (1 on bus A and 1 on bus B) shall be installed on the rear of each rack, at the bottom. DoIT shall provide a mounting bracket.

6.7.4. Unless a raised flooring is installed, all jumpers and cabling will be fed to the racks from overhead installed cable trays/pathways.



6.8. Telecommunication Blocks:

- 6.8.1. Telecommunication blocks compatible with the type of telecommunications cable to be installed, shall be securely mounted on the plywood backboard.

27 16 00 Communications Connecting Cords, Devices and Adapters

1. Cross-connect outside plant cable pairs/strands to building riser pairs/strands.
2. Cross-connect inside plant riser cable pairs to horizontal cable pairs.
3. To house active electronic equipment such as campus network and local area network (LAN) hubs/servers/routers, alarms and security equipment, environmental sensor controls, audio system controls and campus clock synchronization electronics.
4. To terminate telecommunication cables (fiber, copper, coaxial and special purpose)

BICSI Telecommunications Distribution Methods Manual (Latest revision) shall be used as a reference in addition to the UW-Madison guidelines noted within.

27 50 00 Distributed Communications and Monitoring Systems

27 53 00 Distributed Systems

27 53 13 Clock Systems

1. A central building clock system, with very few exceptions, should be included in all building projects. Use synchronizing GPS broadcast signals for new buildings not currently on the campus clock system.
2. All buildings shall have stand-alone GPS 120 volt clock systems.
3. All instructional areas shall have a soft tone classroom bell system.
4. Provide digitally operated clocks in appropriate public spaces, classrooms, lecture halls, student spaces, conference rooms, and laboratories and other areas at user's request. Number size should be selected based on the distance and view angle. Clocks in corridors should be double faced and mounted on a stem perpendicular to the wall. The style of clocks can be determined by designers as long as they are part of a stand-alone GPS system that utilizes 120 volt clocks.



Division 27 Detail 1

UW Madison Voice & Data Jacks

Several different types of voice and data jacks with different types of labeling schemes are installed on the UW-Madison campus. The intent of this document is to provide standards for the installation and labeling of these jacks to promote consistency and avoid confusion.

New construction or large remodeling projects:

Voice jacks – Terminate and label as diagrammed on page 2

Data jacks – Terminate and label as diagrammed on page 3

Small remodeling projects where an existing ER (MDF) or TR (IDF) will be used:

Follow the wire termination and labeling schemes currently being used in that MDF or IDF (see appropriate figure), **EXCEPT:** If there are currently both voice and data USOC jacks in an ER or TR **AND** more than half of the current jacks will be replaced, then use:

Voice jacks – Terminate on new Cat 6 110 blocks and label as diagrammed on page 2

Data jacks – Terminate on a new Cat 6 patch panel and label as diagrammed on page 3

Standard jack label (example):

Example = B150E - TA102 or B150E - DA012

B150E: represents the Telecommunication Room

T: represents Voice jack, D: represents a Data jack

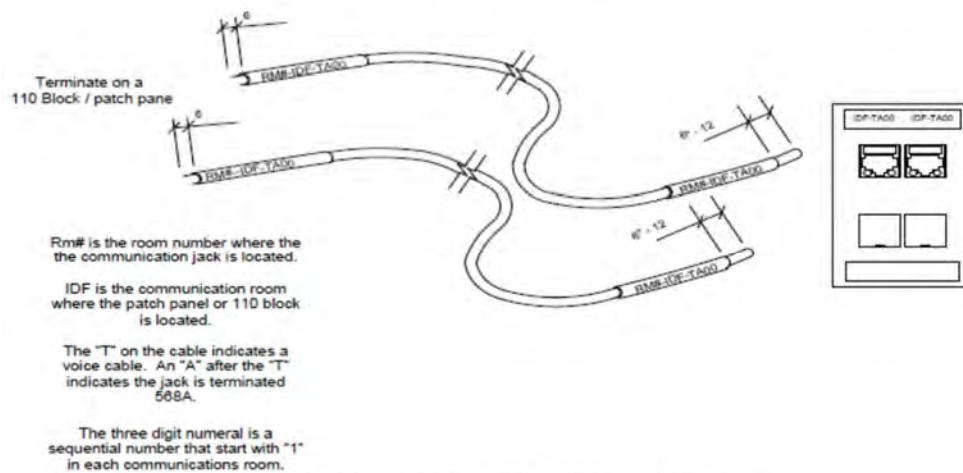
A: represents 568A termination on the jack

012: represents a sequential number for the jack. The voice and data jacks in each telecom room shall start with 001.

NOTE: If there are questions regarding the type of termination or labeling that should be used, dial 608.262.7474 to request a consultation. A technician or engineer will meet with the telecom consultant or installer. Any re-work required by the installer, because they failed to get clarification, will be the responsibility of the installing vendor.

1

Voice Labels



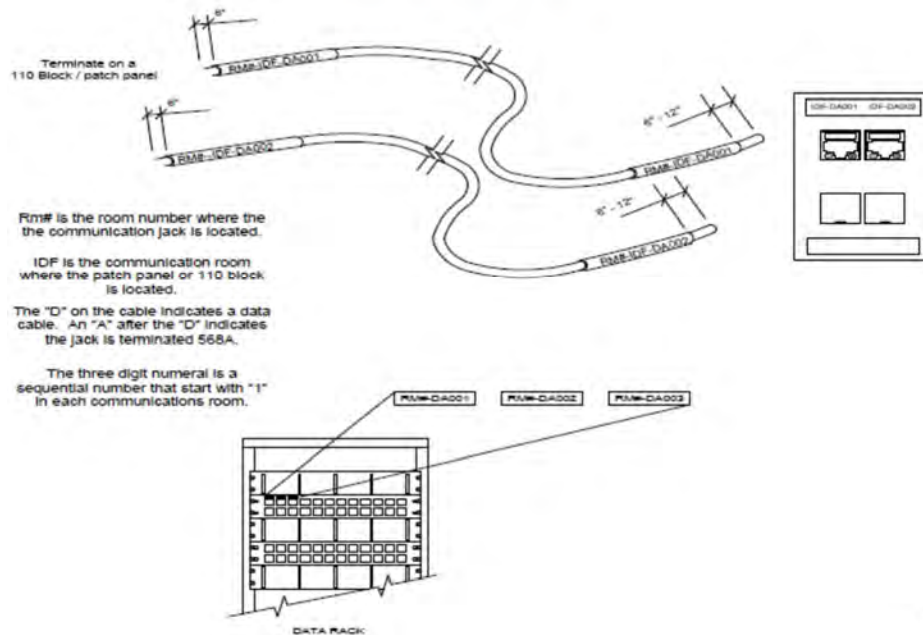
| | | | | | |
|----------|----------|----------|----------|----------|----------|
| Rm#-TA00 | Rm#-TA00 | Rm#-TA00 | Rm#-TA00 | Rm#-TA00 | Rm#-TA00 |
| Rm#-TA00 | Rm#-TA00 | Rm#-TA00 | Rm#-TA01 | Rm#-TA01 | Rm#-TA01 |

110 Blocks mounted on plywood
back board painted with fire
retardant pain

2

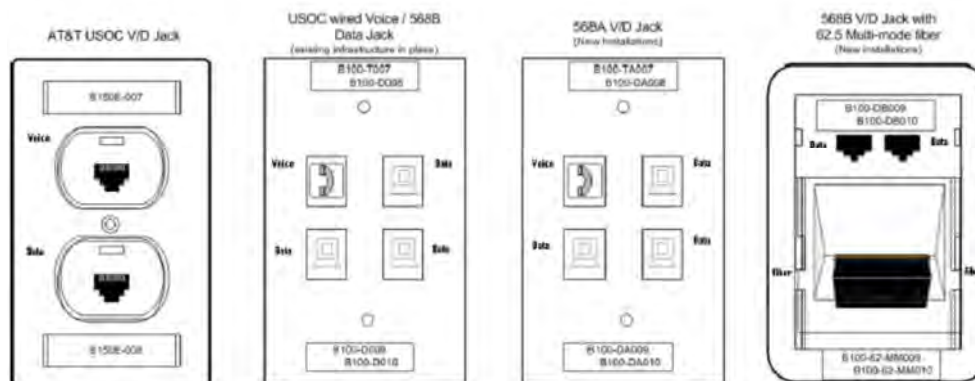


Data Labels



3

Voice and Data Jack Labels at Desktop



4

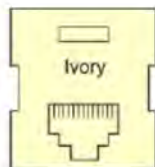


UW Cable Color Code

- Non-Plenum Cable
 - Voice White
 - Data Blue
- Plenum Cable
 - Voice Purple
 - Data Pink

5

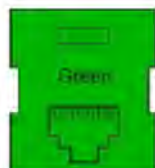
UW Jack Color Code



Telephone



Data - Room to IDF/MDF



Data - Special applications
Jacks not going back to an IDF/MDF

6



Video Jack Labels

Coaxial Video Jack Labels

| | |
|-----------|-----------|
| B100-V001 | B100-V007 |
| B100-V002 | B100-V008 |
| B100-V003 | B100-V009 |
| B100-V004 | B100-V010 |
| B100-V005 | B100-V011 |
| B100-V006 | B100-V012 |

NOTE: The above shows an example of a twelve jack installation; an ER/TR can have any number of jacks.
There shall be no duplicate jack labels in any building.

7

Fiber Jack Labels

Single Mode Fiber Jack Label

| | |
|------------|------------|
| B100-SM001 | B100-SM007 |
| B100-SM002 | B100-SM008 |
| B100-SM003 | B100-SM009 |
| B100-SM004 | B100-SM010 |
| B100-SM005 | B100-SM011 |
| B100-SM006 | B100-SM012 |

62.5 micron Multi Mode
Fiber Jack Label

| | |
|---------------|---------------|
| B100-62-MM001 | B100-62-MM007 |
| B100-62-MM002 | B100-62-MM008 |
| B100-62-MM003 | B100-62-MM009 |
| B100-62-MM004 | B100-62-MM010 |
| B100-62-MM005 | B100-62-MM011 |
| B100-62-MM006 | B100-62-MM012 |

50 micron Multi Mode
Fiber Jack Label

| | |
|---------------|---------------|
| B100-50-MM001 | B100-50-MM007 |
| B100-50-MM002 | B100-50-MM008 |
| B100-50-MM003 | B100-50-MM009 |
| B100-50-MM004 | B100-50-MM010 |
| B100-50-MM005 | B100-50-MM011 |
| B100-50-MM006 | B100-50-MM012 |

NOTE: Terminate outside plant fiber in a box separate from the inside plant fiber wherever possible. Single Mode and Multi Mode fiber should share sequential numbering. If 62.5 micron and 50 micron fibers are terminated in the same ER/TR, then these shall also share sequential numbering.

8



Fiber Cabinet Labels

Outside Fiber Box Label

[illegible]

Inside Fiber Box Label

[illegible]

NOTE: Fiber cabinet labels are generated by DoIT Network Field Services. Please call 608.262.7474 to request a for a fiber cabinet label to be generated. Outside plant fiber cable numbers are assigned and tracked by DoIT Network Infrastructure Engineer; please contact Al Sauer (608.263.7735).

9

Inside Plant Fiber Optic Cable Labels

Bldg #/Starting Location (IDF/MDF Rm #)/Cabinet #/Pair Count/Diameter/End Location (Rm #)/End Cabinet #

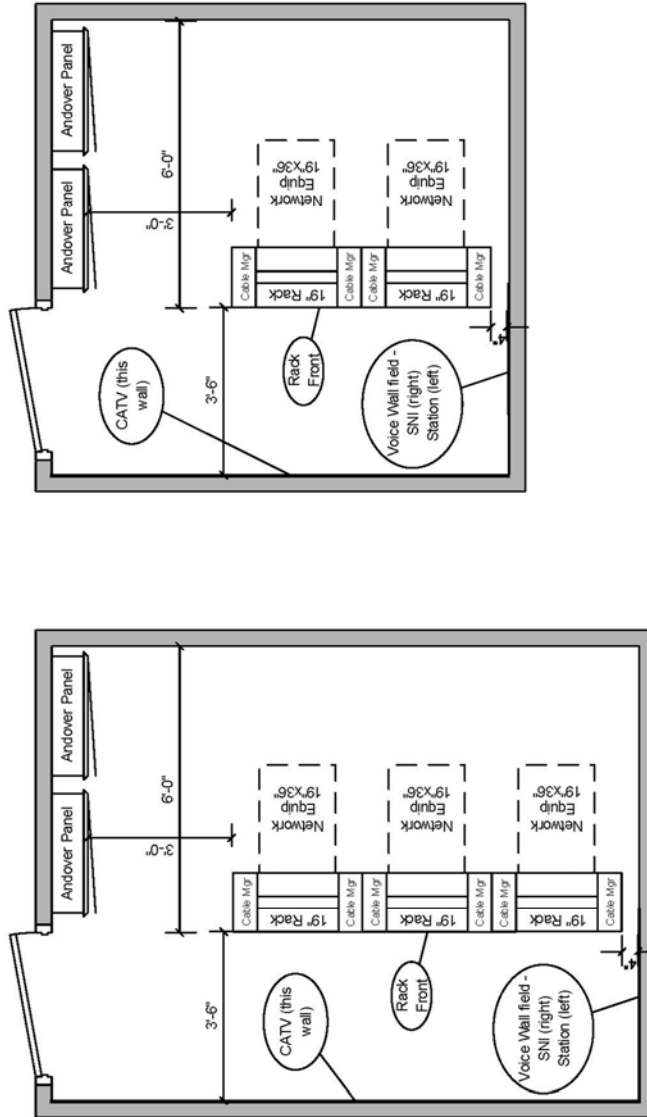
Example:

0155/B150E/Cabinet 1/Strands 1 to 12/62.5 micron/B116/Cabinet 4



Division 27 Detail 2

UW-Madison, Division of Information Technology (DoIT) – ER & TR Minimum Configurations



- Rack = 19" EIA, 2-post; 3 racks (minimum) per ER; 2 racks (minimum) per TR
- Vertical Cable Manager = 6 inches (minimum) wide, double sided; two (2) per rack
- Rack w/2 Vertical Cable Managers = 33"w
- Patch Panels = 48 port (2RU); 240 ports (maximum) per rack
- Voice Riser and Station 110 Modular block adjacent to rack, in front
- Minimal Clearances = 42 inches (between rack front and wall field/nearest obstruction); 72 inches (rack front to nearest wall/obstruction behind); 4 inches (one side); 36 inches (one side)
- Secure top of rack row at both ends (minimally) for stability
- Field verify with DoIT Network Infrastructure before installing racks and overhead cable ladder rack
- 36 inch door with swing into the corridor
- Andover Panels = 30"w 40"h 8"d; 36" access/clearance required; panels not required to be located in room

ER & TR Configuration Revised 2013-11-14.vsd

Revised: June 5, 2017



Division 28 Electronic Safety and Security

28 10 00. Electronic Access Control and Intrusion Detection

28 11 00. Electronic Access Control

28 11 05. Electronic Access Control for New Construction

1. General Requirements:

- Refer to UW-Madison Policy UW-404 Building Electronic Access Control, which can be found on the UW Madison website.
<https://policy.wisc.edu/library/UW-404>
- All significant projects and non-Capital projects shall consult with designated UWPD personnel to see if the project covers any areas where access control is required.
- At a minimum for new construction projects, access control shall be provided on the following doors:
 - Exterior points of entry (electronic locks for the purpose of remote lock/unlock on all – card/credential reader doors will be limited to the amount needed for sensible traffic flow dependent upon building size and occupancy)
 - Access to animal care areas.
 - High security areas including as mandated by federal and/or state regulations and guidelines.
 - Personnel record storage.
 - Sensitive and critical mechanical spaces.
 - Telecom rooms, server rooms.
 - MDF/IDF rooms
 - Those rooms deemed necessary by the building occupants or UWPD.
- Electronic access control in required areas shall not be removed from plans without written consent from UWPD.
- Lenel OnGuard, is the campus standard implemented by UWPD and the UW-Madison contracted integrator. All decisions for access control systems within new construction shall be coordinated jointly with the building occupants, UWPD, UW-Madison contracted integrator, and UW Facilities Planning & Management. The design team shall be responsible for engineering the system in cooperation with those listed above.
- The entire access control system for UW-Madison buildings is funded by the project. It will be designed and installed via a partnership between the design team, UWPD, the UW-Madison contracted integrator, and the Electrical Contractor.
- During the design and development phase of the project, once the security requirements for the building are understood, cameras are located, and doors are noted as having or not having access control features, the UWPD shall receive a request for a cost estimate and funding string to bill to begin work with the UW-Madison contracted integrator.



- The UWPD and the UW-Madison contracted integrator shall provide commissioning services for the following equipment.
 - Lenel mercury head end equipment
 - Termination of the head end equipment
 - Commissioning of the system

The Electrical Contractor shall provide and install all raceways, end of the line resistors cabling, request to exit devices, door hardware, and other devices such as electric locks and local alarm horns. The Electrical Contractor shall also be responsible for installing Life Safety power enclosures (with tamper switches), HID Signo card readers, biometric devices and pin devices, all of which are purchased through the UWPD and the UW-Madison contracted integrator. These items shall be installed on building façade and walls according to UW Physical Plant specifications and may be inspected by UW-Madison quality assurance personnel.

- The Electrical Contractor, working with the UWPD and the UW-Madison contracted integrator may provide the following documents and drawings during this phase.
 - Door location drawings
 - Lenel Mercury panel layout
 - Door detail drawing
 - Riser prints
 - Panel take-offs
 - Contractor termination details
 - Related Cut Sheets
 - Resistor pack layout
 - Camera locations
- Electrical contractors shall use cat 6 or better for cabling between the head end and the network switch. Coordinate installation with UW-DoIT. For standard doors, the electrical contractor shall use shielded access control all-in-one composite cabling for the head end to the door and additional AWG 18 wiring for doors with ADA openers, in/out carding and other doors with additional switches or devices.
- Rack-based head end equipment should reside in the MDF. Any rooms housing head end equipment shall have electronic access control devices. Intelligent System Controllers (ISCs) shall be located within 500 feet (cable length) of the doors they serve, preferably in telecom rooms or electrical rooms, consistent floor to floor. The design team shall be responsible for educating themselves on the system in order to determine panel sizes and required and capacity issues.
- UWPD shall issue appropriate access credentials for contractors. Project Managers must send an approved list of contractors requiring credentials to UWPD. After notification, contractors will be directed to UWPD to obtain access credentials.
- Any door with electronic access control shall have either a UWPD high security keyway core, or for an electronically access-controlled classroom doors a standard classroom key may be used.



- All hardware groups for doors with credential readers and electric locks shall have door contacts and Request to Exit (REX) devices including doors in a pair and inactive-leaf doors. UWPD does not recommend motion detector-type REX's. Internal REX devices are required, except when existing conditions do not permit, these locations may be equipped with motion detector-type REX devices. Doors are not actively monitored at this time by UWPD unless special arrangements have been made.
- The UW utilizes magnetic hold-opens but does not permit magnetic locks unless this is the only way to secure the door.
- UWPD uses several configurations to describe attributes they require on doors with access control. Possible sample configurations are as follows:
 - Config 1 – Electronic latch retraction (crash bar), card reader, REX device, door contacts. Latch bolt status monitor (optional).
 - Config 2 – Electronic latch retraction (crash bar), door contacts, latch bolt status monitor (optional). Internal REX device. No Card Reader
 - Config 3 – Card reader with keypad, door contacts, electric lock, and REX
 - Config 4 – Card reader (standard), door contacts, electric lock and REX
 - Config 5 – Electric Locks, door contacts, and REX
 - Config 6 – Emergency egress device (crash bar), door contacts, local alarm
 - Config 7 – Card reader with Biometric access, REX (Request to Exit), door contacts.
- UWPD shall work with building occupants to set up their security groups. A single representative for the new facility or a representative for each department (school) housed within the facility shall work with UWPD to assign access rights to individual end users. After the initial set-up of the system, UWPD may train building representatives on the use of a "web-client" to modify access requests for their spaces.
- It shall be noted that when the ability to alarm an area (door position switch) is absent, and physical security features are lacking (such as latch guards and pinned hinges), an access control device does not provide a higher level of security than a standard key lock; however, it does provide key control and access logging which standard keying does not.

2. Assistance Alarms:

- Assistance alarms are discouraged as they are the least reliable and least informative tool for summoning help. 911 by telephone is the best form of assistance communication. If the occupants of the building require, assistance alarms can be installed using an RF system whereby an emergency signal is sent to a location within the building and the UWPD simultaneously. Examples of this include panic alarms at cashiering stations. The current standard is the UL listed Ademco Vista system which is available hard-wired or wireless.



3. Code Blue:

- A code blue option shall be available for elevator lobbies if it is determined that an override may be needed for emergencies by the occupants of the building. This is not related to the fire department override.
- A code blue phone shall be available for use in UW parking ramps and other areas where personal safety is a concern. The push button directly connects the person to UWPD 911. The current standard is Code Blue model CB2-A. This is the campus standard for parking ramps. The campus standard for occupied non parking structures shall be the Code Blue model CB 4-S. The campus standard exterior “pedestal” style phone is Code Blue model CB-S, safety red color pedestal. The word ‘Emergency’ shall be stenciled on the side.

4. Security Alarms:

- Security alarms can be set up for afterhours monitoring/reporting if the building occupants require. These alarms may utilize glass break, motion detection, or door contact hardware, along with Ademco alarm control panels tied in to the Lenel access control system.

5. Announcements/Drills:

- Overhead paging can be run through the fire alarm system if the building occupants require. Custom voice-over can be included as well as pre-recorded messages. If this is the case, an additional panel is required, and all devices shall be tamper-proof.

6. Stairs and Elevators:

- There shall be a provision within each passenger elevator for an access control device.
- All elevators shall include a security override switch located in the elevator control room, and this switch should be monitored by UWPD.
- All freight elevators shall be prepped for a future access control device unless the building occupants prefer otherwise. Elevator prep shall be determined on a project-by-project basis.
- Depending on the needs of the building occupants, stairs can be provided with access control at each floor. All egress doors shall be provided minimally with a door contact (DPS) to alert if a door is opened. If the door is used for normal egress along with emergency egress, the door must also have a REX device. If electronic locking is included in egress doors, these devices will “fail safe and remain latched” in an emergency. For emergency egress, the REX device must be internal to the exit hardware.
 1. Only electrified locksets shall be installed on rated assembly doors. Electric strikes are prohibited.
 2. Override key switch shall be included whenever egress doors are equipped with access control. The override key switch installation location shall be coordinated with MFD/EH&S.
 3. Knox Box 4400 series recessed tamper switch box shall be included whenever access control is added to egress doors.



4. A tamper switch point will need to be created by DDC so UWPD can see whenever a Knox Box door is opened.

Note: As this is a “living” document, the configuration list may change dependent upon any new Federal regulations and changes in available technology.

28 20 00. Electronic Surveillance

28 23 00. Video Surveillance

28 23 23. Video Surveillance Systems Infrastructure

1. All use of security cameras and video equipment shall comply with the UW-402 Security Surveillance Camera and Video Policy.
<https://policy.wisc.edu/library/UW-402>
2. Responsibilities
 - The UWPD is authorized to oversee and coordinate the use of video surveillance.
 - The Associate Vice Chancellor/Chief of Police or designee must authorize all video surveillance.
 - The UWPD Director of Security Video Operations is appointed the administrator of the campus surveillance camera and video system.
 - DoIT will manage the servers associated with cameras and video surveillance.
 - The electrical contractor shall conduct a site visit with Director of Security Video or designee prior to camera rough-ins. Failure for the contractor to do so, will require the contractor to cover the cost of any changes to camera positions or locations.
 - The electrical contractor is responsible premise wiring for cameras.
 - The design team is responsible for ensuring installations are both code compliant and meet Federal, State and University Standards. FP&M and/or DoIT are responsible for inspection of installations.
 - The electrical contractor shall coordinate all installations with UWPD and DoIT.
 - Requests for repair, maintenance and replacement will be routed through the UWPD to the FP&M Physical Plant Electric Shop.
 - Purchasing of cameras will be handled by UWPD with the UW-Madison contracted integrator.



3. Cameras:

- Cameras, where desired by UWPD, shall be the “fixed” type with wide angle or as required for specific intended purpose. They shall be ceiling mounted and housed in a lexan bubble. They shall record by movement to a Storage array controlled by DoIT in a secure location which is compatible with Milestone Xprotext Corporate 2019 R3 system. The server shall be in a secure room which shall be accessible by UWPD and the UW Electric shop.
- Typical camera locations include exterior entrances, loading docks, elevator lobbies, where there are cashiering functions, alarmed locations, elevators, and other locations as determined by the building occupants.
- In all cases, fixed cameras will be I.P. cameras, with minimum 1.3 megapixel resolution. Hardware shall be determined by the UW police department or designee. In some locations, distance considerations may preclude the use of I.P. cameras. Where I.P. cameras are not feasible, UW Police Department will specify an alternative camera and lens based on site specific needs.
- Cameras record but are not actively monitored by UWPD unless special arrangements have been made.
- The Wisconsin Office of the Attorney General provides digital storage recommendations based on Wisconsin State Statutes. These statutes outline the time frame to file a notice of claim against the state. The Attorney General suggests storing video for a minimum of 120 days. UWPD shall determine storage needs on a project-by-project basis.

4. Installation and Issuance

- UWPD will make assessments for new camera locations not already in existence. The assessments will be made in consultation with building occupants.
- UWPD’s IS Unit will maintain a current inventory of permanent camera installations.
- All requests for installing video surveillance on UW-Madison property must be routed to the IS Unit of the UWPD. A representative of the IS Unit will then conduct a security survey (also called a SCOPE report) and forward to the appropriate entities, i.e., FP&M Physical Plant, DoIT, AIMS, to develop a cost estimate for the requestor.
- All video surveillance equipment must comply with current University standards.



28 30 00. Electronic Detection and Alarm

28 31 00. Fire Detection and Alarm

1. Most campus facilities are considered common use areas and as such, require both audible and visual fire alarms. Visual fire alarms shall be synchronized so each device flashes at the same time and the cycle of the flashes shall be no less than 2 seconds.
2. Shops and docks shall have heat detectors used in place of smoke detectors, if allowed by the code.
3. Care shall be taken to follow building codes with respect to the design of exterior overhangs and soffits. When these are constructed of combustible materials, heat detection or sprinkler protection shall be incorporated.
4. Most spaces separated by a door from audible alarms require their own audible alarms to meet minimum dB.
5. For campus projects that require either a UTILITY SHUTDOWN (electrical, plumbing, steam, DDC etc.) or a shutdown of a LIFE SAFETY SYSTEM (water-based fire protection, fire alarm, alternative fire suppression system, etc.) the GC shall work with the PM to obtain and submit proper notifications as outlined within the UTILITY SHUTDOWN AND LIFE SAFETY SYSTEM IMPAIRMENT FORM.



Division 31 Earthwork

31 05 00 Common Work Results for Earthwork

31 05 10 General Requirements for Earthwork

1. Earthwork for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) Civil, Site, and Utility Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison managed projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.

31 10 00 Site Clearing

31 13 00 Selective Tree and Shrub Removal and Trimming

31 13 13 Selective Tree and Shrub Removal

1. Identify all existing trees and shrubs on site plan documents. Identify which trees will be protected, which trees will be removed, and which trees will need clearance pruning. Prepare the trees for construction prior to any work taking place on the site. All tree removal, pruning and protection are the responsibility of the contractor. Fence all trees and landscapes to be preserved by the project according to DFD specifications and UW-Madison guidelines
2. Consult with Campus Planning and Landscape Architecture and UW-Madison Grounds as early as possible in the design phase to determine if there are any trees or shrubs on site that are deemed significant, and need be protected throughout the project.

31 13 16 Selective Tree and Shrub Protection and Trimming

1. All tree protection zones are to be approved by the UW-Madison Project Manager and UW-Madison Grounds before construction activities begin on site.
2. Existing trees that are to be preserved may need to be pruned, watered, and fertilized by a licensed arborist prior to any construction. All such work shall be coordinated with UW-Madison Grounds. Any pruning of existing material to remain on site is to be approved by the UW-Madison Project Manager and UW-Madison Grounds before work begins.



31 20 00 Earth Moving

31 20 00 Earthmoving

1. See *Section 32* for more requirements related to grading design and plan preparation.
2. Stockpiling: At no time shall any gravel, excavated soils, topsoil, fill materials or other construction materials be stockpiled outside designated areas within the project limits or outside the project limits. There are no facilities on the UW-Madison campus and the Lakeshore Nature Preserve for stockpiling and storage.
3. Excess Topsoil: During preliminary design, the A/E shall inquire with UW-Madison Grounds if they want to retain any excess topsoil from the construction project and where to store it.

31 03 00 Rock Removal

Explosive removal of subsurface rock during excavation is not permitted on campus or in the City of Madison.

31 23 16 Trenching for Utilities

Use DFD Standard Specification for all applicable utility work.

31 23 19 Dewatering for Utilities

Use DFD Standard Specification for all applicable utility work.

31 25 00 Erosion Controls

1. See *Section 32* for more requirements for Erosion Control and plan preparation.
2. Proper erosion control procedures shall be maintained throughout the course of construction.
3. All guidelines outlined in the DFD specifications on erosion control shall be closely followed throughout construction.
4. Erosion control measures shall be provided for the site including silt fence, gravel construction entrance, inlet filters, etc. Erosion control details shall be provided on a detail sheet. Base all erosion control detail drawings on Dane County or City of Madison standard detail drawings.
5. Tracking pads shall be provided for all construction site entrances. Tracking pad shall be minimum 50 feet long.
6. All erosion control devices shall be removed in accordance with DFD specifications when there is no longer exposed soil on the project site.
7. Construction fencing shall be provided at the perimeter of the construction limits. The construction fencing shall be chain link per the UW-Madison Guidelines and shall completely close off the site to pedestrians. If the construction limits fluctuate through the term of the project, a phasing schedule shall be provided for moving the fencing / construction limits through the project.
8. Type D inlet protection is preferred but it must be appropriate for the inlet size and depth. The design shall indicate the type of inlet protection at each inlet.



9. All designs of storm water devices, systems, or practices shall include formal written maintenance plans for both short term establishment of vegetation and long-term perpetual maintenance.
10. For all projects involving site construction, the A/E or landscape architect shall submit electronic PDF copies of the storm water management plan, maintenance plan, pipe and inlet design, runoff computations, pre & post development runoff rates/volumes, Notice of Intent, USLE worksheet, and other storm related documents and computations to UW-Madison Project Manager and Campus Planning & Landscape Architecture prior to issuing Bid Documents.
11. All site plans shall include proposed spot grades and contours for all new or replaced concrete and asphalt as well as grades of adjacent existing to remain. Calling out “replace in kind” is not sufficient. Grades must be shown.
12. See *Division 32* for additional erosion control design requirements and notes to include on the Erosion Control Plan.



aDivision 32 Exterior Improvements

32 05 00 Common Work Results for Exterior Improvements

32 05 10 General Requirements for Exterior Improvements

1. Exterior Improvements for all UW-Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) Sustainability Guidelines for Capital Projects and the Civil, Site, and Utility Design Guidelines, which is available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison managed projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The Guidelines for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW-Madison Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
7. Incorporate site and landscape design that promotes pollinator habitat, mental health and wellbeing, positive social interaction, outdoor learning, stormwater management, sustainability, and resilience.
8. See *Division 07 33 63 Vegetated Roofs* for green roof guidelines.

32 05 20 Drawing Requirements for Exterior Improvements

Projects involving site construction shall typically include the following site plans. Site plans shall be arranged in the plan set to represent the progressive sequence of work as much as possible. Each plan shall include the features typically provided as well as the specific items found below. This is not an all-inclusive list of plan requirements.

On all site plans, Use only the appropriate number of significant digits in the site dimensions and elevations. Site elevations shall be in feet and decimal feet, not in inches.

1. Existing Conditions Plan:
 - 1.1. All projects involving exterior site construction shall include a site survey performed by a Wisconsin licensed land surveyor. The consultant shall be responsible for all site survey and land survey services.
 - 1.2. An "Existing Conditions Plan" shall be provided with the field survey that was performed for the project. The survey map shall include the typical site features as well as the date of the survey, benchmarks, existing signs (w/ text), utilities, legend,



table of existing site storm and sanitary pipes & structures with inverts & rims etc., tree types and sizes, tree drip lines, critical spot grades, etc. Occasionally, the Existing Conditions map may be combined with another plan such as the Demolition Plan, but all the survey info will still be required.

- 1.3. The consultant is responsible for identifying and obtaining documentation for all easements, public right of ways and property lines that affect the project. The consultant shall accurately depict these easements and property lines on the existing conditions plan and include all pertinent restrictions.
- 1.4. Dane County Coordinates shall be used stated on the plan, for all surveys.
- 1.5. The Dane County USGS vertical datum shall be used for surveys and stated on the plan.
- 1.6. The date of the field survey shall be provided.
- 1.7. Locations of Section Corner Monuments and Campus Control Points and Benchmarks shall be indicated on all surveys.
- 1.8. A table that shows the benchmarks and the control points shall be provided per DFD requirements.
- 1.9. The location of the UW-Madison property corners and public right of way and monuments when within or adjacent to the project site shall be indicated on the plan.
- 1.10. A note stating that property corner markers shall be replaced as needed shall be on the drawings.
- 1.11. Clear graphical distinction between asphalt, concrete, sidewalk, building, and vegetated areas shall be provided.
- 1.12. Existing site dimensions including width of existing roads and driveway shall be provided.
- 1.13. Structure numbers in the drawing at all sanitary and storm structures shall be provided.
- 1.14. Sanitary and storm pipe table and structure table with structure numbers, pipe numbers, invert elevations, pipe lengths, pipe size, pipe material, rim elevations, top of casting elevations, etc. shall be provided.
- 1.15. The names of the owner of any utility or site feature that are not owned by UW-Madison shall be provided.
- 1.16. Indication of what is printed or depicted on each site sign shall be provided.
- 1.17. All stand-alone trees and all individual trees within a massing, having 2 inch calipers or larger, shall be indicated on the plan.
- 1.18. Trunk caliper at 4 feet high (DBH) and species name shall be provided on the plan.



-
- 1.19. Drip lines for all stand-alone trees and tree massings shall be shown on the plans. Ensure the tree symbols are large enough to be seen on the given scale of the drawing.
 2. Demolition Plan:
 - 2.1. A note indicating that all Campus Benchmarks and Control Points shall be protected, and the Contractor shall be required to replace any that are disturbed during construction shall be on the drawings.
 - 2.2. All site features to be removed from the site shall be indicated and explanation of any special salvage requirements shall be provided on the plan.
 - 2.3. Limits and appropriate dimensions of each type of pavement and buildings to be removed shall be indicated.
 - 2.4. The location of the pavement saw cuts shall be shown on the plan.
 - 2.5. A note indicating that all sanitary sewer castings, storm sewer castings, and hydrants that are not being reused shall be salvaged and given to the UW-Madison Plumbing Shop shall be on the drawings.
 3. Traffic Control and Pedestrian Access Plan
 - 3.1. See requirements for Traffic Control Plan in *Division 1 General Requirements*.
 4. Erosion Control Plan (EC):
 - 4.1. The Erosion Control Plan may typically be combined with the Grading Plan.
 - 4.2. The location of the construction staging area and project limits for all projects (even if exclusively interior work) shall be graphically indicated on the plans.
 - 4.3. The proposed grading with the erosion control shall be indicated.
 - 4.4. The type of inlet protection at each inlet shall be called out. Type D protection is preferred but ensure it is appropriate for the inlet size and depth. Inlet protection details shall be provided.
 - 4.5. A short statement on the Erosion Control Plan of what the Wisconsin DNR (WisDNR), City of Madison, and UW-Madison requirements are for sediment and stormwater runoff control and how they are being met shall be shown. If the site is exempt, the plans shall indicate the exemption with an explanation.
 - 4.6. A table on the Erosion Control Plan with areas for total site area, and pre & post development impervious areas, roof area, and disturbed area shall be provided.
 - 4.7. Detailed drawings for all erosion control practices, detail number callouts, and a detail page on the erosion control plan shall be provided.
 - 4.8. A note directing the Contractor to remove sediment from the storm facilities after completion of all site construction and prior to substantial completion shall be provided.



-
- 4.9. This first note on the Erosion Control Plan shall be a General Description of the Site Work to be performed, with phasing and dates as applicable. A/E shall provide this description unique to the project.
- 4.10. All the Erosion Control Plan notes, as shown below, shall be provided.
- 4.10.1. Construction Site Erosion Control Notes (to be added to EC Plan):
1. Additional erosion control measures, as requested by state inspectors, campus inspectors, and/or the A/E shall be installed within 24 hours of request.
 2. All measures indicated on the plans shall be considered minimums.
 3. All erosion control measures shall be constructed and maintained by the contractor in accordance with the Wisconsin DNR Construction Site Erosion & Sediment Control Technical Standards. It is the Contractor's responsibility to obtain a copy of these standards.
 4. Install erosion control measures prior to any site work, including grading or disturbance of existing surface materials as shown on the plan. Modifications to sediment control design may be conducted to meet unforeseen field conditions if modifications conform to Wisconsin DNR Technical Standards.
 5. Inspections and maintenance of all erosion control shall be routine (once per week and after each 1/2 inch rainfall) to always ensure proper function of erosion controls. Erosion control measures are to be in working order at the end of each workday.
 6. Contractor shall keep records on site of all erosion control inspections and available for review by inspectors when requested.
 7. Install erosion controls on the downstream side of stockpiles.
 8. All slopes exceeding 4:1 shall be stabilized with Class 1, Type B Erosion Matting and all drainage swales shall be stabilized with Class II, Type B erosion matting.
 9. Cut and fill slopes shall be no greater than 3:1
 10. Incidental mud tracking off-site onto adjacent thoroughfares shall be cleaned and removed by the end of each working day using proper disposal methods.
 11. Any disturbed area that remains inactive for greater than seven (7) days shall be stabilized with temporary stabilization methods such as temporary seeding, soil treatment, erosion matting, or mulch.
 12. Prevent excessive dust from leaving the construction site in accordance with local and state regulations.
 13. Contractor shall remove erosion control measures after site construction is complete and all soil surfaces having an established vegetative cover.
 14. Contractor shall file a Notice of Termination upon vegetative stabilization in accordance with Wisconsin DNR and WCOMM requirements.



15. Silt fencing shall not be installed within the Critical Root Radius or drip line of any trees or shrubs to be protected. Use silt socks which do not require excavation and cutting roots.

16. Silt fence may be substituted with silt sock.

4.10.2. Grading and Temporary Seeding Notes (to be added to EC Plan):

1. All disturbed areas shall be seeded and mulched immediately following grading activities.
2. The minimum seeding rate for temporary seeding in turf areas is 5 pounds grass seed mix per 1000 square feet used and combined with annual ryegrass at a rate of 1½ pounds per 1000 square feet, unless otherwise specified.
3. All proposed grades shown are finished grades. Contractor shall verify all grades, make sure all areas drain properly and shall report any discrepancies to the engineer prior to completion.
4. Contractor shall water all newly seeded areas during the growing season whenever there is a 7-day lapse with no significant rainfall.
5. All disturbed areas to be seeded shall receive a minimum of 12 inches of topsoil, fertilizer, seed, and mulch.

5. Grading Plan:

- 5.1. The location of the construction staging area and project limits shall be graphically shown on the plans.
- 5.2. The plans shall show construction fencing along the entire length of the construction limits. The construction fencing shall be chain link per the UW-Madison Guidelines and completely close off the site to pedestrians. If it is not appropriate for fence to be placed along the entire construction limits for the entire project, a phasing plan and schedule for moving the fencing/construction limits throughout the project shall be provided.
- 5.3. Slopes shall be no flatter than: (DFD Requirements)
 1. 2% across turf areas or,
 2. 1% across pavements.
- 5.4. Slopes shall be no steeper than: (DFD Requirements)
 1. 4:1 for mowed turf slopes.
 2. 3:1 for turf slopes that are not mowed or,
 3. 12% on short driveways that will be snow plowed or,
 4. 10% on sustained grades along driveways and minor road that will be snow plowed or,



5. 8% on sustained grades on major roads that will be snow plowed.
- 5.5. Grades within all hardscape pedestrian spaces and travel routes shall follow ADA guidelines for slope and cross slope.
 - 5.5.1. Ensure accessible ramps have landings at the top and bottom of ramp and spaced along length of ramp per ADA guidelines.
- 5.6. Provide existing contours, proposed spot grades, and proposed contours on the plan..
- 5.7. The First Floor and Basement Floor elevations shall be shown on the Grading Plans.
- 5.8. The percent slope for critical areas such as long runs of grass or pavement, sidewalk and pavement cross slopes, storm basin side slopes, green infrastructure side slopes, and flat slopes shall be provided. Any locations where slopes are 1% or less and 5% or more for paved areas and 2% or less and 5:1 or more for vegetated areas shall be indicated.
- 5.9. Proposed spot grades and contours for all new or replacement concrete and asphalt shall be provided. Calling out “replace in kind” is not acceptable.
- 5.10. Spot grades at 25 feet to 50 feet intervals and at high and low points along prolonged stretches of pavement and/or curbs shall be provided.
- 5.11. Specific location of spot grades shall be provided. (i.e. top-of-curb, edge of pavement, flag of curb, ground, FFE at all building entrances, accessible ramps etc.)
- 5.12. Utility structures shall be shown in the drawing as well as the structure numbers and rim elevation at all storm structures, sanitary manholes, steam vaults, electric vaults, etc.
- 5.13. Overland stormwater overflow route shall be indicated.
- 5.14. ADA accessible route and the percent slopes along the route shall be provided.
- 5.15. Location and type of all sidewalk ramps and curb cuts shall be indicated.
6. Site Layout Plan:
 - 6.1. Dimensions for all proposed site features including new and replacement pavements shall be provided. Calling out “replace in kind” is not acceptable and does not provide enough information for proper site restoration. This includes existing road widths adjacent to the site when curb is being replaced.
 - 6.2. Detail number and sheet number for proposed site features shall be called out in the plan.
 - 6.3. Required fire lanes and their widths as approved by the City of Madison shall be provided.
 - 6.4. All existing and proposed easements, property lines, and right of way lines shall be provided on the proposed site plan with the existing and proposed building and validation that there are no conflicts or encroachments.



- 6.5. A table with the number of parking spaces for vehicles, ADA, bikes, and mopeds shall be provided.
- 6.6. X and Y coordinates for a few significant site features as a check to field staking crews shall be provided per DFD requirements.
- 6.7. The consultant shall accurately depict all easements and property lines on the plan and determine if anything within the project conflicts with easements and property lines.
- 6.8. Show all signs and pavement markings on the plan.
- 6.9. Group all green roof site plans, landscape plans, plant schedules, detail drawings (above the roof membrane), etc. together with at-grade site and landscape plans. If not possible, include reference on site and landscape plan where green roof plans and details are located.
7. Site Paving Plan:
 - 7.1. Location and limits of each type of pavement shall be provided with markings.
 - 7.2. Landscape Architect shall provide concrete pavement joints, and any other hardscape pattern details in drawings for review. These details and patterns shall not be determined by contractor.
8. Site Utility Plan:
 - 8.1. First floor and basement building floor elevations shall be provided on the utility plans.
 - 8.2. Structure numbers for all new and existing utility structures shall be provided.
 - 8.3. A table on the plan that shows all sanitary and storm structures with rim elevations, invert elevations, casting types, pipe sizes in and out, and designate if it is a new structure, structure to remain, or structure to remove shall be provided.
 - 8.4. Existing utility structures which will receive new castings and those castings which will be reused shall be indicated on the plans.
 - 8.5. The name of the owners of any utility or site feature that are not owned by UW-Madison shall be provided.
 - 8.6. All existing and proposed utilities with the existing and proposed building shall be graphically shown to validate there are no conflicts.
 - 8.7. It shall be clear to the contractor that all utility castings within newly paved areas and turf areas within the project limits shall be adjusted and reset to grade and per the specifications even if the casting is not being replaced. This includes adjusting rings and mortar.
 - 8.8. Different line types for existing utilities and proposed utilities shall be used.



- 8.9. The plan shall clearly demonstrate there are no vertical or horizontal conflicts for all underground utilities by providing utility profiles or a table of dimensional clearances between utilities.

9. Site Details:

- 9.1. Silt fence, tracking pad at construction entrance, and inlet filter detail drawings based on City of Madison standards shall be provided.
- 9.2. A/E shall provide concrete pavement sidewalk joints, and any other hardscape pattern detail drawings for review. These details and patterns shall not be determined by contractor.
 - 9.2.1. Incorporate UW-Madison guidelines which explicitly state expansion joint material shall not be used.
- 9.3. Appropriate curb details which include the following notes shall be provided:
 - 9.3.1. No expansion joint material shall be used in or behind curb and gutter.
 - 9.3.2. Curbs shall be backfilled with the appropriate soil material after curb has achieved specified strength and prior to placing the adjacent base course and pavement.
- 9.4. Detail drawing with ADA accessible ramps that adhere to campus standard details and Technical Guidelines shall be provided.
- 9.5. Utility details shall be provided.
- 9.6. Detail drawing of crosswalks shall be provided.
- 9.7. Detail drawings for all site retaining walls with structural computations shall be provided.

10. Landscape Plan:

- 10.1. Plant schedules shall be on the same sheet as the landscape plan.
- 10.2. Group all green roof site plans, landscape plans, plant schedules, detail drawings (above the roof membrane), etc. together with at-grade site and landscape plans. If not possible, include reference on site and landscape plan where green roof plans and details are located.
- 10.3. Show all existing vegetation. Use graphic symbols that show current size and dripline of vegetation.

11. Landscape Details:

- 11.1. Include detail drawings for all site furnishings at the 35% review. This includes but is not limited to trash cans, recycling containers, ash urns, outdoor tables, bike racks, bollards, benches, seating areas, signs, light pole bases, fire hydrants, utility access covers, etc.



32 05 30 Design Parameters for Exterior Improvements

1. The site and landscape surrounding the project boundaries shall be taken into consideration when developing the project landscape, site, and building design. There needs to be a seamless, elegant transition between the new design and existing adjacent sites. Think how this project fits into the fabric of the overall campus and not just the specific project site.
2. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
3. Driveway and Roadway:
 - 3.1. The standard two-lane street width is 34 feet (curb face to curb face), with (2) 11-foot-wide travel lanes, (2) 5 foot bike lanes, 18 inch curb & gutter with a 12 inch gutter pan. A 30-inch curb & gutter may be used if an exceptionally large area for roads exists. Where bikes lanes do not exist, streets shall be a minimum of 24 feet wide, including a 12-inch gutter pan. Design issues regarding four-lane streets and streets with parking turn lanes, and other features shall be addressed in consultation with the transportation planner.
 - 3.2. When using 18-inch curb & gutter, storm drain inlets in the gutter shall not extend beyond the gutter pan and additional inlets shall be installed to manage runoff as needed. Inlets shall be designed to avoid endangering bicyclists with grates running perpendicularly or diagonally to the street.
 - 3.3. In locations where inlet castings extend beyond the 12-inch gutter pan, the pan shall taper out 3 feet on both sides of the casting to meet the edge of casting. Provide a detail drawing of this in the site details sheet.
 - 3.4. Driveway intersections on campus shall be either be an “at-grade” asphalt intersection or a City of Madison Standard Commercial Drive concrete apron which shall be determined on a case-by-case basis. All driveways intersecting with a public street shall follow City of Madison requirements.
 - 3.5. Unless otherwise specified, intersection corner radii shall be 25 feet and designed to minimize the length of crosswalks and be pedestrian friendly. A larger radius of 35 feet is required where regular bus activity is expected, especially where pedestrian traffic is limited. Design of effective corner radii shall consider the increase in turning radius created by bike lanes and by on-street parallel parking, etc. Moreover, where possible, widening the appropriate leg of an intersection shall be considered as a more effective solution to facilitating bus turning movements than larger radii.
 - 3.6. The street design shall match or fit the design of the adjacent existing street unless those areas do not meet current standards or do not satisfy the goals and recommendations of the UW-Madison Campus Master Plan (most recent edition).
4. Sidewalk:
 - 4.1. All sidewalks shall be a minimum of 8 feet wide to accommodate snow removal and maintenance equipment.
 - 4.1.1. Sidewalks 10 feet and wider shall be considered in very high pedestrian volume areas, especially in the eastern and central areas of campus.



- 4.1.2. Exceptions for narrower sidewalks shall be considered when building footprint and minimum street widths restrict sidewalk width.
- 4.2. Sidewalks shall be on both sides of a street or driveway
- 4.3. All interior angles of sidewalks shall be rounded, so that the grass on the inside angle is not damaged by snow removal equipment and service vehicles.
- 4.4. Corner radii for sidewalks shall be no greater than 5 feet at intersections but shall be designed sufficiently enough in other circumstances to minimize “short cuts” off the sidewalk.
- 4.5. Sidewalks shall be designed to provide an efficient (versus overly circuitous or meandering) path between a building entrance and the street or another significant point of departure.
- 4.6. The placement and design of sidewalks shall be attractive enough to pedestrians that “short cuts” across turf areas, planting beds, streets, and other campus areas are minimized.
- 5. Street Terrace and Planting Area Considerations:
 - 5.1. Street terraces shall be provided and shall be 6 feet to 10 feet wide, especially in the absence of on-street parallel parking.
 - 5.1.1. Exceptions for a narrower terrace or no terrace may be considered where existing building footprints and minimum street widths do not allow for standard widths or in very low pedestrian traffic areas.
 - 5.1.2. The cross slopes of the terrace shall match the adjacent sidewalk to create a larger streetscape for site amenities and use.
 - 5.2. Provide concrete unit paver terraces within City of Madison right-of-way’s adjacent to University property (See 5.2.4) . Project team shall consult with Campus Planning who will work with City of Madison Engineering to understand desired width, extents, and site conditions for unit paver terraces.
 - 5.2.1. Where terrace width is 18” or less from edge of sidewalk nearest street to back of curb shall use rigid concrete pavement per City of Madison specifications.
 - 5.2.2. Unit paver type basis of design: Manufacturer Unilock Hollandstone. Color: Autumn Red (color to match existing to be confirmed by Campus Planning). Size: 2.73” x 4” x 8”. Pattern: Match existing 1/2 paver running bond pattern perpendicular to sidewalk direction of travel (to be confirmed by Campus Planning). Approved equal manufacturer’s include: Hanover, Wausau Tile, Belgard, others as identified.
 - 5.2.3. All pavers shall be set over a 7” concrete slab with a maximum 1 inch maximum depth 1/4” clear chip bedding condition.
 - 5.2.3.1. Paver terraces shall not exceed 10% slope or where wash out is a concern. In this case rigid concrete pavement shall be used.



-
- 5.2.3.2. 1" maximum depth ¼" clear stone chip, high performance bedding (HPB). Placed over concrete and geotextile protected weep holes per detail. Provide barrier (rigid or geotextile) to edges of bedding material to prevent translocation of adjacent materials.
 - 5.2.3.3. Compact paver field to ensure pavers align with adjacent concrete. Protect paver surface with a urethane scuff pad during compaction.
 - 5.2.3.4. Apply polymeric sand joint stabilizer over paver field per manufacturer recommendations.
 - 5.2.4. City of Madison streets with terraces adjacent to University property which shall be considered for unit paver terraces include all or parts of: N. Brooks Street, N. Charter Street, W. Dayton Street, W. Johnson Street, Langdon Street, Lorch Court, N. Mills Street, N. Orchard Street, N. Park Street, N. Randall Avenue, University Avenue.
 - 5.3. Parallel parking shall be considered to provide a safety buffer between motor traffic and pedestrians on a sidewalk and where access to cars parked on the street needs to be provided in the terrace.
 - 5.4. Landscape considerations shall be the dominant factor in the design if there is a street terrace. See UW-Madison Campus Master Plan.
 - 5.5. Consider sustainable design, stormwater management, and other innovative best practices for street terrace design. See UW-Madison Campus Master Plan.
 - 5.6. The size of the terrace, the soil used, and the placement of utilities near a terrace shall allow for the planting of trees.
 - 5.7. The soil volume provided for street trees, turf, and other plants shall be maximized to create plant environments that maximize growth potential and good health. Potential options to accomplish this include, but are not limited to, the following:
 - 1. Structural soils
 - 2. Engineered Soils
 - 3. Modular suspended pavement system products such as Deep Root Silva Cells.
 - 4. Street terraces that maintain deeper soil volumes for longer distances, creating a "soil trench."
 - 5. Span concrete to allow for soil underneath. This works well in pedestrian areas that do not receive vehicle traffic. Example would be a bike parking area.
 - 6. In terraces without special treatments, such as the ones listed above, the minimum soil depth shall be 12 inches.
 - 6. Bicycle Lanes and Multi-Use (shared bicycle & pedestrian) Paths
 - 6.1. All campus and city streets shall be bicycle friendly and promote safe bicycle travel.



-
- 6.2. All bicycle route planning and design shall follow current published guidelines from the American Association of State Highway and Transportation Officials (AASHTO) and as further specified by Wisconsin Department of Transportation's (WDOT) Wisconsin Bicycle Facilities Design Manual.
 - 6.3. Bicycle lanes in the street shall be a minimum of 5 feet wide, not including the gutter pan, unless otherwise specified.
 - 6.4. Multi-use (shared bicycle and pedestrian) paths shall be a minimum of 14 feet wide with 2 foot shoulders on each side, or 1 foot shoulders next to a continuous linear obstruction (e.g. a fence or railing). A center line shall be provided, and the path shall be striped for each direction of travel.
 - 6.4.1. Bicycle paths shall be designed for 20 mph speeds. (Note: As determined by UW-Madison Facilities Planning and Management, university right-of-way conditions may require different standards to meet special circumstances).
 - 6.5. Refer to *Division 32 17 00 Paving Specialties* for bike lane and multi-use path pavement markings.
 7. Bus Stops:
 - 7.1. The location of bus stops shall be determined in consultation with Madison Metro, UW-Madison Transportation Services, and Campus Planning and Landscape Architecture
 - 7.2. Bus stop pads located within the terrace shall use an integral curb and gutter. Terrace shall be at least 8 to 10 feet wide from the edge of the sidewalk to any bus shelter if one is used.
 - 7.3. If a bus pullout is used (especially in the case of a bus stop that cannot be located at a corner) the cut out shall be 10 feet wide and 120 feet long. Corner radii at the ends of the cutout should be 25 feet long.
 8. Bus Shelters:
 - 8.1. All campus standard bus shelters shall be purchased by the project through UW-Madison Transportation Services using either Line 3 or 4 funds. Alternate bus shelter designs are not acceptable.
 - 8.2. The concrete pad or paver surface shall be provided by the general contractor as a part of the project. Size shall be 7 feet by 13 feet for a single shelter, larger for double shelters.
 - 8.3. The bus shelters shall be installed by the general contractor.
 - 8.4. Bus shelter locations shall be coordinated with UW-Madison Transportation Services, Madison Metro, and UW-Madison Facilities Planning and Management (FP&M).
 - 8.5. One campus standard trash container and one campus standard recycling container shall be provided at each bus stop shelter. See *Division 12 93 23 Waste, Recycling, and Ash Receptacles*. They shall be placed on hardscape. Not lawn or planting bed.



9. Surface Parking Lots and Service Areas

- 9.1. Refer to Division 34. Transportation for Automobile Parking Structures
- 9.2. The UW-Madison campus parking stall quantity is defined through the ongoing transportation demand management efforts between UW-Madison Transportation Services and the City of Madison in accordance with the campus Long-Range Transportation Plan. UW-Madison Transportation Services manages the type and quantity of stalls on a campus wide basis and not on a lot-by-lot basis. Projects dealing with vehicular parking shall coordinate with UW-Madison Transportation Services.
- 9.3. Parking lots should be designed to satisfy Crime Prevention Through Environmental Design (CPTED), including adequate illuminance, uniformity, and glare of lighting, landscaping/natural surveillance, placement of signage, security infrastructure (per UWPD), and to ensure an adequate field of vision.
- 9.4. The following note shall be added to the Site Plan Notes: *Parking facility design standards are established to meet the State of Wisconsin requirements and are identified in UW-Madison Technical Guidelines Division 32 Exterior Improvement, Section 9.*
- 9.5. Parking lot and ramp landscape and screening design shall adhere to or exceed the minimum standards set forth by the City of Madison standards (28.142 Landscaping and Screening Requirements) with the following modification to meet the unique challenges of UW-Madison.
 - 9.5.1. Landscaping and Screen Requirements - Interior Parking Lot Landscaping:
 - 9.5.1.1. A planting island shall be located at least every twelve (12) contiguous stalls with no break or alternatively, landscaped strips at least seven (7) feet wide between parking bays.
- 9.6. Surface parking lots shall employ a site and landscape design that emphasizes simple, elegant, properly scaled vegetation and elements appropriate for the harsh conditions of a parking lot.
 - 9.6.1. Surface parking lots and service areas shall limit the number of pavement and wall types.
 - 9.6.2. Planting design and selection in surface parking lots shall have a smaller pallet of plant species laid out in larger massings. Detailed planting design is not recommend for surface parking lots.
 - 9.6.3. Overall site and landscape design as well as the plants selected shall complement the scale of the development and its surroundings. In general, larger, well-placed contiguous planting areas shall be preferred to smaller disconnected areas.



-
- 9.6.4. Use landscape and site design to break up large expanses of vehicles and pavement.
 - 9.6.5. Provide shade trees within and around the surface parking lot to reduce the urban heat-island effect and assist with stormwater management.
 - 9.6.5.1. Large shade trees are preferred over smaller ornamental trees.
 - 9.6.5.2. Maximize the number of large shade trees.
 - 9.6.5.3. Use a diverse section of shade tree species.
 - 9.6.5.4. Internal parking lot islands and peninsulas shall be sized to provide the required soil volume needed support the growth of the proposed shade trees and plants within them.
 - 9.6.6. Use topography and vegetation to visually screen parking areas.
 - 9.6.7. Plan adequate space for snow storage.
 - 9.6.8. Contribute to campus goals of stormwater mitigation using best management practices (BMPs). This also includes use of large shade trees.
 - 9.7. Wheel stops shall not be used.
 - 9.8. Each stall shall be eight (8) feet six (6) inches wide and be measured from the edge of any columns or other obstructions. Parking stalls shall be eighteen (18) feet in depth.
 - 9.8.1. See Appendix – Division 32 for parking striping detail
 - 9.9. Drive aisles shall be a minimum of twenty-four (24) feet wide for two-way traffic. The width of drive aisles for one-way traffic-oriented parking areas shall be decided on a case by case basis taking into account the geometry of the parking stalls relative to the drive aisles.
 - 9.10. Motorcycle parking stalls shall be four (4) feet wide by eight (8) feet long and shall be paved with concrete.
 - 9.11. Accessible stalls shall comply with ADA and their location shall be in the stalls nearest to an accessible route and accessible entrance.
 - 9.11.1. ADA symbols for accessible stalls shall not be painted on the parking stall surface.
 - 9.11.2. Accessible stalls shall be eight (8) feet wide with a five (5) foot access aisle.
 - 9.11.2.1. Two accessible stalls can share one access aisle.
 - 9.11.3. Van accessible stalls shall be eleven (11) feet wide with a five (5) foot access aisle on the passenger (right) side of the stall.



9.11.3.1. An accessible stall can share the access aisle.

9.11.4. Signs for accessible stalls shall be provided by UW-Madison Transportation Services to be installed by the contractor in consultation with UW-Madison Transportation Services with a minimum of 60" between the bottom of the sign and grade.

9.11.4.1. See Division 10 14 53 Traffic Signage and Signposts for standards.

9.12. UW-Madison Transportation Services will provide two campus standard (2) lot identification signs to the project, to be installed by the contractor (contractor shall provide posts) at all vehicle entrances to the facility. Signs shall be posted before final completion.

9.12.1. See Division 10 14 53 Traffic Signage and Signposts for standards.

9.13. Surface parking lots shall be lit with full cut-off light standards and provide an average foot-candle of .5 fc across the lot.

9.13.1. See Division 26 50 00 Lighting for campus standard fixtures.

9.14. Information on gates, ticket booths, and other parking equipment is in Division 34. Transportation

10. Moped and other Micro-mobility Facilities:

10.1 Specifications for the number and location of moped parking spaces shall be fully incorporated into the site design and included in the 35% review drawings.

10.2 UW-Madison Transportation Services shall be consulted as early as possible in the site development phase to determine number of moped stalls required.

10.3 Moped/micro-mobility spaces may be located close to bicycle parking areas but shall be kept separate to avoid conflicts.

10.4 Moped/scooter parking spaces shall be 3 feet by 6 feet with a 6 foot vertical clearance and a 5 foot 6 inch drive aisle.

10.5 Moped parking areas shall be paved with concrete.

10.6 Moped spaces shall be located to prevent conflicts with pedestrians, bicycles, and other motor vehicles.

10.7 Moped spaces shall be located to prevent mopeds from using or crossing pedestrian facilities such as wheelchair ramps, crosswalk curb cuts and sidewalks.

10.8 Access to moped areas shall be provided using a separate curb ramp (without truncated domes) or mountable curb with a reduced slope after considering traffic movements on the street from which safe access must be provided.



- 10.9 Individual moped stalls shall be marked with a 4 inch painted white non-reflective stripe. Moped parking signs will be provided by UW-Madison Transportation Services. See Appendix – Division 32 for Detail.
- 10.10 Signs for moped parking shall be provided by UW-Madison Transportation Services and installed by the contractor in consultation with Transportation Services.
- 11. Traffic Control Devices:
 - 10.1 See *Division 10 14 53 Traffic Signage and Signposts* for signpost standards.
 - 10.2 Regulatory vehicle signs shall conform to the type, size, and/or color scheme described in the MUTCD and approved by UW-Madison Transportation Services.
 - 10.3 Signposts shall be provided and installed by contractor

32 10 00 Bases, Ballasts, and Paving

32 12 00 Flexible Paving

32 12 16 Asphalt Paving

- 1. All current DFD/civil design guidelines shall be followed in designing asphalt paving.
- 2. The UW-Madison requires the following minimum thicknesses for asphalt pavements. Where geotechnical reports are available, use the thicker design of either the UW-Madison minimum or the geotechnical report.
 - 2.1. All bus routes: 5¼ inches of asphalt (1¾ inch surface + 3½ inch binder) and 8 inch base course.
 - 2.2. Standard pavement for parking lots, driveways, and side roads: 4 inches of asphalt (1¾ inch surface + 2¼ inch binder) and 8 inch base course.
 - 2.3. Heavy Duty Asphalt Pavement for areas with heavy truck use: including the campus roadways 5 inch of asphalt (2 inch surface + 3 inch binder) and 10 inch base course.
 - 2.4. Bicycle/Pedestrian Paths: 3½ inch (1¾ inch surface + 1¾ inch binder)
- 3. All partial removal of pavements shall be saw cut to full depth at removal limits and saw cuts shall be at the nearest existing pavement joint. This note shall be included in the plan set.
- 4. Contractor shall be directed to adjust all utility structure castings within proposed paving areas. This note shall be included in the plan set.
- 5. Asphalt patching for utility trenches shall follow the cross section of City of Madison Standard Detail for Type III Pavement Patch. A detail for this shall be included in the plan set as needed.
- 6. Patching for Curb & Gutter Replacement:



- 6.1. Where curb replacement abuts existing asphalt pavement, the Contractor shall saw cut the existing asphalt to full depth 12 inch from edge of gutter and then patch with appropriate depth of asphalt between saw cut and the new curb after the new curb has sufficiently cured. The contractor shall not use the existing edge of the asphalt as their concrete form. Using the asphalt as a concrete form causes poor quality curb and gutter by creating uneven gutter line and can cause a short concrete depth on the new gutter. A detail shall be included in the plan set, when needed.
7. Pervious Asphalt shall only be used with UW-Madison FP&M approval. Past performance of pervious asphalt on campus has been poor.
 - 7.1. Pervious asphalt shall be limited to locations that do not experience heavy vehicle traffic and contribute significantly to storm water infiltration.
 - 7.2. Pervious asphalt specifications and mix design shall be submitted to UW-Madison FP&M for approval with the 35% review.
 - 7.3. All contractors installing pervious asphalt shall provide proof of experience and certification in the construction of the product.
 - 7.4. Pervious asphalt shall include the appropriate depth of base course for storm water storage.
 - 7.5. Final design submittals shall include a maintenance plan for proposed pervious asphalt.
 - 7.6. Pervious asphalt shall be vacuum cleaned after all site work is complete and before substantial completion when the site is turned over to the UW-Madison.
8. Street Patching Criteria:
 - 8.1 For Arterial Streets and Streets with PACER pavement rating > 6
 - 8.1.1 Length of Patch
 1. Minimum 50 feet long
 2. Minimum of 15 feet beyond the excavation
 3. Where multiple patches are created and the separation between them is less than 100 feet, the patches shall be combined into a single patch.
 4. The patches shall be adjusted in the field to meet special conditions such as previous paving or patching limits.
 - 8.1.2 Width of Patch (all dimensions are curb face to curb face)
 1. All Streets except Divided Roadways or One-Way Streets
 - i) Street width shall be 0 to 24 feet wide – patch entire street width
 - ii) Street width shall be 25 to 37 feet wide – patch one half the street width (curb to centerline of roadway). Note – Utility Engineer may adjust paving limit to correspond with a painted centerline in situations where the painted centerline is not in the center of the street.
 - iii) Street width shall be 38 feet and up - patch width of entire lane for each lane which was disturbed by the excavation.



- (1) If the lane is adjacent to a bike lane, the bike lane shall be included. (except when there is a parking lane between the bike lane and the curb)
 - (2) If the lane is a bike lane and adjacent to a parking lane, the parking lane shall be included.
 - (3) If the lane is a bike lane and not adjacent to a parking lane, the adjacent travel lane shall be included.
2. Divided Roadways and One-Way Streets
 - i) Street 0 to 19 feet wide shall patch entire street width
 - ii) Street width 20 feet and up shall patch the width of entire lane for each lane which was disturbed by the excavation.
 - (1) If the lane is adjacent to a bike lane, the bike lane shall be included. (Except when there is a parking lane between the bike lane and the curb)
 - (2) If the lane is a bike lane and adjacent to a parking lane, the parking lane shall be included.
 - (3) If the lane is a bike lane and not adjacent to a parking lane, the adjacent travel lane shall be included.

32 13 00 Rigid Paving

32 13 13 Concrete Paving

1. All current DFD/civil design guidelines shall be followed in designing concrete paving.
2. Concrete finish for sidewalks and pedestrian areas will be medium broom finish perpendicular to flow of pedestrian traffic. Other finishes may be used with approval from UW-Madison Campus Planning & Landscape Architecture.
3. Colored concrete may be used in special design situations near major building entries and plazas. Coloring shall be integral to the full depth of concrete and not shaken onto the surface.
 - 3.1. Include the color and brand used in the design specifications.
 - 3.2. Color shall be approved by UW-Madison Campus Planning & Landscape Architecture
4. Stamped concrete may be used in special design situations near major building entries and plazas.
 - 4.1. Include the pattern and brand used in the design specifications.
 - 4.2. Pattern shall be approved by UW-Madison Campus Planning & Landscape Architecture.
 - 4.3. Concrete patterns are not approved for crosswalks, roadways, or parking lots.



-
5. Contractor shall adjust all affected utility structure castings as necessary within the project limits, even when the project includes no other utility work. This note shall be provided in the plan set.
 6. All partial removal of pavements shall be saw cut to full depth at removal limits and saw cuts shall be at the nearest existing pavement joint. This note shall be provided in the plan set.
 7. Concrete Pavement Thickness Standards
 - 7.1. Standard Duty: 6 inch thickness with no reinforcement and 6 inch base course.
 - 7.1.1. Sidewalks
 - 7.1.2. Bicycle parking areas
 - 7.1.3. Bus shelter and bus stop pads.
 - 7.1.4. Moped and motorcycle parking
 - 7.1.5. Plaza and patio areas with little or no vehicle traffic
 - 7.2. Heavy Duty: 7 ½ inch minimum thickness with minimum epoxy coated 6x6, W2.9xW2.9 WWF placed 3 inches above subgrade into the slab. 8 inch base course.
 - 7.2.1. Loading docks
 - 7.2.2. Fire lanes
 - 7.2.3. Sidewalk and plaza areas where motor vehicles are routinely expected or cranes for construction/renovation work.
 - 7.3. Extra Heavy Duty: 9 inch minimum thickness with minimum epoxy coated reinforcement per WDOT specifications. 8 inch base course.
 - 7.3.1. Street intersections
 - 7.3.2. Bus pullouts
 8. Rebar:
 - 8.1. All rebar for exterior concrete shall be epoxy coated and all scratches and chips in epoxy shall be repaired prior to placing concrete. Epoxy coat all cut ends.
 - 8.2. Typical for Standard Duty Concrete:
 - 8.2.1. There shall be no rebar in curb when abutting sidewalk.
 - 8.2.2. There shall be no rebar between site pavement slabs and exterior stairs.
 9. Concrete Joints:
 - 9.1. Construction joints, commonly called control joints or contraction joints, in concrete slabs shall be hand tooled and then sawed ¼ inch per 1 inch of concrete thickness. (For example, a 6 inch concrete sidewalk should be tooled then sawed ¼ inch per 1 inch making the cut depth 1 ½ inches).
 - 9.1.1. Joints may be hand tooled without saw cutting if bullet trowel can provide required depth. Consult with UW-Madison Project Manager.



-
- 9.2. Saw cut joints without hand tooling are not acceptable except for streets and other large paved areas of thickened pavement primarily intended for vehicular traffic.
 - 9.3. Control joints for unreinforced concrete shall be placed so that the total square footage of the slab does not exceed 100 square feet total surface area and be placed to give the concrete work some artistic continuity. Control joints for reinforced concrete shall be placed so that the total square footage of the slab does not exceed 144 square feet total surface area and be placed to give the concrete work some artistic continuity. The largest dimension between control joints should not exceed 12’
 - 9.4. There shall be no expansion joint material placed in concrete sidewalks, curb/gutters, between curb and abutting sidewalk, between sidewalk and stairs, or in drive approaches unless reviewed by UW-Madison FP&M Civil Engineer. Decision to use expansion joints shall be approved by UW-Madison FP&M. A detail drawing with descriptive notes shall be provided in the 35% plan set.
 10. An expansion joint (sized accordingly) shall be used between building foundation and the abutting concrete pavement.
 11. Bond breaker and expansion joint material shall be closed cell material and not felt. Ethafoam 220 skinless by Dow Chemical or approved equal.
 12. Curb and Gutter
 - 12.1. Curb & gutter details shall be based on the following City of Madison (COM) Standard Details.
 - 12.1.1. 30 inch curb & gutter shall use COM Type “A”.
 - 12.1.2. 30 inch mountable curb & gutter shall use COM Type “A” Mountable
 - 12.1.3. 18 inch curb and gutter shall use COM Type “D”.
 - 12.1.4. 18 inch reject curb and gutter shall use COM Type “G”
 - 12.1.5. 18 inch mountable curb & gutter shall use COM Type “A” mountable and adapt a 12 inch gutter width with $\frac{3}{4}$ inch gutter slope.
 - 12.1.6. 24 inch curb and gutter, with 12 inch head shall use COM Type “E” for standard and Type “H” for reject.
 - 12.2. A custom design mountable curb with a reduced slope for bicycle or moped parking access may be necessary and shall be developed in consultation with the UW-Madison FP&M.
 - 12.3. The use of 24 inch curb & gutter (COM Type E & H with 12 inch head) shall be used for street islands and may be considered for other locations when approved by UW-Madison FP&M.
 - 12.4. Unless otherwise specified in the construction documents, the lengths between joints in curb and gutter shall be a minimum of six (6) feet and a maximum of fifteen (15) feet.
 - 12.5. When replacing or reconstructing curb & gutter, the new curb shall match the size of the old curb (i.e. 18 inch c&g replaced with 18 inch c&g and 30 inch c&g replaced with 30 inch c&g). Typically, “standup” curb (with no gutter) shall be replaced with appropriate sized curb and gutter.



- 12.6. “Standup” curb (i.e. 6 inch curb without a gutter) shall not be used for parking lots, driveways, and roads unless approved by UW-Madison FP&M.

13. Accessible Curb Cuts and Ramps:

- 13.1. Paired perpendicular accessible ramps shall be installed per City of Madison Standard Detail for Type 2 Curb Ramp unless special conditions require otherwise. Any alternate designs must be approved by UW-Madison FP&M.

- 13.2. Detectable warning surfaces are required for all pedestrian curb ramps.
See *Division 32 17 26 Tactile Warning Surfacing* for product details.

- 13.2.1. Detectable warning surfaces shall be recessed into the sidewalk so that the top of the truncated domes align with the top of the adjacent concrete. Adjacent concrete surface shall not be more than 1/4 inch above the detectable warning surface base plate.

- 13.3. See Appendix – Division 32 for standard accessible curb cut and ramp details.

14. Porous Concrete:

- 14.1. Porous concrete is an encouraged practice for stormwater management.
- 14.2. Porous concrete shall be limited to locations that do not experience heavy vehicle traffic and will contribute to stormwater infiltration.
- 14.3. Porous concrete specifications and mix design shall be submitted to UW-Madison FP&M for approval with the 35% review.
- 14.4. All contractors installing porous concrete shall provide proof of experience and certification in the construction of the product.
- 14.5. Porous concrete shall include the appropriate depth of base course for stormwater storage.
- 14.6. Final design submittals shall include a maintenance plan for porous concrete areas.
- 14.7. Porous concrete shall be vacuum cleaned after all site work is complete and before substantial completion when the site is turned over to the UW-Madison.

32 14 00 Unit Paving

1. One pallet’s worth of paver units shall be provided as attic stock for future repairs. Extra pavers will be stored in building adjacent to space where pavers are used.
2. Landscape features such as stepping stones and stone blocks shall be set so lawn mowers can access lawn and not damage the blades. Riding lawn mowers need gaps greater than 6 feet between objects.

32 14 13 Concrete and Clay Unit Paving

1. Concrete and/or clay unit pavers may be used in situations where regular vehicular traffic is not anticipated.



- 1.1. Pedestrian Only Applications: Pavers shall be dry laid over a 1" maximum depth of 1/4" clear stone chip – high performance bedding (HPB) set over a 6" layer of compacted aggregate base material.
- 1.2. Compact paver field to ensure pavers align with adjacent concrete and minimize shifting, sinking, and frost heave. Protect paver surface with a urethane scuff pad during compaction.
- 1.3. Apply polymeric sand joint stabilizer over paver field per manufacturer recommendations.

32 14 16 Street Terrace Unit Pavers

1. Unit paver type basis of design: Manufacturer Unilock Hollandstone. Color: Autumn Red (color to match existing to be confirmed by Campus Planning). Size: 2.73" x 4" x 8". Pattern: Match existing 1/2 paver running bond pattern perpendicular to sidewalk direction of travel (to be confirmed by Campus Planning). Approved equal manufacturer's include: Hanover, Wausau Tile, Belgard, others as identified.
 - 1.1. All pavers shall be set over a 7" concrete slab with a maximum 1" depth of 1/4" clear stone chip - high performance bedding (HPB) with geotextile protected weep holes per the detail.
 - 1.2. Paver terraces shall not exceed 10% slope or where wash out is a concern. In this case rigid concrete pavement shall be used.
 - 1.3. Compact paver field to ensure pavers align with adjacent concrete and minimize shifting, sinking, and frost heave. Protect paver surface with a urethane scuff pad during compaction.
 - 1.4. Apply polymeric sand joint stabilizer over paver field per manufacturer recommendations.
2. City of Madison streets with terraces adjacent to university property which shall be considered for unit paver terraces include all or parts of: N. Brooks Street, N. Charter Street, W. Dayton Street, W. Johnson Street, Langdon Street, Lorch Court, N. Mills Street, N. Orchard Street, N. Park Street, N. Randall Avenue, University Avenue. Also consult Campus Master Plan and proposed treatments for those streets.

32 14 43 Pervious Unit Paving

1. Pervious pavers are strongly encouraged in areas where there is little or no vehicle traffic such as outdoor seating areas, patios, and bike parking.
2. Pervious pavers shall follow current ADA guidelines.
3. Follow manufacturer's specifications for installation.
4. Design shall meet site conditions and soil type.
5. Design and underground water storage capacity shall meet site conditions and soil type.
6. Ensure all dust and construction debris is removed/vacuumed out of paver joints before stone chip is swept into joints. Protect joints during construction to prevent clogging with construction debris.



7. Chips in joints shall be flush with top of pavers. Top off prior to substantial completion to account for settling.

32 17 00 Paving Specialties

32 17 23 Pavement Markings

1. Pavement markings shall be applied in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and industry standards.
 - 1.1. Consult UW-Madison Transportation Services for use and location of bike lane arrows and other bike related pavement markings. See Appendix – Division 32 for details.
 - 1.2. Consult UW-Madison Transportation Services for use and location of shared lane markings. See Appendix – Division 32 for details.
2. All roadways, bike lanes/paths, and crosswalks shall use reflective epoxy markings with glass beads rated to last 3 to 5 years. See Appendix – Division 32 for details.
 - 2.1. Pavement markings to designate traffic and bicycle lanes shall follow standard AASHTO and Wisconsin DOT standards as further specified by campus lane width guidance.
 - 2.2. The standard for campus crosswalk is the Continental configuration. See Appendix – Division 32 for details.
 - 2.3. There are two kinds of centerlines: Dashed yellow and double solid yellow lines. Both shall be painted yellow 4 inch wide lines.
3. All non-roadway surfaces including parking stalls, loading docks, and motorcycling parking shall use yellow non-reflective paint markings.
 - 3.1. Single line painting shall be used for surface parking lots. Use 4 inch wide yellow painted lines. See Appendix – Division 32 for details.
 - 3.2. The ADA symbol for accessible stalls shall not be painted on the parking stall surface.
4. At parking structures, pavement markings must be applied wherever necessary in accordance with MUTCD and industry standards, including directional arrows and center lines, especially at corners, entrances, and exits.
5. Dual stall line painting shall be required in parking structures using 4 inch wide yellow painted lines 24 inches from outside edge to outside edge centered on the division between stalls. Single stall lines shall be sufficient inside parking structures. Stall lines shall be applied with two separate coats of paint. See Appendix – Division 32 for details.

32 17 26 Tactile Warning Surfacing

The campus standard for detectable warning surfaces at the bottom of accessible ramps and curb cuts shall be a non-galvanized, non-painted, natural finish, cast iron truncated dome product. This product is also specified by the City of Madison. Neenah Foundry Detectable Warning Plate R-4984 or UW-Madison FP&M approved equivalent is acceptable. See *Division 32 13 13 Concrete Paving*, Item 12. See Appendix – Division 32 for details.



32 30 00. Site Improvements

32 31 00 Fences and Gates

1. If a non-structural barrier is needed to discourage pedestrian access, a campus standard black post and chain shall be used. See Appendix – Division 32 for details.
2. Fence posts shall be surface mounted on paved surfaces, hardscape, and walls.
3. Fence posts shall be embedded in below grade footings in planting beds and lawn areas.

32 31 13 Chain Link Fences and Gates

All permanent chain link fencing shall be vinyl coated black. Plastic or vinyl inserts for screening are not acceptable as they tend to fade, become brittle, and breakdown in sunlight.

32 31 19 Decorative Metal Fences and Gates

1. A brick pillar with black iron fencing design is used along the campus edges. Babcock Drive entrance, Botany Garden, Breese Terrace, Allen Centennial Garden, Olin House, etc. are precedents. This style shall be replicated to help define the campus edge.
 - 1.1. Brick color for the columns shall be selected to compliment the surrounding buildings and shall be approved by UW-Madison Campus Planning & Landscape Architecture.
 - 1.2. The cap and base for the pillars shall be similar in design to the existing pillars on campus and shall be approved by UW-Madison Campus Planning & Landscape Architecture
 - 1.3. Stainless steel flashing under the pillar caps shall be provided.
 - 1.4. Anchoring of the decorative fence to the pillars shall be in the mortar joints and not within the brick units. This is to avoid the pillars and brick units from cracking.

32 32 00 Retaining Walls

1. Construction and plans for all retaining walls shall be pre-approved by UW-Madison FP&M to ensure walls are built of appropriate materials, are structurally sound, and are not in the way of snow removal equipment.
2. Natural limestone is the campus standard for retaining walls and raised planting beds. Dry laid and limestone veneer walls are acceptable.
 - 2.1. Limestone shall be hard enough to avoid cracking and fracturing
 - 2.2. Wisconsin dolomitic limestone is preferred. Buff color range or match existing. Local examples include: Fond du Lac Weathered Edge Wallstone and Fond du Lac Wallstone.



-
- 2.3. All walls 3 feet in height or lower shall be dry laid unless specific structural requirements need to be met.
 - 2.4. All walls above 3 feet in height shall be an engineered and the designs shall be stamped by Wisconsin licensed structural engineer.
 - 2.5. When natural, dry laid or veneered limestone stone walls are not appropriate based on surrounding site conditions and overall height of wall; finished cast-in-place concrete walls can be considered. Use of this cast-in-place walls shall be approved by UW-Madison Campus Planning & Landscape Architecture and UW-Madison Civil Engineer and reserved for non-public locations.
 - 2.6. Precast retaining walls or cast stone is an acceptable alternative to cast in place or limestone retaining walls but should be approved by UW-Madison Campus Planning & Landscape Architecture.
 - 2.7. Modular concrete retaining wall systems shall not be used on campus.
 3. All non-cast-in-place retaining walls 4 feet in height and above shall incorporate geotextile or deadmen wall tie backs for every 2 feet in vertical height.
 4. All non cast-in-place retaining walls shall have a batter for increased structural stability and to minimize snow blade contact with wall (where applicable).
 5. All exposed surfaces of exterior cast-in-place concrete walls shall have at minimum a sand blast finish.
 6. Creative design of the exposed surface for cast in place concrete retaining walls is encouraged. This includes but not limited to the finish type, use of concrete form liners, color applications, location and orientation of control joints, finish, batter of walls, and reveals etc.
 7. All cast in place retaining walls, with or without a masonry or stone veneer, shall be sealed on the side which contacts soil to prevent efflorescence from appearing on outside of wall.
 8. All cast in place retaining walls with a masonry or stone veneer shall not have veneer extend below grade or below the surface of the adjacent pavements and sidewalks. At least 2 inches of the foundation shall be exposed above the level of the grade / pavement / sidewalk.
 9. Skateboard Prevention: Exterior planters, seat walls, retaining walls, sculptures, art work, railing, and other masonry features in the landscape shall be designed to deter skateboard use and subsequent damage.
 - 9.1. The preferred methods for skateboard deterrence include but is not limited to the following list:
 - 9.1.1. Create breaks, control joints, or interruptions every 3 to 4 feet along the retaining wall or raised planter. These can be raised bumps, deep cuts, or objects such as arm rests. These applications shall be integral to the site element design.
 - 9.1.2. Use rounded edges which are less likely to be ground down.
 - 9.1.3. Obstructions designed into the site design.



- 9.1.4. Strategically placed paver units, stamped concrete, porous concrete or any other surface application with joints or a rough surface. This method shall be ADA compliant.
- 9.1.5. Strategically placed landscape beds.
- 9.1.6. Skateboard deterrence hardware affixed to site features shall be a last option if methods integral to the site feature design is not feasible.

32 39 00 Manufactured Site Specialties

32 39 13 Manufactured Metal Bollards (Also includes masonry bollard info)

- 1. Include all proposed bollards, along with detail drawings and specifications, in the 35% review plans.
 - 2. The preferred finish for new metal exterior bollards on the campus is galvanized steel that is primed and then powder coated black. Stainless steel is another acceptable finish for metal bollards. Alternatives shall be approved by Campus Planning and Landscape Architecture during the review process.
 - 3. Bollards used in loading dock areas shall be black or red in color with two or three horizontal reflective white stripes at the top.
 - 4. Use 316L stainless steel hardware when surface mounting bollards.
 - 5. Masonry and cast concrete bollards are also acceptable when appropriate. Provide details and material samples at the 35% plan review for approval by UW-Madison Campus Planning & Landscape Architecture.
- 5.1 Use materials that relate to adjacent buildings, site features, and site.

32 80 00 Irrigation System

- 1. Consult with UW-Madison Grounds and the Office of Campus Planning and Landscape Architecture regarding irrigation needs and specifications
- 2. The campus standard propriety products for irrigation is Rainbird. All the campus systems (UW Grounds, UW Recreation & Wellbeing, and UW Athletics) use Rainbird due to its performance and ability to be efficient with maintenance and spare parts storage.
- 3. Irrigation controls in building or facility will be easy for UW Grounds staff to access.

32 90 00 Planting

- 1. See Division 07 33 63 Vegetated Roofs for green roof guidelines.

32 91 00 Planting Preparation



32 91 13 Soil Preparation

1. Before installation of soil takes place, the subgrade shall be deep tilled at minimum 12 inches deep to eliminate soil compaction from construction activities.
2. For a successful planting and long-term survival of plants, planting area soil shall be engineered such that it can support the plants, eliminate conflicts with sidewalks and utilities, and provide water, oxygen and cation exchange needed by the plants and turf to survive.
3. Minimum depth of topsoil desired after construction for the given situations:
 - 3.1. Turf: 24” Minimum. 12” if no trees will be planted in area and approved by UW-Madison Campus Planning and Landscape Architecture.
 - 3.2. Trees: The depth of the root ball or 24 inches, whichever is greater.
 - 3.3. Beds for shrubs, perennials, or both: 18 inches
 - 3.4. If no soil depth is specified, consult with UW-Madison Campus Planning and Landscape Architecture for soil depth.
 - 3.5. Soil tests shall be performed in accordance with NR 151 regulations and the results of these tests shall be submitted to the appropriate campus representatives for approval prior to installation.
4. No construction debris or rocks shall be buried near root systems of any tree or shrub or anywhere else on site. All debris shall be removed completely from site.
5. All planting crews shall have proper machinery and staffing to carry out the installation.
6. Include mycorrhizal application in soil per manufacturer’s specifications.

32 92 00 Turf and Grasses

32 92 19 Seeding

1. All material and installation guidelines shall be followed as specified in the Division of Facilities Development master specifications.
2. Use site appropriate seed mixes approved by UW Grounds and Campus Planning and Landscape Architecture
3. A liquid broadleaf herbicide shall be applied in the second growing season of all seeded areas with a three year maintenance period.
4. Any seeded area shall be a minimum of ten square feet in size.
5. Seeded areas bordered by curb shall have mountable curb points for mower access.

32 92 20 Native Seeding

1. Weed control in all native seeded areas shall be addressed by the contractor before the project is turned over to campus. Weed control shall be accomplished by hand-pulling in all seasons of the maintenance period; beginning in the second growing season, herbicide may be used for weed control under the supervision of a campus representative.



32 92 23 Sodding

1. Areas requiring new turf or turf restoration shall be sodded.
2. Sod shall be approved by a campus representative before it is laid at a project site.
3. All sod used on campus shall be comprised of at least 25% fescue lawn grasses.
4. Sod shall be sourced from locations where it is grown in mineral soil.
5. Weeds shall be hand-pulled from all sodded areas by the contractor before the project is turned over to campus.
6. Any sodded area shall be a minimum of ten square feet in size.
7. Seeded areas bordered by curb shall have mountable curb points for mower access.

32 93 00 Plants

1. Landscape plans shall call out quantity, type, condition, and name of all plants to be installed and include planting details. See Appendix– Division 32 for standard planting details.
2. Site restoration shall not be called out simply as “Restore in Kind.” This does not provide enough information and often leads to improper restoration. A landscape plan and site plan detailing all site restoration work shall be provided.
 - 2.1. Any trees and shrubs removed shall be replaced with a similar species unless specified by UW-Madison Campus Planning and Landscape Architecture.
 - 2.2. Consult with UW-Madison Campus Planning and Landscape Architecture for site restoration. Replace “Like Kind” instead of “In Kind” to avoid replanting invasive species and troublesome plant species while also creating a layout that best meets the needs of the site.
3. Lime deposits on all site furniture, building signs, lights, build facades, and any other surfaces due to irrigation shall be removed by the contractor as part of substantial completion.
4. Plants shall be from local nurseries within our hardiness zone.
5. Plants shall be from local nurseries that do not use neonicotinoids.
 - 5.1. Provide documentation for neonicotinoid use at nursery.
 - 5.2. If no nursery can be found, include documentation from at least three nurseries to verify search.

32 93 05 General Guidelines for Plants and Trees

1. The University requires a minimum of 2 years and preferably 3 years of maintenance by the landscape contractor on new plant materials.



-
2. Locate fruiting trees and shrubs so they do not create tripping or falling hazards or where fruit may track into buildings.
 3. Do not plant perennials groundcovers, and ornamental grasses within 2 feet of tree trunks.
 4. The maximum tree caliper that shall be specified is 2 1/2 inches.
 5. Trees, shrubs, perennials, and other plant species shall be approved by UW-Madison Facilities Planning and Management prior to bidding.
 - 5.1. Use of Wisconsin native plants is encouraged where site conditions are appropriate, especially if a site is adjacent to or near the Lakeshore Nature Preserve.
 - 5.2. Plant schedules shall be on the same page as the landscape plan.
 6. UW-Madison reserves the right to inspect and choose the trees, shrubs, and other plant in the nursery field prior to delivery to project site and installation.
 7. Plant installation and maintenance processes shall be periodically reviewed by university representatives. A pre-installation meeting shall be held for each project to address proper installation techniques. Any plants not installed according to campus standards shall be removed and re-installed to meet campus standards.
 8. Prior to installation, all plants shall be protected from root and foliar drying sources.
 9. Use native topsoil from site when planting trees, shrubs, and perennials.
 - 9.1. Engineered or structural soils may be used if site appropriate and approved by UW-Madison Facilities Planning and Management.
 10. Planting soil mixtures shall only be used for perennials or annuals in containers. All soil mixtures shall be approved for use by the UW-Madison Facilities Planning and Management.
 11. Follow UW-Madison campus standard planting details. See Appendix – Division 32.
 - 11.1. Planting details shall expose the root collar of the trees and shrubs. Current nursery practices tend to bury the root collar plate and soil shall be removed from this area prior to planting. The planting pit shall be narrower at the bottom, same size at the root ball and wider at the top, 3 times the width of the root ball. See Appendix – Division 32.
 - 11.2. All wire baskets, burlap, twine, and any other binding materials shall be removed from around the entire root ball.
 12. Fertilizers shall not be used when planting trees, shrubs, and perennials for the first year after installation.
 13. Do not use any plants from the Regulated and Non-Regulated Wisconsin DNR Invasive species lists.
 - 13.1. Do not use cultivars or varieties of plants found on the Regulated and Non-Regulated Wisconsin DNR Invasive Species List.



14. Do not place plants under building eaves or overhangs unless automated in-ground irrigation is provided.
15. All planting beds shall have a shovel cut edge. Do not use metal or plastic edging. Consult UW-Madison Campus Planning & Landscape Architecture for alternative approval.
16. All single specimen trees and shrubs (existing and proposed) located within lawn areas of the project limits shall have at least a 3 foot diameter bark mulch ring around the trunk.
 - 16.1. Any groupings of single specimen trees and shrubs within lawn areas may have one large bark mulch planting bed around them.
 - 16.2. Show the bark mulch bed edges on the landscape plan.
17. Weed control in all plant bed and mulch areas shall occur on a weekly basis for the duration of the maintenance period. Weeds shall be hand-pulled or spot-treated with herbicide. Weeds taller than four inches are to be hand-pulled.
18. Weed barrier fabric shall only be used in areas with stone mulch.
19. Plants shall not be installed between July 1st and August 15th due to the heat and the added stress it creates. Plants shall not be installed after October 15th due to the cold temperatures, dry weather, and stress it puts on the plants.
20. Careful consideration should be given to plants used within intersection vision triangles.
21. Consider plant species and planting plans that provide pollinator food and habitat.
22. Consider plant species and planting plans that promote mental health and wellbeing.
23. Incorporate more evergreen trees and shrubs into the landscape.
24. Proposed plants shall promote interest for every season, including winter.
25. Stakes: Use Arbor tie or other flexible strap tree tie for staking. Do not use wire or hose in any situation.

32 93 13 Groundcovers

1. Highly aggressive and/or invasive groundcovers shall not be used where they cannot be controlled.

32 93 53 Grasses and Ornamentals

1. Grass selections shall be verified as non-invasive by the project landscape architect.
2. The use of tall grasses and plants near entryways driveways, etc. shall be limited to avoid blocking sight lines.

32 93 63 Annual and Perennial Plantings

1. Do not include annuals in planting plans unless pre-approved by UW-Madison Grounds and UW-Madison Campus Planning & Landscape Architecture.



32 94 00 Planting Accessories

32 94 43 Tree Grates

1. Campus standard tree grates include:
 - 1.1. Neenah Foundry Tree Grate R-8707
 - 1.2. Neenah Foundry Tree Grate R-8707-A
 - 1.3. Neenah Foundry Tree Grate R-8784
 - 1.4. Neenah Foundry Tree Grate R-8809
 - 1.5. Neenah Foundry Tree Grate R-8815
 - 1.6. Neenah Foundry Tree Grate R-8815-B
 - 1.7. Tree grate and frame components shall be from the same manufacturer. Frames shall be set into wet concrete and grates shall be placed after curing.

32 96 00 Transplanting

1. Stakes: Use Arbor tie or other flexible strap tree tie for staking. Do not use wire or hose in any situation.
2. The campus does not recommend transplanting between July 1st and August 15th due to the heat and the added strain it puts on transplanted materials.
3. Any plant material that is transplanted within the project limits shall be maintained by the contractor through the duration of the contracted maintenance period.
4. Coordinate any plant transplants with UW-Madison Grounds.



Division 33 Utilities

33 05 00 Common Work Results for Utilities

32 05 10 General Requirements for Exterior Improvements

1. Utility Work for all UW Madison facilities shall comply with all the provisions of the latest version of the Division of Facilities Development (DFD) Civil, Site, and Utility Design Guidelines, Deaerator Heater and Storage Tank Inspection Policy, and Weld Filler Metal Selection Guideline for Various Metal Combinations, which are available from the DFD website.
2. References within the DFD Guidelines regarding the DFD Project Manager shall apply to the UW-Madison Project Manager on UW-Madison Managed Projects.
3. Project Specifications shall use as their basis all appropriate sections of the latest edition of the DFD Master Specifications.
4. Deviations from DFD's Minimum Design Guidelines or the DFD Master Specification sections shall be made only upon approval from the UW-Madison Project Manager.
5. The Guideline for Planning and Design of UW-Madison Facilities shall take precedence over DFD Guidelines, but the A/E shall discuss all conflicts within the guidelines and specifications with the UW Project Manager.
6. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.
7. When determining the placement of all utilities, locate them to minimize current and future impact to identified building sites in the campus master plan, historic buildings and archeological sites, existing mature trees, trees of importance (i.e. teaching trees or donor trees), programed outdoor spaces, and other planting areas of significance whenever possible. Coordinate in preplanning phase and initial design phase with UW-Madison Campus Planning & Landscape Architecture.

33 05 20 Drawing Requirements for Utilities

See Section 32 05 20 Drawing Requirements for Exterior Improvements.

33 10 00 Water Utilities

33 11 00 Water Utility Distribution Piping

1. All underground pipe material, 4 inch diameter and larger shall be HDPE-wrapped class 52 ductile iron pipe conforming to ASA Standard A21.51 and AWWA C105 or HDPE as approved by UW-Madison Facilities Planning and Management (FP&M).
2. Pipes under 4" shall be Type K copper water tube, O (annealed) temper, ASTM B88; with cast copper pressure fittings, ANSI B16.18, wrought copper pressure fittings, ANSI B16.22; with copper-phosphorous-silver brazing.



3. All abandoned water piping and appurtenances shall be removed from the ground.
4. Building water services shall terminate with a threaded flange on the ductile iron service pipe. Bolt on or quick flanges shall not be allowed.
5. For new building water services, provide two water services into the building directly from the water main. Include a valve on both new water services and a new valve installed on the main between the two new connections. Coordinate this with interior plumbing and valve design.
6. Hydrants:
 - 6.1. All fire hydrants shall conform to the City of Madison Water Utility standards for manufacturer and placement.
 - 6.2. There shall be no obstructions, including but not limited to: power poles, trees, shrubs, fences, posts located, or grade changes exceeding 1½ feet in height, within 5 feet of a fire hydrant.
 - 6.3. Hydrants shall be located so the front nut is 3 feet behind the back of curb (or 3½ feet from the edge of pavement with no curb)
7. Valves:
 - 7.1. When feasible, building water service valves should be within the pavement and not in street terrace. Valves shall never be into the curb & gutter.

33 30 00 Sanitary Sewerage Utilities

General

1. The design consultant is responsible for identifying and obtaining documentation for all sanitary sewer service permits, approvals, and agreements issued or required by regulatory agencies or municipalities. The design consultant shall provide designs and plans that comply with all said permits, approvals, and agreements. Consultant shall apply for and obtain approval from MMSD and/or City of Madison when existing permits are affected or when new sanitary permits are needed.
2. All plans that effect or are adjacent to any MMSD or city of Madison utility shall be submitted to them for approval by the design consultant.

33 39 00 Sanitary Utility Sewerage Structures

33 39 13 Sanitary Utility Sewerage Manholes, Frames, and Covers

1. All sanitary utility sewer manholes lids shall have “sanitary sewer” cast onto them. Casting is the same; however, Neenah’s standard lid with the text shall be used. The lids shall be Type B, self sealing, non-rocking, with concealed pick holes, and are typically gasketed. There should be no additional cost of these lids over the standard type B lid.
2. Eccentric cones shall be used at the top of manholes.
3. Steps shall not be included in sanitary manhole structures.
4. All abandoned sanitary sewers and structures shall be removed from the ground.



5. Sanitary laterals shall be connected directly into a manhole rather than a wye in the sewer main.
6. Casting shall never be in the curb & gutter.

33 40 00 Storm Drainage Facilities

1. Storm Sewer Pipe: Use minimum 12 inch pipe for all storm sewers.
 - 1.1 Reinforced Concrete Pipe (RCP) shall be used for all storm pipe 12 inches and larger.
 - 1.2 Building storm sewers can be less than 12 inches and shall be PVC. HDPE storm pipe shall not be used unless approved by the UW-Madison Plumbing Shop.
 - 1.2 When exterior building downspouts are directed to storm sewer, downspouts shall be directed down inside larger open-ended piping at a minimum of 4 inches above grade.
 - 1.3 All pipe apron endwalls shall be reinforced concrete and have epoxy coated pipe grates.
 - 1.4 A minimum of 12 inch RCP shall always be used when an outfall pipe apron is needed.
 - 1.5 Storm sewers shall not contain bends, curves, or siphons. Storm sewers shall not be constructed such that a sump condition is created and cause water to remain standing in the pipe.
 - 1.6 When same size pipes meet at a storm structure, the downstream pipe invert shall be at least 0.1 feet below the upstream pipe inverts.
 - 1.7 When pipe sizes increase in a storm structure, the inside top elevations of the upstream and downstream pipes shall match. However, a larger drop in pipe invert elevations is acceptable when necessary.
 - 1.8 All abandoned storm sewer shall be removed from the ground.
 - 1.9 Storm sewer shall have a minimum of 12 inch cover above top of pipe and shall never have the top of pipe into the pavement gravel base course or pavement.
 - 1.10 When a project requires connecting to a City of Madison or MMSD sewer, the A/E is responsible for determining the permitting/approval requirements, designing systems that meet those requirements, and obtaining the permit/approval.
2. Pipe Culverts
 - 2.1 Material for new or replaced culverts, on or off campus, shall be RCP.
3. Storm Drainage Structures, Frames, and Covers



3.1 Castings:

- 3.1.1 All storm drainage manholes lids shall have “storm” cast onto them. Casting is the same; however, Neenah’s standard lid with the text shall be used. The lids shall be Type B, self sealing, non-rocking, with concealed pick hole, and are typically not gasketed. There should be no additional cost of these lids over the standard type B lid.
- 3.1.2 Use Neenah casting R-3067 (per DFD Standard) for storm curb inlets in both 18 inch and 30 inch Curb & Gutter except as stated below.
- 3.1.3 Use Neenah R-3170 casting for storm curb inlets in 18 inch curb & gutter when it runs parallel to a bike lane or abutting concrete pavement. This is a smaller inlet so it may require additional inlets.
- 3.1.4 Use Neenah Casting R-3067 for storm curb inlets in parking lots.
- 3.1.5 Since most storm inlets drain to the lake, all inlets shall have a cast logo on it that says “Dump No Waste Drains to Lake”
- 3.1.6 Manhole castings shall never be in the curb & gutter.
- 3.1.7 Round castings, rather than square, shall be used for catch basins, pavement inlets, and yard inlets unless approved by UW-Madison FP&M.
- 3.1.8 Exterior trench drain castings shall be cast iron.

3.2 Structures:

- 3.2.1 Integral steps shall not be included in storm structures.
- 3.2.2 Inlet detail drawings shall be based on City of Madison Type H inlet standards.
- 3.2.3 All abandoned sanitary sewer structures shall be removed from the ground.

- 3.3 Submit the storm water management plan, maintenance plan, any storm water computations, storm sewer computations, pre & post development runoff rates/volumes, Notice of Intent, USLE worksheet, and other storm related documents and computations to UW-Madison Campus Planning & Landscape Architecture (CPLA) prior to issuing Bid Documents.

4. Stormwater Management Facilities

- 4.1 The design consultant is responsible for identifying and obtaining all new and existing stormwater management permits, approvals, and agreements issued by regulatory agencies. Consultant shall provide designs and plans that comply with all said permits, approvals, and agreements.
- 4.2 In addition to regulatory requirements, site designs for newly developed and redeveloped campus areas shall address the *UW-Madison Policy* on stormwater runoff (2003), the latest edition of the UW-Madison Campus Master Plan, and incorporate stormwater sediment and nutrient controls as needed.



- 4.3 A draft of the design computations for storm sewers and stormwater management facilities shall be submitted to the UW-Madison FP&M - Civil Engineer with the 35% review documents.
- 4.4 Submit the storm water management plan, maintenance plan and any storm water computations, pre & post development runoff rates/volumes, Notice of Intent, Chapter 30 permits, USLE worksheet, and other storm related documents and computations to the UW-Madison FP&M - Civil Engineer with 100% review documents.
- 4.5 Sustainable stormwater facilities and best practices that promote filtration and/or infiltration and reduce the amount of water entering storm drains are strongly encouraged.
 - 4.5.1 Examples include, but are not limited to, rain gardens, bio-retention areas, cisterns, green roofs, pervious pavers, porous concrete, dense tree canopies, etc.
 - 4.5.2 Facilities that promote infiltration shall be at least 20 feet from building foundations to reduce risk of water entering basements.
 - 4.5.3 Where these facilities incorporate vegetation and are designed such that water may eventually enter Lake Mendota or the Lakeshore Nature Preserve, the plants selected shall not be on the Regulated or the Non-Regulated Wisconsin DNR Invasive Species lists and shall not spread aggressively. Native plant species shall be used when site conditions allow.
- 4.6 Raingardens, Bioswales, Bioretention Basins (Green Infrastructure):
 - 4.6.1 The proposed use, implementation, and design of these facilities shall be coordinated with UW-Madison FP&M, CP&D, and CPLA prior to the 35% review.
 - 4.6.2 Engineered soils shall be designed for the specific project and coordinated with UW-Madison FP&M. The design shall take into consideration the latest Wisconsin DNR guidelines as well as the engineered soils effect on increase nutrient loading to groundwater. (i.e increase phosphorus caused by compost).
 - 4.6.3 Consider and incorporate design features that will allow for easier removal of accumulated sediment within the green infrastructure.
 - 4.6.4 When vegetated slopes of green infrastructure are too steep for safe use or to maintain, consider stone retaining walls and seat walls to manage slopes and get depth required for stormwater collection.
 - 4.6.5 Consider how to make green infrastructure multifunctional and how people can safely interact with these features and learn about stormwater management. (i.e., incorporate seating, pollinator habitat, interpretive signs, seat walls, etc.)
- 4.7 Sediment sumps and vortex separator style sediment structures shall not be used on UW-Madison projects unless preapproved by UW-Madison FP&M, CP&D, and the UW Plumbing Shop.



33 61 10 Underground Chilled Water Piping, Valves and Access

The latest version of DFD Standard Specification Section 33 61 10 shall be used for all applicable utility work.

33 63 03 Utility Tunnel, Steam Pits and Box Conduits

1. DFD Standard Specification Section 33 63 03.90 shall be used for all applicable utility work. It can be obtained from DFD or UW-Madison Facilities Planning & Management.
2. Veneer for raised utility and steam tunnel access hatches shall match nearby building façade and existing adjacent steam tunnel access hatches. Samples shall be provided to UW-Madison Project Manager and Campus Planning and Landscape Architecture for approval.
3. Raised hatches shall be located at the edge of a site so they do not inhibit, obstruct, or limit maintenance activities, student activities, outdoor events, and the programming of outdoor spaces. Existing raised hatch locations to be reconstructed shall be evaluated and relocated if they are inhibiting the use of the site or pose a safety risk to those using the space.
4. Locations of all raised steam tunnel hatches and other raised utility hatches shall be reviewed by UW-Madison Campus Planning & Landscape Architecture.

33 70 00 Electrical Utilities

33 71 00 Electrical Utility Transmission and Distribution

33 71 19 Electrical Underground Ducts and Manholes

1. All underground electrical and signal manholes shall have water proofing membrane applied to the outside with a sump. A sump pump shall be installed at locations as deemed necessary. All electrical manholes shall have 120v power outlet and lights inside the manhole.
2. All cast-in-place or pre-cast concrete manholes shall be reinforced with epoxy coated reinforcing steel.



Division 34 Transportation

34 05 00 Common Work Results for Transportation

34 05 10 General Requirements for Transportation

1. Parking structure plans shall satisfy Crime Prevention through Environmental Design (CPTED) criteria. That is, they shall demonstrate:
 - 1.1. Natural surveillance via open stairwells, high pedestrian and vehicular visibility, good nighttime lighting, and other features.
 - 1.2. Territorial Reinforcement, differentiating the structure from public right of ways.
 - 1.3. Natural access control where appropriate by means of gates and other features.
 - 1.4. Target hardening if called for.
 - 1.5. Minimization of interior shear walls and obstructions.
 - 1.6. Glass-backed elevators.
 - 1.7. Columns pushed to the head of the stalls, away from the drive aisles
2. The goals and guiding principles of the UW-Madison Campus Master Plan (latest edition) shall be considered and referenced as part of the planning, design, detailing, and material section for every project.

34 05 20 Drawing Requirements for Transportation

1. Refer to *Section 01 05 20 Drawing Requirements for All Projects* for additional information regarding project drawing requirements.
2. Refer to *Section 32 05 20 Drawing Requirements for Exterior Improvements* for additional information regarding project drawing requirements.
3. Plans for trees, shrubs, perennials, and turf planted in parking lots and bike parking areas shall be included in the 35% review documents.
4. Scaled and dimensioned plans showing the stalls, ramps, and drive aisles shall be provided at the 35% review documents or early enough that structural changes to the ramp and any connected building can still be accomplished. Transportation Services reserves the right to approve all parking structure plans before they are used in a building's design.
5. Snow removal and snow storage plans shall be included in all parking plans.

34 05 30 Design Parameters for Transportation Planning

34 05 31 Bicycle Lanes and Multi-Use Paths

Refer to *Section 32 05 30 Design Parameters for Exterior Improvements* for requirements for Bike Routes and Multi-use paths.



34 05 32 Bicycle Parking Facilities

Refer to *Section 12 93 13* for Bicycle Racks, Bicycle Parking Facilities, and Bicycle Parking in Parking Structures requirements

34 05 33 Moped and Scooter Parking

Refer to *Section 32 05 30 Design Parameters for Exterior Improvements* for requirements for moped and scooter parking.

34 05 35 Automobile Parking Structures

1. All parking structures shall be designed with a minimum 20 foot setback from property lines or street curbs to allow for adequate landscape screening and trees.
2. Parking structures shall be designed to efficiently maximize parking with the least amount of wasted space with respect to such features as location of support columns, length of parking bays, ramps from one level to the next, storage rooms, stairs, elevator rooms, and any other feature.
3. Entrance ramps for parking structures shall conform to City of Madison standards regarding sight lines, including ramp incline, driveway aprons, walls around the entrance ramp, and any other visibility issue affecting the driver or pedestrians.
4. The corner radii and other features of ramps and drive aisles, including the placement of access control equipment, shall be tested with AutoTurn or its equivalent for a full-sized personal vehicle.
5. Each stall inside the parking structure shall be 8 feet, 6 inches wide and be measured from the edge of any columns or other obstructions.
6. Drive aisles shall be a minimum of 24 feet wide for two-way traffic. The width of drive aisles for one-way traffic-oriented parking areas shall be decided on a case by case basis taking into account the geometry of the parking stalls relative to the drive aisles.
7. The number of accessible stalls shall be determined using a 1:6 ratio in consultation with UW-Madison Transportation Services. The UW-Madison accommodates all disability parking needs and provides a number of accessible stalls that meets or exceeds ADAAG requirements.
8. Accessible stalls shall comply with ADA and their location shall be in the stalls nearest to an accessible route and accessible entrance.
 - 8.1.1. Do not paint ADA symbols for accessible stalls on the parking stall surface.
 - 8.1.2. Accessible stalls shall be eight (8) feet wide with a five (5) foot access aisle.
 - 8.1.2.1. Two accessible stalls can share one access aisle.
 - 8.1.3. Van accessible stalls shall be eleven (11) feet wide with a five (5) foot access aisle on the passenger (right) side of the stall.
 - 8.1.3.1. Van accessible stalls must maintain eight (8) feet four (4) inches of vertical clearance from the entry of the structure to the parking space



and the exit of the structure.

8.1.3.2. An accessible stall can share the Van stall access aisle.

8.1.4. Signs for accessible stalls shall be provided by UW-Madison Transportation Services to be installed by the contractor in consultation with UW-Madison Transportation Services with a minimum of 60" between the bottom of the sign and the ground.

8.1.4.1. See Division 10 14 53 Traffic Signage and Sign Posts for standards.

9. Motorcycle parking stalls are 5 feet wide by 10 feet long at minimum and shall be paved in concrete.
10. Each parking structure shall have a clearance of at least 7 feet, 4 inches on all floors. A clearance of 8 feet, 4 inches is desired on the first level to accommodate vans for persons with disabilities. This clearance shall be posted on a headache bar outside and above each entrance and ticket dispenser if access control equipment is used.
11. In the case that Paratransit buses may need to enter a parking structure, a clearance of 10 feet, 6 inches shall be provided on all floors that the buses may need to access.
12. If a booth is required in the parking structure, then the entry and exit lanes shall be designed to accommodate access control equipment used by UW-Madison Transportation Services.
13. Post-and-cable barriers shall be provided wherever a grade separation between two paved areas is encountered.
14. Parking will be controlled by parking access control (PARCS) equipment.
 - 14.1. Concrete infrastructure and the electrical conduits and hand holds for access control equipment shall be provided in accordance with specifications provided by UW-Madison Transportation Services and their PARCS supplier.
 - 14.2. In some cases, high-speed security doors will need to be provided.
15. A copy of all operating and maintenance (O&M) manuals for all equipment and operating systems shall be provided to Transportation Services.
16. Follow standards defined elsewhere in "General" and "Construction Site Plan" as they apply to traffic, parking, and transportation impact elements of project.
17. There shall be a minimized loss of auto parking stalls (including accessible stalls), bike racks, and moped/scooter parking areas.
18. Disruptions to accessing lots and/or roads for special events shall be prevented. Coordinate any access issues with UW-Madison Transportation Services.
19. All parking structures shall be built with a minimum of one single unisex restroom. Restroom shall have one ADA compliant toilet, one garden hose water hook-up, a space heater, manual lock on the door, janitorial stainless-steel sink, and small hot water heater. Restroom shall be keyed to TS booth key.



20. All parking structures shall be built with at least one environmentally controlled room for storage. The minimum size shall be 12 feet x 12 feet. This room can be used to fulfill the requirement of having a snow blowing equipment room and if so, shall meet requirements for storage of combustible materials. Storage room shall have electricity run to it for possible space heaters or other electrical needs. There shall be a minimum of three duplex outlets. Storage room to be keyed to TS booth key.
21. One elevator with an emergency phone shall be located in opposite corners of the parking structure for a minimum of two per ramp.
22. Snow Chutes and Snow Exposure:
 - 22.1. Parking structures that have an exposed upper level shall be equipped with at least one snow chute.
 - 22.2. It shall be presumed that parking structures need snow removal design components unless it is completely clear that snow cannot fall or be blown from above or from open sides into the ramp.
 - 22.3. Snow chutes shall be gated at the top with a sliding gate and locked with a UW-Madison provided master lock key #2027.
 - 22.4. Snow chutes shall have a flat concrete area at the bottom of the chute where snow can be stored until it is hauled away. This area shall be accessible by trucks that are used to haul the snow off site.
 - 22.5. Snow chute designs shall be approved by UW-Madison Transportation Services.
23. Stairwells:
 - 23.1. Any stairwell that is exposed under the stairs shall be gated. Chain link fence shall have a swing gate attached. Padlocks shall not be used.
 - 23.2. Stairwells and elevators shall be located as needed based on the size of the structure and proximity to routes leading to key pedestrian destinations.
 - 23.3. Landings in the stairwells shall be kept to a minimum square footage, to help reduce the desire to use the stairwells for shelter.
 - 23.4. Stairwells shall have all appropriate signage and exit signs as required by codes and these guidelines.
 - 23.5. Stairwells shall follow the requirements set for hose bibs and drainage.
 - 23.6. All stairwell walls shall be painted with anti-graffiti paint.
 - 23.7. Treads on stairs shall be durable and non-slip.
 - 23.8. Stairwells shall be designed with user safety in mind. They shall be well lit, as visible as possible from outside and elsewhere, and shall generally not allow someone to be hidden from view in any area.
 - 23.9. Bird diversion treatment should be added to all windows.



23.10. Stairwells shall be environmentally controlled.

24. For window washing equipment see *Section 11 24 23 Window Washing Equipment*.
25. For fire hose connections and drains see *Section 21 12 50 Fire Suppression in Parking Structures*.
26. For signage see *Section 10 14 55 Parking Structure Signage*.
27. For pavement markings in parking structures see *Section 32 17 23 Pavement Markings*.
28. For lighting requirements in parking structures see *Section 26 55 00 Parking structure Lighting*.
29. For requirements for mirrors in parking structures see *Section 10 86 00 Mirrors in Parking structures*.
30. For locking and hardware requirements specific to parking structures see *Section 08 71 40 Parking Structure Locking Requirements*.
31. For trash receptacle and ash tray requirements see *Section 12 91 00 Parking Structure Furnishings*.
32. For fire extinguishers and cabinets see *Section 10 44 00 Fire Protection Specialties*.

34 50 00 Transportation Equipment

34 50 10 Parking Structure Equipment

1. UW-Madison Transportation Services shall provide information on all forms of parking equipment as needed.
2. UW-Madison Transportation Services shall provide supplier specifications for all parking equipment to be installed.
3. When a booth is needed, consider the following in the plans: Booth – ADA compliant, telephone hook-up, computer hook-up, minimum 2, duplex electrical outlets, heater, air-conditioning, hook up to the gate system, and a safe for money.



BIM for Architects & Engineers

See following attachment



UNIVERSITY OF WISCONSIN - MADISON BUILDING INFORMATION MODELING FOR ARCHITECTS & ENGINEERS

Division 01. General Requirements

01 0 00. Administrative Requirements

In addition to the Division of Facility Development (DFD) Building Information Modeling (BIM) Standards, the University of Wisconsin-Madison (UW-Madison) requests that the Architects and Engineers (AE) Firm for each project provide a Building Information Model.

00 54 36. Building Information Model

1. BIM Requirement

The primary objective is an implemented process focused on the development, use and transfer of the digital information model of a building project in order to improve the design, construction and operation of a project or facility.

- 1.1. The Design Team shall use parametric BIM Authoring software for UW-Madison projects. Architects, Structural, Mechanical, Electrical, Plumbing Engineers, and Consultants are requested to use the following design authoring software:
 - Autodesk® Revit® Architecture
 - Autodesk® Revit® MEP
 - Autodesk® Revit® Structure
 - Autodesk® AutoCAD
 - Autodesk® Civil 3D
- 1.2. Projects will remain on the same software release at the beginning and throughout the life of the project, unless all team members of the project agreed to a different software release. AE shall follow the guidelines and requirements detailed in the DFD BIM Standards and in applicable portions of this document for BIM related services.
- 1.3. Where DFD Standards and UW-Madison Standards are not provided, AE's in-house BIM Standards are acceptable methods in producing models, construction drawings, and final submissions.

2. Level of Development

BIM Level of Development (LOD) describes the level of completeness to which a BIM is developed and their minimum requirements. The Level of Development is accumulative and should progress from the design phase through the construction phase.

- 2.1. BIMs shall be created and include geometry, physical characteristics, information and data necessary so to describe and facilitate the design, intended construction, and cost estimating of a project as necessary to meet the requirements, as described in



this document and the AE's BIM Execution Plan, for each Design Phase of a project. In addition, drawings, simulations, and services required for analysis and review shall be extractions from the BIMs

- 2.2. Required Building Elements need not illustrate, depict individual parts that are required for the assembly and/or the manufacture of the Modeled Building Element. The intent and requirements for a Modeled Building Element is different for each phase and LOD. It is to provide overall size, shape, clearances, information, data, and the orientation of a Modeled Building Element for its installation and coordination with other required work, as well as for the population of required Schedules.

3. Shared Parameter

Shared Parameter is a definition of a container for information that can be used in multiple families or projects.

- 3.1 Upon request, UW-Madison will provide the AE with the UW Revit Families, Shared Parameter, and Templates. The UW-Madison shared parameters shall include but not limited to:

- UW Building No.
- UW Asset I.D.
- UW Asset Type
- UW Equipment Name
- UW Manufacturer
- UW Serial Number
- UW Installation Date

4. Architect and Engineer Discipline Model Requirement

4.1. Architectural

In addition to the DFD minimum requirements, the model should include the following architectural elements to a level that defines the design intent and accurately represents the design solution:

- Architectural Site
- Existing conditions
- Demolition items
- New interior and exterior walls including but not limited to:
 - Doors, windows, openings
 - Interior and exterior soffits, overhangs, sun control elements
 - Parapets, screening elements
 - Architectural precast
- Floor, ceiling and roof systems including but not limited to:
 - Appropriate structural items listed below if not provided by the structural engineer and integrated into the architectural model for coordination and document generation.
 - Insulation, ceiling systems, and floor are to be included.
 - Roof, floor and ceiling slopes, if needed, shall be modeled.
 - Soffits, openings, and accessories will also be modeled.
- Elevators, stairs, and ramps



- Casework, shelving, and other interior architectural elements
- Furnishings, fixtures, and equipment
 - Furniture Systems
 - Specialty equipment (food service, medical, etc)
 - Model mechanical, electrical and plumbing items that require architectural space (toilets/sinks/etc), require color/finish selection
 - (louvers, diffusers, etc.) or affect 3D visualization (lighting fixtures) unless provided by engineers.
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of all equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

4.2. Structural

In addition to the DFD minimum requirements, the model should include the following structural elements to a level that defines the design intent and accurately represents the design solution:

- Foundations
- Framing
 - Columns and beams
 - Floor Joists
 - Open Web Joist
 - Precast Concrete
 - Floors, including overall extents and openings
 - Fireproofing, clearance zones
- Housekeeping pads
- Wall Types
 - Load Bearing Walls
 - Structural Foundation Walls

4.3. Mechanical HVAC Systems

In addition to the DFD minimum requirements, the model should include the following mechanical elements to a level that defines the design intent and accurately represents the design solution:

- Equipment
 - Fans, VAV's, compressors, chillers, cooling towers, air handlers etc.
- Distribution
 - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater)
 - Duct Fittings
 - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, wall units
- Pipes larger than 2" diameter, include any insulation
- Stacked/bundled pipes 2" or greater in diameter
- Clearance zones for access, door swings, service space requirements, gauge reading, equipment removal zones, and other operational clearance must be modeled as part of the HVAC equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.



4.4. Plumbing and Fire Protection Systems

In addition to the DFD minimum requirements, the model should include the following plumbing and fire protection elements to a level that defines the design intent and accurately represents the design solution:

- Waste and Vent Piping sized at and over 2" diameter, include any insulation
 - Roof and floor drains, leaders, sumps, grease interceptors, tanks, water treatments and other major items.
- Supply Piping larger than 2" diameter, include any insulation
 - Domestic Booster Pumps
- Lab and Med Gas Piping at and over 1" diameter, include any insulation
- Fixtures: sinks, toilet fixtures, water tanks, floor sinks
- Fire protection
 - Sprinkler lines larger than 2" diameter
 - Sprinkler heads, Fire Protection Pumps
 - Stand pipes, wall hydrants, fire department connections, risers, including valve clearances
- Clearance zones for access, service space requirements, gauge reading, equipment removal zones, valve clearances and other operational clearance must be modeled as part of the plumbing and fire protections system and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

4.5. Electrical Systems

In addition to the DFD minimum requirements, the model should include the following electrical elements to a level that defines the design intent and accurately represents the design solution:

- Power and Telecommunications
 - Interior and exterior transformers, emergency generators, cable tray and other equipment
 - Main and distribution panels and switchgear including access clearances
 - Main IDF's
 - Feeders and conduit larger than 2" diameter
 - Outlets, switches, junction boxes
- Lighting
 - Permanently mounted lighting fixtures
 - Lighting Controls
 - Switches
 - Junction Boxes
- Fire Alarm and Security Systems
 - Input devices
 - Notification devices
 - Associated equipment and access clearances
 - Permanently mounted fixtures
 - Building Controls
- Clearance zones for access, door swings, service space requirements, equipment removal zones, and other operational clearance must be modeled as part of the electrical equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.



4.6. Specialty Equipment

In addition to the DFD minimum requirements, the model should include the following specialty equipment elements to a level that defines the design intent and accurately represents the design solution:

- Equipment
- Rough-in connections points
- Clearance zones for access, door swings, service space requirements, equipment removal zones, and other operational clearance must be modeled as part of the specialty equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.

4.7. Civil Engineering

In addition to the DFD minimum requirements, the model should include the following civil engineering elements to a level that defines the design intent and accurately represents the design solution:

- Topography
- Landscaping
- Stormwater

5. Coordination Meeting

- 5.1. BIM Coordination Meeting shall occur regularly and in accordance to what is defined in the AE's Design Team - BIM Implementation Plan Outline, by necessity of the project and the coordination team using a collaboration software. Attendance is mandatory by all team members to maintain the coordination and construction schedules. Throughout the modeling process, any design conflicts, clashes, interferences, discrepancies in drawing details and design documentation, lack of information and coordination issues will be identified, documented, reviewed, and/or resolved by the coordination team.
- 5.2. AE BIM Manager will be responsible for BIM coordination meeting management.
- 5.3. Attendees shall include but not limited to:
 - Project Manager
 - Construction Manager
 - MEP Contractor
 - Design Team
 - Owner's BIM Facilitator

6. BIM Deliverables

BIMs are submitted to DFD by the AE and serve as the permanent record of construction for the facilities and landscape. Upon substantial completion, the AE shall submit:

- 6.1. BIM - The model shall have information in the component parameters. Files and models shall be cleaned of extraneous layers, sheets, revision clouds, worksets, section cuts, reference lines, reference planes, and other miscellaneous content typically produced during BIM design.





BIM for Contractors

See following attachment



UNIVERSITY OF WISCONSIN - MADISON BUILDING INFORMATION MODELING FOR CONTRACTORS

Division 01. General Requirements

01 0 00. Administrative Requirements

In addition to the Division of Facility Development (DFD) Building Information Modeling (BIM) Standards, the University of Wisconsin-Madison (UW-Madison) requests that the Contractor for each project provide a Building Information Model.

00 54 36. Building Information Model

1. BIM Requirement

The primary objective is an implemented process focused on the development, use and transfer of the digital information model of a building project in order to improve the design, construction and operation of a project or facility.

- 1.1. The Construction Team shall use parametric BIM Authoring software for UW-Madison projects.
- 1.2. Projects will remain on the same software release at the beginning and throughout the life of the project, unless all team members of the project agreed to a different software release. Contractor shall follow the guidelines and requirements detailed in the DFD BIM Standards and in applicable portions of this document for BIM related services.
- 1.3. Where DFD Standards and UW-Madison Standards are not provided, Contractor's in-house BIM Standards are acceptable methods in producing models, construction drawings, and final submissions.

2. Level of Development

BIM Level of Development (LOD) describes the level of completeness to which a BIM is developed and their minimum requirements. The Level of Development is accumulative and should progress from the design phase through the construction phase.

- 2.1. BIMs shall be created and include geometry, physical characteristics, information and data necessary so to describe and coordinate the construction, and cost estimating of a project as necessary to meet the requirements, as described in this document and the Contractor's BIM Execution Plan. In addition, drawings, simulations, and services required for analysis and review shall be extractions from the BIMs
- 2.2. Required Building Elements need not illustrate, depict individual parts that are required for the assembly and/or the manufacture of the Modeled Building Element. It is to provide overall size, shape, clearances, information, data, and the orientation of a Modeled Building Element for its installation and coordination with other required work, as well as for the population of required Schedules.



3. Shared Parameter

Shared Parameter is a definition of a container for information that can be used in multiple families or projects.

3.1 Upon request, UW-Madison will provide the Contractor with the UW Revit Families, Shared Parameter, and Templates. The UW-Madison shared parameters shall include but not limited to:

- UW Building No.
- UW Asset I.D.
- UW Asset Type
- UW Equipment Name
- UW Manufacturer
- UW Serial Number
- UW Installation Date

4. Construction Model Requirement

4.1. Architectural

In addition to the DFD minimum requirements, the model should include the following architectural elements to a level that accurately represents installation and constructability:

- Architectural Site
- Existing conditions
- New interior and exterior walls including but not limited to:
 - Doors, windows, openings
 - Interior and exterior soffits, overhangs, sun control elements
 - Parapets, screening elements
 - Architectural precast
- Floor, ceiling and roof systems including but not limited to:
 - Appropriate structural items listed below if not provided by the structural engineer and integrated into the architectural model for coordination and document generation.
 - Insulation, ceiling systems, and floor are to be included.
 - Roof, floor and ceiling slopes, if needed, shall be modeled.
 - Soffits, openings, and accessories will also be modeled.
- Elevators, stairs, and ramps
- Casework, shelving, and other interior architectural elements
- Furnishings, fixtures, and equipment
 - Furniture Systems
 - Specialty equipment (food service, medical, etc)
 - Model mechanical, electrical and plumbing items that require architectural space (toilets/sinks/etc), require color/finish selection (louvers, diffusers, etc.) or affect 3D visualization (lighting fixtures) unless provided by engineers.
- Clearance zones for access, door swings, service space requirements, gauge reading, and other operational clearance must be modeled as part of all equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.



4.2. Structural

In addition to the DFD minimum requirements, the model should include the following architectural elements to a level that accurately represents installation and constructability:

- Foundations
- Framing
 - Columns and beams
 - Floor Joists
 - Open Web Joist
 - Precast Concrete
 - Floors, including overall extents and openings
 - Fireproofing, clearance zones
- Housekeeping pads
- Wall Types
 - Load Bearing Walls
 - Structural Foundation Walls

4.3. Mechanical HVAC Systems

In addition to the DFD minimum requirements, the model should include the following mechanical elements to a level that accurately represents installation and constructability:

- Equipment
 - Fans, VAV's, compressors, chillers, cooling towers, air handlers etc.
- Distribution
 - Supply, return, exhaust, relief and outside air ductwork modeled to outside face dimension or duct insulation (whichever is greater)
 - Duct Fittings
 - Diffusers, grilles, louvers, hoods, radiant panels, perimeter units, wall units
- All pipes, include any insulation
- Clearance zones for access, door swings, service space requirements, gauge reading, equipment removal zones, and other operational clearance must be modeled as part of the HVAC equipment and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

4.4. Plumbing and Fire Protection Systems

In addition to the DFD minimum requirements, the model should include the following plumbing and fire protection elements to a level that accurately represents installation and constructability:

- All Waste and Vent Piping, include any insulation
 - Roof and floor drains, leaders, sumps, grease interceptors, tanks, water treatments and other major items.
- All Supply Piping include any insulation
 - Domestic Booster Pumps
- Lab and Med Gas Piping, include any insulation
- Fixtures: sinks, toilet fixtures, water tanks, floor sinks
- Fire protection
 - Sprinkler lines



- Sprinkler heads, Fire Protection Pumps
 - Stand pipes, wall hydrants, fire department connections, risers, including valve clearances
- Clearance zones for access, service space requirements, gauge reading, equipment removal zones, valve clearances and other operational clearance must be modeled as part of the plumbing and fire protections system and checked for conflicts with other elements. These clearance zones should be modeled as invisible solids within the object.

4.5. Electrical Systems

In addition to the DFD minimum requirements, the model should include the following electrical elements to a level that accurately represents installation and constructability:

- Power and Telecommunications
 - Interior and exterior transformers, emergency generators, cable tray and other equipment
 - Main and distribution panels and switchgear including access clearances
 - Main IDF's
 - All Feeders and conduits
 - Outlets, switches, junction boxes
- Lighting
 - Permanently mounted lighting fixtures
 - Lighting Controls
 - Switches
 - Junction Boxes
- Fire Alarm and Security Systems
 - Input devices
 - Notification devices
 - Associated equipment and access clearances
 - Permanently mounted fixtures
 - Building Controls
- Clearance zones for access, door swings, service space requirements, equipment removal zones, and other operational clearance must be modeled as part of the electrical equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.

4.6. Specialty Equipment

In addition to the DFD minimum requirements, the model should include the following specialty equipment elements to a level that accurately represents installation and constructability:

- Equipment
- Rough-in connections points
- Clearance zones for access, door swings, service space requirements, equipment removal zones, and other operational clearance must be modeled as part of the specialty equipment for collision checking. These clearance zones should be modeled as invisible solids within the object.



4.7. Civil Engineering

In addition to the DFD minimum requirements, the model should include the following civil engineering elements to a level that accurately represents installation and constructability:

- Topography
- Landscaping
- Stormwater

5. Coordination Meeting

- 5.1. BIM Coordination Meeting shall occur regularly and in accordance to what is defined in the Construction Team - BIM Implementation Plan Outline, by necessity of the project and the coordination team using a collaboration software. Attendance is mandatory by all team members to maintain the coordination and construction schedules. Throughout the construction process, any construction conflicts, clashes, interferences, discrepancies in drawing details and construction documentation, lack of information and coordination issues will be identified, documented, reviewed, and/or resolved by the coordination team.
- 5.2. Construction BIM Manager will be responsible for BIM coordination meeting management.
- 5.3. Attendees shall include but not limited to:
 - Project Manager
 - Construction Manager
 - MEP Contractor
 - Design Team
 - Owner's BIM Facilitator

6. BIM Deliverables

BIMs are submitted to DFD by the Contractor and serve as the permanent record of construction for the facilities and landscape. Upon substantial completion, the Contractor shall submit:

- 6.1. The model shall have information in the component parameters. Files and models shall be cleaned of extraneous layers, sheets, revision clouds, worksets, section cuts, reference lines, reference planes, and other miscellaneous content typically produced during BIM design.
- 6.2. If the BIM Authoring software is not Revit, UW-Madison requests a separate 2018 or older version Revit (RVT) file for each discipline.



BIM Floor Naming Standards

Naming convention for Floor Levels in the Architectural model

XXXX = Project Phase Number

XXXX BASEMENT DEMOLITION PLAN
XXXX BASEMENT REMODEL PLAN

XXXX - 1ST FLOOR DEMOLITION PLAN
XXXX - 1ST FLOOR REMODEL PLAN

XXXX - 1ST FLOOR CEILING DEMOLITION PLAN
XXXX - 1ST FLOOR CEILING REMODEL PLAN

... 2nd FLOOR
3RD FLOOR ...
Roof

Naming convention for Floor Plan Views in the MEP models

XXXX = Project Phase Number

XXXX - BASEMENT ELECTRICAL DEMOLITION PLAN
XXXX - BASEMENT ELECTRICAL REMODEL PLAN

XXXX - 1ST FLOOR ELECTRICAL DEMOLITION PLAN
XXXX - 1ST FLOOR ELECTRICAL REMODEL PLAN

XXXX - 1ST FLOOR ELECTRICAL CEILING DEMOLITION PLAN
XXXX - 1ST FLOOR ELECTRICAL CEILING REMODEL PLAN

XXXX - 2nd FLOOR ELECTRICAL CEILING DEMOLITION PLAN
XXXX - 2ST FLOOR ELECTRICAL CEILING REMODEL PLAN

...



Naming convention for Arch, MEP Sheet Views in the CD model

Architectural plan title doesn't need the word "Architectural".

BASEMENT DEMOLITION PLAN
BASEMENT REMODEL PLAN

FIRST FLOOR DEMOLITION PLAN
FIRST FLOOR REMODEL PLAN

Mechanical, Electrical, Plumbing & Fire Protection title will need to spelled out.

BASEMENT ELECTRICAL DEMOLITION PLAN
BASEMENT ELECTRICAL REMODEL PLAN
FIRST FLOOR ELECTRICAL DEMOLITION PLAN
FIRST FLOOR ELECTRICAL REMODEL PLAN

FIRST FLOOR ELECTRICAL CEILING DEMOLITION PLAN
FIRST FLOOR ELECTRICAL CEILING REMODEL PLAN

SECOND FLOOR ELECTRICAL DEMOLITION PLAN
SECOND FLOOR ELECTRICAL REMODEL PLAN

...



Drawings Checklist

This list is not comprehensive and does not include all the requirements of a given project, nor are all elements in the checklist pertinent to all projects. The list represents some elements that reviewers may want to look at as is appropriate for the given project. Confer with the UW-Madison Project Manager if items are deemed not pertinent to a specific submittal. Consult other divisions of these Guidelines for additional drawing requirements for project reviews.

All numbers to the right of each checklist item indicate the latest drawing review stage at which the item should be coordinated.

35% = Design Development Review

100% = Construction Document Review

Project Title _____

Reviewer's Name _____

Coordinated?
YES NO N/A %

| CIVIL | | | | |
|--|--|--|--|-----|
| AE has read and is following the UW-Madison Technical Guidelines | | | | 35 |
| AE has verified that that all drawings contain the required elements as stated in the UW Technical Guidelines Div. 32 05 20 "Drawing Requirements for Exterior Improvements. | | | | 35 |
| AE demonstrates that new underground utilities (power, telephone, water, sewer, gas, storm drainage, fuel lines, grease traps, fuel tanks) have no interferences with other utilities or structures. | | | | 35 |
| AE shows the limits of construction, clearing, grading, sodding, grass or mulch are shown and are consistent in other disciplines. | | | | 35 |
| AE has verified that fire hydrants and street light poles do not conflict with other utilities or other above ground items. | | | | 35 |
| AE coordinated the proposed grading plan with the proposed ground floor/ first floor elevations of all other disciplines. | | | | 35 |
| AE verified locations of gas meters, water meters, electrical transformers, substations are acceptable with owner, utility, and designer. | | | | 35 |
| AE verified that all pertinent existing and proposed grades are shown. | | | | 35 |
| AE verified that site runoff does not adversely affect areas off site. | | | | 35 |
| LIFE SAFETY PLANS | | | | |
| Verify location of perimeter fire lane and 150' fire department access requirement. | | | | 35 |
| Review construction classification and allowable area. | | | | 35 |
| Review sprinkler and fire lane floor area increase worksheet. | | | | 35 |
| Locate Fire proofing & Fire Rated Walls. | | | | 35 |
| Knox Box Location | | | | 35 |
| Knox Box Specification | | | | 100 |
| Review NFPA 13 vs. 13R requirements (if applicable – 13R will be rare on campus). | | | | 35 |
| Review fire apparatus worksheet. | | | | 35 |
| Review Pre-design Report (if any). | | | | 35 |
| SITE PLAN | | | | |
| AE has read and is following the UW Technical Guidelines | | | | 35 |
| AE has verified that that all drawings contain the required elements as stated in the UW Technical Guidelines Div. 32 05 20 "Drawing Requirements for Exterior Improvements. | | | | 35 |
| AE has verified that limits of construction, clearing, grading, sodding, grass or mulch are shown and consistent with other disciplines. | | | | 35 |
| AE has verified that the locations of flag poles, dumpster pads, and landscaping have been coordinated with other discipline site plans. | | | | 35 |
| Specialty paving/surfaces, and curbs & gutters are identified. | | | | 35 |



| | | | | |
|--|--|--|--|-----|
| Dumpster locations / enclosures are shown in correct locations. | | | | 35 |
| Site signage locations are shown and AE coordinated them with Transportation. | | | | 35 |
| Property line dimensions on survey or civil site plans match architectural. | | | | 35 |
| Building is located behind setback lines and outside easements. | | | | 35 |
| Limits of construction are shown and AE verified that they are consistent with other disciplines. | | | | 35 |
| Distinction shown between asphalt and concrete paved areas. | | | | 35 |
| All site detail meet UW Technical Guidelines | | | | 35 |
| Existing and new work is clearly identified. | | | | 35 |
| ARCHITECTURAL - GENERAL | | | | |
| Property line dimensions on survey or civil site plans match architectural. | | | | 35 |
| Building is located behind set-back lines. | | | | 35 |
| Locations of columns and bearing walls, and overall building dimensions match structural. | | | | 35 |
| Existing and new work is clearly identified on site plans. | | | | 35 |
| Building elevations match floor plans. In particular, check roof lines, window and door openings, louver openings, exterior light fixtures, and expansion joints. | | | | 35 |
| Building sections match elevations and plans. | | | | 35 |
| Wall sections match architectural and structural building sections. | | | | 35 |
| Size of openings for windows and doors matches structural. Verify window glass types with specifications. | | | | 35 |
| Expansion joints are continuous throughout the building. | | | | 100 |
| Large scale partial floor plans match small scale floor plans. | | | | 100 |
| Reflected ceiling plans match architectural floor plans to ensure no variance with wall locations. Location of electrical fixtures and mechanical registers/diffusers on electrical and mechanical plans does not conflict with location on reflected ceiling plans. | | | | 100 |
| Room finish schedule information matches plan and elevation information; including room numbers, names of rooms, finishes, and ceiling heights. look for omissions and inconsistencies. | | | | 100 |
| Door schedule information matches plan, and elevation information; including sizes, types, labels, etc. Look for omissions and inconsistencies. | | | | 100 |
| The location of fire rated walls matches the location of fire and/or smoke dampers on mechanical plans. | | | | 100 |
| Cabinets will fit in available space and electrical outlets on cabinet walls are at the correct height. | | | | 100 |
| Flashing material, gauges and construction methods match drawings and specifications. | | | | 100 |
| Verify edge condition at wall/roof is adequate to contain tapered insulation thickness. | | | | 100 |
| The locations of flag poles, dumpster pads, and landscaping have been coordinated with other discipline site plans. | | | | 100 |
| Walls required to extend to deck above do not interfere with joists above. | | | | 35 |
| FLOOR PLAN(S) | | | | |
| Structural grid and column locations, with typical bay dimensions indicated. | | | | 35 |
| Exterior wall articulation with window openings, doors, overhead doors, and important design elements. | | | | 35 |
| Building elevations match floor plans (roof lines, window and door openings, louvers, exterior light fixtures, and expansion joints). | | | | 35 |
| Door and window opening sizes match structural. | | | | 35 |
| Enlarged unit plans match overall floor plans. | | | | 35 |
| Millwork indicated. | | | | 35 |
| Door schedule information matches plan and elevation information; including sizes, types, labels, etc. | | | | 35 |
| Reflected ceiling plans match floor plans. | | | | 35 |
| Door and window opening sizes match structural. | | | | 35 |



| | | | | |
|---|--|--|--|----|
| All plans have generic wall type or poche' wall for Revit projects. | | | | 35 |
| Enlarged unit plans match overall floor plans. | | | | 35 |
| Interior partitions with doors, borrowed lights, and important design elements. | | | | |
| Rated enclosures and fireproofing indicated. | | | | 35 |
| Stairs, elevators, and access ladders accurately depicted. | | | | 35 |
| Toilet rooms indicated. | | | | 35 |
| Electrical and Mechanical rooms and chases, data and telecom closets indicated. | | | | 35 |
| Millwork indicated. | | | | 35 |
| Specialty construction or design elements and explanatory notes. | | | | 35 |
| Indicate special ceiling elements on Reflected Ceiling Plan. | | | | 35 |
| Indicate special finishes on Room Finishes Schedule. | | | | 35 |
| Building section mark. | | | | 35 |
| Room finish schedule information matches plan and elevation information; including room numbers, room names, finishes, and ceiling heights. | | | | 35 |
| Door schedule information matches plan and elevation information; including sizes, types, labels, etc. | | | | 35 |
| Cabinets will fit in available space and electrical outlets on cabinet walls are at the correct height. | | | | 35 |
| Flashing material, gauges and construction methods match drawings and specifications. | | | | 35 |
| Verify edge condition at wall/roof is adequate to contain tapered insulation thickness. | | | | 35 |
| Walls required to extend to deck above do not interfere with joists above. | | | | 35 |
| Owner-supplied equipment (vending, appliances, etc.). | | | | 35 |
| ROOF PLAN(S) | | | | |
| Building Footprint with major roof materials indicated. | | | | 35 |
| Intended roof pitch and drainage systems (located gutters and downspouts). | | | | 35 |
| Skylights located. | | | | 35 |
| Mechanical screens indicated. | | | | 35 |
| Mechanical RTU locations. | | | | 35 |
| EXTERIOR ELEVATIONS | | | | |
| Minimum all principal elevations depicted. | | | | 35 |
| Exterior wall materials indicated. | | | | 35 |
| Windows and doors indicated. | | | | 35 |
| Floor elevations indicated. | | | | 35 |
| Building response to site contours. | | | | 35 |
| Column grids indicated. | | | | 35 |
| Special design elements and explanatory notes. | | | | 35 |
| Building-mounted lighting and signage. | | | | 35 |
| Mechanical screening. | | | | 35 |
| BUILDING SECTIONS | | | | |
| Indicate major materials and systems. | | | | 35 |
| Column grid indicated. | | | | 35 |
| Floor elevations indicated. | | | | 35 |
| Roof pitch. | | | | 35 |
| Fire proofing (if required). | | | | 35 |
| Special design elements and explanatory notes. | | | | 35 |
| STRUCTURAL | | | | |
| Column grid lines on structural and architectural match. | | | | 35 |
| Column locations are the same on structural and architectural. | | | | 35 |
| Perimeter slab on structural matches architectural. | | | | 35 |
| Depressed or raised slabs are indicated and match architectural. | | | | 35 |
| Slab elevations match architectural. | | | | 35 |



| | | | | |
|---|--|--|--|-----|
| Foundation <i>piers</i> are identified and sized on a schedule or plan. | | | | 100 |
| Foundation <i>beams</i> are identified and sized on a schedule or plan. | | | | 100 |
| Locations of roof framing plan column lines and columns match foundation plan column lines and columns. | | | | 35 |
| Structural perimeter roof line matches architectural roof plan. | | | | 35 |
| Columns, floor beams, and roof beams are listed in column and beam schedules. | | | | 100 |
| Verify columns drawn match column profile as scheduled- (i.e. if a W 15x24 is scheduled, a W 15x24 should be shown) | | | | 35 |
| Sections are properly labeled. | | | | 100 |
| Expansion joint locations match other disciplines. | | | | 35 |
| Dimensions match architectural. | | | | 35 |
| Drawing notes do not conflict with specifications. | | | | 100 |
| Roof drain locations and roof slopes match architectural roof plan and plumbing plan. | | | | 35 |
| PLUMBING AND MECHANICAL | | | | |
| Plumbing / Mechanical floor plans match architectural floor plans. | | | | 35 |
| New gas, water, sewer, etc. lines connect to existing or new utilities on civil drawings. | | | | 35 |
| Plumbing fixtures match plumbing schedules and architectural locations. | | | | 35 |
| Roof drain locations and roof slopes match architectural roof plan. | | | | 35 |
| Pipes and drains are connected and do not interfere with foundations. | | | | 35 |
| Wall chases are provided on architectural to conceal vertical piping. | | | | 35 |
| Sanitary drain system pipes are sized and all fixtures are connected. | | | | 100 |
| HVAC floor plans match architectural. | | | | 35 |
| Sprinkler heads are in appropriate rooms and do not interfere with other ceiling items. | | | | 35 |
| Mechanical/plumbing ducts and pipes do not conflict with architectural features or structural members. | | | | 35 |
| Adequate ceiling height exists at worst case duct intersection or largest beam. | | | | 100 |
| Structural supports required for mechanical equipment are indicated on structural drawings. | | | | 100 |
| Dampers are indicated at smoke and fire walls. | | | | 100 |
| Diffuser locations match architectural reflected ceiling plans. | | | | 100 |
| Openings for roof penetrations (ducts, fans, etc.) are indicated on structural roof plans. | | | | 100 |
| Ductwork and piping does not interfere with walls required to extend to structure above. | | | | 100 |
| Notes are referenced. | | | | 100 |
| Air conditioning units, heaters, and exhaust fans match architectural roof plan locations. | | | | 100 |
| Mechanical equipment will fit in spaces allocated and that there is room for maintenance such as removing filters or tubes. | | | | 100 |
| Horsepower ratings, phases, and voltages of major items of equipment on mechanical and electrical drawings and specifications match. | | | | 100 |
| Thermostat locations have been coordinated with architectural drawings. | | | | 35 |
| Waste and supply line diagrams with sizes. | | | | 35 |
| Air handling unit location, size, and type indicated. | | | | 35 |
| Chiller location, size, and type indicated. | | | | 35 |
| Boiler, heat exchanger and pumps location, and size indicated. | | | | 35 |
| Other gas and fluids location, size, and type indicated. | | | | 35 |
| Distribution Systems (HVAC ductwork, Plumbing, Fire Protection, etc.) line diagrams with sizing and flow requirements. | | | | 35 |
| ELECTRICAL | | | | |
| Electrical floor plans match architectural and mechanical. Check that the location of floor mounted equipment is consistent between disciplines. | | | | 35 |
| The location of light fixtures matches architectural reflected ceiling plan and that light fixtures do not conflict with the structure or mechanical HVAC system. | | | | 100 |
| Major pieces of equipment have electrical connections and that horsepower ratings, Phases, and voltages are consistent with other discipline schedules. | | | | 100 |



Guidelines for Planning and Design of UW-Madison Facilities
Division 01 Appendix – Drawings Checklist
University of Wisconsin – Madison

10/17/2022

| | | | | |
|--|--|--|--|-----|
| Locations of panel boards are consistent with architectural, mechanical, and plumbing floor plans and that the panel boards are indicated on the electrical riser diagram. | | | | 35 |
| Notes are referenced. | | | | 100 |
| There is sufficient space for electrical panels to fit. | | | | 35 |
| Electrical panels are not recessed in fire rated walls. | | | | 35 |
| Exterior electrical equipment locations are coordinated with site paving, grading, and landscaping. | | | | 100 |
| Locations of electrical conduit runs, floor trenches, and openings are coordinated with structural plans. | | | | 35 |
| Equipment Plan indicating switch gear, transformers, and generators location and size indicated. | | | | 35 |
| One line power distribution plan. | | | | 100 |
| Lighting Plan with fixture cut sheets or quality/performance requirements. | | | | 35 |
| Light fixture locations match architectural reflected ceiling plan. | | | | 35 |
| Typical power plan with special requirements. | | | | 35 |
| Typical communications plan with special requirements and equipment locations. | | | | 35 |
| FOOD SERVICE – verify that: | | | | |
| The equipment layout matches other discipline floor plans and that there are no conflicts with columns. | | | | 35 |
| Equipment is connected to utility systems. | | | | 35 |
| SPECIFICATIONS | | | | |
| Check that bid items explicitly state what is intended. | | | | 35 |
| Check specifications for phasing of construction. | | | | 100 |
| Compare architectural finish schedule to specification index. | | | | 35 |
| Check major items of equipment and verify that they are coordinated with contract drawings. | | | | 100 |
| Verify that the items specified “as indicated” or “where Indicated” in the specifications are in fact indicated on contract drawings. | | | | 100 |
| Verify that all specification sections are in the index and that cross referenced specifications sections exist. | | | | 100 |
| Verify that thickness of materials or quantities of materials ARE NOT in specifications. | | | | 100 |



Facility Information Requirements

Design and Drawing Requirements

Project Start (Planning & Design)

1. **Facility number** assigned by Space Management for accounting.
2. **Facility number** included in FP&M project tracking.
3. **Facility name** provided to Space Management. A working name is sometimes used until an official moniker has been approved.
4. **Facility address** assigned by the designated main entry. This can also take some time and negotiations. Mail drops are limited on campus and may play a role in addressing.
5. **INSITE facility data** will now be included as “Planning” status.

Pre Design Development (UW Managed) or Preliminary (DFD) Review

1. **Floor level assignments** need to be established in conjunction with Space Management per UW guidelines. See *Typical Floor Level Numbering* below.
2. **Vertical passages numbering** will be done by Space Management per UW guidelines. See *Typical Vertical Passage Numbering* below.
3. **Exterior door numbering** will be done by Space Management per UW guidelines. See *Exterior Door Numbering* below.
4. **Room number assignments** will be done by Space Management on the UW’s behalf.
 - a. The request should be made early enough to be included in the 35% review.
 - b. Numbering rooms can take about 4 weeks to establish the best schema for the particular building. Projects within existing facilities often have unique restrictions and negotiations.
 - c. Preferably, Project Staff and/or Occupants meet with Space Management to establish building flow, function, and downstream wayfinding/signage at this time.
5. **Room number guidelines** are established by Space Management to provide transparency. See *Typical Room Numbering* below.
6. **Workstation/lab bench numbering** is done by Space Management.
7. **Review** of assigned room numbers by Space Management will be done as part of the standard 35%, 90% and bid review process.
 - a. Space Management will provide a graphic representation of the room number review with both changing and approving each number.
 - b. A listing of these room changes may also be requested.



Design Revisions (Post Design Development or Preliminary Design Review)

1. **Room numbering updates** may be needed when design is altered. It will be the responsibility of the UW Project Manager to contact Space Management with any design changes effecting room numbering.
 - a. Any appropriate A/E staff may work directly with Space Management staff.
 - b. Turn-around time required will depend on the scale of changes.

Final Review on UW Managed or DFD Projects

1. **Official Facility Name** should already be assigned.
2. **Address(es)** should already be negotiated with city.
3. **Final room number review** - hopefully just a proof of room numbers already assigned.
 - a. If there are any reported room number changes are still required to be implemented in the project, due to new redesign or oversight of implementing previous changes.

Bid Set Plans

1. Digital design documents (Revit AutoCAD dwg) be delivered to FP&M when bid paper and PDF plans are distributed. These rvt/dwg files should include plans of the site plan and floor plans, including room numbers and workstation/lab bench designations when appropriate.
 - a. Revit and/or AutoCAD documents provided will enable Space Management to easily transition these plans into FP&M dwg standards.
 - b. These will be used to create Evacuation Posters as well as by several campus units to get the facility on-line.
 - c. If AutoCAD documents are submitted, a room schedule is also required.
2. **Changes** during construction that effect walls/windows/doors/numbers should be communicated to FP&M and Space Management staff.

Record Drawings

1. **Delivery requests** of record drawings from FP&M Project Managers should include getting both hardcopy and Revit .rvt (or AutoCAD .dwg) files on disk to both FP&M & DFDM as standard protocol. Complete record plan sets, including mechanicals and details, are currently required by contract.
 - a. These digital files will be formatted as per UW guidelines in the bid documents above.
2. **Long term:** Work with DFD to collapse delivery time on as-built/record hardcopy and AutoCAD dwg files. Length of time should be measured from when the building is turned over to UW-Madison. Exceptions may need to be negotiated when substantial completion is delayed from occupancy.



Typical Floor Level Numbering

1. First floor is the main facility entry level. It is denoted as 2-digit floor numbers (i.e. 01) in campus data sets.
 - a. This is also the level that has the primary door used for the facility address.
2. Ascending floors above the first floor are numbered sequentially (second, third, . . . tenth, etc.) They are denoted as 2-digit floor numbers (i.e. 02, 03, . . . 10, etc.) in data sets.
3. The first basement level below the first floor is the first basement. It is denoted as B1 in data sets.
4. The next lower basement is the second basement. It is denoted as B1 in data sets.
5. The basement numbers increase as the depth of the floor level increase (B3, B4, etc. as needed)
 - a. For public floor levels below the entry level “Lower Level” may be used similar to the Basement level numbering (L1 down to L2, etc.)
 - b. For parking ramps under the entry floor level, “Parking Level” may be used similar to the Basement level numbering (P1 down to P2 down to P3, etc.)
6. A mezzanine floor level is a partial floor and numbered with the full floor below, so the first floor mezzanine is above the first floor. The floor level is denoted with a “M” suffix in data sets (01M, 10M, B2M, etc.)
 - a. A mezzanine level that is a very public area may be numbered as a standard floor even though is technically for code purposes. This would eliminate the “M” suffix in room numbers and make wayfinding more convenient. (floor 01M becomes 02, then 02 becomes 03, and up as needed).
 - b. Mechanical mezzanines are typically considered a mezzanine level independent of the floor below.
 - c. Penthouses are often a standard floor level, even though the floor area may be much smaller than the floor below.
7. UW-Madison does NOT use “Ground” as an acceptable level. It has no data set reference.
8. Special attention is needed for floors with different elevation levels.
 - a. All rooms starting with “1” are technically on the first level, even though the floor may have a split level component.
 - b. If possible, floors that do not connect without elevators, should be assigned a floor level that does not have a corresponding level in the facility footprint.



Typical Vertical Passage Numbering

Vertical passages such as elevators and stairwells have both a Vertical identification for the entire vertical shaft as well as a room number for every floor level for space assignment.

Elevators

1. Elevator cars have a unique number across the entire facility (ELEV 1, ELEV 2, etc.)
 - a. These are used for elevator emergency and mechanical purposes.
 - b. These numbers may be used for wayfinding and directions within facilities.
2. Elevators have sequential numbers within a facility.
 - a. In new facilities, these will increase with the increase of the room numbering schema (i.e. ELEV 1 will be closest to room number 1001, then up through room number 1999).

Stairs

1. Stairwells have a unique number across the entire facility (STAIR 1, STAIR 2, etc.)
 - a. These numbers may be used for wayfinding and directions within facilities.
2. Stairwells with the most floors for public access are numbered first, starting with STAIR 1 closest to the lowest room numbers and sequentially increasing with the room numbering.
 - a. Special consideration may be given to facility layout if the stair numbers may be used for wayfinding.
3. Stairs with less floors are numbered as they are encountered from the lowest floor up.
 - a. Stairs starting on upper floors, especially to mechanical areas are given the highest stair number identifiers.
 - b. Special consideration may be given to single flight stairs in very public areas if it will be used for wayfinding.

Exterior Door Numbering

Four Faces of Each Building

1. Every building is divided into 4 sections dictated by North, South, East or West.
 - a. If the building has many wall sections, the building is divided into the primary 4 sections.
 - b. Site location and landscape may play a practical role in the common sense of these divisions.
 - c. These 4 faces are marked with an “Exterior Cut” line on the FPM Base Floor plans and are consistent vertically up the building.
2. Then a 3 part label will be used to identify all exterior doors.



Three Part Label

Part One:

Identifies on what side of the building (orientation) the doorway is located.

1. N - North.
2. E – East.
3. S – South.
4. W – West.

Part Two:

Identifies a specific doorway on a given face of a building with 2 digits.

1. Starting at the left most corner on a given side number the doorways progressively, from left to right (counter clockwise).

Part Three:

Identifies the floor of a door is located.

1. The first floor doors have no floor level identifier.
2. Other floors have doors numbered for that floor with a dash (-) and the 2 digit floor level (Ie N01-08) E – East.

Interior Courtyards

When exterior doors enter onto an interior courtyard, the identifiers:

1. Start with “C”.
2. Then the courtyard alpha assignment from Space Management.
3. A dash “-“.
4. Ending with the floor level.
5. Example: CA1-B1

Exterior Door Sign Standards

Individual signs are to be installed in the center of the doorframe above each door. Double-sided tape will be used to attach the signs and will be provided with the signs. . The signs are 1”x 3 1/2” and made of an exterior grade plastic. The type size is 1/ 2” Helvetica single line. The UW Sign Shop will produce the signs (contact for the UW Sign Shop).

Typical Room Numbering

Here are some ‘typical’ numbering schema:

1. The first digit (#) is the floor level (ideally corresponds with the elevator buttons as well).
 - a. The first floor is the floor with entry at the primary address to the building.



-
- b. In smaller buildings, it is the first of 3 digits.
 - c. In larger buildings, it is the first of 4 digits and then the second digit is a zone of the floor.
 - d. Of course, facilities with floors 10 and above add an additional digit to the room numbers.
 2. Basements are numbered with the preface “B” and the basement level, similar to the floor level numbering so for B1## numbers are on the first basement level.
 - a. Lower Levels use the preface “L” and floor level to match the floor level, so L1## are on the first Lower level.
 - b. Parking levels use the preface “P” and floor level to match the floor level, so P1## are on the first parking level underground.
 3. Mezzanines use the preface “M” and floor level to match the floor level, so M1## are on the mezzanine above the first floor.
 - a. As described in the floor numbering, public mezzanines may be given standard floor levels to avoid using this “M” preface. In these cases all floor references (including elevator buttons) will use the sequential floor numbering, even though code reference may need to refer to a “mezzanine.”
 4. Circulation spaces are #00alpha, like 100A, 1400F, etc.
 - a. Stairs are typically #00A-#00D.
 - b. Elevators are typically #00H, #00I, #00Z, #00Y, #00X.
 - c. Main lobbies are #00L or #00M, followed by corridors #00N, #00P, etc.
 - d. #00E, #00F, and #00G are used for stairs, vestibules, or corridors as needed.
 - e. Alphabet “O” are not used if possible, since they look like 0 (unfortunately history has used “I” for elevators even though it looks like 1)
 5. Room numbering is in order of access walking through the corridors
 - a. Even numbers on one side, Odd on the other, increasing along the path of travel.
 - b. It is often desirable to allow for a number ever 10’ or so, skipping number at large spaces (this allows for inserted rooms over time).
 - c. If the building has a circular path, it is desirable for the highest number to end up back at the lowest number and continue the circle.
 - d. Suites (rooms accessed through another room of the corridor) are sub-numbered with an alpha (101A is inside 101) If there is a second sub-room, it is given the next alpha, and then continue from the main room again (101A is entered from 101, then 101B is entered from 101A, and 101C is again entered from the main room 101, etc.) The secondary sub-room is 101B, not 101AA.



- i. The suite numbering pattern is matched to the specific layout and function, increasing alphabets in the most understandable way possible while walking inside the space.
- ii. Alpha numbers may be skipped if there is a large probability that more sub-rooms may be added in the future.
- e. Existing room numbers are maintained as much as possible during internal remodels.
 - i. That said, there are times that areas outside the project must be renumbered. Any related costs for this will need to be part of the project budget
- f. Mechanical rooms, and especially telecom and electrical rooms sometimes remain existing numbers, even though they do not follow the life safety pattern. Please give this VERY serious consideration, as there will never be a better time to make adjustments. However, sometimes there are significant downstream issues created by changing these particular numbers.

Workstation Numbering

Workstation (and Lab Bench) numbering is becoming more common as Schools and Colleges start using the floor plans and room data to assign occupants to these locations. It also helps them find available space for staff changes.

Workstation numbering may not be desirable if there is no interest in maintaining the data at this minute level. Without occupant data, it only adds more rooms and clutter to the data base with no gain in usefulness.

Workstation Numbering (20 or more)

1. A grid system will be established to identify workstation numbers within open office areas (these can be from 4'x4' to 10'x10' depending on the configuration design and long range vision of the facility).
 - a. The columns of the grid will be identified by two digit numbers, beginning with 01 and extending as needed.
 - b. The rows of the grid will be identified by alphabets (capitalized), omitting "I" and "O" to minimized confusion with 1 & 0.
 - i. In large areas, double alphabets will be used, starting with AA-AZ, then BA-BZ, CA-CZ, etc.
2. The general format is 4275-05E; where 4275 is the open office room number, 05 is the grid column, and E is the grid row.
 - a. Large grid format would be 4275-05AE.
3. The numeric component will be the first workstation identifier. This is to minimize confusion with the alpha system already in place on campus to identify permanent rooms that are entered through another room (i.e. currently rooms 101A and 101B are entered through room 101 from the public corridor).
4. The grid will typically start in the northwest corner of the workstation area--a working "north" will be established when the building is not oriented N-S-E-W (in this sample working North is up on the plan).



-
5. Corridors will be skip grid sections to accommodate any future reconfigurations.
 6. Half stations (more than one seat in a grid section) will not be identified uniquely--it would be like assigning two people or data jacks in a single office.
 7. When multiple open areas do not include barriers, the grid will extend over the combined areas (as in 4275 & 4170 in this bldg.) with the appropriate room number assignment followed by the grid workstation assignment.
 8. The grid will be left in the plans for reference of future changes.
 9. When workstations are included in a suite with a mixture of offices/anterooms, judgment will be used as to identifying them as workstations vs. rooms, 101-01B vs. 101L respectively, on a case by case basis.
 10. Lone workstations in a corridor may be assigned a standard room number (101), especially if it is a public contact desk (see 4214 in attached PDF).
 11. In instances where a workstation lies in two grid areas, use the best option below:
 - a. Establish the primary flow of workstations within the grid and work out to the edges with the best possible fit (on the 4th floor, row E is the best fit for most workstations below; rows # C&D were assigned from that baseline).
 - b. Use the grid section containing the desk units (see open office 6131).
 - c. Use the grid section with the door opening (see open offices 7220 & 7230).





Key Request Forms

See the following attachments:

Single Key Request Form

Multiple Keys Request Form

Contractor Utility Key Request



Facilities Planning
& Management
UNIVERSITY OF WISCONSIN-MADISON

UW MADISON LOCK SHOP

REQUEST FORM FOR SINGLE KEY ACCESS TO ROOMS - SUPPLIED BY UW LOCK SHOP


| | | |
|----|--|--------------|
| 1 | DATE | |
| 2 | NAME (PLEASE PRINT) - INDIVIDUAL RECEIVING KEY | |
| 3 | SIGNATURE | |
| 4 | CONTACT INFORMATION / PHONE NUMBER | |
| 5 | DEPARTMENT OR COMPANY NAME FOR NON-FP&M PERSONAL | |
| 6 | SUPERVISOR'S NAME (PLEASE PRINT) | |
| 7 | SUPERVISOR'S SIGNATURE | |
| 8 | PURPOSE FOR ISSUING KEY PROJECT NAME / NUMBER | / |
| 9 | BUILDING NAME / NUMBER | / |
| 10 | BUILDING ROOM OR AREA OF ACCESS | |
| 11 | NOTES : | |
| 12 | SCHEDULE OF DATES THAT KEY IS NEEDED, | FROM - TO - |
| 13 | ATTENTION- Any keys issued by this document are for the sole purpose of completing assigned work. These keys will be kept secure and shall NOT BE DUPLICATED OR SHARED with other persons. Any loss of keys will be reported to the UW Key Shop immediately. | |
| 14 | FP&M - AUTHORIZING SUPERVISOR | |
| 15 | SIGNATURE | |
| 16 | DATE | |
| 17 | COMMENTS: | |
| 18 | ESCORT REQUIRED | YES - NO - |
| 19 | APPROVAL | YES - NO - |
| 20 | KEY CODE - | MFG- NUMBER- |
| 21 | LOCK SHOP EMPLOYEE PROCESSING REQUEST | |
| 22 | DATE RETURNED | |



UW MADISON LOCK SHOP

REQUEST FORM FOR MULTIPLE KEYS ACCESS TO ROOMS - SUPPLIED BY UW LOCK SHOP

| | | |
|----|---|--------------|
| 1 | DATE | |
| 2 | NAME (PLEASE PRINT) - INDIVIDUAL RECEIVING KEY | |
| 3 | SIGNATURE | |
| 4 | CONTACT INFORMATION / PHONE NUMBER | |
| 5 | DEPARTMENT OR COMPANY NAME FOR NON-FP&M PERSONAL | |
| 6 | SUPERVISOR'S NAME (PLEASE PRINT) | |
| 7 | SUPERVISOR'S SIGNATURE | |
| 8 | PURPOSE FOR ISSUING KEYS PROJECT NAME / NUMBER | / |
| 9 | BUILDING NAME / NUMBER | / |
| 10 | BUILDING ROOM OR AREA OF ACCESS | |
| 11 | NOTES : | |
| 12 | SCHEDULE OF DATES THAT KEY IS NEEDED, | FROM - TO - |
| 13 | ATTENTION- Any keys issued by this document is for the sole purpose of completing assigned work. These keys will be kept secure and shall <u>NOT BE DUPLICATED OR SHARED</u> with other persons. Any loss of keys will be reported to the UW Key Shop immediately. | |
| 14 | FP&M - AUTHORIZING SUPERVISOR | |
| 15 | SIGNATURE | |
| 16 | DATE | |
| 17 | KEY CODE - | MFG- NUMBER- |
| 18 | KEY CODE - | MFG- NUMBER- |
| 19 | KEY CODE - | MFG- NUMBER- |
| 20 | KEY CODE - | MFG- NUMBER- |
| 21 | KEY CODE - | MFG- NUMBER- |
| 22 | KEY CODE - | MFG- NUMBER- |
| 23 | KEY CODE - | MFG- NUMBER- |
| 24 | LOCK SHOP EMPLOYEE PROCESSING REQUEST | |
| 25 | DATE RETURNED | |

| | | | |
|--|---------------------|--|--------------|
|  | | Physical Plant - Occupational Safety Program Contractor Utility key request | |
| Program Segment: Facility Project Access Request | | Release Date: | Return Date: |
| Company Requesting Access | Utility Released By | Utility Returned date: | |
| | | | |

Dear key requestor:

Thank you for your recent project order requesting Utility Keys. **All utility keys provided are required to be returned within 2 weeks of project completion.** The access approval team will need the following information in order to complete your request:

Company Name Contact Info:

Name of person being issued the key(s) Contact Info:

FP&M Responsible Person: Contact Information:

Facility Name: Project number:

Detailed explanation for access:

| |
|--|
| |
| |
| |
| |

FP&M Responsible Person* Validation

As the Project Manager and by my signature below, The Contractor requesting the keys is under contract with the University and will abide by the rules, standards & policies set forth in the contract and by UW-Madison.

(Project Manager Shall Check Off)

- ☐ Contractor has an understanding of the hazards present while accessing requested locations.
- ☐ Contractor has the ability to recognize those hazards and properly perform corrective action in eliminating and or controlling the hazards in order to perform assigned activities safely.

FP&M Responsible Person

Date

Key issued to Validation

By my signature below, I acknowledge I have the ability to recognize any hazards that apply to entering the locations that I am requesting access to and will abide by the rules, standards & policies set forth in the contract and by UW-Madison. **All utility keys provided are required to be returned within 2 weeks of project completion.**

Key issued to Signature

Date

Please return this completed form to the Lock Shop, FPM/Physical Plant attention to the Supervisor indicated below. The University Project Manager responsible will evaluate your request based upon the information provided. If additional information is required, the assigned Project Manager will contact you accordingly. If access is granted, keys for the spaces where access is approved will be issued. Costs associated with any unique keying will be the requestor's responsibility. The intent of this procedure is to ensure a safe environment for all who access FPM/Physical Plant utility spaces.

Thank you,
Tim Croy
Building & Grounds Superintendent
UW-Madison Lock shop
tim.croy@wisc.edu
608-263-3333

Approved Access Tier/ Keys issued: _____

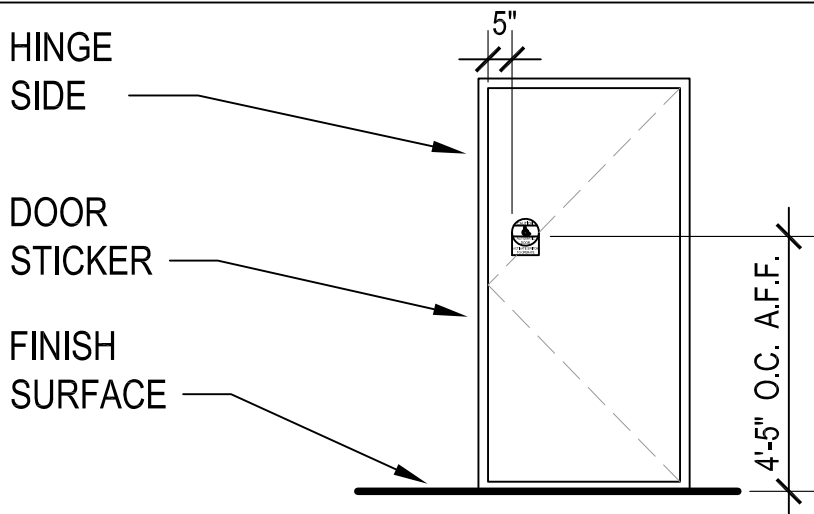
Electric Shop approval: _____
(If needed)

*FPM Responsible Person: Project Manager, Facilities Specialist, Shop Supervisor, Work Coordinator, Contract Representative



Division 08 Appendix - Details

See following attachment



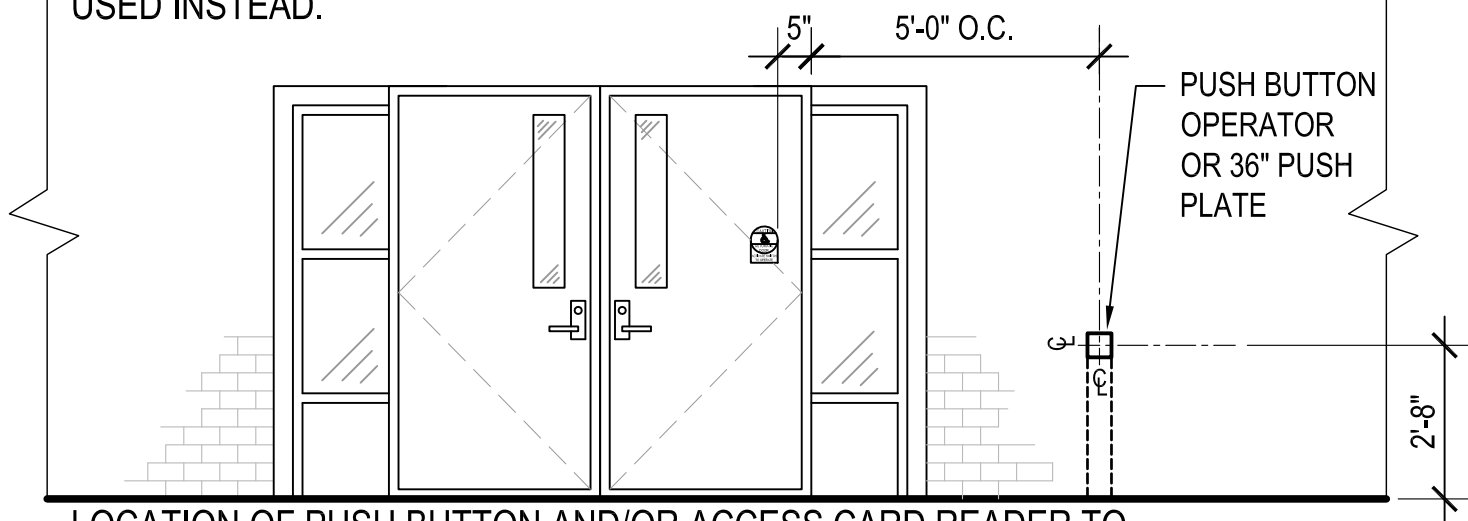
NOTE:
STICKER SHALL BE PLACED ON EACH SIDE OF THE DOOR BEING OPENED, AT THE SPECIFIED HEIGHT. EXACT STICKER PLACEMENT LOCATION MIGHT BE DOOR SPECIFIC. CHECK WITH DESIGNER TO VERIFY.

DOOR ID PLACEMENT STICKER

NOT TO SCALE



SITE CONDITIONS MAY NOT ALLOW PUSH BUTTON OPERATOR TO BE INSTALLED ON WALL NEXT TO DOOR. BOLLARD POST MAY BE USED INSTEAD.




LOCATION OF PUSH BUTTON AND/OR ACCESS CARD READER TO BE MOUNTED 32" A.F.F.

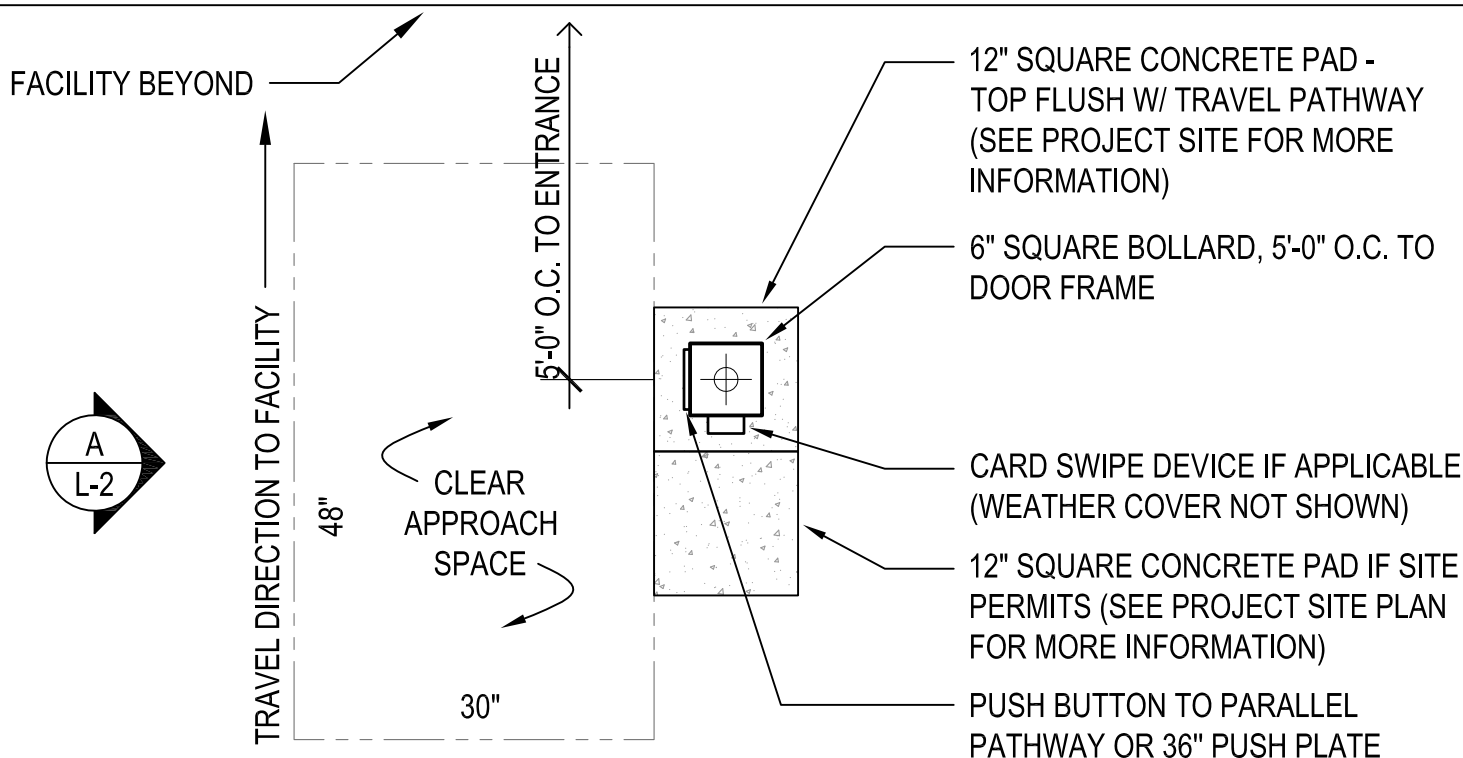
PUSH BUTTON LOCATIONS

NOT TO SCALE (NON-BOLLARD APPLICATIONS)

NOTE: ILLUSTRATION ONLY, SITE CONDITIONS MAY VARY. SEE PROJECT LEADER FOR FINAL QUESTIONS.

| | | | | | | |
|--|--|---|------------------|------------|----------------|--|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: | | Designed By: N/A | | Date: 01/04/10 | |
| | Accessibility Details | | Drawn By: RJR | | Scale: NTS | |
| | Drawing Title: ID Sticker and Button Locations | | O.S.M.: | | | |
| | Building No.: N/A | | Revision: | | Date: | |
| | File: L:\ACAD\PLANNING\Accessibility\Accessibility Details\Stickers_PushButtons_Bollards.dwg | | HF | | 06-09-2022 | |
| | | | | | | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street 6th Floor Madison, WI 53715 | | Sheet: L-1 | | |
| | | | | Of: 2 | | |

L-1

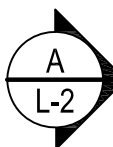
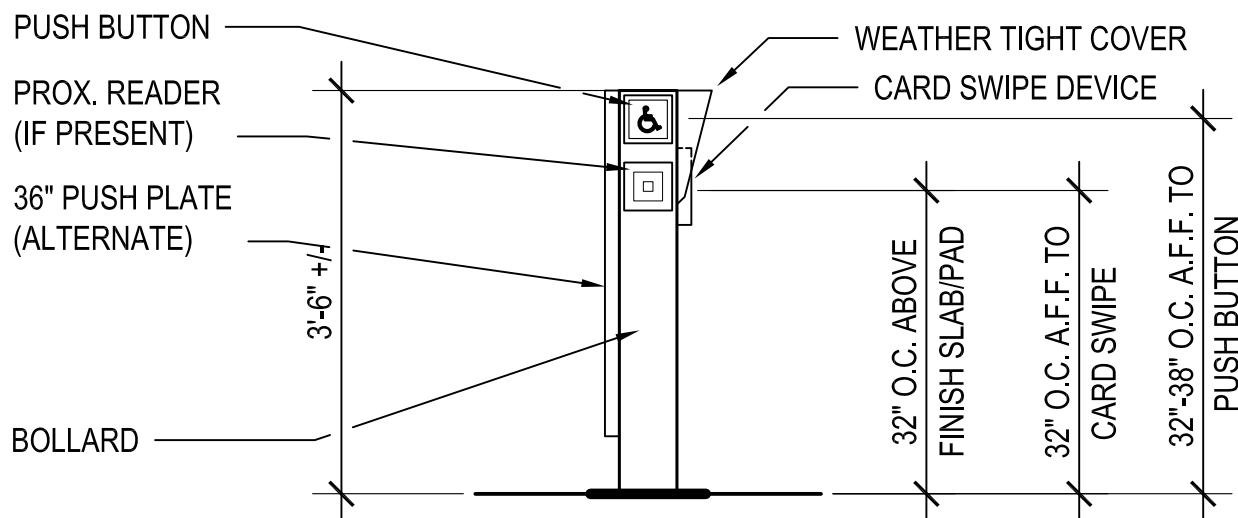


BOLLARD PLAN

NOT TO SCALE


NOTE:

IF APPLICABLE, THE PUSH BUTTON MOUNTING HEIGHT SHALL BE RAISED TO 38" O.C. INSTEAD OF THE STANDARD 32" O.C. TO ACCOMMODATE A PROX. CARD READER 32" O.C. ON THE SAME SIDE OF THE BOLLARD.



BUTTON MOUNTING HEIGHTS

NOT TO SCALE

| | | | | |
|---|--|---|------------------|-------------------|
|  <p>WISCONSIN UNIVERSITY OF WISCONSIN-MADISON</p> | Project: | Designed By: N/A | | Date: 01/04/10 |
| | Accessibility Details | Drawn By: RJR | | Scale: NTS |
| | Drawing Title: Bollards and Push Buttons | O.S.M.: | | Sheet: L-2 |
| | Building No.: N/A | Revision: HF | Date: 06-09-2022 | |
| | File: L:\ACAD\PLANNING\Accessibility\Accessibility Details\Stickers_PushButtons_Bollards.dwg | | | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street 8th Floor Madison, WI 53715 | | Of: 2 |



Interior Finish Standards & Guidelines

The following interior finish standards are typically used on campus projects. New capital construction projects may deviate from these standards with the approval of the Project Manager.



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON



UW Facilities Planning & Management
**CAMPUS INTERIOR FINISH STANDARDS
& GUIDELINES**

June, 2020
Updated 12/4/2020

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

OUR MISSION

It is our intent that standardization of frequently-used finishes will significantly reduce the amount of waste, maintenance costs, and material storage space in Campus buildings. In addition, standardization will create a more cohesive aesthetic across our campus and improve customer service through a more streamlined design process.

SERVICE REQUESTS & BILLING

- » All requests for work should be submitted through Customer Service (<https://physicalplant.wisc.edu/customer-service/>).
- » Neither faculty/staff nor students are permitted to paint their own space.
- » New finishes in spaces such as offices, conference rooms, labs, and department-specific areas are billable.
- » For common spaces within campus facilities, most paint work is non-billable.
- » Refer to Service Level Agreement for details.
- » Disposal fees for all non-standard materials will be charged to the project/work order. Fees vary by material.

EXCEPTIONS

- » If an exception is requested (i.e., a non-standard color), it must be approved by UW Physical Plant designers and the dean of the college or department head before a work order is submitted. Contact the designers via Customer Service (<https://physicalplant.wisc.edu/customer-service/>).
- » The college/department is responsible for returning all walls painted non-standard colors to the standard palette upon departure from the space. This work must be completed via billable work order.
- » If multiple finishes are being updated within one space, a facilities work request should be initiated to ensure coordination of finishes and installation.
- » No materials, such as left over carpet or other flooring, may be stored in mechanical rooms, corridors, or stairwells.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



INTERIOR FINISH GUIDELINES

- » Standard colors have been chosen for:
 - Paint
 - Rubber wall base and floor transitions
 - Carpet tile
 - Plastic laminate
 - Solid surface countertops
 - Toilet partitions
 - » The Campus Standard palette of paint colors includes a carefully curated selection of neutrals and accent colors.
 - » Sherwin Williams 6147 “Panda White” will be used for any white painted surfaces.
 - » Facility managers and the UW Physical Plant Shops will have swatches for all campus standard materials. For maintenance or small projects, end users are encouraged to select colors from the standard palette.
 - » Existing building standard whites, trim colors, accent colors, etc. will not change unless there is a major renovation project or maintenance initiative to refresh large areas of the building, or a finish is made obsolete by a manufacturer (most common in flooring products). In such cases, new standards will be selected from our preapproved palette in coordination with existing building finishes such as stone, terrazzo, wood, etc.
 - » Due to their architectural and/or historical significance, the following surfaces shall not be painted:
 - exposed concrete block
 - brick or stone masonry
 - glazed block or tile
 - raw metal
 - cast in place or precast concrete
- These surfaces may be cleaned to help restore them to their original condition. Consideration for altering these finishes must be discussed with design personnel.
- » Due to the wide range of resilient flooring options (vinyl tile, rubber flooring, sheet vinyl, etc.), standards are not established and each application should be evaluated in conjunction with design personnel.

» *No maintenance funding will be considered for any work where non-standard finishes are used.*

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



HOW TO USE THIS GUIDE:

- » To build a successful color palette, is is recommended to use the 60-30-10 rule as a guideline. Start with the dominant color (60% of the room's finishes), add a secondary color (30%), and finish with a small amount of an accent color (10%).
 - The dominant color should be "Panda White" or another Light Neutral.
 - As an example, "Panda White" will be the dominant color (used on most of the walls), with a medium neutral as the secondary color (possibly a grey carpet and/or door trim). One wall could then be painted with a paint from the "Accent Colors" or "Bold Accent Colors" groupings.
- » Keep in mind that a color palette is created from all elements within a space - paint, flooring, furnishings, artwork, etc. - so it is not necessary to select three paint colors for one space.
- » Several recommended color schemes have been included in this document as examples. All of the color schemes have been chosen to coordinate with "Panda White" as the dominant color.
- » If the space to be renovated is visible from public spaces within a building, consideration must be taken to coordinate with the colors and finishes in the public space.
- » When selecting a "Bold Accent Color" consider the light levels within the space, as well as how the color will work with the selected neutral and door & frame colors. For maximum impact these colors should be used sparingly and in selective applications.
- » When selecting a color keep in mind that the door/frame color should be the same throughout the entire floor of a building if not the entire building as a whole.

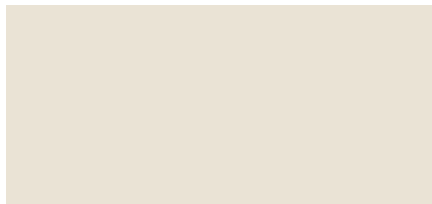
UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



PAINT - LIGHT NEUTRALS

The primary base color for all buildings is PT-W1 “Panda White”. PT-W2 and PT-W3 are alternate neutrals for use when white is not suitable.



PT-W1
SW 6147
Panda White



PT-W2
SW 6141
Softer Tan

Coordinating Wall
Base (Johnsonite
color or equal):

34 “Almond”



PT-W3
SW 7649
Silverplate

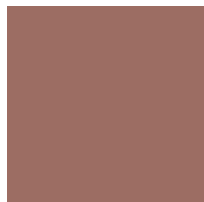
Coordinating Wall
Base (Johnsonite
color or equal):

24 “Grey Haze”

*Light-colored wall base and trim will show scuffs and dirt more readily. Recommended only in buildings where these colors are previously established standards.



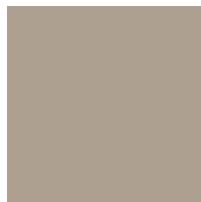
PAINT - MEDIUM NEUTRALS



PT-W7
SW 6053
Reddened Earth



PT-W9
SW 7690
Townhall Tan



PT-W11
SW 7633
Taupe Tone



PT-W13
SW 7066
Gray Matters

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

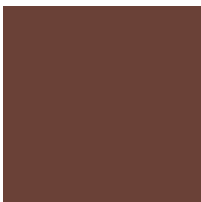
UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



PAINT - DARK NEUTRALS

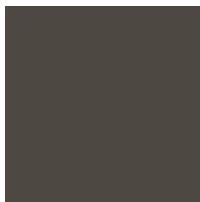
Dark neutrals are predominantly used for trim and painted doors.
coordinating rubber wall base colors are listed beside each color.



Coordinating Wall
Base (Johnsonite
color or equal):

76 "Cinnamon"

PT-W6
SW 2837
Aurora Brown



Coordinating Wall
Base (Johnsonite
color or equal):

63 "Burnt Umber"

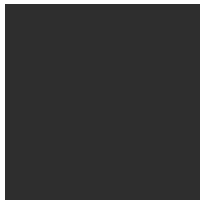
PT-W4
SW 7020
Black Fox



Coordinating Wall
Base (Johnsonite
color or equal):

47 "Brown"
45 "Sandalwood"

PT-W8
SW 2806
Rockwood Brown



Coordinating Wall
Base (Johnsonite
color or equal):

40 "Black"

PT-W5
SW 6258
Tricorn Black



Coordinating Wall
Base (Johnsonite
color or equal):

29 "Moon Rock"
80 "Fawn"

PT-W10
SW 7025
Backdrop



Coordinating Wall
Base (Johnsonite
color or equal):

28 "Medium Gray"
71 "Storm Cloud"

PT-W12
SW 7076
Cityscape

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



PAINT - ACCENT COLORS



PT-W14
SW 7705
Wheat Penny



PT-W16
SW 6130
Mannered Gold



PT-W18
SW 2861
Avocado



PT-W15
SW 7718
Oak Creek



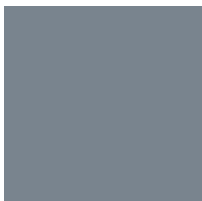
PT-W17
SW 6129
Restrained Gold



PT-W19
SW 7726
Lemon Verbena



PT-W20
SW 6179
Artichoke



PT-W22
SW 6249
Storm Cloud



PT-W24
SW 6263
Exclusive Plum



PT-W21
SW 9128
Green Onyx



PT-W23
SW 9152
Let it Rain



PT-W25
SW 7080
Quest Gray

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



PAINT - BOLD ACCENT COLORS



PT-W26
SW 6328
Fireweed



PT-W28
SW 6361
Autumnal



PT-W30
SW 6381
Anjou Pear



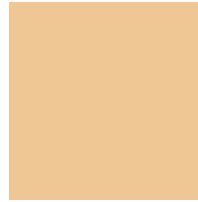
PT-W32
SW 6424
Tansy Green



PT-W27
SW 6326
Henna Shade



PT-W29
SW 9011
Sun Bleached Ochre



PT-W31
SW 6380
Humble Gold



PT-W33
SW 9037
Baby Bok Choy



PT-W34
SW 6438
Dill



PT-W36
SW 6214
Underseas



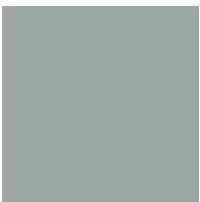
PT-W38
SW 6243
Distance



PT-W40
SW 6550
Mythical



PT-W35
SW 6437
Haven



PT-W37
SW 6213
Halcyon Green



PT-W39
SW 9151
Daphne



PT-W41
SW 6549
Ash Violet

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

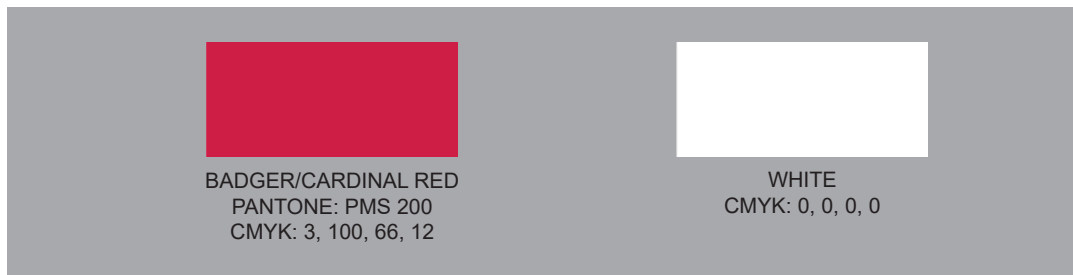
Facilities Planning & Management



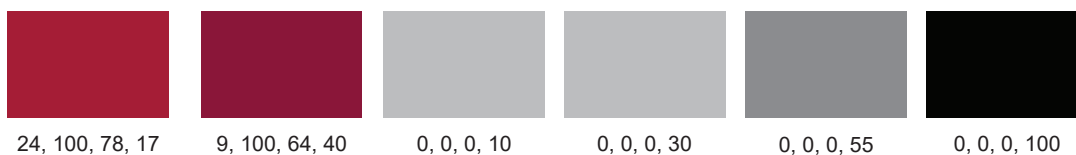
BRANDING COLORS

*Branding colors are for reference only and not to be used without design staff approval. See UW Brand and Visual Identity website for complete information (<https://brand.wisc.edu/print/colors/>).

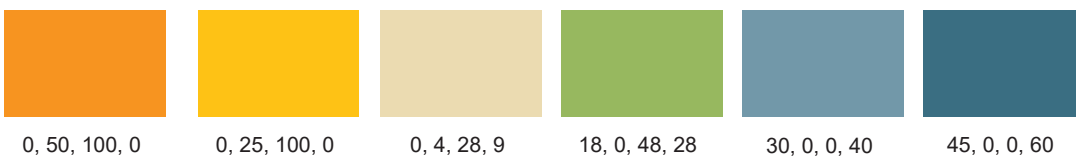
OFFICIAL PRINT COLORS



BRANDING SECONDARY COLORS



BRANDING ACCENT COLORS



*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

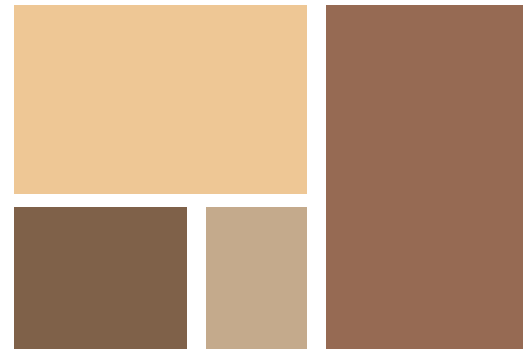
UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

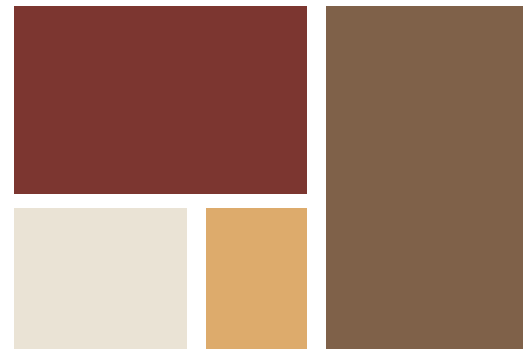
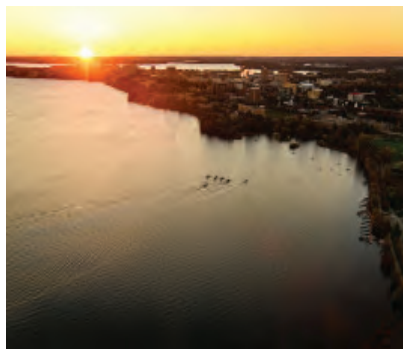
SAMPLE SCHEMES



SW 7025 Backdrop, SW 7020 Black Fox, SW 6129 Restrained Gold, SW 6328 Fireweed



SW 6461 Autumnal, SW 6147 Panda White, SW 7649 Silverplate, SW 7081 Sensuous Gray



SW 6328 Fireweed, SW 9151 Daphne, SW 7020 Black Fox, SW 6213 Halcyon Green

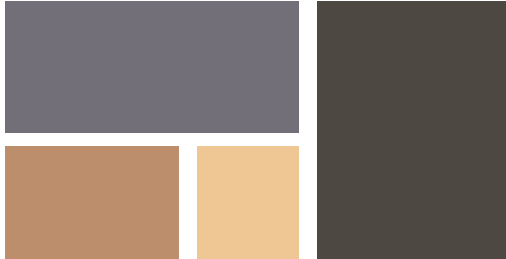
*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

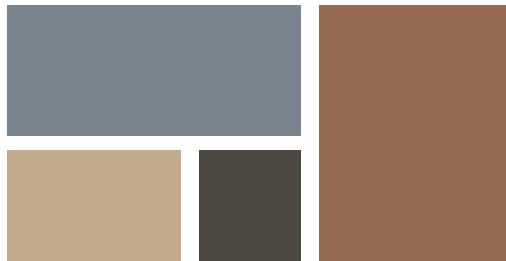
Facilities Planning & Management



SAMPLE SCHEMES



SW 6263 Exclusive Plum, SW 7020 Black Fox, SW 6380 Humble Gold, SW 7718 Oak Creek



SW 6249 Storm Cloud, SW 7705 Wheat Penny, SW 7020 Black Fox, SW 7690 Townhall Tan



SW 6249 Storm Cloud, SW 6263 Exclusive Plum, SW 6424 Tansy Green, SW 7080 Quest Gray



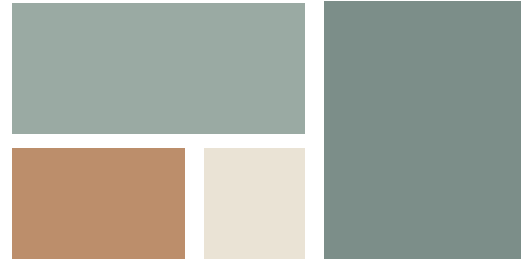
SW 6381 Anjou Pear, SW 6214 Underseas, SW 6328 Fireweed, SW 6361 Autumnal

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

SAMPLE SCHEMES



SW 6213 Halcyon Green, SW 6214 Undearseas, SW 6147 Panda White, SW 7718 Oak Creek



SW 6243 Distance, SW 7633 Taupe Tone, SW 7020 Black Fox, SW 6328 Fireweed



SW 2861 Avocado, SW 7726 Lemon Verbana, SW 6328 Fireweed, SW 7690 Townhall Tan



SW 6424 Tansy Green, SW 6249 Storm Cloud, SW 9152 Let it Rain, SW 6381 Anjou Pear

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



COLOR COMBINATIONS TO AVOID

The official colors of the Big10 schools have been included for reference.

UNIVERSITY OF ILLINOIS



RGB: (19,41,75)



RGB: (232,74,39)

UNIVERSITY OF MICHIGAN



CMYK: (100,60,0,60)

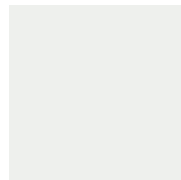


CMYK: (0,18,100,0)

INDIANA UNIVERSITY



RGB: (153,0,0)

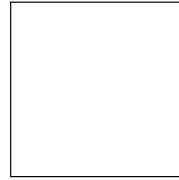


RGB: (238,237,235)

MICHIGAN STATE UNIVERSITY



RGB: (24,69,59)

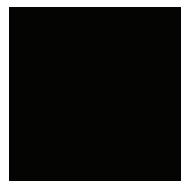


WHITE

UNIVERSITY OF IOWA



RGB: (255,205,0)



BLACK

UNIVERSITY OF MINNESOTA



RGB: (122,0,25)

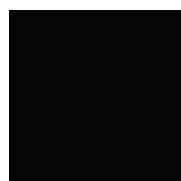


RGB: (255,204,51)

UNIVERSITY OF MARYLAND



RGB: (224,58,62)



BLACK



WHITE



RGB: (255,213,32)

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



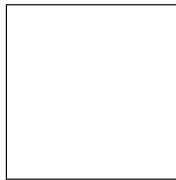
UNIVERSITY OF NEBRASKA



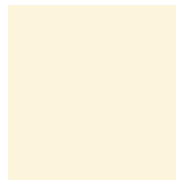
RGB: (187,0,0)



BLACK



WHITE

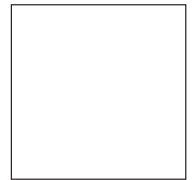


RGB: (253,242,217)

PENN STATE



RGB: (4,30,66)

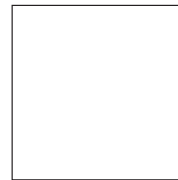


WHITE

NORTHWESTERN UNIVERSITY



RGB: (78,42,132)



WHITE

RUTGERS



RGB: (204,0,51)



RGB: (95,106,114)



BLACK

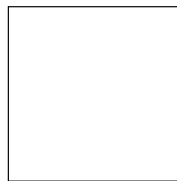
THE OHIO STATE UNIVERSITY



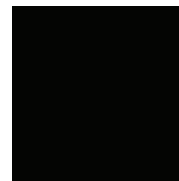
RGB: (187,0,0)



RGB: (102,102,102)



WHITE

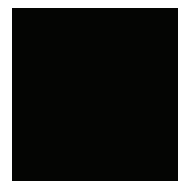


BLACK

PURDUE UNIVERSITY



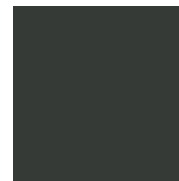
RGB: (206,184,136)



BLACK



RGB: (157,150,141)



RGB: (55,58,54)



RGB: (194,142,12)

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



CARPET GUIDELINES

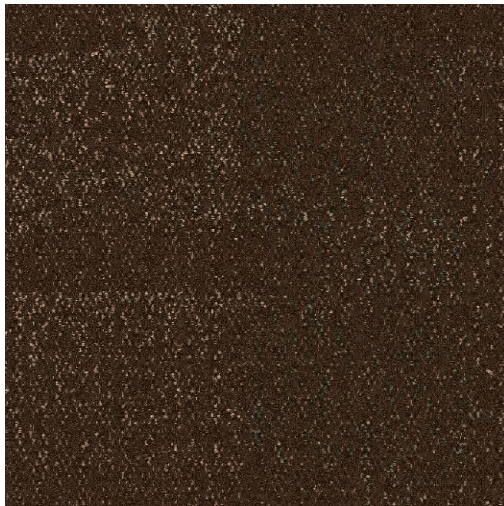
- » The following standards have been selected to meet UW performance specifications and provide a variety of neutral colors and patterns to coordinate with the wide variety of buildings. These standards are intended for use on Physical Plant work orders and maintenance work. It is also recommended that these carpets be considered first for small renovations.
- » It is not recommended that selections be made based solely on this document. Samples are available from Campus Renovation Services and most building managers.
- » All carpet orders must be approved by Physical Plant designers. This is to ensure that the carpet quality, installation, and substrate preparation are appropriately planned for the best possible result. Contact the designers via Customer Service (<https://physicalplant.wisc.edu/customer-service/>) to discuss approval options.
- » A few of the following carpet options are available in both carpet tile and broadloom sizes. Carpet tile is the recommended product in the majority of applications.
- » Many of the following options are available on “Quick Ship” programs which could have lead times as short as two weeks.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



CARPET TILE



Code: CPT-W1
Manufacturer: Interface
Pattern: 381102500 "Profile"
Color: 106087 "Crest"
Size: 50 cm x 50 cm (19.7" x 19.7")
Quick Ship: Yes



Code: CPT-W2
Manufacturer: Interface
Pattern: 381102500 "Profile"
Color: 106081 "Meridian"
Size: 50 cm x 50 cm (19.7" x 19.7")
Quick Ship: Yes

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

CARPET TILE



Code: CPT-W3
Manufacturer: Interface
Pattern: 381102500 "Profile"
Color: 106090 "Summit"
Size: 50 cm x 50 cm (19.7" x 19.7")
Quick Ship: Yes



Code: CPT-W4
Manufacturer: Patcraft
Pattern: 10K
Color: 00175 "Marathon"
Size: 24" x 24"
Quick Ship: Yes

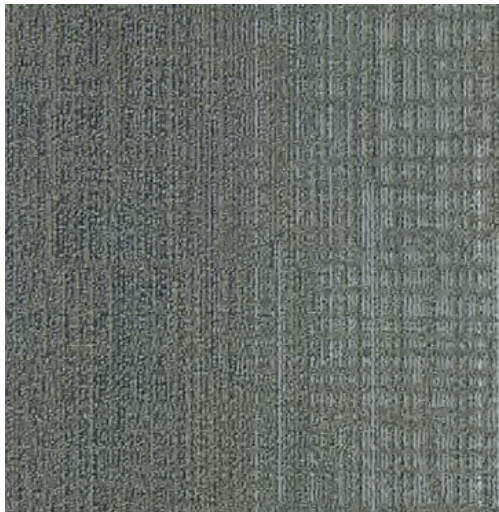
DISCONTINUED AS OF 10/1/2021

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

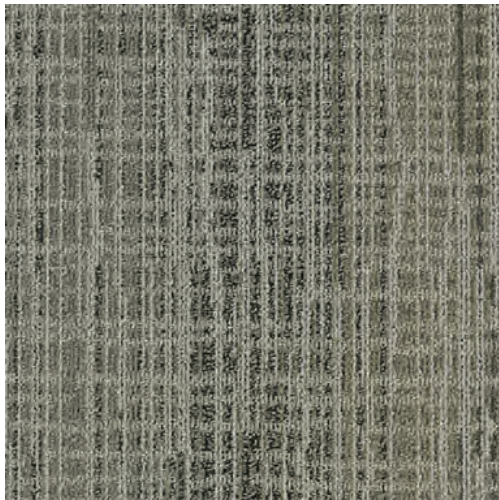
UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

CARPET TILE



Code: CPT-W5
Manufacturer: Mannington
Pattern: Nashville
Color: 12333 "Laurelhurst"
Size: 18" x 36"
Quick Ship: No (updated 12.4.2020)



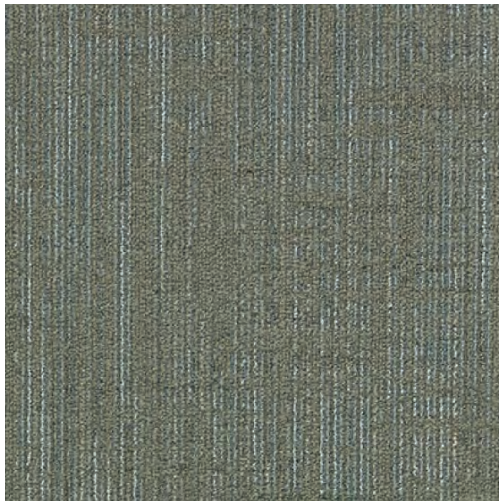
Code: CPT-W6
Manufacturer: Mannington
Pattern: Nashville
Color: 82323 "Bella Vista"
Size: 18" x 36"
Quick Ship: No (updated 12.4.2020)

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

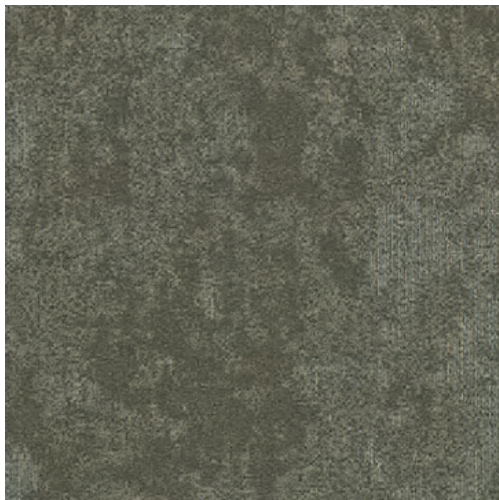
Facilities Planning & Management

CARPET TILE



Code: CPT-W7
Manufacturer: Mannington
Pattern: Ramie
Color: 43333 "Sorrel"
Size: 24" x 24"
Quick Ship: No

Coordinates: Mannington, Watercolor Moire "Sable"



Code: CPT-W8
Manufacturer: Mannington
Pattern: Watercolor Moire
Color: 24554 "Sable"
Size: 24" x 24"
Quick Ship: No

Coordinates: Mannington, Ramie "Sorrel"

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

CARPET TILE



Code: CPT-W9
Manufacturer: Mannington
Pattern: Social
Color: 14199 "Linked"
Size: 24" x 24"
Quick Ship: No (updated 12.4.2020)

Coordinates: Mannington, Relay "Operator"



Code: CPT-W10
Manufacturer: Mannington
Pattern: Relay
Color: 14148 "Operator"
Size: 24" x 24"
Quick Ship: Yes

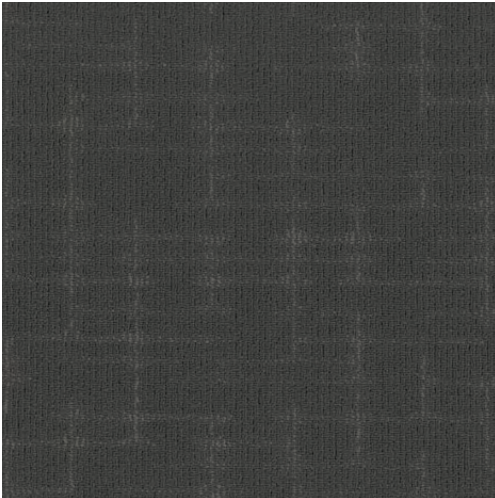
Coordinates: Mannington, Social "Linked"

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

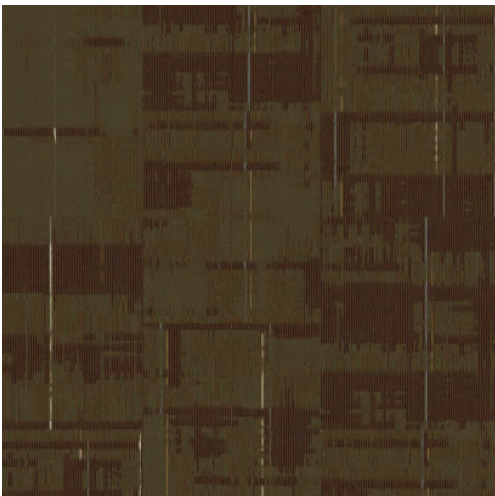
UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

CARPET TILE



Code: CPT-W11
Manufacturer: J&J Invision
Pattern: Tempo Modular
Color: 1758 "Finale"
Size: 24" x 24"
*Broadloom option available
Quick Ship: Yes



Code: CPT-W12
Manufacturer: Tandus Centiva
Collection: Urban View
Color: 19803 "Iron Bark"
Size: 24" x 24"
Quick Ship: Yes

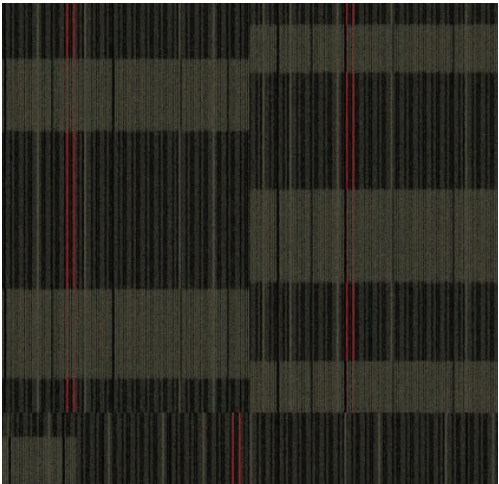
*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

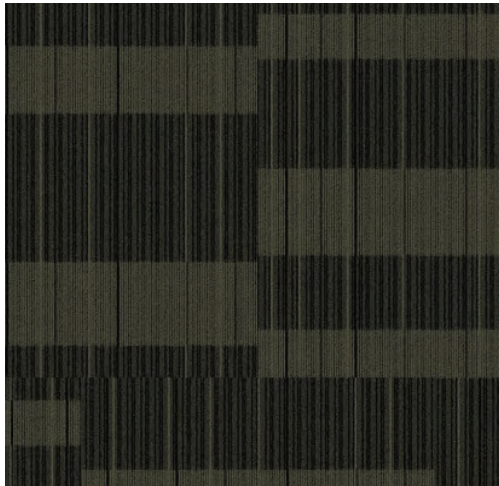


CARPET TILE



Code: CPT-W13
Manufacturer: Tandus Centiva
Pattern: Street Life
Color: 36101 "Lights Out"
Size: 24" x 24"
Quick Ship: Yes

Coordinates: Tandus, City Walk, "Lights Out"



Code: CPT-W14
Manufacturer: Tandus Centiva
Pattern: City Walk
Color: 36101 "Lights Out"
Size: 24" x 24"
Quick Ship: Yes

Coordinates: Tandus, Street Life "Lights Out"

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management

PLASTIC LAMINATE

- » These standards are intended for use on Physical Plant work orders and maintenance work. It is also recommended that these colors be considered first for small renovations and major capital projects.
- » It is not recommended that selections be made based solely on this document. Physical samples are available from Campus Renovation Services, Physical Plant Shops, and most building managers.
- » Lab countertops are addressed with different material options. Contact design personnel to discuss.



Formica 5875-58
Neutral Weft

PVC edge color:
Doellken 2001 "White"



Wilsonart 4841-60
Desert Zephyr

PVC edge color:
Doellken 2240 "Khaki Brown"



Wilsonart 4656-60
Bronze Legacy

PVC edge color:
Doellken 2428 "Shadow"



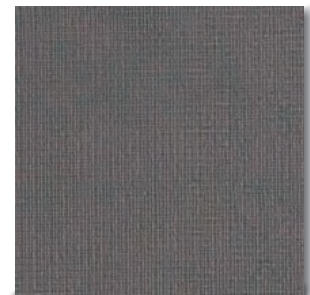
Wilsonart 4943-38
Classic Linen

PVC edge Color:
Doellken 2495 "Pepperdust"



Wilsonart 4843-60
Misted Zephyr

PVC edge color:
Doellken 2425 "Fog Grey"



Wilsonart 4879-38
Steel Mesh

PVC edge color:
Doellken 2477 "Northsea"

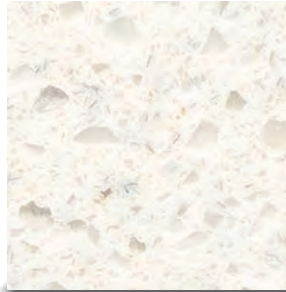
*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

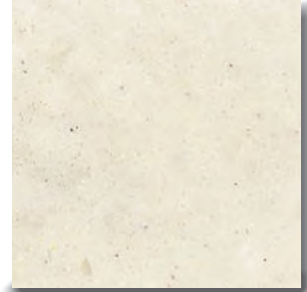
Facilities Planning & Management

SOLID SURFACE

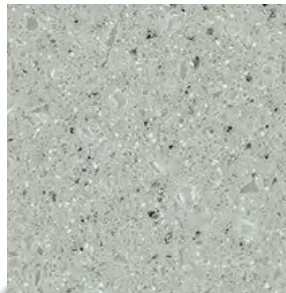
- » These standards are intended for use on Physical Plant work orders and maintenance work. It is also recommended that these colors be considered first for small renovations and major capital projects.
- » It is not recommended that selections be made based solely on this document. Physical samples are available from Campus Renovation Services, Physical Plant Shops, and most building managers.
- » Lab countertops are addressed with different material options. Contact design personnel to discuss.



Wilsonart 9204CE
"Morning Ice"



Wilsonart 9210CM
"Europa"



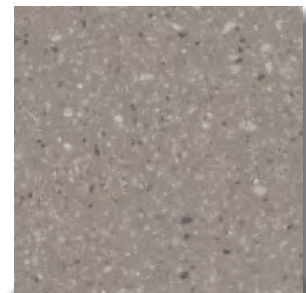
Wilsonart 9219GS
"Brooklyn Concrete"



Wilsonart 9135MG
"Cashmere Mirage"



Corian "Matterhorn"



Corian "Doeskin"

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.

UNIVERSITY OF WISCONSIN- MADISON

Facilities Planning & Management



BATHROOM PARTITIONS - HDPE

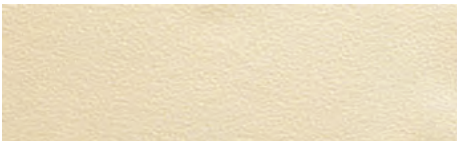
The colors below are based on Eclipse Partitions HDPE colors.



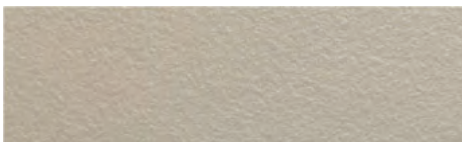
Sandcastle



Sandstone



Linen



Concrete

*NOTE: Images shown are representations only - Colors may appear different on screens and printouts. See actual samples for color accuracy.



Finish Solutions over Existing Glazed Block Walls

CAMPUS STANDARD FOR FINISH SOLUTIONS OVER EXISTING GLAZED BLOCK WALLS UW FACILITIES PLANNING & MAINTENANCE

Goal: To offer predetermined and preapproved parameters for updating buildings with existing glazed block walls.

General Requirements, All Spaces:

1. Solution must not require direct adherence to existing block. Some existing block contains lead in its glaze, and all would require caustic abrasion of the existing surface, which is unacceptable.
2. Solution must respect what is being covered by attempting to minimize trauma to it – for example, by aiming to limit connection penetrations to mortar joints.
3. Solution should be space-specific and appropriate.
4. Solution thickness to be maximum one inch (1”) from the surface of the glazed block in order to minimize change in space dimensions, construction of chases, and fire rating concerns.
5. Solution must be installed by and in conjunction with FP&M.

Additional Requirements for Public Spaces:

1. Solutions for public spaces must be low maintenance, and approved by the University Architect, the Director of Campus Services and the Director of Maintenance. Submittal for review should include product sample, attachment detail, fire rating, and reason for selection.
2. All materials for use in public spaces must be Class A as defined by the current International Building Code.
3. Historic designation of the building must be taken into account and solutions must be reviewed with Campus Historic Preservation Coordinator and if required the Wisconsin Historic Society.

Examples of Acceptable Solutions/Materials – including but not limited to:

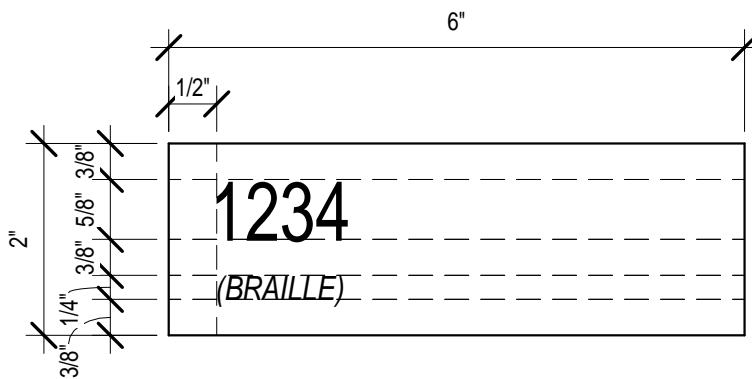
(All solutions presume appropriate wall attachment per General Requirement #1 above)

- Linoleum
- Sheet metal
- Plexiglass/film
- Back-painted glass/translucent glass
- Thin acoustic panels (not appropriate for public spaces)
- MDC panels



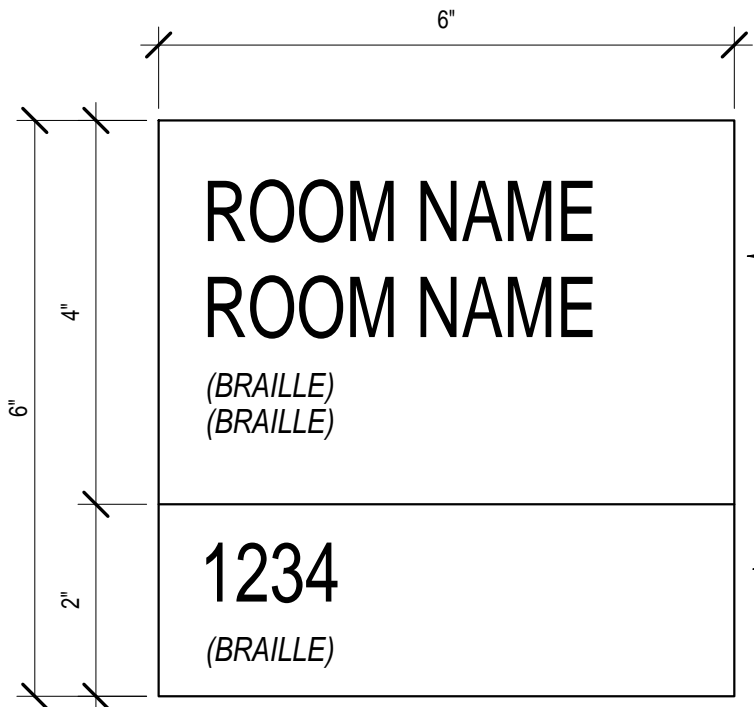
Interior Signage

See the following attachment



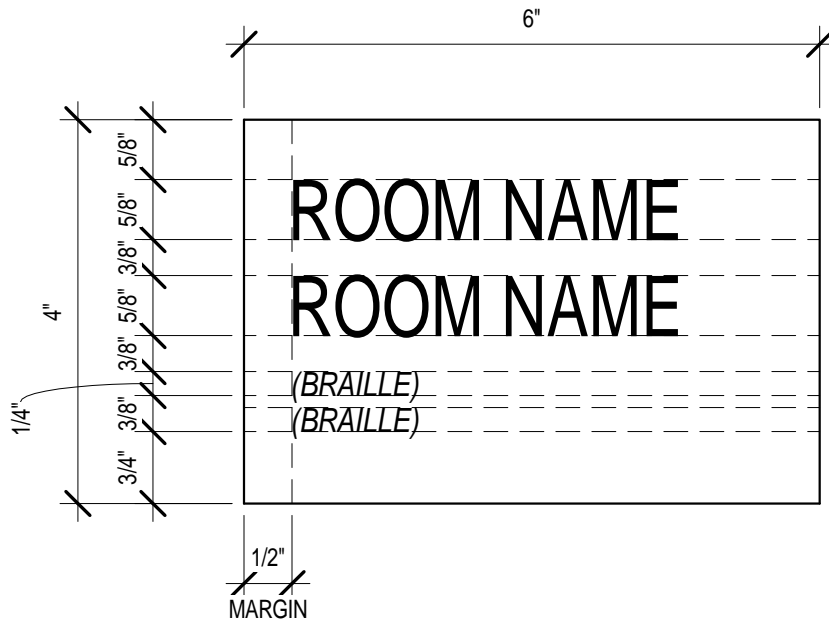
- STORAGE
- JANITOR/CUSTODIAL
- KITCHENETTE
- COPY ROOM

1 SIGN TYPE ID-1, ROOM NUMBER
6" = 1'-0"



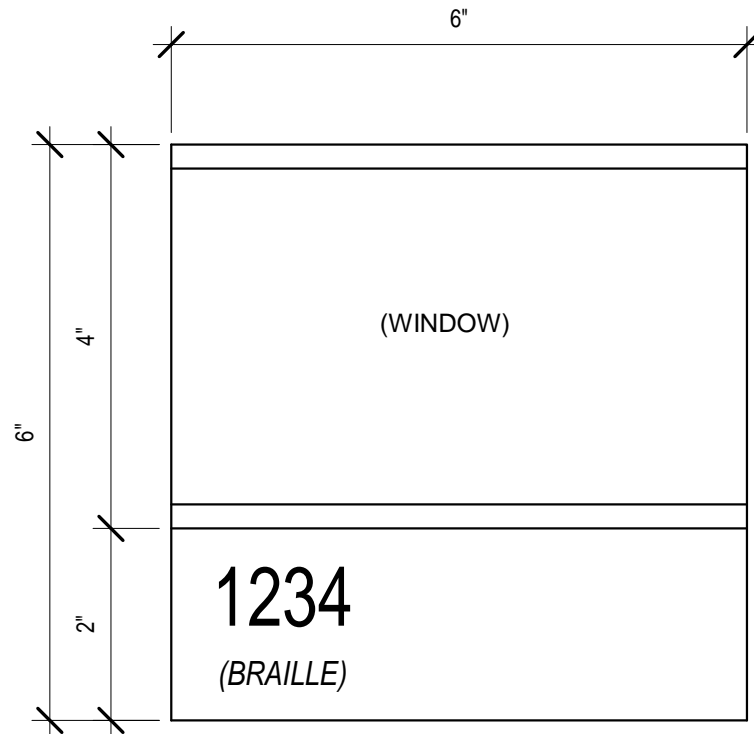
- CONFERENCE ROOM
- CLASSROOM / LECTURE / AUDITORIUM
- DEPARTMENT OFFICE
- LABORATORY
- SPECIAL UTILITY ROOMS WHERE APPLICABLE (I.E. FIRE COMMAND CENTER)
- LACTATION / SPECIAL PURPOSE ROOM
- SUPPORT ROOMS (I.E. MAIL, COPY, ETC.)

4 SIGN TYPE ID-4, NAMED ROOM
6" = 1'-0"



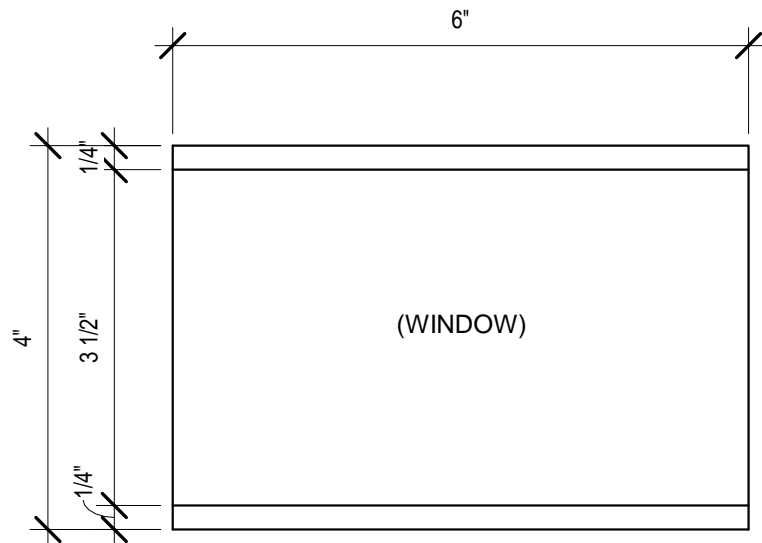
- ADD'L PLAQUE FOR ROOM ID
- INFORMATIONAL TEXT WHICH REQUIRES TACTILE LETTERING AND BRAILLE (I.E. "EXIT ONLY", "NO SMOKING")

2 SIGN TYPE ID-2, ROOM NAME
6" = 1'-0"

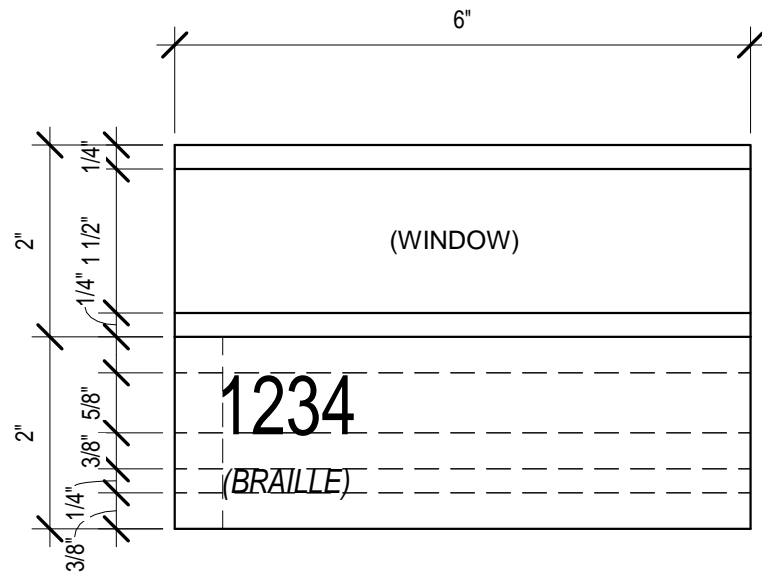


- SINGLE OCCUPANT
- MULTIPLE OCCUPANTS
- OTHER NAMED ROOMS NOT REQUIRED TO HAVE TACTILE LETTERING & BRAILLE

5 SIGN TYPE ID-5, OFFICE
6" = 1'-0"



3 SIGN TYPE ID-3, WINDOW
6" = 1'-0"



- PIN OR MAGNETIC MOUNT TO WORKSTATION PANELS

6 SIGN TYPE ID-6, WORKSTATION
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- 1 ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- 2 ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- 3 FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- 4 COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- 5 ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- 6 MATERIAL FINISHES SHALL BE NON-GLARE.
- 7 INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- 8 SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- 9 MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

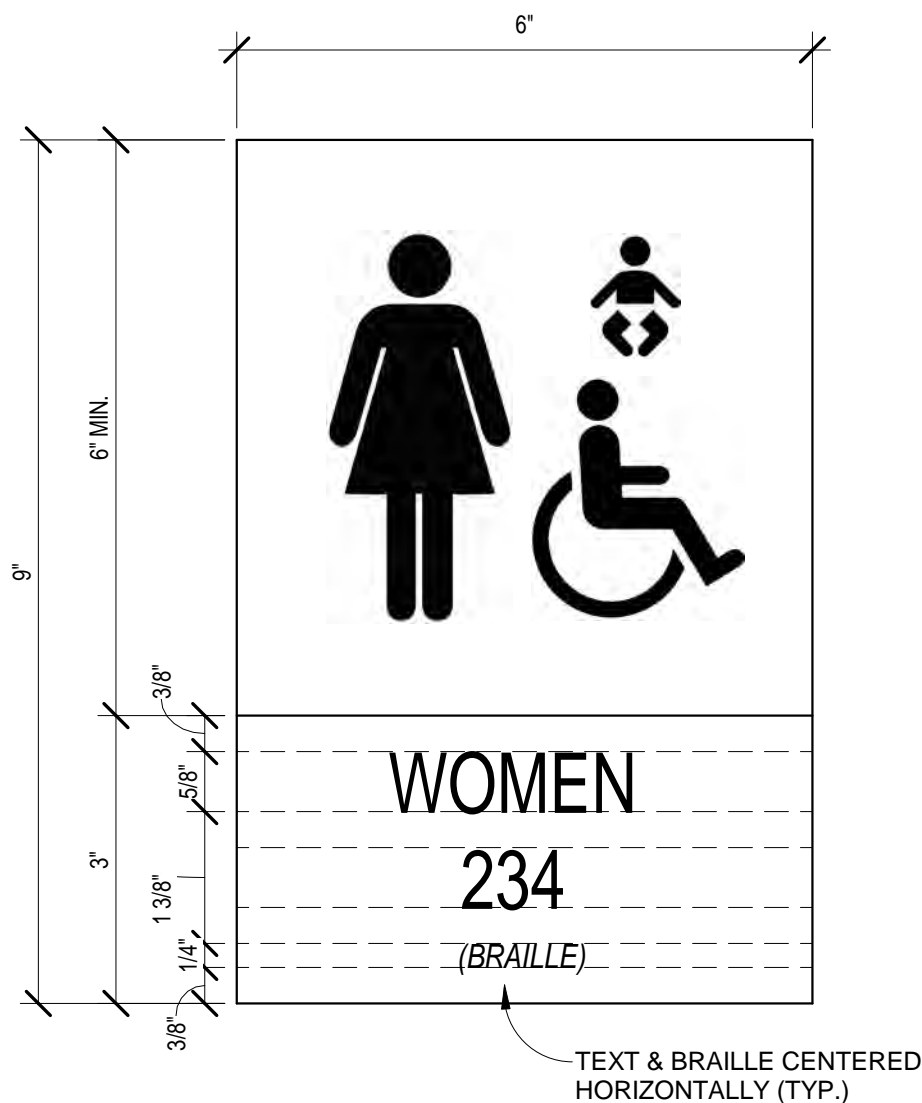
Project Title:
**UW CAMPUS STANDARD
INTERIOR SIGNAGE**

Sheet Title:
IDENTIFICATION SIGNAGE

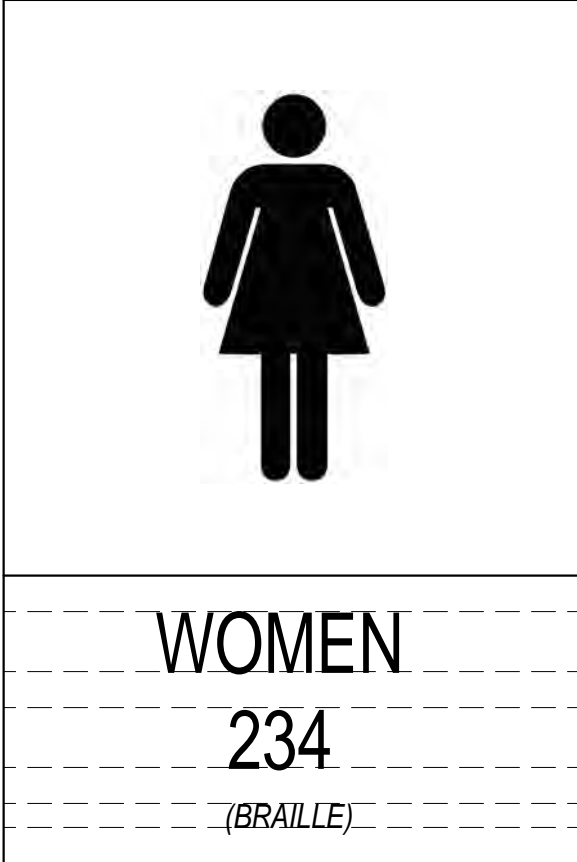
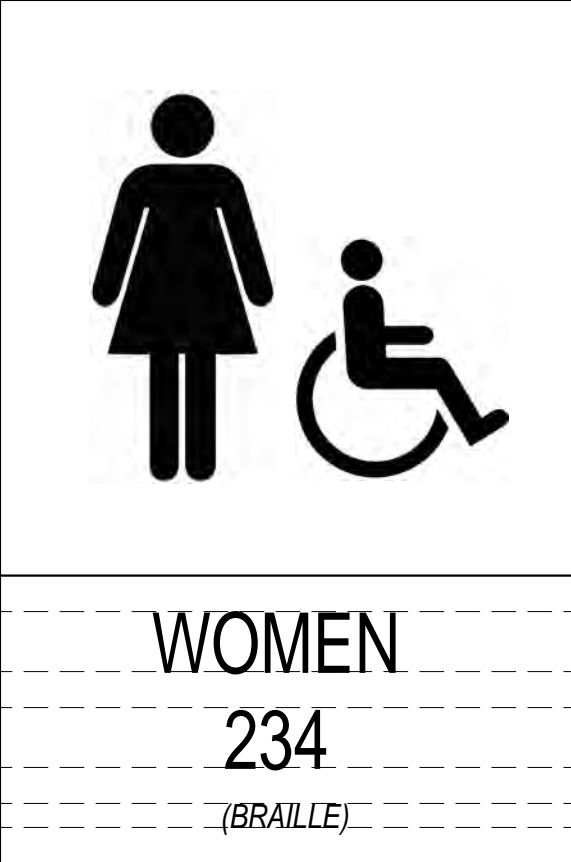
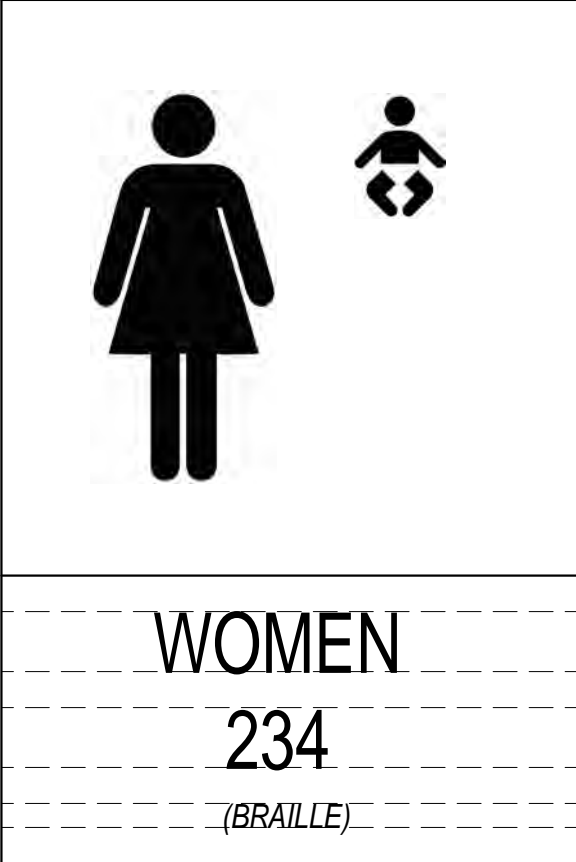
| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

Date Issued 03/12/2020

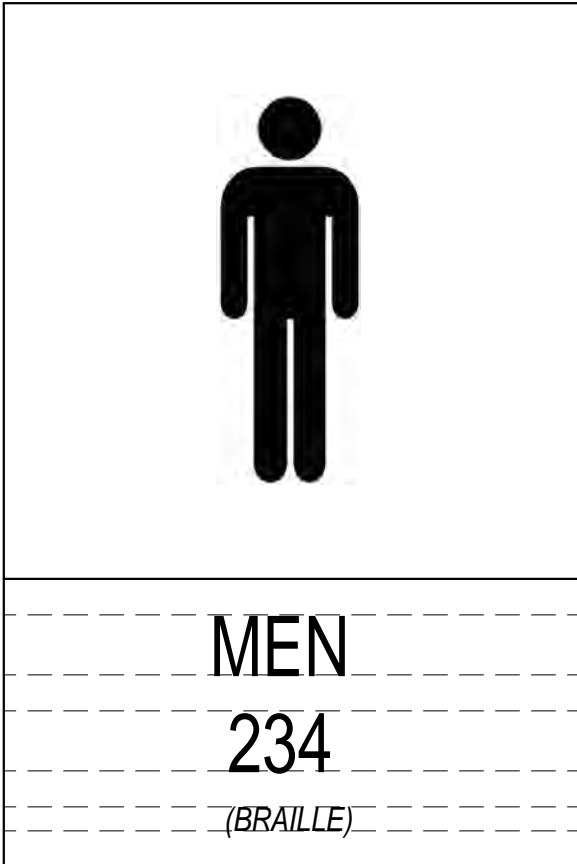
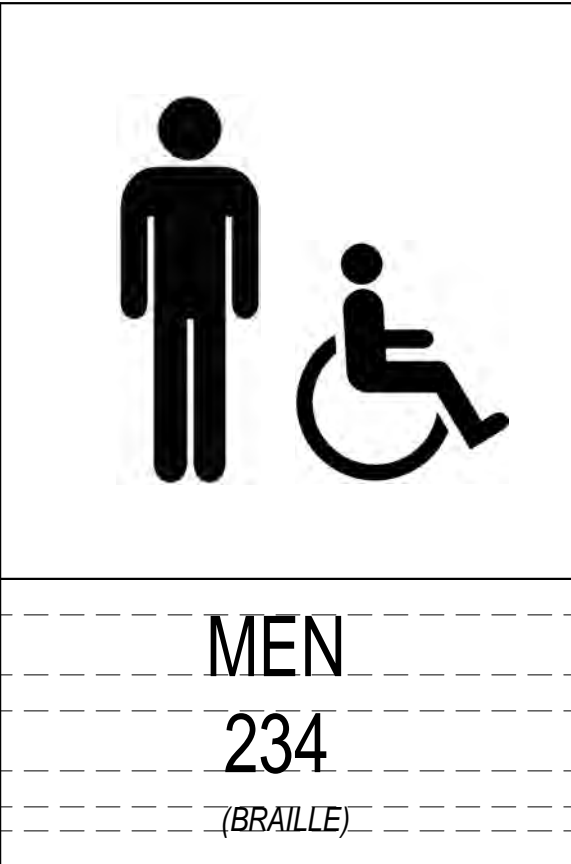
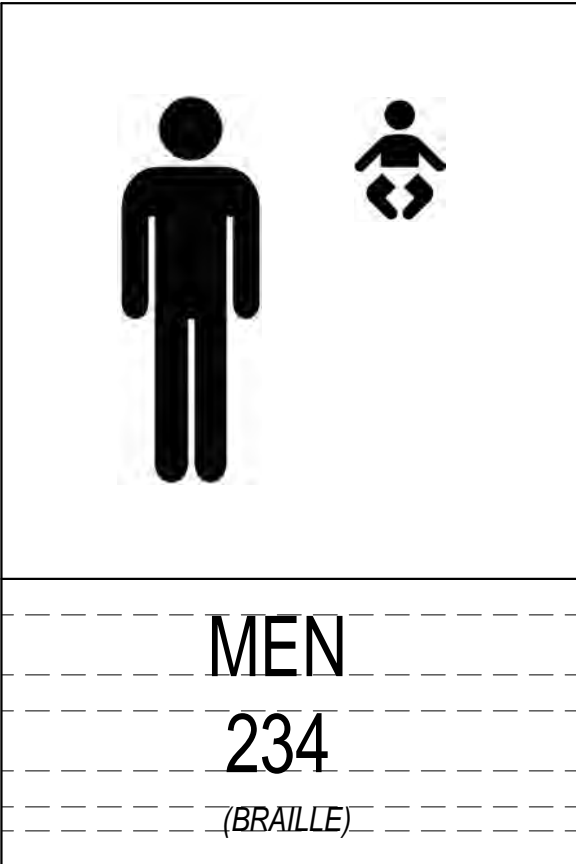
X1



TEXT & BRAILLE CENTERED
HORIZONTALLY (TYP.)



TEXT & BRAILLE CENTERED
HORIZONTALLY (TYP.)



1 SIGN TYPE R-1, WOMEN'S RESTROOM OR LOCKER ROOM
6" = 1'-0"

*SEE SHEET "X3" FOR TYPICAL RESTROOM SIGN
CONSTRUCTION & PICTOGRAM SIZE/PLACEMENT

2 SIGN TYPE R-2, MEN'S RESTROOM OR LOCKER ROOM
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

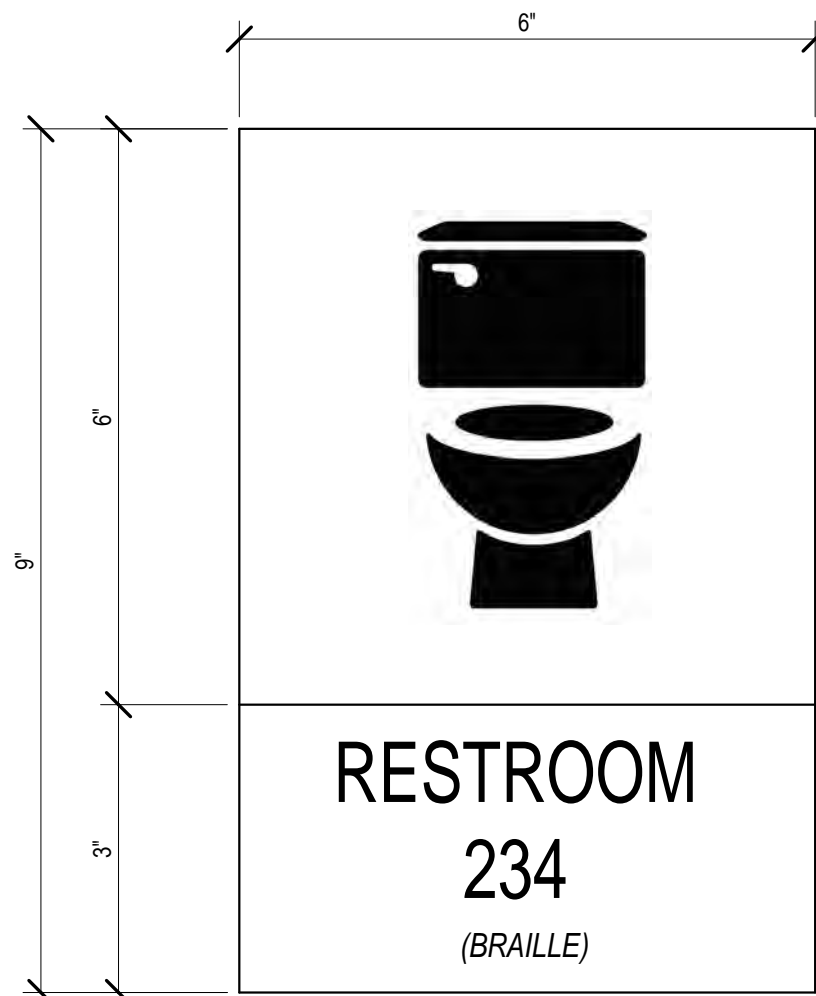
Project Title:
UW CAMPUS STANDARD
INTERIOR SIGNAGE

Sheet Title:
RESTROOM SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |

Date Issued 03/12/2020

X2



1 SIGN TYPE R-3, SINGLE USER RESTROOM / SHOWER
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSUAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

Project Title:
UW CAMPUS STANDARD INTERIOR SIGNAGE

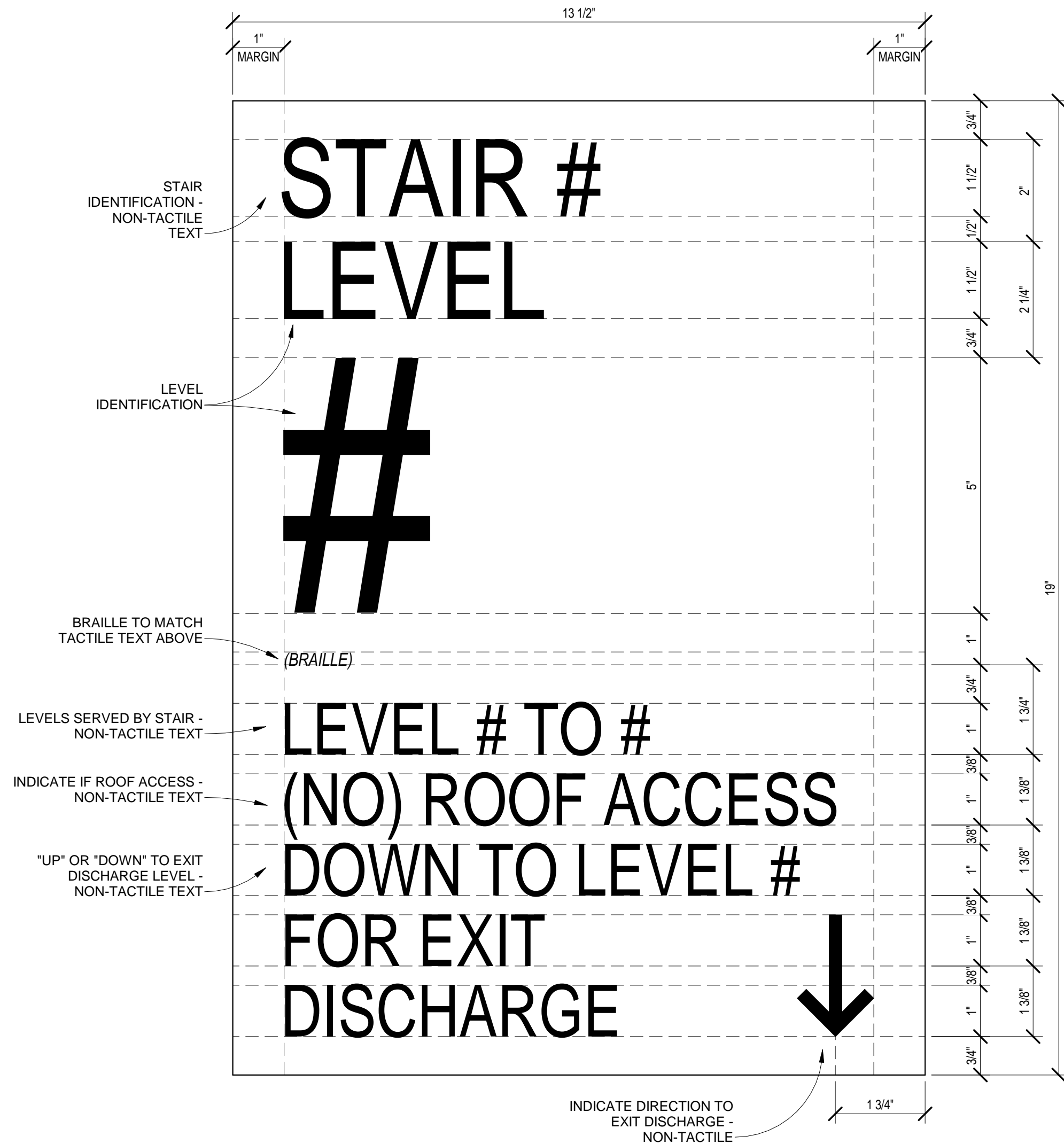
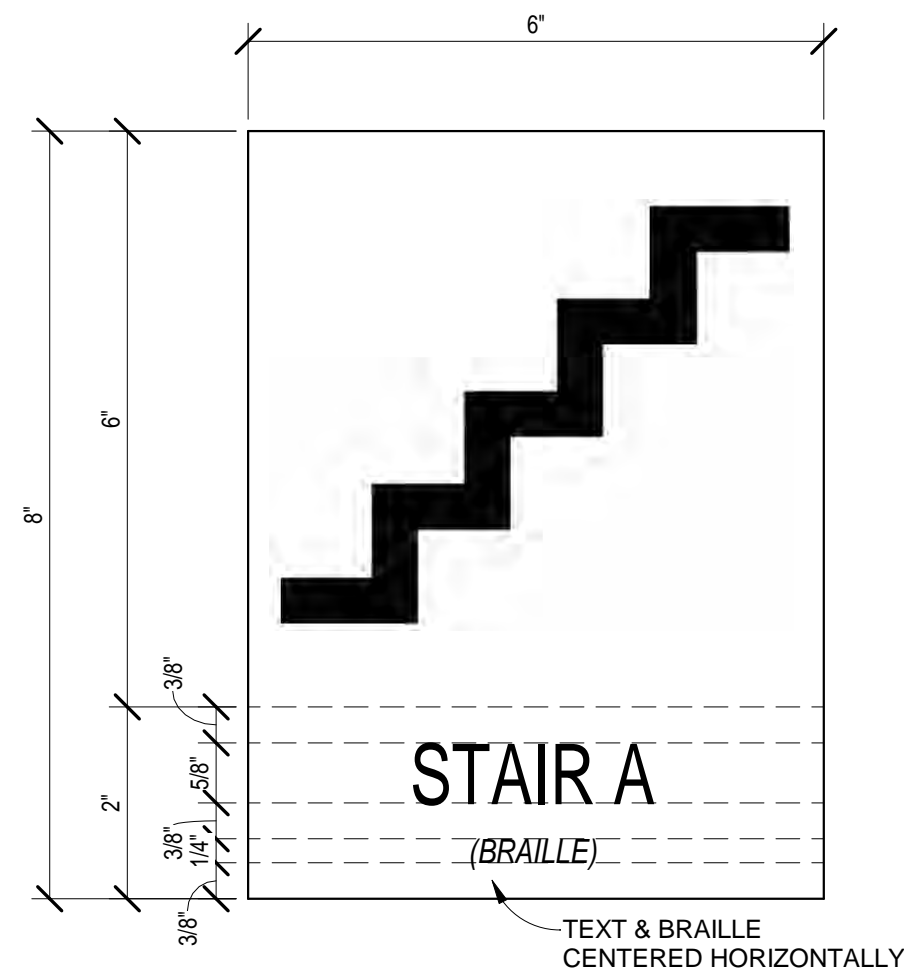
Sheet Title:
RESTROOM SIGNAGE

REVISIONS:

| No. | By: | Date: | Description: |
|-----|-----|-------|--------------|
| | | | |
| | | | |
| | | | |

Date Issued 03/12/2020

X3



APPLIES TO ROOMS LABELED "STAIR".

TO BE INSTALLED INSIDE STAIRWELL AT EACH LEVEL
PER IBC AND MFD REQUIREMENTS.

TEXT ON SIGNAGE WITHIN HIGH RISE BUILDINGS SHALL BE SELF-LUMINOUS OR PHOTOLUMINESCENT IN ACCORDANCE WITH IBC 1025.4.

| |
|------------------|
| Drawn By: FOSDAL |
|------------------|



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- 1 ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- 2 ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- 3 FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- 4 COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- 5 ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- 6 MATERIAL FINISHES SHALL BE NON-GLARE.
- 7 INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- 8 SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- 9 MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

Project Title:

UW CAMPUS STANDARD INTERIOR SIGNAGE

Sheet Title:

EGRESS SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

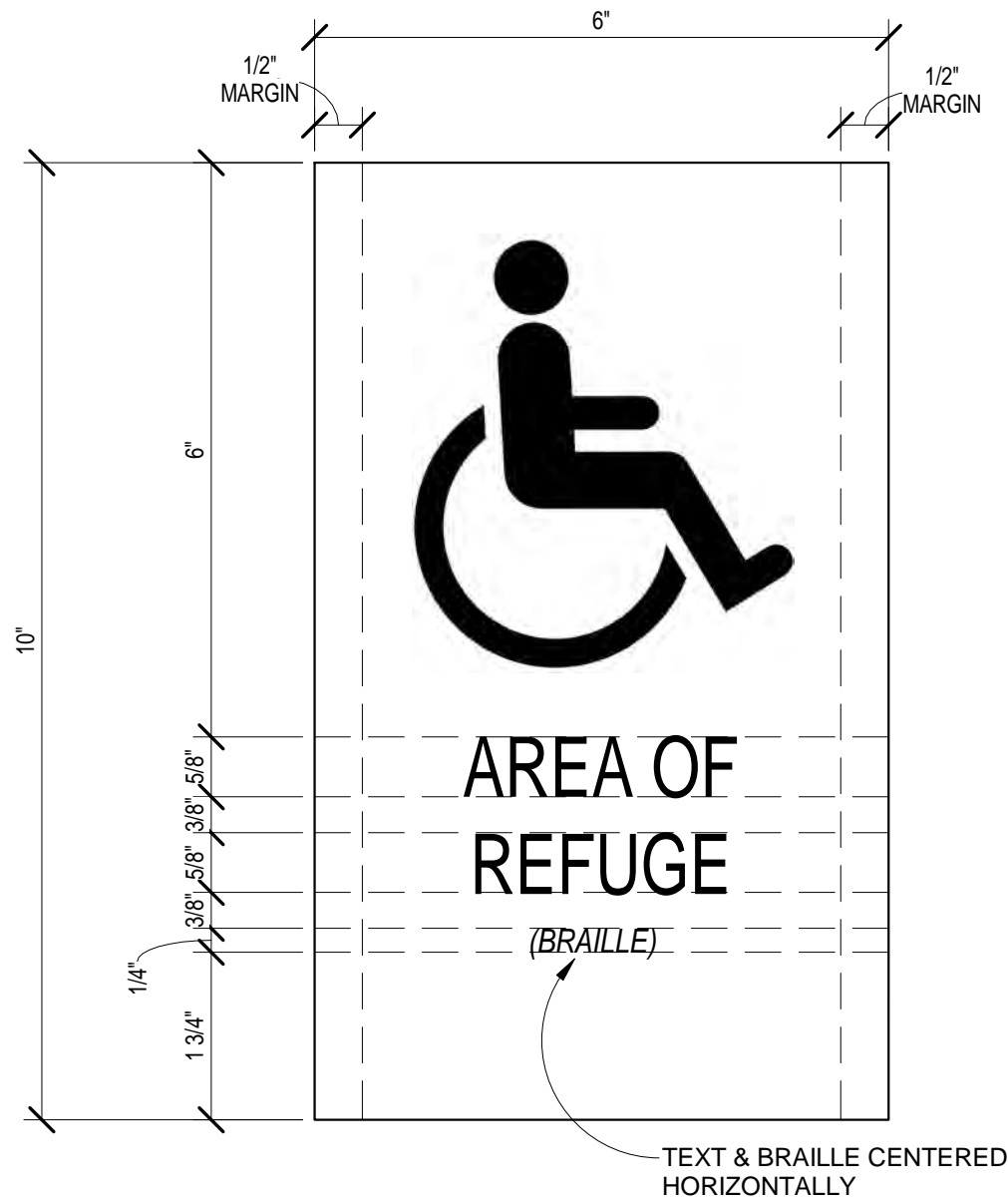
Date Issued

03/12/2020

X4



1 SIGN TYPE E-3, AREA OF REFUGE, OUTSIDE STAIRWELL
6" = 1'-0"




2 SIGN TYPE E-4, AREA OF REFUGE, INSIDE STAIRWELL
6" = 1'-0"



3 SIGN TYPE E-5, ELEVATOR INSTRUCTIONS
6" = 1'-0"

Drawn By: FOSDAL


WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

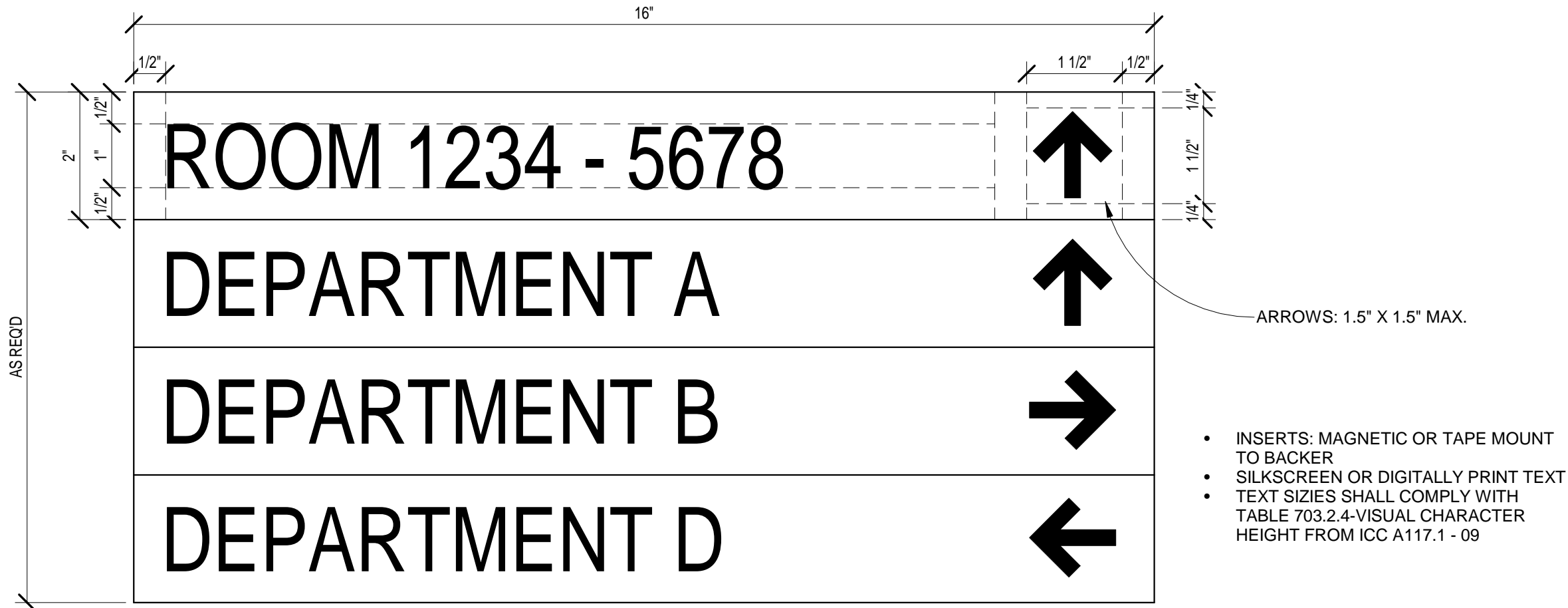
Project Title:
UW CAMPUS STANDARD INTERIOR SIGNAGE

Sheet Title:
EGRESS SIGNAGE

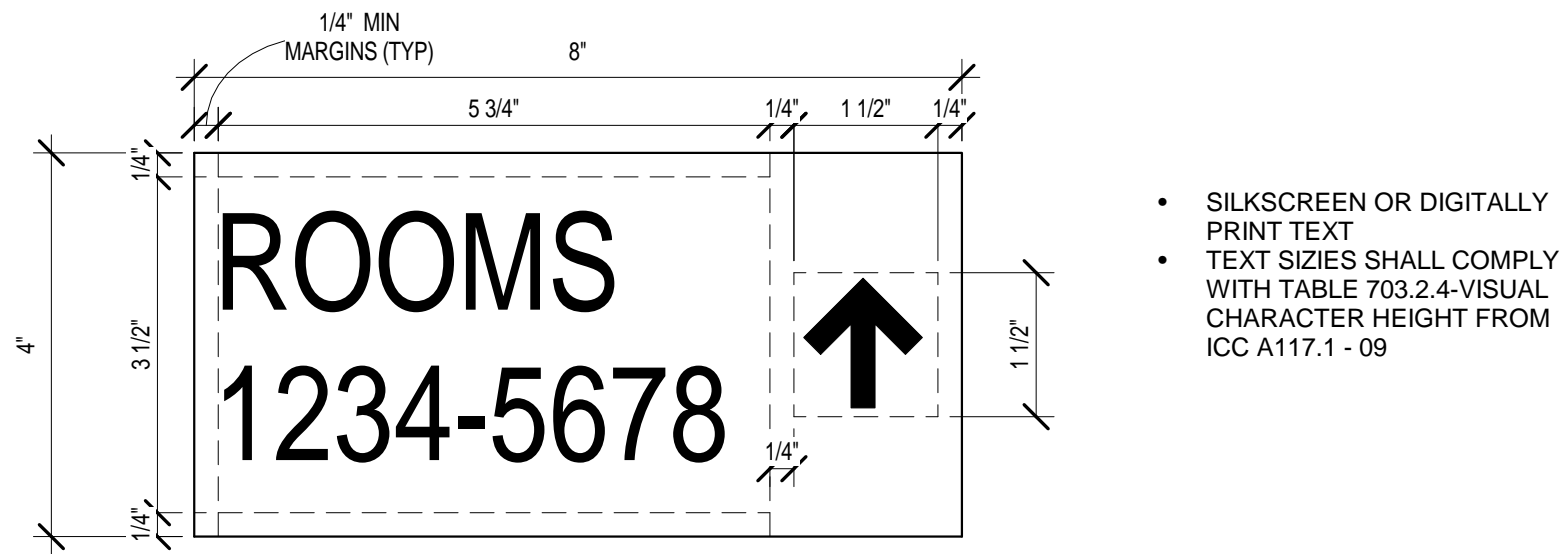
| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

Date Issued: 03/12/2020

X5




1 SIGN TYPE W-1, LARGE DIRECTIONAL
6" = 1'-0"



2 SIGN TYPE W-2, SMALL DIRECTIONAL
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

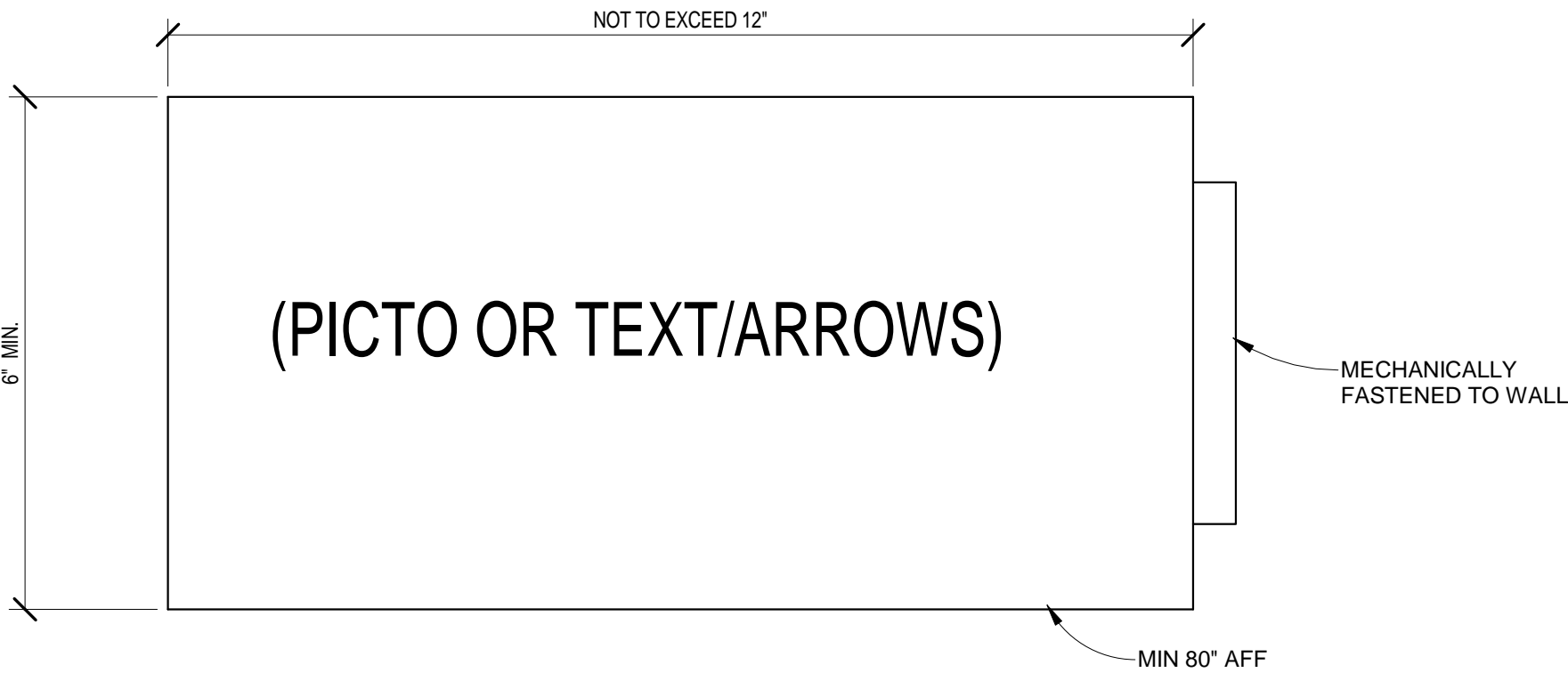
Project Title:
UW CAMPUS STANDARD INTERIOR SIGNAGE

Sheet Title:
WAYFINDING SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

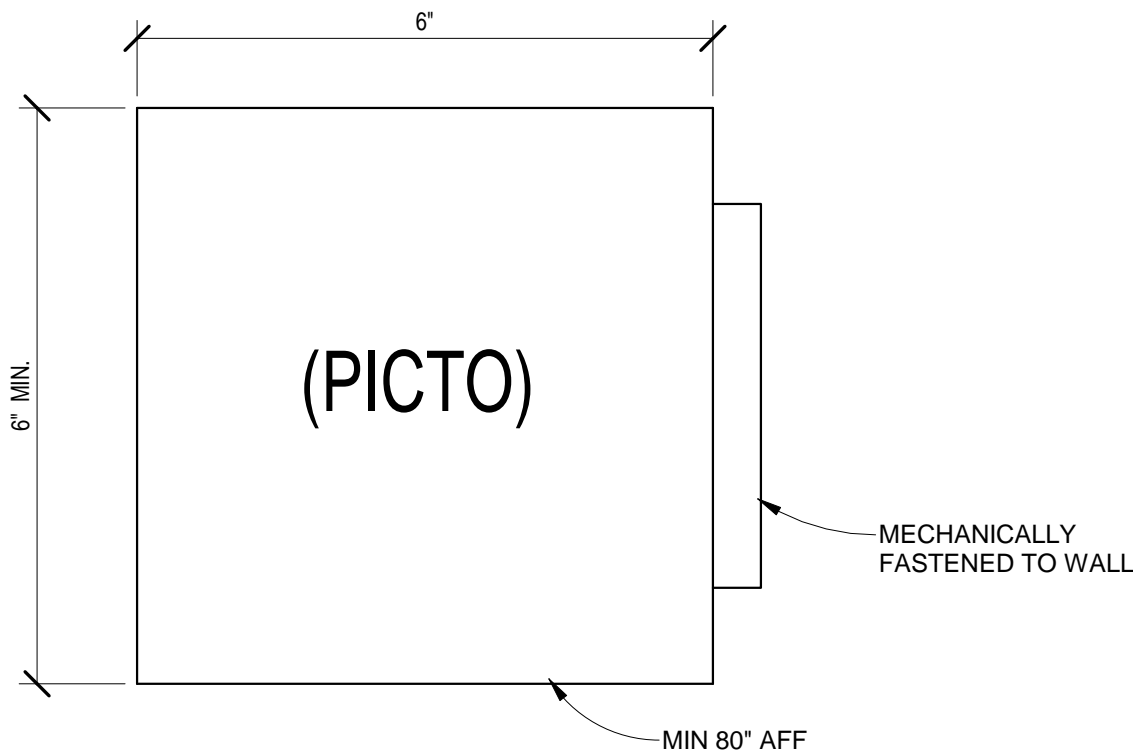
Date Issued03/12/2020

X6



- SILKSCREEN OR DIGITALLY PRINT TEXT
- TEXT SIZES SHALL COMPLY WITH TABLE 703.2.4-VISUAL CHARACTER HEIGHT FROM ICC A117.1 - 09

1 SIGN TYPE W-3, LARGE FLAG
6" = 1'-0"



- SILKSCREEN OR DIGITALLY PRINT TEXT/PICTOGRAMS
- TEXT SIZES SHALL COMPLY WITH TABLE 703.2.4-VISUAL CHARACTER HEIGHT FROM ICC A117.1 - 09

2 SIGN TYPE W-4, SMALL FLAG
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- 1 ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- 2 ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- 3 FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- 4 COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- 5 ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- 6 MATERIAL FINISHES SHALL BE NON-GLARE.
- 7 INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- 8 SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- 9 MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

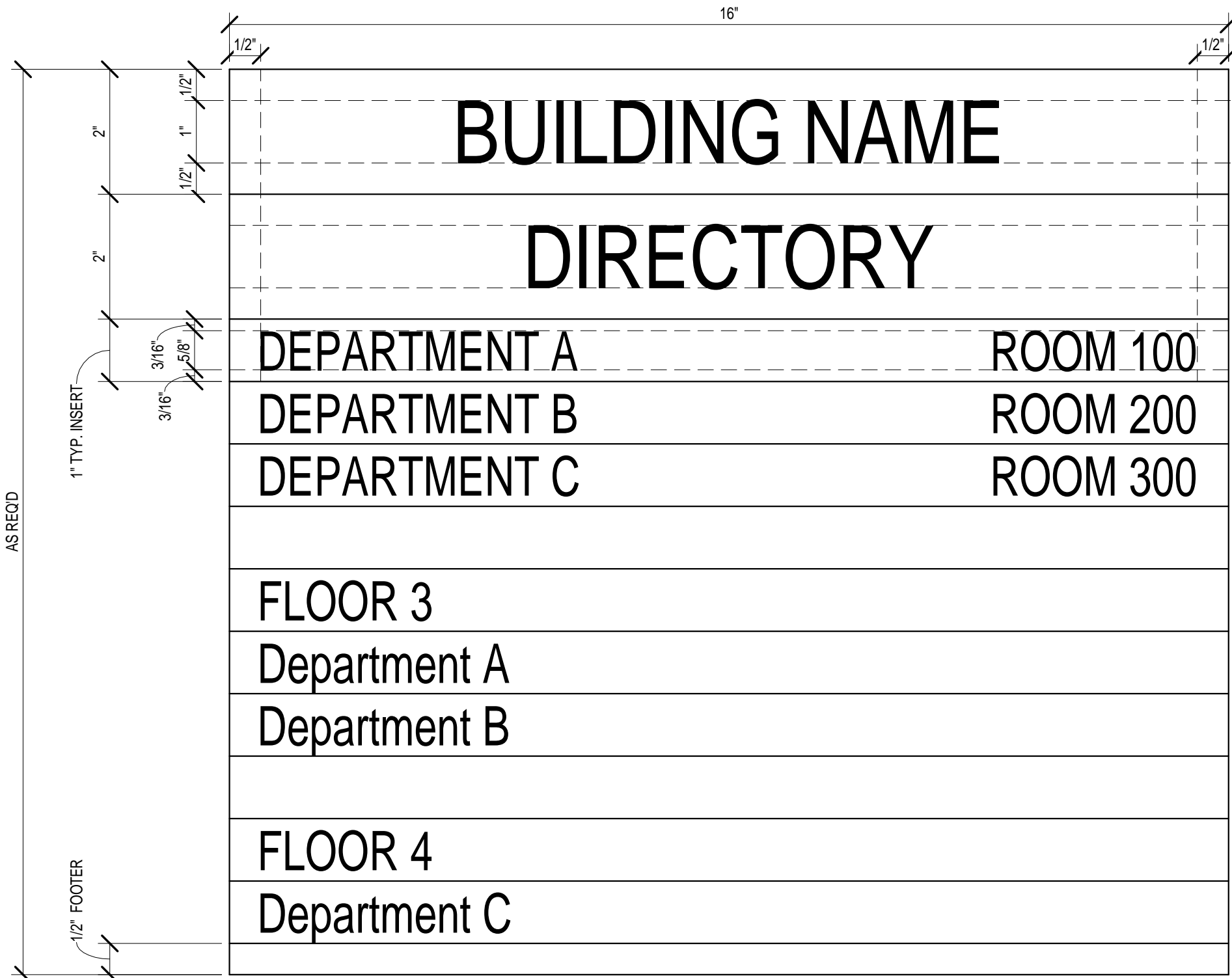
Project Title:
UW CAMPUS STANDARD
INTERIOR SIGNAGE

Sheet Title:
WAYFINDING SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

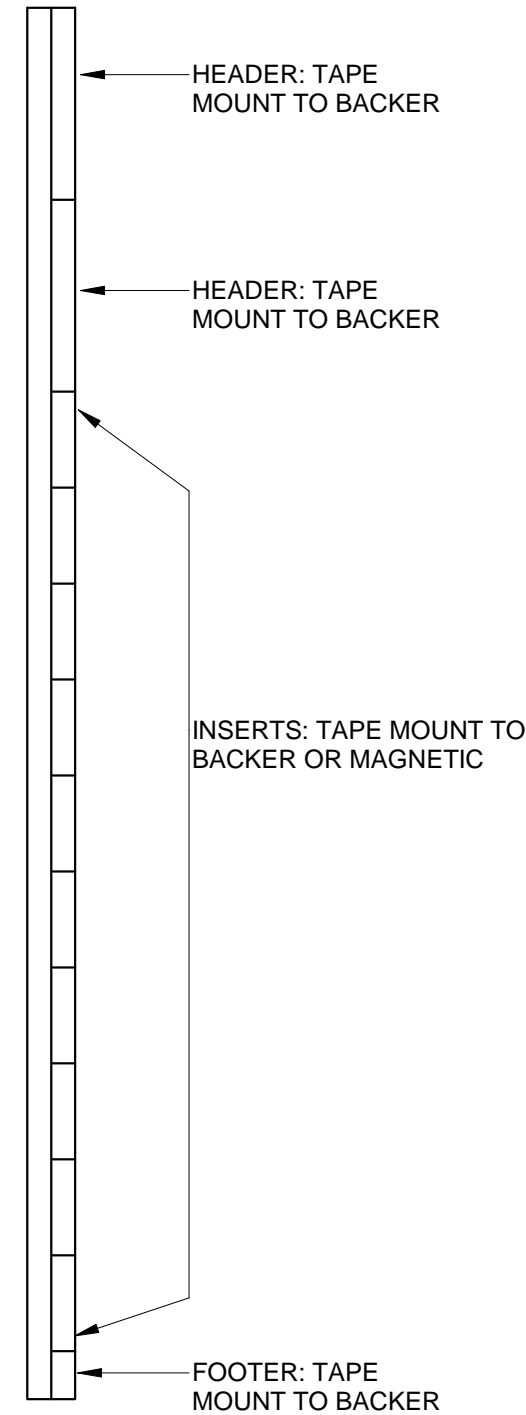
| | |
|-------------|------------|
| Date Issued | 03/12/2020 |
|-------------|------------|

X7




- INSERTS: MAGNETIC OR TAPE MOUNT TO BACKER
- SILKSCREEN OR DIGITALLY PRINT TEXT
- TEXT SIZES SHALL COMPLY WITH TABLE 703.2.4-VISUAL CHARACTER HEIGHT FROM ICC A117.1 - 09
- LOWERCASE TEXT ACCEPTABLE.

1 SIGN TYPE W-5, DIRECTORY LARGE
6" = 1'-0"



2 SIGN TYPE W-5 & W-6 TYP. SECTION
6" = 1'-0"

Drawn By: FOSDAL


WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- 1 ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- 2 ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- 3 FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- 4 COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- 5 ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- 6 MATERIAL FINISHES SHALL BE NON-GLARE.
- 7 INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- 8 SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- 9 MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

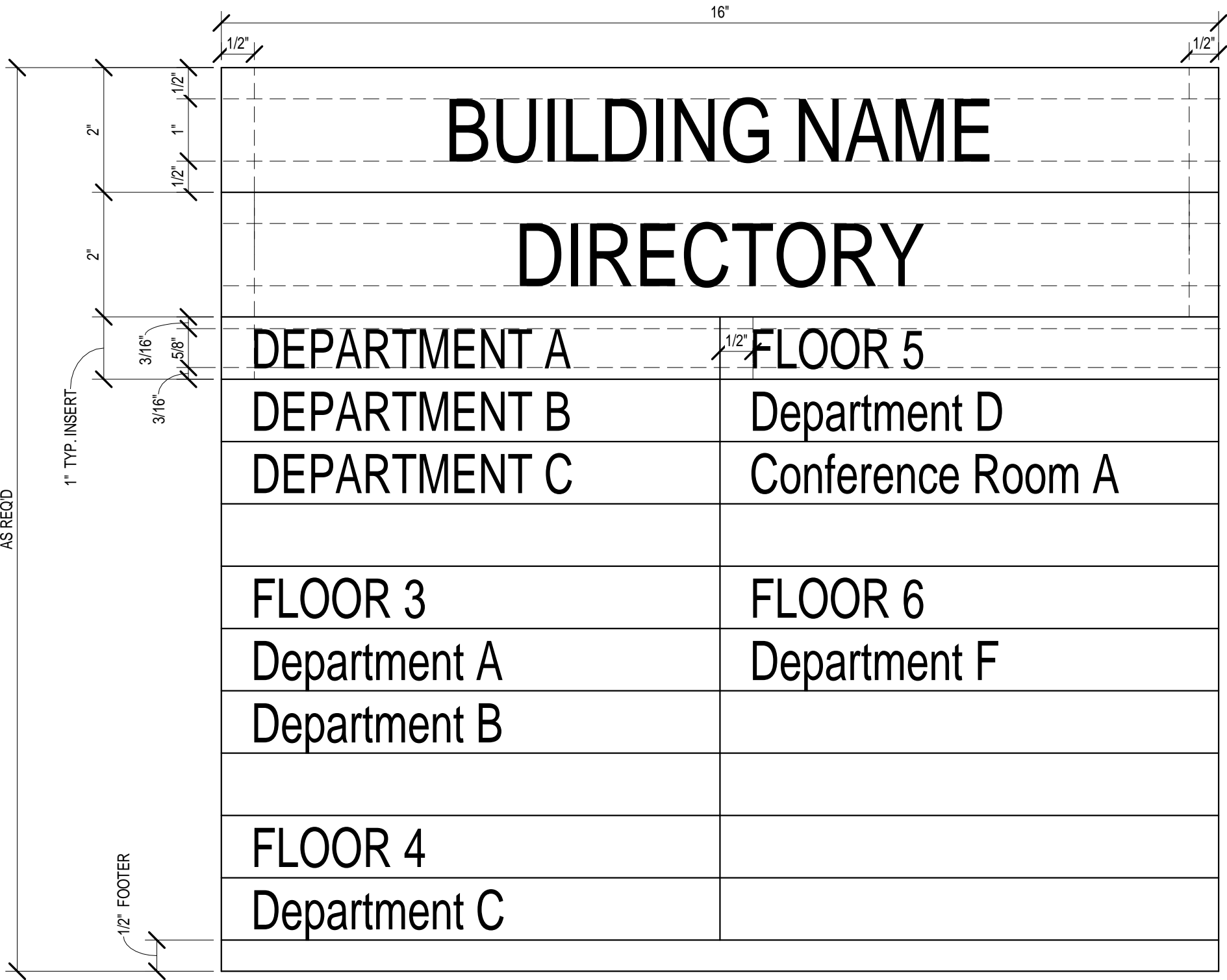
Project Title:
UW CAMPUS STANDARD INTERIOR SIGNAGE

Sheet Title:
WAYFINDING SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

Date Issued: 03/12/2020

X8



- INSERTS: MAGNETIC OR TAPE MOUNT TO BACKER
- SILKSCREEN OR DIGITALLY PRINT TEXT
- TEXT SIZES SHALL COMPLY WITH TABLE 703.2.4-VISUAL CHARACTER HEIGHT FROM ICC A117.1 - 09
- LOWERCASE TEXT ACCEPTABLE.

1 SIGN TYPE W-6, DIRECTORY SMALL
6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- 1 ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- 2 ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- 3 FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- 4 COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- 5 ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- 6 MATERIAL FINISHES SHALL BE NON-GLARE.
- 7 INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- 8 SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- 9 MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

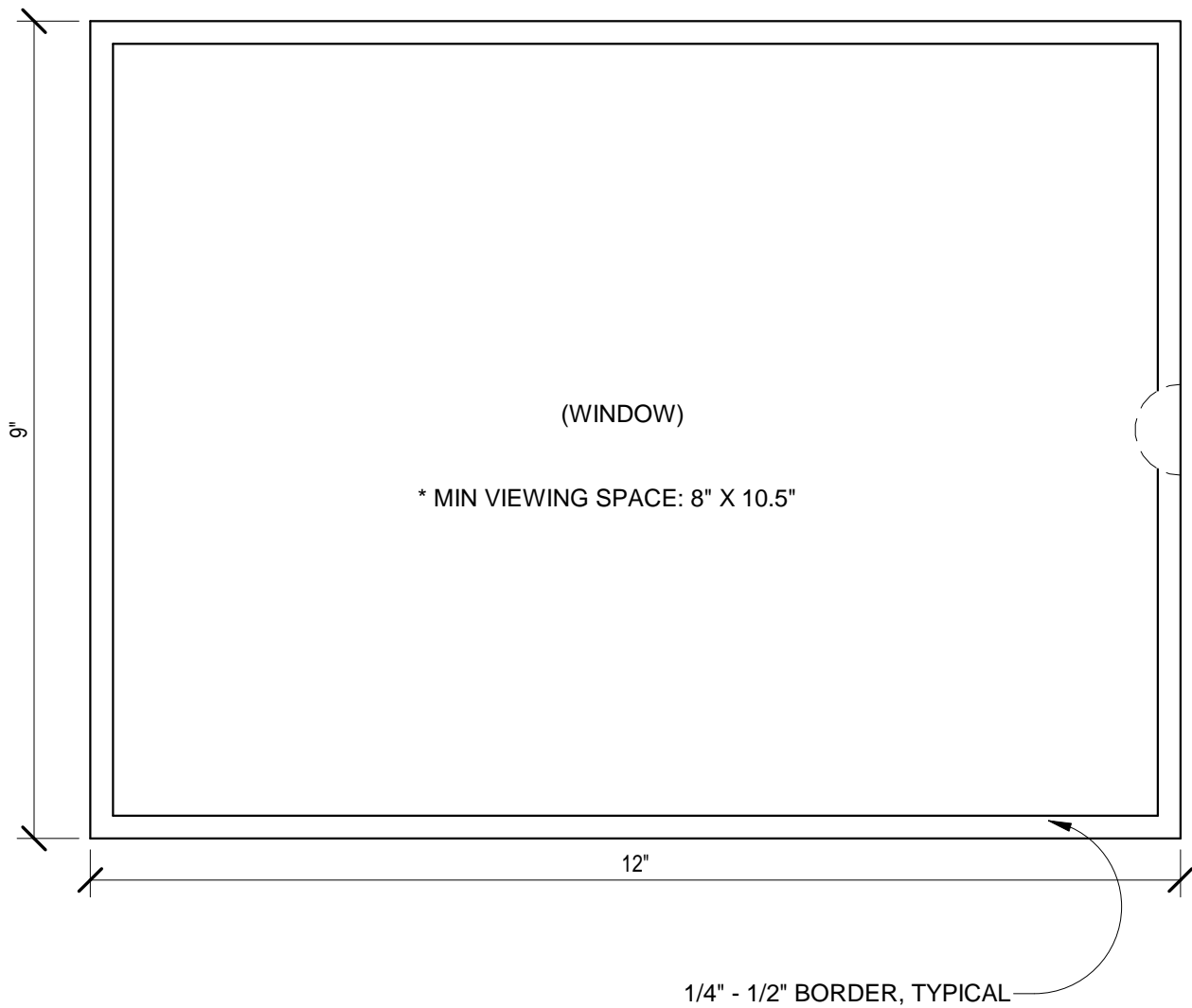
Project Title:
UW CAMPUS STANDARD
INTERIOR SIGNAGE

Sheet Title:
WAYFINDING SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

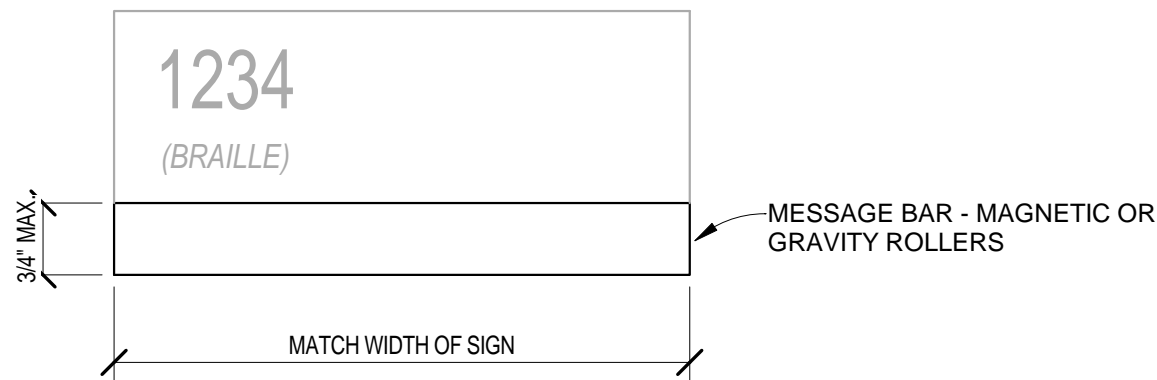
Date Issued 03/12/2020

X9

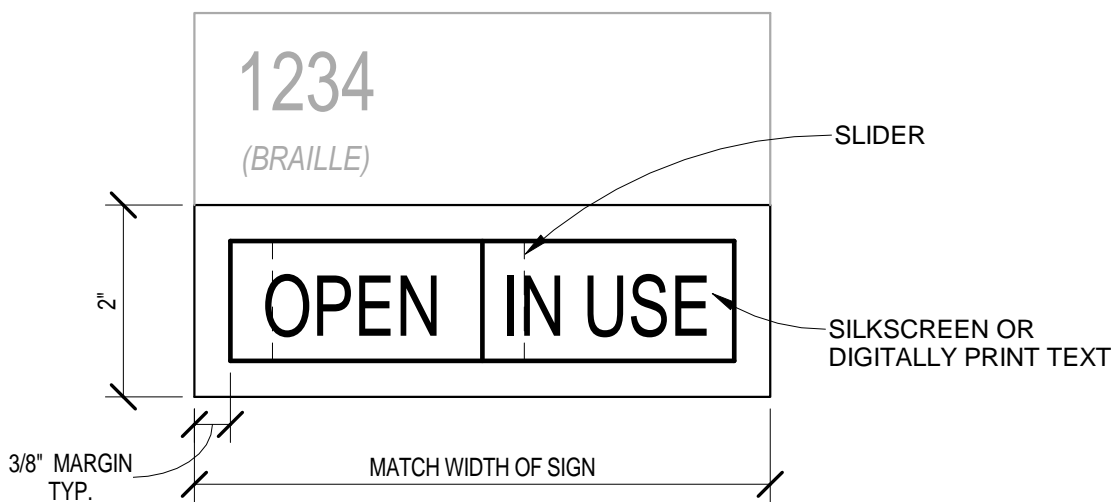


*MUST BE ABLE TO USE IN PORTRAIT
AND LANDSCAPE LAYOUT

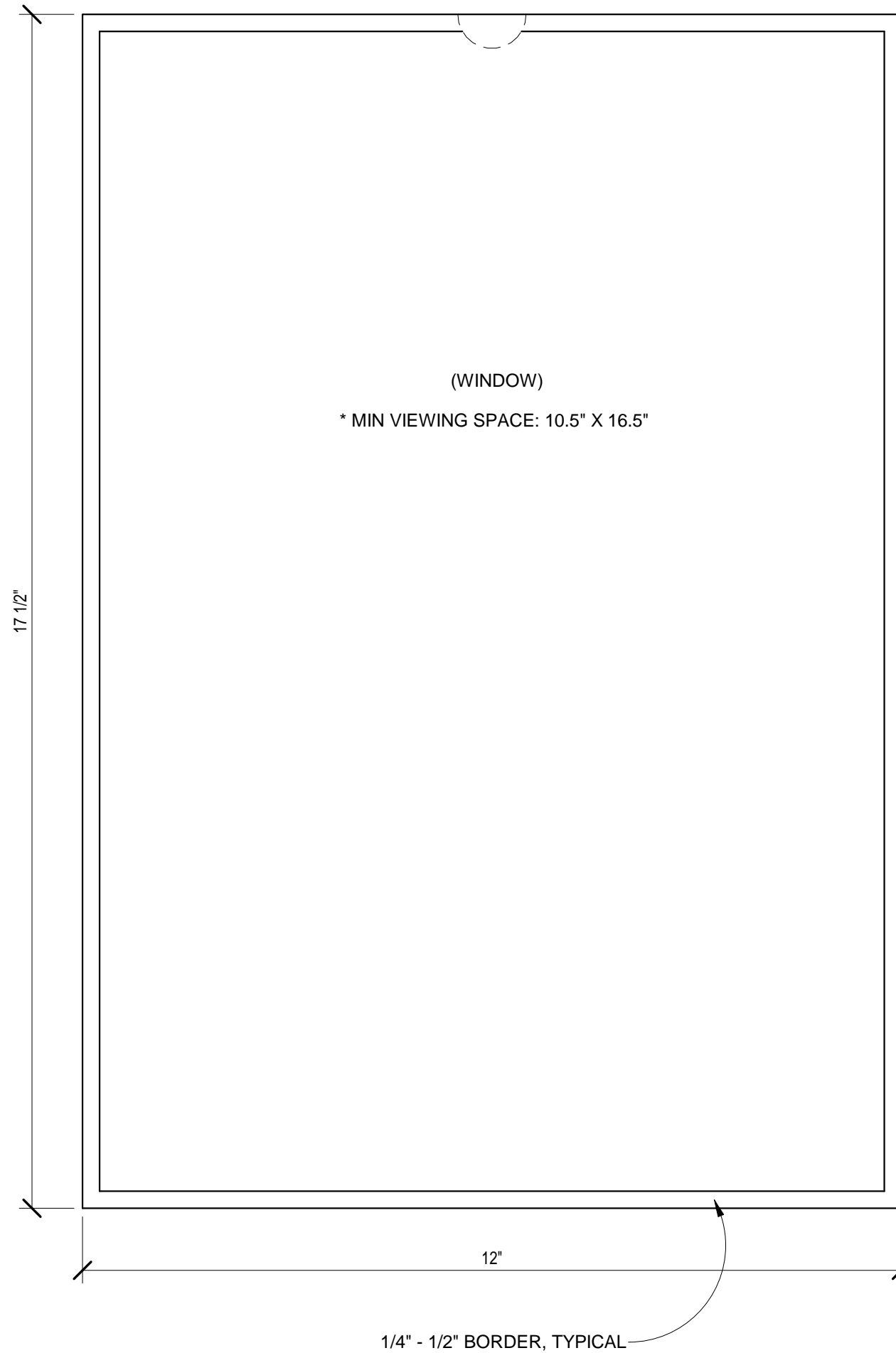
2 SIGN TYPE M-2, 8.5" X 11" WINDOW 6" = 1'-0"



3 SIGN TYPE M-3, MESSAGE BAR 6" = 1'-0"



4 SIGN TYPE M-4, SLIDER 6" = 1'-0"



*MUST BE ABLE TO USE IN PORTRAIT
AND LANDSCAPE LAYOUT

1 SIGN TYPE M-1, 11"X17" WINDOW 6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

Project Title:
**UW CAMPUS STANDARD
INTERIOR SIGNAGE**

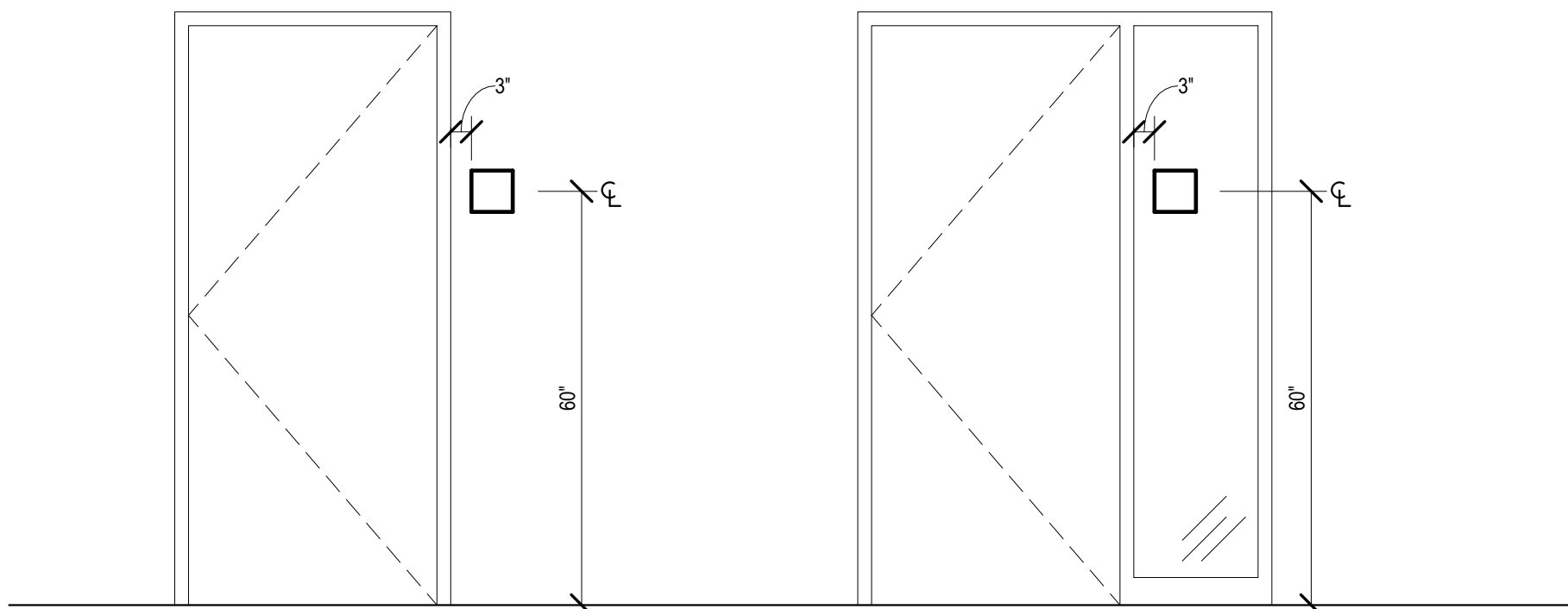
Sheet Title:
MISC. SIGNAGE

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

Date Issued 03/12/2020

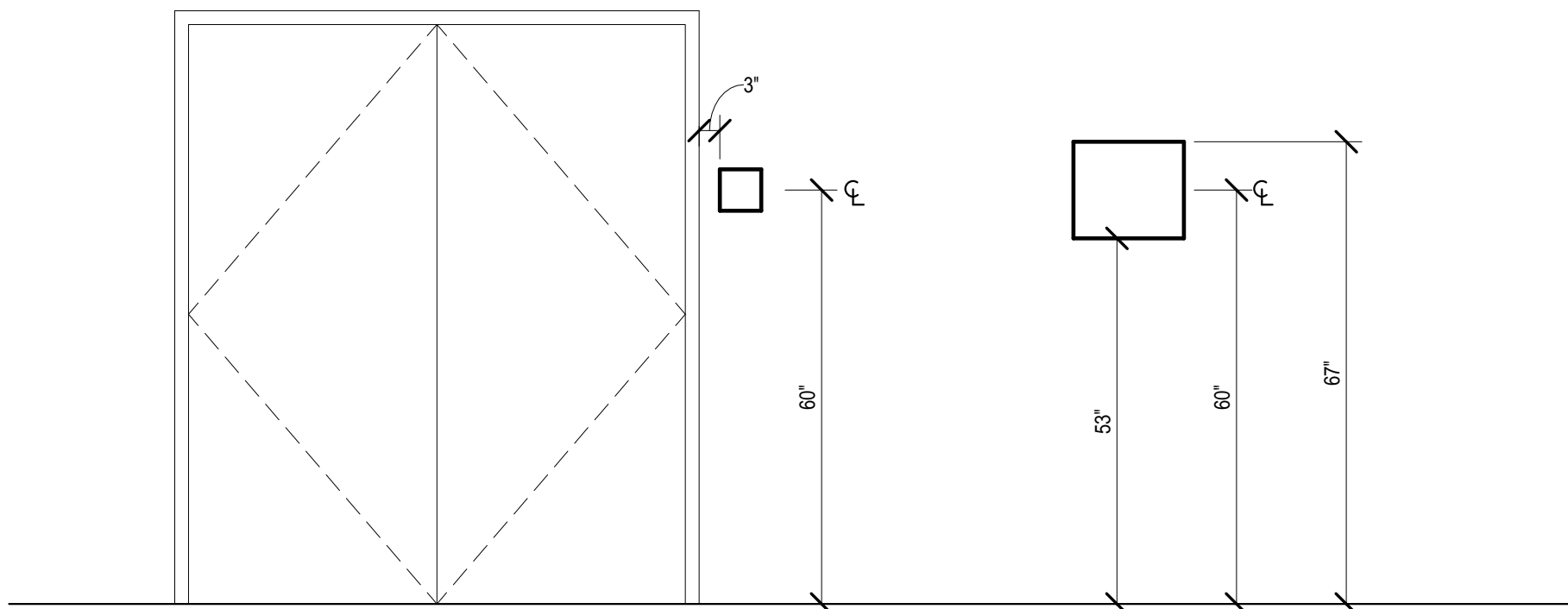
X10

3/12/2020 8:38:28 AM



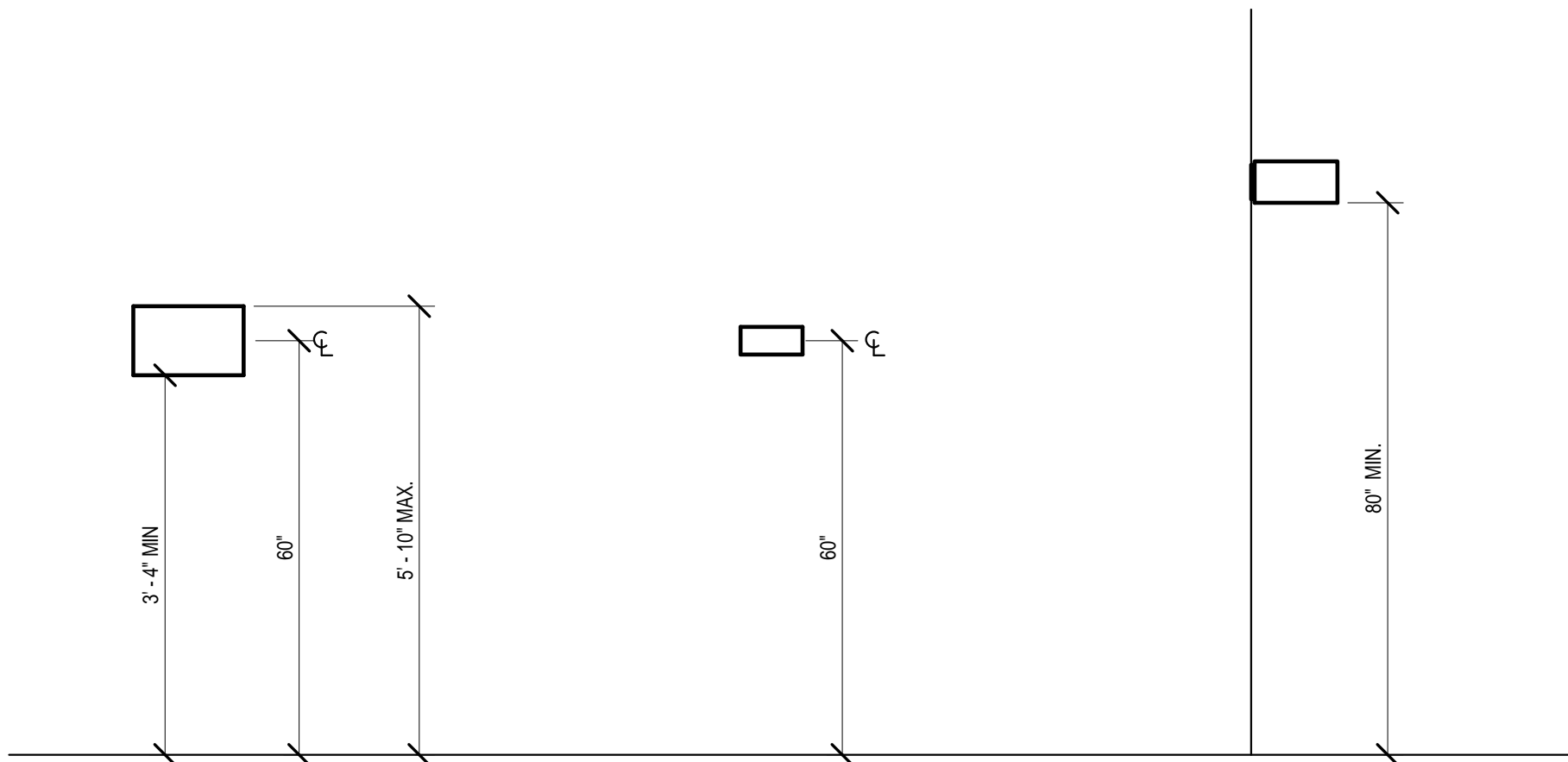
TACTILE / BRAILLE - SINGLE DOOR

TACTILE / BRAILLE - SINGLE DOOR W/ SIDELIGHT



TACTILE / BRAILLE - DOUBLE DOOR

BUILDING DIRECTORY



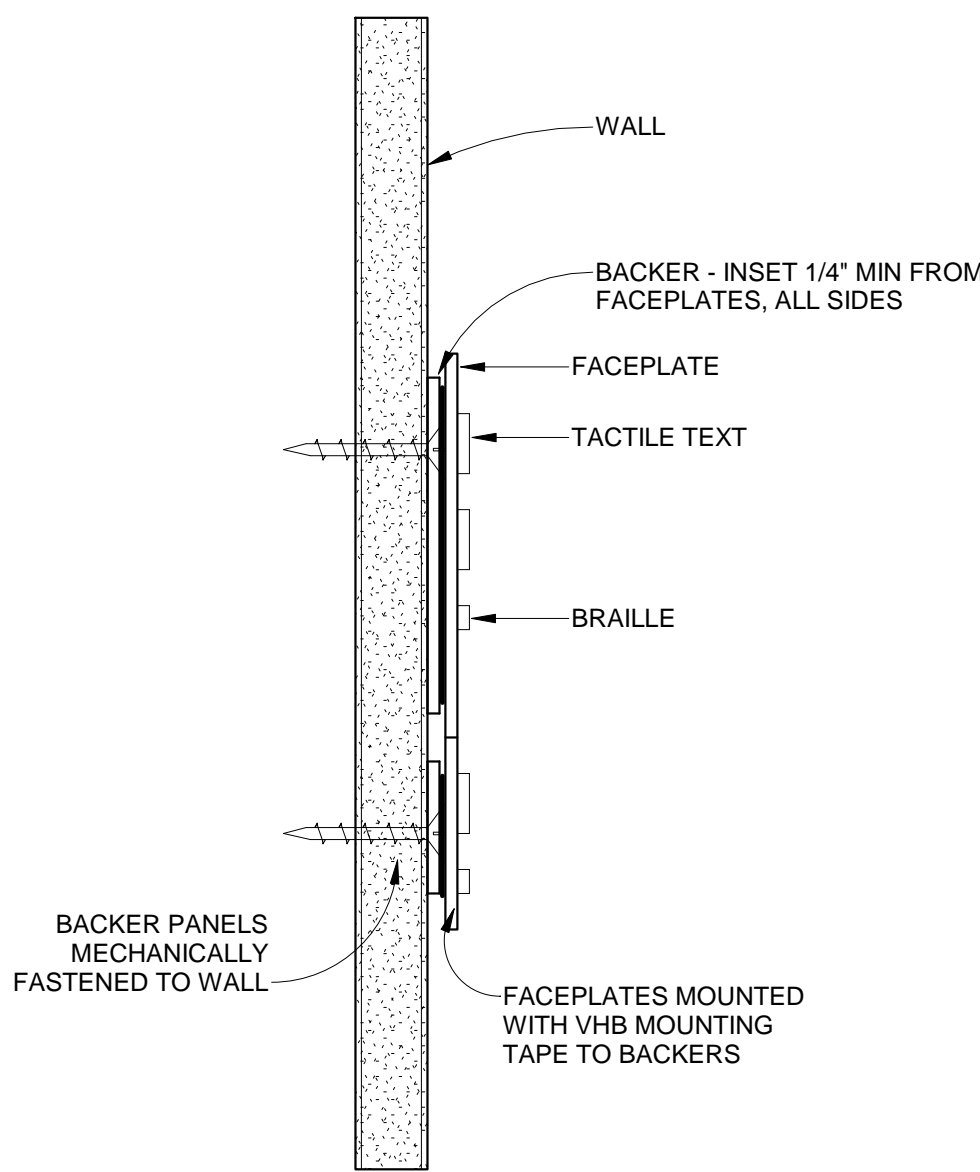
WAYFINDING - LARGE

WAYFINDING - SMALL

OVERHEAD FLAG

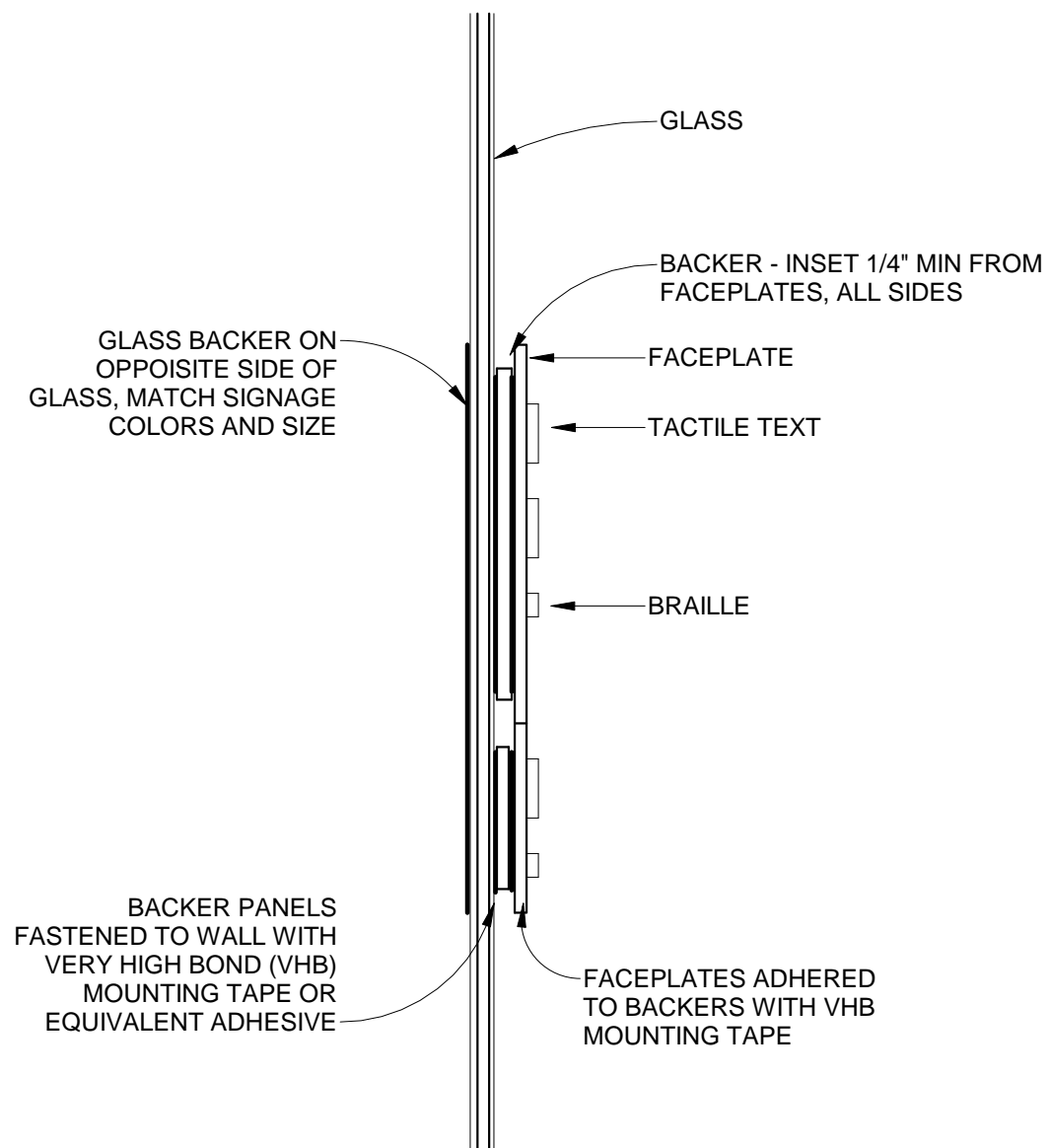
3 TYPICAL INSTALLATION ELEVATIONS

1/2" = 1'-0"



1 TYP. MOUNTING - GWB & CONCRETE

6" = 1'-0"



2 TYP. MOUNTING - GLASS

6" = 1'-0"

Drawn By: FOSDAL



University of Wisconsin-Madison
Facilities Planning and Management
Physical Plant - Architects/ Engineers
30 N. Mills Street, Madison, WI 53715

GENERAL NOTES

- ALL SIGNAGE MUST COMPLY WITH THE CURRENT REQUIREMENTS OF ICC A117.1, AMERICANS WITH DISABILITIES ACT (ADA), INTERNATIONAL BUILDING CODE, AND UW GUIDELINES.
- ALL TEXT MUST BE TACTILE AND INCLUDE CORRESPONDING GRADE II BRAILLE UNLESS NOTED OTHERWISE.
- FONT: HELVETICA, UPPERCASE ONLY UNLESS NOTED OTHERWISE. CHARACTERS SHALL NOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OF OTHER UNUSAL FORMS. THE USE OF SARIF FONTS IS PROHIBITED.
- COLOR CONTRAST BETWEEN BACKGROUND AND TEXT/PICTOGRAMS SHALL MEET REQUIREMENTS OF ICC A117.1. STANDARD COLORS ARE BASED ON 2/90 SIGNAGE COLORS:
 - BLACK #704
 - EARTH #728
 - DARK GRAY #734
 - WHITE #708
 - SILVER #150 OR BRUSHED NATURAL #104
- ROOM NUMBERING MUST BE COORDINATED WITH UW FP&D SPACE MANAGEMENT OFFICE (SMO)
- MATERIAL FINISHES SHALL BE NON-GLARE.
- INCLUDE APPROPRIATELY SIZED BACKER PANELS FOR ALL GLASS-MOUNTED SIGNAGE
- SEE SHEET "X11" FOR TYPICAL INSTALLATION DETAILS.
- MATERIAL THICKNESS SHALL BE 1/8" MINIMUM.

Project Title:
**UW CAMPUS STANDARD
INTERIOR SIGNAGE**

Sheet Title:
INSTALLATION DETAILS

| REVISIONS: | | | |
|------------|-----|-------|--------------|
| No. | By: | Date: | Description: |
| | | | |
| | | | |
| | | | |

Date Issued 03/12/2020

X11



Division 10 Detail 4

Refer to *Division 10 14 18 Interior Signage, Item 9* for Area of Rescue Assistance signage information.




Specifications

- 12" (w) x 12" (h) blue sign panel
- Raised white letter letters per specification and ADA requirements
- 4.75" white handicap pictograph, centered
- 1/2" text, centered
- Upper case letters only
- Braille (Grade 2) translation included
- Includes vinyl tape for mounting

Sign Location

Signs will be installed square, plumb and level at the location as indicated in FP&M Technical Guidelines.

| | | | |
|---|---|---|-------------------|
|  THE UNIVERSITY WISCONSIN MADISON | Project: Campus Accessibility | Designed By: VTT | Date: 03-4-2010 |
| | Drawing Title: Area of Rescue Assist. | Drawn By: JRH | Scale: 1"= 2' |
| | Building No.: | O.S.M.: | Sheet: L-1 |
| | File: L:\ACAD\PLANNING\Accessibility\Assistive listening sign\Assistive Listening Device Sign.dwg | Revision: | Date: |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | Issue 030 WAMP 610 Walnut Street Madison, Wisconsin 53726 | Of: 1 |



Division 11 Appendix – Fume Hood Program

See following attachment

University of Wisconsin - Madison Fume Hood Program

Policies and Procedures for
Design, Installation, Operation, and
Maintenance of Campus Fume Hoods

July 2010

I. Introduction

This document describes required practices for the design and operation of University of Wisconsin – Madison laboratory ventilation systems used for the control of exposure to air borne contaminants while conserving energy via best practices. The document is intended for use by campus faculty, students and staff, engineers, architects, industrial hygienists, safety engineers, chemical hygiene officers, environmental health and safety professionals, ventilation system designers, maintenance personnel, testing, controls and air balance specialists, energy engineers and the UW chemical safety committees.

II. Mission Statement & Policy

“Implement an efficient and effective program for the design, installation, operation, and maintenance of campus laboratory fume hoods and their associated systems to maintain the health and safety of occupants in and around UW-Madison campus buildings while conserving energy via best practices.”

Required practices for the design and operation of University of Wisconsin laboratory ventilation systems used for the control of exposure to air borne contaminants are based on the following policies:

- The design and operation of campus laboratory ventilation systems shall maintain the health and safety of occupants while incorporating means and methods to conserve energy.
- UW-Madison laboratory ventilation and fume hood exhaust systems shall comply with the specifications set forth in this document and in the listed references in Appendix A. Fume hoods and associated ventilation systems shall meet minimum design and performance requirements in order to be placed in service and to remain in service.
- Performance of new and renovated laboratory fume hood systems shall be evaluated using Fume Hood Performance Testing Guidelines (Appendix C). Fume hood systems that do not meet testing criteria and specifications shall not be accepted for use.
- Performance of established laboratory fume hood systems shall be evaluated annually using the Procedures for Testing Fume Hood Systems. Fume hood systems that do not meet performance criteria and specifications shall be placed out of service.
- Fume Hood users shall be trained in the proper operation and use of a fume hood and adhere to the training outlined in the PI’s laboratory chemical hygiene plan. The user shall establish work practices that minimize emissions and employee/student exposures.

III. Roles & Responsibilities

WI Department of Administration Division of State Facilities (DSF): Provides oversight, technical assistance, and development and delivery of projects requested via the Small Projects and All Agency Projects programs.

Facilities Planning & Management (FP&M) Physical Plant: Conducts annual testing and reporting of fume hood performance. Completes routine maintenance repairs of fume hoods and fume hood systems. Provides design and construction services for departmental

requests of new fume hood installations and/or relocated fume hoods. Packages and submits projects to DSF for funding and delivery consideration.

FP&M Environment Health & Safety (EH&S): Addresses safety needs of faculty, staff, and students in campus buildings through compliance assessments, chemical use surveys and laboratory inspections. Develops and communicates protocols for laboratory and fume hood decontamination. Conducts risk assessment for lab design and accident investigations. Provides training assistance for fume hood use and chemical hygiene plans.

University Health Services Environmental Health Program (EHP): Addresses safety needs of students in campus buildings through certification programs for biological safety cabinets, laminar flow stations, and HEPA filters. Conducts ASHRAE 110 testing, IAQ air sampling and building entrainment studies.

Departmental Safety Committee/Coordinator: Coordinates the needs of individual laboratories within the context of all laboratories in a given department or building. Coordinates and prioritizes the needs of individual laboratories as related to the capabilities of building HVAC and lab service systems.

Facility (Building) Manager: Coordinates and communicates individual laboratory service and repair requirements to building occupants.

Principal Investigator (PI): Maintains user safety within the laboratory by monitoring that mechanical systems, lab services, and lab equipment are functioning properly; requests repair work orders from physical plant (263-3333) to address malfunctioning systems and/or lab services. Maintains accurate and current information of the chemicals used in the lab and the lab chemical hygiene plan. Maintains inventories of radioactive and non-radioactive chemicals.

Researcher/Laboratory Manager/Student: Follows all safety and health procedures specified in the Chemical Hygiene Plan/Lab Safety Guide and by the PI or supervisor in the laboratory. Attends all required health and safety training sessions. Does not use fume hoods which have failed certification. Reports fume hoods which are not operating properly, accidents, unhealthy, and unsafe conditions to the PI or supervisor.

IV. Conflict/Issue Resolution

In the fume hood program, as with any program, misunderstandings and differences of opinions can arise; such as when dealing with fume hoods that do not meet the performance testing criteria. Most issues can normally be resolved by a meeting between the Principal Investigator, the facility manager and a representative of the Environment, Health and Safety Department. If a resolution is not reached then representatives of the following may be brought into the discussions:

- Campus Fume Hood Program Management Team
- Departmental Safety Committee /Coordinator
- College Representative
- Campus Chemical Safety Committee
- Graduate School Research & Sponsored Programs

In all instances, the safety of personnel working within the facility must be paramount in determining the course of action.

V. Funding, Scope, and Delivery Guidelines

A. Supported and Non-Supported Buildings

UW-Madison buildings that are supported with funding by the UW-Madison physical plant maintenance operation are qualified to receive campus fume hood program funding for fume hood performance testing and repairs. Most campus buildings fall within this category.

Fume hood program testing and repairs in campus buildings that are not supported by the UW-Madison physical plant maintenance operation shall be departmental funding responsibilities. Examples of non-supported buildings include leased facilities, VA Hospital, Clinical Science Center, UW Research Park facilities and Agricultural Research Stations.

B. Program Scope and Delivery

The campus fume hood program addresses the maintenance and safety requirements of fume hoods used for general laboratory chemical safety in supported campus facilities. Standard-flow fume hoods, high-performance fume hoods, and three-sided capture hoods that are utilized for this purpose are included in the scope of the campus fume hood program.

Fume hood annual performance testing is required per Wisconsin administrative code chapter Comm 32, section 32.24(6) with incorporated ANSI/AIHA Z9.5 laboratory ventilation standards. Testing is scheduled by building and prioritized by the date of last annual inspection.

Replace non-compliant fume hoods: Non-compliant fume hoods shall be scheduled for replacement and updated to campus standards. Non-compliant, standard-flow fume hoods may be replaced with high-performance hoods if hood sizes are not increased and/or if energy savings/payback may be realized. Replacement fume hoods shall be provided as available from physical plant, energy conservation projects, and appropriate DSF projects.

Minor repair problems: Repairs less than \$5,000 shall be funded by the physical plant. Examples of minor repairs include maintenance and repair work orders for fan belts, lights, and monitors. Proper functionality shall be confirmed by the use of air flow monitors, air measurement analysis, or other performance testing means.

DSF Small Projects: Repair projects with budgets \$5,000 – \$150,000 shall be submitted to the Division of State Facilities (DSF) for funding consideration via the DSF Small Project program. Examples of small projects include fume hood exhaust fan replacements serving individual laboratories.

All Agency Projects: Project funds for fume hood system repairs with budgets greater than \$150,000 are actively pursued through the DSF All Agency Projects program. Examples of All Agency projects include multiple exhaust fan replacements for fans supporting building fume hood exhaust.

C. Funding Exclusions

Fume hood annual performance testing is required per Wisconsin administrative code chapter Comm 32, section 32.24(6) with incorporated ANSI/AIHA Z9.5 laboratory ventilation standards. Funding for annual performance testing of fume hoods in non-supported buildings is a departmental funding responsibility.

Remodeling and Space Reassignment: Fume hood performance tests are conducted as a condition of acceptance when new hoods are installed or when existing hoods are included as

part of a significant renovation. Performance testing is also required when a significant change is made to the operating characteristics of a hood. Costs associated with new installations and remodeling are departmental funding responsibilities.

ASHRAE 110 Testing of Fume Hoods: Tests are completed by the Environmental Health Program upon request and as required for new installations of high-performance hoods. Funding for ASHRAE 110 tests shall be provided by the requestor of the test.

Special Use/Point-of-use Ventilation Systems: Funding of the testing and repairs of laminar down flow hoods, slot hoods, HEPA filtered fume hoods, necropsy tables, wet benches, grossing stations, snorkel exhausts, and associated equipment shall be a departmental funding responsibility. Funding for testing and repairs of canopy hoods used to remove steam and heat shall be a departmental funding responsibility.

Special Use/Hazardous Ventilation Systems: Funding for fume hood testing and repairs of special use fume hoods and associated equipment shall be a departmental funding responsibility. The three main types of ventilation systems in this category are hazardous radiation, perchloric acid, and high volume/high hazard acid use (i.e., hydrofluoric acid) ventilation systems.

Vandalism or Misuse: Funding to repair damage to fume hoods caused by misuse or inappropriate use of a fume hood as well as any vandalism shall be a departmental or risk management funding responsibility. Reinstallation or repair of fume hood components removed or damaged by the user shall be a departmental responsibility. The nature of an experiment conducted within a fume hood shall not modify the integrity of proper fume hood function (e.g., too much equipment within the hood or protruding out of the hood).

Biological Safety Cabinets: Biological safety cabinets are not included in the campus fume hood program.

See Appendix A for additional information on hood types.

VI. Laboratory Design Standards

Laboratory exhaust ventilation systems designed, constructed, maintained, and used at the University of Wisconsin Madison campus shall comply with the specifications set forth in this document and the listed publications in Appendix A. The national standard ANSI/AHIA Z9.5-2003 for laboratory exhaust ventilation systems is used by the university.

A. Laboratory Configuration

1. Proper laboratory design is critical to ensure the health and safety of researchers and experiments. A detailed summary of the laboratory hazard classification, intended research use, and listing of chemicals to be used should be provided to the lab design team, including chemicals with corrosive, explosive, flammable, or radioactive properties. The potentially dangerous portion of an experiment is usually conducted in a fume hood. Many lab fires and explosions originate in fume hoods.
2. The following design guidelines should be followed to ensure a safe laboratory:
3. Fume hoods must be located so that persons exiting the lab do not have to pass in front of fume hood. Ideally, there should be two exits from rooms where new fume hoods are to be installed. If this is not feasible, the fume hood should be situated as far away as possible from the door.

4. Locating fume hoods directly opposite occupied work stations should be avoided. If this is not feasible, a minimum 48" clear in front of the hood must be maintained.
5. Fume hoods should not be located side by side unless a divider is located between the hoods to prevent contaminants pulled from one hood to another. Fume hoods should be located not less than 12" from an inside corner of a room.
6. Supply and or general laboratory exhaust air diffusers and grilles should be located and designed not to cause any air currents or cross drafts affecting the exhaust air flow to the fume hood.
7. Sufficient make-up air must be available within the laboratory to permit fume hoods to operate at their specified face velocities. The difference between the supply and exhaust volumes should not be more than 150 CFM up to two hoods and no more than 250 CFM for 3 or more hoods.
8. Windows in labs containing fume hoods must be fixed closed. Breezes from open lab windows can adversely affect the proper functioning of the hood. Turbulence caused by these wind currents can easily carry the contaminated air outside the sash into the operator's breathing area.
9. Safety devices such as deluge showers, eye wash stations, and fire extinguishers should be conveniently located near personnel operating the fume hood.
10. New fume hoods shall not have an exhaust fan on/off control accessible in the laboratory. Fume hoods are an integral part of the entire laboratory's air balancing system which must be maintained.

Exception: Perchloric acid fume hood with wash down features is considered a specialty type use hood. This hood may be designed with a hood mounted on/off fan switch. If the on/off switch is utilized, a general exhaust grille will need to be installed in the lab to maintain negative pressure relationships.

B. Americans with Disabilities Act (ADA) Fume Hoods

There should be at least one ADA compliant fume hood in each type of classroom lab and in each building housing classroom labs. The intent of this requirement is to ensure that classes can be easily reassigned to alternative rooms, should the need arise to place a particular class in a lab with an accessible fume hood station. Fume hoods in research labs are not required to be ADA compliant unless there is a specific request.

An ADA compliant fume hood should have a lower sill that has been configured especially for persons in wheelchairs (between 28 and 34 inches above the floor) with at least 36" of the underside left open to allow for the necessary knee space. Controls must be within ADA compliant reach range. For a forward and/or side reach, this range is 15 to 48 inches above the floor. Light switch, all service nozzles and sash handle/edge must be within this reach range. The clear space in front of an accessible hood should be 48" from the face of the hood.

C. Fume Hood Exhaust Velocity

The following specified velocity ranges have been tested by University Health Services Environmental Health Program and verified as passing containment assuming acceptable cross draft and roof dispersal conditions and comply with Wisconsin Administrative Code 32.24 State Employee Safety.

High performance fume hoods: The ideal exhaust velocity design is 45-55 feet per minute (fpm) at full open sash and the acceptable face velocity range (open vertical sash) is 45 - 75 fpm maximum vertical sash. The ideal exhaust velocity range for the horizontal sash is 90 – 110 and acceptable range is 90 -150 fpm in the maximum horizontal sash opening (one/two panel). Status conditions for high performance combination sash fume hoods are defined with the sash in the maximum vertical position and horizontal sashes closed. However it is understood that field conditions may require the horizontal sash opening measurement because of hood design such as the auxiliary blower and ceiling restrictions. Since each fume hood has only one independent TSI or TEL face velocity monitor, the low velocity set point the alarm shall activate at less than 70-fpm. Two sets of acceptable field criteria are specified: Vertical sash and Horizontal sash:

Open Vertical Sash

- Normal: Ideal 45 – 55 fpm
- Normal: Accept 45 – 75 fpm*
- Restricted: < 45 fpm
- Shut Down: < 40 fpm
- High Velocity: > 75 fpm
- Low Vel Alarm: < 70 fpm

Open Horizontal Sash

- Normal Ideal 90 – 110 fpm
- Normal: Accept 90 – 150* fpm
- Restricted: < 90 fpm
- Shut Down: < 80 fpm
- High Velocity >150 fpm
- Low Vel Alarm < 70 fpm

Vel = Velocity

If the fume hood face velocity requires adjustment, the system airflow shall be adjusted or the fume hood evaluated with recommendations which may require a containment test. In the event that the fume hood can not be adjusted within the normal range due to low airflow, the system airflow shall be increased. If the fume hood air velocity exceeds the acceptable range and the room exhaust can not be properly adjusted, the exhaust air duct work and room exhaust grill shall be changed to balance the fume hood air velocities to the ideal range.

*When employing high performance combination sash fume hoods it is recognized that different fume hood manufacturers may vary from the stated acceptable range specified in this policy and that the fume hood may be the sole source of the laboratory exhaust. As a sole source the velocity maybe higher to maintain directional flow relationships from adjacent spaces, heat and cooling loads and allow for design air changes as specified by the design engineer. The normal velocity range should still be followed and mechanical changes made to maintain the face velocity within the normal acceptance range (45 - 75) fpm. If field conditions prohibit operation in this range, the engineer can request a containment test for safety and/or economic reasons and should be prepared to adjust the exhaust design pending final results of the containment tests.

Vertical sash standard fume hoods: The ideal face velocity at the maximum open sash position shall be 95 - 105 fpm and the acceptable face velocity range (open vertical sash) is 95 - 150 fpm design vertical sash. The design sash position shall either be full open or 18 inches vertical sash.

Open Vertical Sash & 18 inch sash

- Normal: Ideal 95 – 105 fpm
- Normal: Accept 95 – 150 fpm
- Restricted: < 95 fpm
- Shut Down: < 75 fpm
- High Velocity: >150 fpm
- Low Vel Alarm: < 70 fpm

Vertical sash models shall not be certified below 18 inches on a standard fume hood. If the fume hood velocity is below 95-fpm the system exhaust should be adjusted, below 75 – fpm the face velocity shall be adjusted upward. If the velocity is above 150-fpm the system exhaust shall be

adjusted to revise the air exhaust ductwork and room exhaust grill under the direction of a campus engineer. The fume hood air shall then be air balanced to achieve the ideal velocity range of 95 – 105 fpm.

For face velocity measurement the hood vertical sash shall be either 18-inches or measured at the maximum vertical sash position and meet 95 - 150 fpm at 18 inch sash or 95 -150 fpm full open sash. As presented in the discussion section of ANSI /AHIA Z9.5 Laboratory Standard “Most laboratory experts agree that velocities above 150 fpm at the design sash opening are excessive at operating sash height and may cause turbulent flow creating more potential for leakage.”

Horizontal sash standard fume hoods: *There are fume hoods which only have horizontal sash assemblies. The ideal face velocity at the maximum opening (one or two panels) shall be 95 – 105 fpm and the acceptable range shall be 95 – 150 fpm.*

Open Horizontal sash is defined as one or two panels

- Normal: Ideal 95 – 105 fpm
- Normal: Accept 95 – 150 fpm
- Restricted: < 95 fpm
- Shut Down: < 75 fpm
- High Velocity: >150 fpm
- Low Vel Alarm: < 70 fpm

The horizontal sash shall not be certified with less than one panel to achieve the face velocity. If the fume hood velocity is below 95-fpm the system lab exhaust should be adjusted, not the sash opening. If the face velocity is below 75-fpm the exhaust system air flow shall be adjusted. If the velocity is above 150-fpm the system exhaust shall be adjusted to revise the air exhaust ductwork and room exhaust grill under the direction of a campus engineer. The fume hood exhaust shall then be air balanced to achieve the required ideal face velocity range. 95 – 105 fpm.

For face velocity measurement, the hood horizontal sash panel shall be at the maximum open sash position (1 or 2 panel full open) or design sash position and meet 95 - 150 fpm. As presented in the discussion section of ANSI /AHIA Z9.5 Laboratory Standard(1) “Most laboratory experts agree that velocities above 150 fpm at the design sash opening are excessive at operating sash height and may cause turbulent flow creating more potential for leakage.”

Combination sash standard fume hoods: *There maybe standard fume hoods which have horizontal and vertical sash assemblies. The airflow in these fume hoods are based on a design sash position. This was done to allow a large working zone plus energy conservation. The face velocity at the maximum horizontal opening (one or two panels) must be determined and maintained. Opening the vertical sash is only for laboratory set up and not measurement. Therefore when a velocity traverse is made the vertical sash shall be down and secured. If lab equipment prevents center horizontal sash measurement use the open horizontal sashes created by the equipment and report. If the equipment in the hood causes more than two panels to be open the hood face velocity shall still comply with the table.*

Combination sash with Open Horizontal sash one or two panels

- Normal: Ideal 95 – 105 fpm
- Normal: Accept 95 – 150 fpm
- Restricted: < 95 fpm
- Shut Down: < 75 fpm
- High Velocity: >150 fpm
- Low Vel Alarm: < 70 fpm

Changes or alterations to the laboratory and/or fume hood design sash opening shall be made under the direct supervision of the engineer of record or the assigned HVAC designer who has

the final responsibility for approval and safety of the fume hood in consultation with the Environmental Health Program and Environmental Health and Safety Department.

When the fume hood face velocity exceeds the allowable range the engineer in charge can make mechanical changes to improve performance or request that the fume hood be quantitatively tested to verify or disprove containment. The evaluation team may test the fume hood at the design or operational sash position to verify that the fume hood operates safely in the as used condition or needs design alteration. Fume hoods proven to provide protection (4.0AU 0.1) outside the required velocity ranges can be tagged as approved for use at the posted face velocity and the ASHRAE 110 report maintained on file at Physical Plant until such a time that the fume hood is adjusted or modified and the face velocity is changed to comply with the table.

Face Velocity Alarm: TSI and TEL monitors: These monitors have optional low velocity and high velocity alarm set points. The low velocity set point shall be set to alarm at less than 70-fpm by consensus. Therefore at any time the user reports an alarm it will be associated with low face velocity. High face velocity shall be set > 500-fpm to avoid nuisance reporting when the operator closes the sash and restricts the fume hood face opening with CV systems and short term alarm when the HVAC system is adjusting air flow in response to a change in the sash opening or occupancy change, also known as (system response time).

(1) ANSI/AIHA Z9.5 Laboratory Standard, Review Statement by the Z9.5 Committee

D. Fume Hood Alarms

All high performance fume hoods shall be equipped with an air flow measuring device and alarm. The device shall be located on the fume hood no higher than 72 inches from floor level. The device shall be field calibrated. The device should be calibrated to the operation sash position and have velocity read out, visual alarm and audio alarm. The device is calibrated by UW Physical Plant or the fume hood installer.

1. Combination sash (vertical/horizontal sash) fume hoods shall have an air flow alarm that gives a warning when the sash is vertically raised from the lowered position (1).
2. Required Sash Alarm: On Thermo Fisher Hamilton High Performance Fume Hoods, the fume hood is provided with a left hand post sash alarm system to alert the operator to close the vertical sash. This audio and visual system is in "Green" mode under normal operation, "Yellow" mode with an audio alarm "seat belt beep" when the vertical sash is raised above 18 inches. "Red" alarm when the vertical sash is left in the wide open position followed by a "loud beep" that can be heard everywhere in the lab. If the house ventilation to this fume hood fails or the hood auxiliary blower fails to run, the red light on the sash alarm and the "loud beep" will actuate until the problem is corrected, airflow restored and the vertical sash is lowered. .
3. Standard Laboratory Fume Hoods operated at 100-fpm or less at the 18-inch vertical sash stop position shall be provided with a calibrated air flow measuring device and alarm when the sash is raised above the sash stop position, 18 inches, to alert the fume hood operator to close the sash or if a major change in air velocity has occurred. This alarm should be programmed to alarm with audio and visual alarms. The flow measuring device shall be checked for calibration annually and if found defective, repaired or replaced with a calibrated device.

E. Ductwork

Ductwork construction, reinforcement, and duct support specifications shall follow the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) standards and DSF Master Specifications standards.

1. Fume hood duct construction is specified based upon a review of the chemical usage list provided by the researcher. Typical duct applications are as follows:
 - Poly vinyl coated steel (PVS) is used for most standard laboratory applications. It has a good resistance to weather, mineral acids, alkalines, and many chemicals. It is not dissolved or softened by alcohols and petroleum solvents.
 - Polymerized Vinyl Chloride (PVC) duct work is typically used in a more aggressive acid environment. Hydrofluoric acid exhaust would be an application for PVC. This material becomes brittle over time and could crack.
 - Chlorinated Polyvinyl Chloride (CPVC) has comparable corrosion resistance to PVC pipe, yet it is suitable for handling corrosive material at temperatures 40 to 60 degrees higher than PVC. This is not recommended for use with compressed air.
 - Stainless Steel 316-L is very corrosion resistant to severe duty with many chemicals.
2. All fume hood duct work must be sealed air tight at joints and seams.
3. Fire control type dampers will not be utilized in any fume hood exhaust ductwork.
4. Ductwork velocities in branches and mains should be maintained between 1500-2000 linear feet per minute- (fpm) to minimize noise, static pressure loss, and blower power consumption within a duct system.
5. All horizontal ducts should be sloped down towards the fume hood (Guideline: 1/8" to the foot). Liquid pools, which result from condensation, can create a hazardous condition if allowed to collect.
6. Gang ducting of fume hoods is not recommended unless required by special conditions. These must be properly designed with final approval from EH&S and Physical Plant. Gang ducting of fume hoods that may be used for radiological materials with half lives greater than 30 days is not allowed under any circumstances.
7. New duct work installations should be tested at a negative pressure, 1 ½ times its operating pressure. Tests should show zero leakage but no more than 2 percent of design airflow capacity.

F. Exhaust Fan and Stack

1. Exhaust fans should be located exterior to the building on the roof to provide negative pressure in all fume hood ductwork located inside the building.
2. Fume hood exhaust should be located as far from fresh air intakes as possible (but at least 30 feet) to prevent re-entrainment of exhaust fumes back into the building.
3. Fume hood exhaust stack termination should be a minimum of 10 feet above the roof or 2 feet above a parapet wall, which ever is greater. Discharge must be directed vertically upward. New exhaust fans should be oriented in an up-blast orientation.
4. Discharge velocities at the stack termination shall be between 3000 to 4000 FPM. A sufficient discharge velocity is necessary to adequately disperse contaminants and allow service personnel access. At the velocities listed exhaust plumes should go 15 to 30 ft. above the exit point before any noticeable change.

5. Sound levels of an exterior exhaust system shall be no greater than 75-dBA 5 feet from the fan in any direction. Fume hood sound levels should be restricted to 60-dBA at 12 inches in front of the open sash.

G. Plumbing

1. All Plumbing utilities must have a shut-off valve adjacent to the hood.
2. Hot or cold water supplies must be connected to potable water system. For hot water use pre-softened water. Hot and cold city water supplies shall be protected by atmospheric vacuum breakers. Vacuum breakers shall be accessible for service.
3. Verify with the hood user what specific laboratory gases and services will be needed. If special tanks for gases are required, provide wall chains to secure the tanks.

H. Electrical

1. Electrical outlets must be located outside the hood. Minimum electrical service to the hood should be a 20-amp, 120-volt circuit. Ground fault circuit interrupter (GFCI) protection is recommended. Reference 2008 NEC article 210.8 (B) (5) exception #1.
2. Lighting fixtures all should be of the fluorescent type rated for daylight color and produce 80 foot candle at the work surface. Light fixtures should be sealed and vapor tight, UL-listed and protected by a transparent impact resistant shield. Fixtures shall be accessible for bulb replacement without having to take the fume hood apart.
3. The potential for flammable, combustible and corrosive atmospheres requires explosion-proof electrical equipment.

I. Sashes

1. Sashes may be horizontal, vertical, or a combination, and should have the capability to completely close off the hood face.
2. Sashes should be made of safety glass:
 - Laminated safety glass for standard use when internal temperature is anticipated to be less than 160 °F.
 - Tempered safety glass when high internal temperatures are anticipated that will result in sash surface temperatures greater than 160 °F.
 - Where hydrofluoric acid is used, sashes will be made of plastic or lexan with a flammability rating of 25 or less when tested in accordance with ASTM E162-76.
3. Horizontally sliding sash panels may not be less than twelve inches, nor more than fifteen inches in width. Such sashes may offer extra protection to lab workers as they can be positioned to act as a blast shield for small explosions and projectiles.

J. Requirements for Special Use/Hazardous Ventilation Systems

Radioisotope Hood

This fume hood is made with a coved stainless steel liner and coved integral stainless steel countertop that is reinforced to handle the weight of lead bricks. If research is planned with

volatile radioisotopes, contact the University of Wisconsin – Madison, Radiation Safety Officer at 265-5000.

Acid Digestion Hood

These units are typically constructed of polypropylene in order to resist the corrosive effects of acids at high concentrations. If hydrofluoric acid is being used in the hood, the hood's glass sash should be constructed of polycarbonate which resists etching. Hood ductwork should be lined with polypropylene or coated with PTFE (Teflon).

Perchloric Acid Hood

Concentrated or hot perchloric acid is highly oxidizing and extremely corrosive. In addition the fumes can settle and form shock-sensitive crystals. For this reason specially designed fume hoods should be designated for work with the acid. These fume hoods are designed with the following characteristics:

1. Fume hoods designated for use with perchloric or other acids shall be identified by a label indicating suitability for use with perchloric or acid procedures.
2. All exposed hood and duct construction materials shall be suitable for use with perchloric or other acid - inorganic, non-reactive, acid resistant and relatively impervious.
3. The work surface in the hood shall be water tight and dished or furnished with a raised bar to contain spills and wash-down water. The Perchloric acid fume hood and exhaust ducting design shall be provided with a water spray (wash-down) system. The baffle must be removable to allow for periodic cleaning and inspection.
4. Each perchloric acid fume hood must have an individually designated duct and exhaust system. The duct system should be straight, vertical and as short as possible.
5. Use only plastic or plastic-coated metallic fan.
6. The perchloric acid fan motor must be located outside of the air stream.
7. The hood liner and work surfaces are usually stainless steel, sealed with welding at all seams.

VII. Fume Hood Procurement

A fume hood that is approved under UW-Madison procurement contract #07-5763 shall be used. Refer to website <http://www.bussvc.wisc.edu/purch/contract/wp5763.html> for details.

| MANUFACTURER | VENDOR |
|---|---------------------------|
| LAB CRAFTERS AIR SENTRY | LAB CRAFTERS |
| FISHER HAMILTON PIONEER | WYNN O JONES & ASSOCIATES |

A. Variable Air Volume Hoods

Variable-air volume fume hoods and constant volume high performance fume hoods shall be installed unless accepted design practice dictates otherwise. A VAV hood is one that is fitted with a face velocity control which varies the amount of air exhausted from the fume hood in response to the sash opening to maintain a constant face velocity. These hoods produce an acceptable face velocity over a relatively large sash opening and also provide significant energy savings by reducing the flow rate from the hood when it is closed. High performance Fume hoods require less exhaust ventilation system maintenance since the hood operates at constant volume. These hoods conserve energy by using less air. They also can be made to operate as VAV for additional energy savings.

B. Constant Flow Hoods

Standard constant flow hoods are not encouraged during new construction or renovations. Use the high performance fume hood or standard fume hood with VAV hoods are preferred over standard constant flow hoods because VAV and high performance hoods provide greater flexibility in usage.

C. Re-circulating Hoods

Re-circulating or ductless fume hoods are not permitted for the removal of chemical, biological or radiological contaminants. UW does not service such hoods and the EH&S prohibits the use on campus.

D. Special Use Fume Hoods

ANSI/AIHA Z9.5-1992 and ANSI/AIHA Z9.2-2001 provide standards for non-traditional laboratory fume hoods. These hoods include: perchloric acid fume hoods, floor-mounted fume hoods, and glove boxes. ACGIH's "Industrial Ventilation – A Manual of Recommended Practices" provides information on perchloric acid fume hoods, biological safety cabinets, and glove boxes. All class II biological safety cabinets must meet the National Sanitation Foundation Standard Number 49, for Class II Biohazard Cabinetry, for design, manufacturing and testing.

E. Evaluation Requirement for Procurement Consideration

General guidelines on types of hoods and their application are presented in ACGIH's "Industrial Ventilation – A Manual of Recommended Practices" (most current edition). Laboratory fume hoods and associated exhaust ducts should be constructed of noncombustible, nonporous material that will resist corrosion. They should be equipped with vertical or horizontal sashes, air foils built into the fume hood at the bottom and the sides of the sash opening, and baffles to attain a uniform face velocity under different conditions of hood use. Combination horizontal and vertical sashes shall be provided unless special conditions dictate otherwise. Additionally, recognized design and construction features are listed in the ANSI/AIHA Z9.5-2003 standard titled, "Laboratory Ventilation," and ANSI/AIHA Z9.2-2001 standard, "Fundamentals Governing the Design and Operation of Local Exhaust Systems."

Fume hoods should be tested before a hood leaves the manufacturer using the ANSI/ASHRAE 110 110-2007 standard, "Method of Testing performance of Laboratory Fume Hoods." All new hoods shall meet the ANSI/ASHRAE 110 requirements for Class 1 hoods including a tracer gas performance of AM (as manufactured) 0.05 (parts per million) or better at a tracer gas release rate of 4.0 Liters per minute (lpm).

See Appendix F for additional information.

VIII. Procedures for the Proper Use of a Fume Hood

Fume Hood users shall be trained in the proper operation and use of a fume hood and the training outlined in the laboratory chemical hygiene plan. New user training and refresher training should be provided. EH&S is available to assist upon request. The user shall establish work practices that reduce emissions and employee or student exposures. For high volume/high hazard acid use fume hoods the fume hood user shall review these rules more frequently and may need additional personal protection equipment.

The following basic rules shall be constantly emphasized by the teaching assistant, investigator or responsible person in charge of the laboratory.

1. The user shall not modify the interior or exterior or components of the fume hood without approval of the designated chemical hygiene officer, responsible person or other appropriate authority in the organization.
2. The user shall not enter the 3 inch zone in front of the open face plane of the fume hood when contamination is present. If the operator must enter this area the use of a respirator shall be evaluated by risk analysis of the planned experimental emissions. Alternatively the operator can work behind the sash to gain closer access to the hood interior. The operator should never enter the fume hood interior except during set up without the presence of hazards and after the hood has been decontaminated.
3. When operating the fume hood, the sash should be positioned to maximize the protection of the user.
4. Equipment and materials shall not block the hood air slots or interfere with the smooth flow of air into the fume hood. This includes the airfoil.
5. Tubes and appliance cords shall be routed through fume hood Iris ports if provided. Otherwise route tubes and cords under the airfoil to allow sash closure.
6. All work shall be done 6-inches behind the plane of the sash opening.
7. Large objects shall be elevated at least 1.5 inches off the fume hood work zone.
8. Flammable liquids should not be stored permanently in the fume hood or cabinet under the fume hood.
9. The fume hood sashes shall be closed as much as possible during active experiments and closed completely when the operator leaves the fume hood.
10. The fume hood sash shall not be opened beyond the design sash position when the hood has contamination present.
11. Traffic shall be restricted in front of the fume hood.
12. Rapid movements by the operator inside the work zone shall be restricted when contamination is present.
13. The fume hood shall not be operated unless verified that the hood is in working status.
14. Sash panels shall be opened and closed slowly, no rapid movement which could create a spill or damage the sash assembly.
15. House fans shall not be used in a laboratory. If the temperature of the lab is unacceptable contact the building manager to correct the problem. Do not use personal fans or open lab windows.
16. Consult with the laboratory manager and principle investigator regarding the need for a respirator if you must enter the work zone in the fume hood when hazardous emission(s) are present. By all means try and plan experimentation so no one has to enter the fume hood and can work behind the sash when hazards are present.
17. If the fume hood is provided with water service(s), the water service lines have back flow prevention valves. The valve is on the outside front of the fume hood. The device can leak water periodically. If this occurs contact the UW Plumbing shop to have the valve repaired.
18. Combination sash fumes hood operators, use the vertical sash for experimental set up involving large objects or need for full range of motion and the horizontal sashes for active experimentation and leave the vertical sash down.
19. **Special Precaution:** Hydrofluoric acid (HF) is highly corrosive and readily penetrates the skin, causing destruction of bone and tissue. Unlike other acids, pain from an exposure is often delayed, thus exposures can initially go unnoticed. Since inhalation of HF vapor can seriously damage the lungs, work with HF should be performed in a properly functioning fume hood. It is also important to note that HF, especially at elevated temperatures where the vapor concentration is higher, is also well known to etch glass. This can cause damage to glass sashes which are expensive to replace. Glass sashes that appear cloudy should be examined.
20. **Special Precaution:** Working with perchloric acid poses a unique risk which may require use of a specially designed fume hood. Perchloric acid is a strong mineral acid

and at elevated temperatures is highly oxidizing. Most importantly, with respect to fume hoods, use of perchloric acid can lead to a buildup of perchlorate residues on surfaces and in duct work. These residues are highly reactive and can explode or ignite under certain conditions. For this reason special fume hood systems have been designed for use with perchloric acid. These fume hoods have a water wash down system which removes any residues from hood, ductwork and fan.

A specially designated perchloric acid fume hood must be used if any of the following is applicable:

- Concentrated perchloric acid (60% or greater) is used
- Perchloric acid (at any concentration) is used at elevated temperatures
- Perchloric acid is used under conditions where it may become concentrated (such as with strong dehydrating agents)

The wash down system should be used after each operation. Do not handle sulfuric acid, acetic acid, organic solvents, or combustible materials in a perchloric acid hood. It is permissible to use nitric acid in a perchloric acid fume hood.

Note: Concentrations greater than 72.5% are anhydrous solutions and are unstable and can explode when coming in contact with organic materials. Anyone requiring the use of anhydrous perchloric acid must contact EH&S prior to use.

IX. Fume Hood Performance Testing

Fume hood performance tests are conducted when new hoods are installed or when existing hoods are included as part of a significant renovation as a condition of acceptance. In addition tests are conducted annually or whenever a significant change is made to the operating characteristics of the hood.

Annual testing is required per Wisconsin administrative code chapter Comm 32, section 32.24(6) with incorporated ANSI/AIHA Z9.5 laboratory ventilation standards. Testing is scheduled by building and prioritized by the date of last annual inspection.

Refer to Appendix C for additional information on testing protocols.

X. Maintenance & Repair of Fume Hoods

A. Work Requests

| Work Task (in ascending order of priority) | Resource | Work Code |
|---|-------------------|-----------|
| Restricted - low airflow | Sheetmetal | S-FH03 |
| Shutdown - low airflow | Sheetmetal | S-FH04 |
| Hood usage issue | EH&S review | |
| Fire damage | EH&S review | |
| Analyze hood for replacement | Sheetmetal review | |
| Cross draft problem | Sheetmetal | S-FH14 |
| Down flow problem | Sheetmetal | S-FH15 |
| Room pressure | Sheetmetal | S-FH07 |
| Repair superstructure - baffle, sash, liner | Sheetmetal | S-FH13 |
| Repair sash | Sheetmetal | S-FH08 |
| Repair glass | Paint | I-G15 |
| Repair lights and electrical outlets | Electric | E-44 |
| Repair base cabinet and work surface | Carpenter | C-22 |

| | | |
|------------------------------------|--------------------|---------|
| Repair plumbing fixtures | Plumbing | P-F27 |
| Repair backflow preventer | Plumbing | P-E18 |
| Calibrate air-flow monitor | Sheetmetal | S-FH-11 |
| Repair or replace air-flow monitor | Sheetmetal | S-FH05 |
| Repair sash monitor | Sheetmetal | S-FH05 |
| Pressurized exhaust duct | Engineering review | |
| High air flow | Sheetmetal | S-FH16 |

B. Maintenance Staff Requirements

The following procedures are to be followed by anyone who services fume hoods at UW.

1. Communicate to laboratory personnel the need to service the fume hood and obtain permission to shut down the system. If lab personnel are not available, contact the facility manager to obtain permission to shut down the hood. Do not turn off fan without permission from an authorized person. Scheduled shutdowns shall be communicated to the building occupants by the building facility manager. Additional approval from EH&S may be required for special use/hazardous ventilation systems (SUVS)
2. Locate the blower or motor on the roof to be serviced and the room in which it is housed.
3. Fill out an "OUT OF SERVICE" notice and fix it to the hood sash.
4. Shut down the fan and perform appropriate work.
5. After service is completed, restart the fan and remove the notice from the fume hood(s).

C. Laboratory Staff Requirements

During routine servicing, repair or dismantling of fume hoods, the potential exists for exposure to hazardous substances that have been used or stored in the hood. Hazardous substances should be removed depending on the nature of the material in the hood and the work being performed on the hood. Contact EH&S for advice is unsure whether materials should be moved out of the fume hood. To protect laboratory personnel and maintenance staff, do not perform any hazardous experiments while the fume hoods are being serviced.

D. Contractors working with Fume Hoods, Fans, and Ductwork

In addition to requirements outlined in the above Section X.B. all contractors and subcontractors not associated with DSF projects shall notify CARS (263-3333) prior to entering and working in campus buildings.

XI. EH&S Requirements/Recommendations for Maintenance & Repair of Fume Hoods and Associated Ductwork

Fume hoods can be broken down into two general types; general use fume hoods and special use/hazardous ventilation systems (SUVS). The SUVS require additional practices and procedures beyond those described for the general use fume hoods. When Special Use Ventilation Systems (SUVS) are scheduled for repair or maintenance, the system must be tested for the presence of radioactive materials or hazardous chemicals. EH&S will determine the need for testing and decontamination of the system, in conjunction with the faculty member. If decontamination is necessary, the system must be decontaminated before maintenance. The following outlines the general EH&S requirements concerning fume hoods. Contact EH&S should any questions arise concerning safety issues.

A. General Use Fume Hood Systems

Fume hoods are, by their very nature, designed for use with hazardous materials. Hazardous substances should be removed or enclosed by laboratory staff prior to work involving work on and/or shut down of the ventilating system (including ductwork). Interior surfaced of fume hood

and ductwork servicing these fume hoods may be contaminated with hazardous materials. While it is unlikely that enough hazardous materials can accumulate on these surfaces workers, these standard precautions are sufficient to protect against chemical residues. Workers should take routine precautions to protect themselves during all construction, maintenance and demolition. Routine precautions include:

- Work clothes and gloves to prevent contact with hazards. These should be laundered separately from family laundry.
- Good personal hygiene to prevent accidental ingestion. This means washing hands and face before eating or using tobacco and before going home.
- Using a dust mask when dusty conditions are expected. This is especially appropriate when working on the ductwork or during demolition.
- Eye protection, hard hats and other general protective gear.

B. Asbestos

Asbestos-cement (Transite) is a tough, rigid, chemical and heat resistant material that was used extensively for fume hood lining, shelving and ductwork. The asbestos content of the material presents no hazard as long as the material is intact. However, cutting, breaking, drilling, filing, etc. will release asbestos fibers unless precautions are taken. Any activity that releases asbestos fibers requires special precautions. Certified workers must perform the work according to federal and state regulations.

C. Biological Hazards

Fume hood systems are not designed for use of biological pathogens since they lack HEPA-filtration. No biological hazards are expected

D. Radiation Ventilation Systems

Radiation ventilation systems shall have a swipe test to check for the presence of radioactivity prior to performing maintenance work. Contact the UW Radiation Safety Officer before working on any radiation ventilation systems. Notify the faculty member who uses the system prior to commencing any maintenance. In addition, the following requirements apply to radioisotope fume hoods:

1. Facilities Service personnel shall contact the person responsible for the lab to schedule service, and shall NOT enter a laboratory or area marked "RESTRICTED" for radiation safety unless accompanied by the authorized user or Radiological Safety Office personnel. Written Radiological Safety Officer (RSO) approval may be posted on the hood by the user prior to servicing.
2. All radiological hoods shall vent separately to the outside of the building.
3. The RSO shall provide a list of fume hoods used for radiological materials.
4. Any person working or assisting with fume hood repairs in radioactive materials laboratories must be under supervision of the authorized user of radioactive materials. The only exception is work which has specific written prior approval of the RSO.
5. Maintenance personnel are to receive basic radiation safety instruction from the RSO prior to work in active laboratories.
6. Radioactive materials shall be secured against unauthorized removal, and all surfaces decontaminated and surveyed to assure that no contamination remains when unattended. This is to assure that no radiation hazard is present during routine, nonscheduled maintenance activities.
7. If radioactive materials are unattended for any reason without direct supervision by the user or trained assistants, the room shall be locked to prevent unauthorized entry and posted "RESTRICTED" for radiation safety purposes.
8. The authorized user or his assistants shall promptly notify the RSO of any spill, accident, or any operation which may have contaminated the hood or released any contamination through the hood to ductwork or air in an uncontrolled area.

9. The user shall provide documentation of radiation and contamination surveys of the hood for all scheduled maintenance and repair work, including face velocity calibration.

E. Perchloric/High Volume/Hazard Acid Use Ventilation Systems

Working with perchloric acid poses a unique risk which may require use of a specially designed fume hood. Perchloric acid is a strong mineral acid and at elevated temperatures is highly oxidizing. Most importantly, with respect to fume hoods, use of perchloric acid can lead to a buildup of perchlorate residues on surfaces and in duct work. These residues are highly reactive and can explode or ignite under certain conditions. For this reason special fume hood systems have been designed for use with perchloric acid. These fume hoods have a water wash down system which removes any residues from hood, ductwork and fan.

A specially designated perchloric acid fume hood must be used if any of the following is applicable:

- Concentrated perchloric acid (60% or greater) is used
- Perchloric acid (at any concentration) is used at elevated temperatures
- Perchloric acid is used under conditions where it may become concentrated (such as with strong dehydrating agents)

The wash down system should be used after each operation. Do not handle sulfuric acid, acetic acid, organic solvents, or combustible materials in a perchloric acid hood. It is permissible to use nitric acid in a perchloric acid fume hood.

Note: Concentrations greater than 72.5% are anhydrous solutions and are unstable and can explode when coming in contact with organic materials. Anyone requiring the use of anhydrous perchloric acid must contact EH&S prior to use.

Perchloric acid hood systems may require a special test to determine the presence of explosive perchlorate crystals prior to performing maintenance work. Contact the Chemical Hygiene Officer (CHO) before working on any perchlorate or acid hood systems. Notify the faculty member who uses the system prior to commencing any maintenance. In addition, the following requirements apply to perchloric acid fume hoods:

1. Laboratory fume hoods designated for use with perchloric or other acids shall be identified by a label indicating suitability for use with perchloric or acid procedures.
2. All exposed hood and duct construction materials shall be suitable for use with perchloric or other acid - inorganic, non-reactive, acid resistant and relatively impervious.
3. The work surface in the hood shall be water tight and dished or furnished with a raised bar to contain spills and wash-down water.
4. The perchloric acid fume hood and exhaust ducting design shall be provided with a water spray (wash-down) system. The baffle must be removable to allow for periodic cleaning and inspection.
5. Each perchloric acid fume hood must have an individually designated duct and exhaust system. The duct system should be straight, vertical and as short as possible.
6. Use only plastic or plastic-coated metallic fan.
7. Do not use lubricants, caulking materials, gaskets or other materials in the fan which are not compatible with perchloric or other acids. Use fluorocarbon type grease.
8. The perchloric acid fan motor must be located outside of the air stream.

Appendices

Appendix A – Definitions

biological safety cabinet (BSC): Cabinets designed to provide for the control of airborne particulates and aerosols within a confined space through the use of directional airflow and high efficiency particulate arresting (HEPA) filters.

The operational integrity of a new biological safety cabinets (BSC) must be validated by certification before it is put into service or after a cabinet has been repaired or relocated. It is the responsibility of the faculty member to have the BSC tested and certified annually by EHP. The faculty member is also responsible for decontamination of the BSC. Certification will be performed by UW Environmental Health Program which has accredited certifiers using the National Sanitation Foundation (NSF) Standard Number 49 for Class II Biological Safety Cabinets. All biological safety cabinets shall be purchased off the UW Purchasing Contract for biological safety cabinets. BSC must meet NSF-49 and comply with campus purchase specifications and procurement contract.

building envelope: the three-dimensional space surrounding a building containing the building's makeup air.

distillation (or acid) fume hood: a fume hood which is larger than a bench model and has double vertical sashes and lots of fume hood sinks and water supplies; Also sold with combination sashes examples are located at Chemistry-Shain Tower. A distillation fume hood is one in which liquids are heated to boiling and the condensate collected in a water or liquid cooled condenser. Water is the typical cooling liquid. The atmospheric backflow valve on the water lines prevents condenser water from entering the potable water system. Condenser water is normally discharged into the fume hood water drains and eventually to the sanitary sewer. Drains normally are in the fume hood work zone and must be checked for blockage. Distillation fume hoods come in all sizes and are fitted with lattice racks which are not in this picture and variacs in order to heat up liquids to a desired temperature and condense the vapors with the water cooled condensers. Liners are generally the standard resin cement board; Special liners only on request by the user such as stainless steel for a particular acid such a perchloric acid. The thing to remember is a distillation can be done in a standard fume hood and if the user is going to be conducting large numbers of distillations he buys a fume hood set up for running 5 or more distillations at the same time. Then he buys a distillation fume hood like in the picture which allows for large condenser racks and big experiments. So why do distillation in a fume hood? Because some distillation condensers vent to atmosphere and acid vapor could get into the lab air harming people and experiments. Also if there is an accident better in the fume hood so you don't harm people and building components.



Distillation Fume Hood or Acid Fume Hood

downwash: pollutants discharged from an exhaust stack that travel towards the ground due to insufficient discharge velocities, poor wind dispersion, and physical obstructions.

exhaust air: the air that is removed from an enclosed space and discharged into atmosphere (ANSI/AIHA Z9.5 - 1992).

face velocity: average velocity of air moving perpendicular to the hood face, usually expressed in feet per minute (fpm) or meter per second (m/s) (ANSI/ASHRAE 110 110 - 1995).

floor-mounted hood: a fume hood designed to be floor mounted with sash and/or doors for closing the open face (ANSI/AIHA Z9.5 - 1992).

fume hood type: there are many types of hoods, each with its own design and function.

1. Conventional Fume Hood: Single vertical sash-Figure 1
2. Horizontal Sash Fume Hood: Multiple horizontal sashes-Figure 2
3. Combination Sash Fume Hood: Vertical & Horizontal sashes-Figure 3
4. Fixed Side Panel Fume Hood: Vertical sash in the middle
5. Polypropylene FH No HEPA Filter – Figure 4
6. Polypropylene FH with HEPA Filter & Blower -Figure 5
7. Special Operations Hoods
 - a. Canopies
 - b. Biological safety cabinets
 - c. Laminar benches
 - d. Snorkels
 - e. Downdraft tables
 - f. Slot exhausts
 - g. Isolator
 - h. Glove box
 - i. Re-circulating

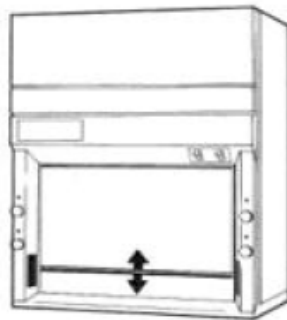


Figure 1
Single vertical sash
Conventional Fume Hood-Vertical Sash
Constant Air Volume, Open bypass
Variable Air Volume, Restricted bypass
Bench Top or Floor Mount

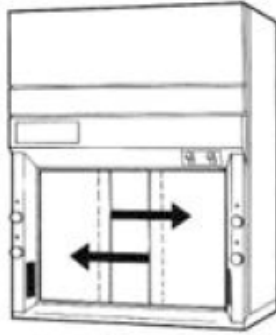


Figure 2
Multiple horizontal sashes, No vertical sash
Conventional Fume Hood-Horizontal Sash
Constant Air Volume, Open bypass
Variable Air Volume, Restricted bypass
Bench Mount or Floor Mount

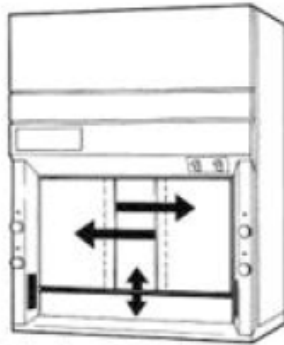


Figure 3
Combination sash Fume Hood Vertical & Horizontal Sashes
High Performance Combination Sash; Air Foil Bypass
Constant Air Volume, Conventional FH Open Bypass
Variable Air Volume, Conventional FH Restricted Bypass
Bench or Floor Mount

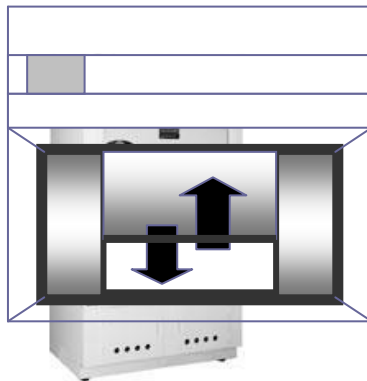


Figure 4
Figure 5
Polypropylene HEPA Filtered Fume Hood with internal
Internal Blower & HEPA filtered work zone.
Constant Air Volume.
Special Applications from General Use FH, Ultra-clean
Containment, Ultra-clean and Containment.
Integral under cabinet.



Figure 6
Polypropylene Fume Hood No HEPA Filter
Restricted Vertical sash
Variable Air Volume MFG Model Nu 162
Constant Air Volume MFG Model Nu 164
Used with boiling acids and related support processes
Integral under cabinet



Figure 7
Student Fume Hoods
Fixed sash opening or no sash
Constant Volume
Small internal volume & size
Low Hazard experiments

glove box: a boxlike structure provided with tight-closing doors or air locks, armholes with impervious gloves sealed to the box at the armholes, and exhaust ventilation to keep the interior of the box at negative pressure relative to the surroundings (ANSI/AIHA Z9.5 - 1992).

high performance fume hood: A high performance fume hood is a fume hood designed to operate at a reduction in the required exhaust volume from the traditional fume hood of 100 feet per minute (fpm) with the sash in the full open vertical position and has a validated containment level of 8.0 AM 0.05 (8 liters per minute gas challenge as manufactured with an instantaneous leak rate of less than or equal to 0.05 parts per million) with a sash opening of 24-inches or higher (vertical sash) opening at 45-55 fpm face velocity.

hood face: the plane of minimum area at the front portion of a laboratory fume hood through which air enters when the sash(es) is (are) fully opened, usually in the same plane as the sash(es) when sash(es) is (are) present (ANSI/ASHRAE 110 - 1995).

internal condensation: fumes and vapors that condense into liquids inside of the exhaust stack.

laboratory fume hood: a boxlike structure enclosing a source of potential air contamination, with one open or partially open side, into which air is moved for the purpose of containing and exhausting air contaminants, generally used for bench-scale laboratory operation but not necessarily involving the use of a bench or a table (ANSI/ASHRAE 110 - 1995).

lpm: liters per minute (ANSI/ASHRAE 110 - 1995).

makeup air: outside air drawn into a ventilation system to replace exhaust air (ANSI/AIHA Z9.5 - 1992). Makeup air MUST always be provided when any exhaust system is designed and installed.

perchloric acid hood: a fume hood constructed with water wash so it is safe for use with perchloric acid or other reagents that might form flammable or explosive compounds with organic materials of construction (ANSI/AIHA Z9.5 - 1992).

recirculation: air withdrawn from a space, passed through a ventilation system, and delivered again to an occupied space (ANSI/AIHA Z9.5 - 1992).

reentrainment: see reentry.

reentry: The flow of contaminated air that has been exhausted from a space back into the space through air intakes or openings in the walls of the space (ANSI/AIHA Z9.5 - 1992).

replacement air: see makeup air

return air: air being returned from a space to the ventilation fan that supplies air to a space (ANSI/AIHA Z9.5 - 1992).

special use/hazardous ventilation system: A Special Use Ventilation System (SUVS) is a ventilation system in which highly hazardous materials are employed. The mechanical equipment contained in the SUVS includes the motor and all working parts, the motor cage, air inlets (including fume hoods and canopy ducts), air outlets (including stack) and all associated ductwork. There are four main types of SUVS:

- Radiation Ventilation Systems
- Perchloric Acid Ventilation Systems
- Infectious Agent Ventilation Systems
- High Acid Use Ventilation Systems

special use/point-of-use ventilation system: an exhaust hood, not otherwise classified, for a special purpose such as- but not limited to - capturing gases from equipment such as atomic absorption, gas chromatographs, liquid pouring or mixing stations, and heat sources (ANSI/AIHA Z9.5 - 1992).

variable air volume fume hood: a fume hood designed so the exhaust volume is varied in proportion to the opening of the hood face by changing the speed of the exhaust blower or by operating a damper in the exhaust hood (ANSI/AIHA Z9.5 - 1992).

velocity: speed and direction of motion (ANSI/AIHA Z9.5 - 1992).

wet bench: a specialized fume hood typically found in ECB clean rooms for example which provides an enclosure where liquids are processed safely. The service and process are the same. The wet bench provides a place work can safely be done and the wet bench confines the wet processes. Another example is the anatomy down draft wet bench. The down draft keeps vapors and liquids from escaping into the operator's breathing zone such as the down draft wet bench at the UW Primate Center.



Wet Benches

Appendix B – References

ACGIH. "Industrial Ventilation - A Manual of Recommended Practice." American Conference of Governmental Industrial Hygienists, Ed. 26, 2008 (or the most recent edition).

Available from:

ACGIH
1330 Kemper Meadow Drive
Cincinnati, OH 45240

ANSI/ASHRAE 110. "Method of Testing Performance of Laboratory Fume Hoods." American Society of Heating, Refrigeration, and Air Conditioning Engineers. 1995 (or the most recent edition).

Available from:

ASHRAE 110
1791 Tullie Circle, NE
Atlanta, GA 30329

ANSI/ASHRAE 110 111. "Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems." American Society of Heating, Refrigeration, and Air-Conditioning Engineers. 1988 (or the most recent edition).

Available from:

ASHRAE 110
1791 Tullie Circle, NE
Atlanta, GA 30329

ANSI/AIHA Z9.2. "Fundamentals Governing the Design and Operation of Local Exhaust Systems. 2001 (or the most recent edition).

Available from:

AIHA
2700 Prosperity Avenue, Suite 250
Fairfax, VA 22031

ANSI/AIHA Z9.5. "Laboratory Ventilation." American Industrial Hygiene Association. 2003 (or the most recent edition).

Available from:

AIHA
2700 Prosperity Avenue
Suite 250
Fairfax, VA 22031

ASHRAE 110. "1997 Handbook - Fundamentals Volume." American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. 1997 (or the most recent edition).

Available from:

ASHRAE 110
1791 Tullie Circle, NE
Atlanta, GA 30329

ASHRAE 110. "1995 ASHRAE 110 Handbook - Heating, Ventilating, and Air-Conditioning Applications." American Society of Heating, Refrigerating and Air Conditioning Engineers. 1995 (or the most recent edition).

Available from:

ASHRAE 110
1791 Tullie Circle, NE
Atlanta, GA 30329

"Biosafety in Microbiological and Biomedical Laboratories." U. S. Department of Health and Human Services. U. S. Government Printing Office. Washington, D.C. 1993 (or most recent edition).

"Laboratory Stack Height Determination and Evaluation Methods - Possible Additions to the ANSI/AIHA Z9.5 Standard on Lab Ventilation." Ratcliff, M., Sandru, E. ASHRAE 110 Winter Meeting. 1998.

NFPA. "Standard on Fire Protection for Laboratories Using Chemicals." Standard 45. National Fire Protection Association. 1996 (or most recent edition).

"Primary Containment for Biohazards: Selection, Installation, and Use of Biological Safety Cabinets." U. S. Department of Health and Human Services. U. S. Government Printing Office. Washington, D.C. 1995 (or most recent edition).

"Prudent Practices in the Laboratory: Handling and Disposal of Chemicals." Committee on Prudent Practices for Handling, Storage, and Disposal of Chemicals in Laboratories. National Academy Press, Washington, D.C. 1995 (or the most recent edition).

ANSI 305

UW-Madison Business Services – Fume Hood Procurement Contract:
<http://www.bussvc.wisc.edu/purch/contract/wp5763.html>

Appendix C – Fume Hood Performance Testing Guidelines

A. Fume Hood Performance Test Conditions

1. General room ventilating systems, both supply and exhaust, including fume hood exhaust, must meet FP&M & Division of State Facilities design specifications and shall be in full normal operation. Airflow systems in the laboratory shall be properly balanced and commissioned prior to this test. This includes calibration of airflow controls, calibration of automatic temperature controls, balance of supply air, etc. ("Prudent Practices for Handling Hazardous Chemicals in Laboratories," 1995 and ANSI/ASHRAE 110 110-2006). Laboratories must be under negative pressure relative to corridor unless special design conditions prevail.
2. Hoods are tested in fully open position and 18 inch open position.
3. All other hoods in the same room are in the 18 inch sash position.
4. The hood being tested should be empty (new and renovated hoods only)
5. The doors to the laboratory will be closed.
6. When adjustments are made to hood sashes, supply and exhaust air in the room will be allowed to stabilize before testing is done.
7. Hood monitor is calibrated and not in alarm.

B. Determination of Average Face Velocity as contained in the ANSI/AIHA Z-9.5 and ANSI/ASHRAE-110

Measuring fume hood velocity at individual grid points helps reveal how well a fume hood is working. Therefore, to make sure all employees use the same protocol, the following four points are provided:

1. Face velocity measurements shall be made by dividing the hood opening into equal area grids with the sides measuring no more than 12 inches. No less than nine (9) grid areas should be used.
2. The tip of the probe shall be positioned in the plane of the sash opening and fixed at the approximate center of each grid, (Holding a probe by hand creates the potential for error so the evaluator should use a fixed probe measurement (were feasible) and stand to the side so as to affect air flow as little as possible).
3. Face velocity readings shall be averaged over at least a five second period; report the average and individual grid readings.
4. Face velocity measurements shall be made with an annually calibrated digital velocity meter (TSI) with an articulating (90 degree) probe tip, with a range of at least 40 to 400 feet per minute and accuracy of +/- 3.0% of the reading. The instrument should have a calibration label affixed to the hand held portion and certificate available.

C. Inspection & Performance Testing of Pioneer D.A.T. System

Due to past concerns of the UW testing representatives, the Pioneer D.A.T alarm operation should be verified before final installation of the fume hood (easier when hood is still on skid). To start this test, remove the plug from the receptacle on the roof of the hood that controls the D.A.T air system and plug it into a 120-volt receptacle at the job site. This will energize the D.A.T supply air system.

With the D.A.T alarm powered up and the vertical sash in the closed position, the sash monitor's green led should be illuminated. Raising the sash above 18 inches should engage the yellow led, and at 10-second intervals a beep (chirp type sound) will be heard. This is to let the user of the

hood know that the sash is raised above 18 inches and in this position; the D.A.T blower should be operational. If the D.A.T blower is not on, the electronic eye at the top left side of hood and located inside the sash enclosure should be inspected to see if the bracket has been compromised, which would not allow the sash to trigger the D.A.T blower. If the D.A.T blower runs all the time no matter the position of the sash, the electronic eye should be considered the prime problem. Check to see if the bracket is positioned correctly, and that the electronic eye is placed in the bracket correctly, and is functional.

If the D.A.T fan runs when the vertical sash is opened beyond 18 inches; the next step to perform is verify the operation of the alarm in case the D.A.T blower fails. Allow the D.A.T blower to run for 30 seconds, before performing the test (there is a delay built into the software to prevent unintended alarms before the blower has reached full speed). With the D.A.T blower running, close off the intake air to the D.A.T blower. With this accomplished the D.A.T alarm should engage in about 5 seconds. If the alarm does not engage after 15 seconds, the static pressure switch needs to be adjusted. With the D.A.T fan running, slowly turn the adjustment screw on the pressure switch clockwise, until the alarm engages. With the alarm sounding, reverse the rotation of the adjustment screw until the alarm no longer sounds off, and turn an extra $\frac{1}{4}$ to $\frac{1}{2}$ turn (counter clockwise). After this, repeat the blocking off of the intake blower and verify the alarm engages in 5 to 10 seconds.

In case the alarm sounds almost immediately (red led illuminated) after the D.A.T system is powered up with the sash raised above 18-inches; then two things could be triggering the alarm. First, check the pressure switch, it may not of been adjusted properly at the factory, or the diaphragm could have been jiggled around during shipment. The remaining culprit could be the control board, which is housed in the Hoffman box located on the roof of the hood. Replace the electrical board with another, and check to see if the D.A.T alarm is functioning correctly.

D. Smoke Testing To Determine Airflow and Turbulence

1. Using a smoke tube, puff smoke 6 inches within the face of the hood around the outside edge of the opening. Determine direction of smoke flow. If visible fumes flow out of the front of the hood, make necessary adjustments.
2. Ignite a smoke candle in the hood and visually observe if there is leakage of smoke from the ductwork or if smoke is being drawn back into building or surrounding buildings.

E. Conditions for Passing Hoods

1. General room ventilating systems, both supply and exhaust, including fume hood exhaust shall be in full normal operation.
2. Hood must have an acceptable face velocity and must pass the smoke testing.
3. No leakage of exhaust from ductwork.

Appendix D – Chemical Fume Hood Performance Test Report

Appendix E – Failure Notice

Appendix F – Evaluation Requirements for Procurement Consideration

A. General Guidelines

General guidelines on types of hoods and their application are presented in ACGIH's "Industrial Ventilation – A Manual of Recommended Practices" (most current edition). Laboratory fume hoods and associated exhaust ducts should be constructed of noncombustible, nonporous material that will resist corrosion. They should be equipped with vertical or horizontal sashes, air foils built into the fume hood at the bottom and the sides of the sash opening, and baffles to attain a uniform face velocity under different conditions of hood use. Combination horizontal and vertical sashes shall be provided unless special conditions dictate otherwise. Additionally, recognized design and construction features are listed in the ANSI/AIHA Z9.5-2003 standard titled, "Laboratory Ventilation," and ANSI/AIHA Z9.2-2001 standard, "Fundamentals Governing the Design and Operation of Local Exhaust Systems."

Fume hoods should be tested before a hood leaves the manufacturer using the ANSI/ASHRAE 110 110-2007 standard, "Method of Testing performance of Laboratory Fume Hoods." All new hoods shall meet the ANSI/ASHRAE 110 requirements for Class 1 hoods including a tracer gas performance of AM (as manufactured) 0.05 (parts per million) or better at a tracer gas release rate of 4.0 Liters per minute (lpm).

Documentation shall be provided with the results of the test. Performance is measured by specific tests:

- Flow visualization,
- Face velocity measurements,
- Test method for Variable Air Volume (VAV) fume hoods,
- VAV response test, and,
- Tracer gas containment.

Flow visualization qualitatively tests a hood's ability to contain vapors. This test consists of a small local challenge (use of a smoke tube), and a gross challenge (use of a smoke candle or smoke generator) to the hood. Smoke is released into the hood to visually determine if a hood or associated duct has a leak.

Face velocity measurements determine the average velocity of air moving perpendicular to the hood face. The measurement is usually expressed in feet per minute (fpm). Face velocities will often provide information concerning the fume hood's ability to properly control contaminants. A tracer gas leak test will quantitatively determine if the fume hood is properly containing contaminants. A tracer gas is released in the hood and a continuous-reading instrument is positioned outside the hood to monitor the escape of the tracer gas. The preferred tracer gas is sulfur hexafluoride (SF₆).

B. Face Velocity

Each variable air volume hood shall maintain an average face velocity of 70-130 fpm (100 fpm optimum) at the maximum allowed hood opening. Each constant volume hood shall maintain an average face velocity of 70-130 fpm (100 fpm optimum) in the half open position. Face velocity measurements are to be made with a recently calibrated mechanical or electrical anemometer. Measurements, of 1 square foot areas, should be made across the face of the hood and no single face velocity measurement should be more than plus or minus 20% of the average. For further information, refer to ANSI/ASHRAE 110 111-1988, "Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems."

C. Face Velocity Monitoring

All fume hoods shall include some means of monitoring air flow with a visual and audio alarm. The Thermo Fisher Hamilton "Pioneer" fume hood shall also have a sash position alarm.

D. Supply Air

The proper volume, distribution, and quality of supply air shall be provided to laboratories containing fume hoods. ANSI/AIHA Z9.5 1992 and ANSI/ASHRAE 110 62 provide these standards. Make up air (replacement air) should be equal to at least 95% of the volume exhausted from the laboratory. This air shall not be recirculated from other laboratory areas. Although laboratory supply air seldom requires air cleaning, ASHRAE 110 (HVAC Application Handbook, 1995) provides technical information for the reduction of contamination from atmospheric dust and dirt.

Air supply systems for rooms containing chemical fume hoods shall not create room air drafts at the face of any hood greater than one half (and preferably one third) the face velocity of the hood. For most laboratory hoods, this means 50 fpm or less terminal throw velocity at 6 feet above the floor. ACGIH's "Industrial Ventilation - A Manual of Recommended Practice," provides design criteria to help achieve these standards. Room air change rate will be based on maintaining space temperature and desired room clearance time. If the building supply air can not control the space heating or cooling loads a re-circulating room supply air system can be installed as long as this air supply does not interfere with the fume hood(s).

E. Exhaust Stack Discharge and Exit Velocities

Exhaust stacks shall be designed and built to prevent recirculation of contaminated air from the fume hood exhaust system into the fresh air supply of the facility. Effluent exhaust shall escape the building envelope. The stack shall also provide significant effluent dispersal so that effluent downwash does not occur at ground level. They shall be designed and built with the latest applicable ANSI, ASHRAE 110, and AIHA standards. The "2001 ASHRAE 110 Fundamentals Handbook," and the publication titled, "Laboratory Stack Height Determination and Evaluation Methods," presents three methods for specification and evaluation of stack heights from laboratory hood exhaust fans.

Effluent discharge shall:

1. Direct to the atmosphere (unless treated for recirculation).
2. Conform to federal, state, and local air emission regulations.
3. Release so that reentry of effluent from the discharging building or a surrounding building is reduced to allowable concentrations inside of the building. (Allowable concentrations shall be determined using information on the nature of the contaminants to be released, recommended industrial hygiene practice, and applicable safety codes.)

Exhaust discharge from stacks shall:

1. Be in a vertical up-draft direction at a minimum of 10 ft above adjacent roof lines and located with respect to surrounding air inlets as to avoid contaminant reentry.
2. Have a minimum exit velocity of 3000 fpm.

APPENDIX G:

Memorandum

To: All UW-Madison Principal Investigators who utilize chemical fume hoods

Cc: College and School Representatives
Facility Managers
Facilities Planning & Management – Environment Health & Safety department
University Health Services – Environmental Health Program
Physical Plant Central Answering & Receiving (CARS)

From: UW-Madison Physical Plant

Re: Funding for Campus Fume Hood Performance Testing and Repairs

The UW-Madison campus fume hood program addresses the maintenance and safety requirements of campus fume hoods used for general laboratory chemical safety. Standard-flow fume hoods, high-performance fume hoods, and capture hoods that are utilized for this purpose are included in the scope of the campus fume hood program.

Beginning July 1, 2009 physical plant will assume funding support of the campus fume hood program through its maintenance operation. As such, funding support for performance testing and repairs of chemical fume hoods shall be provided in those buildings that are supported by the physical plant maintenance operation only.

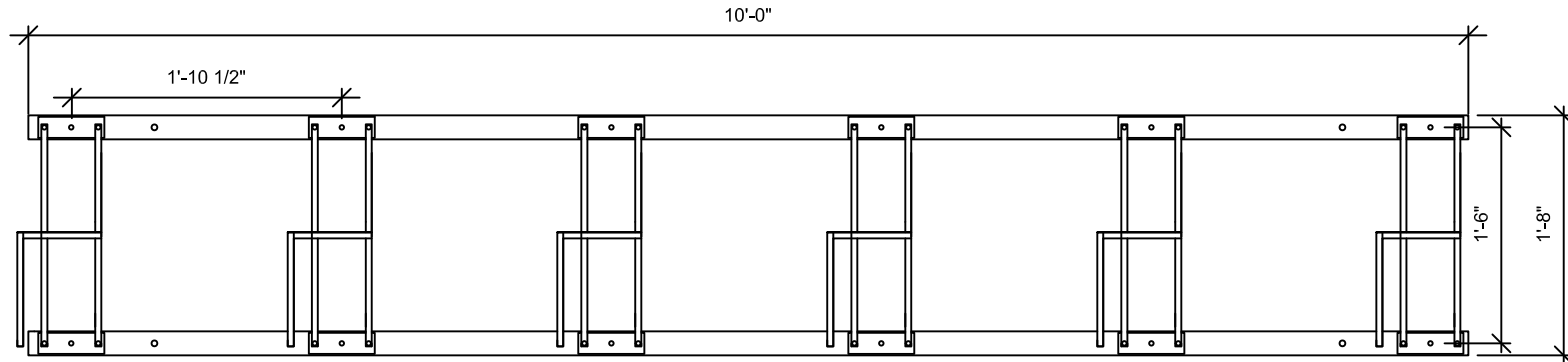
Funding for performance testing and repairs in non-supported buildings shall be a departmental responsibility. Physical Plant shall request departmental funding support as needed in non-supported buildings.

Please refer to attachment for additional information.

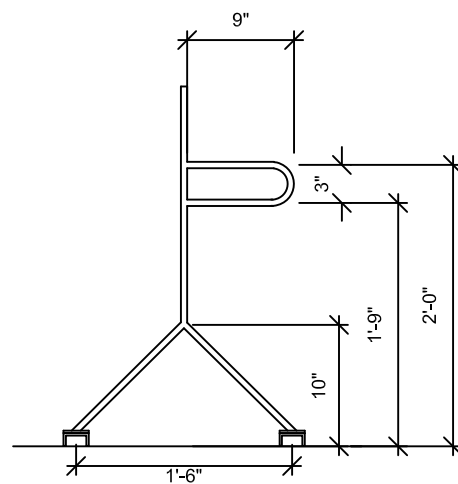


Division 12 Appendix - Details

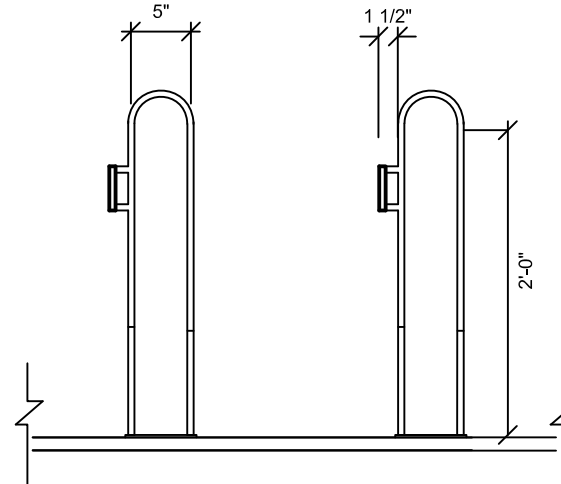
See following attachment



Plan View



Side View



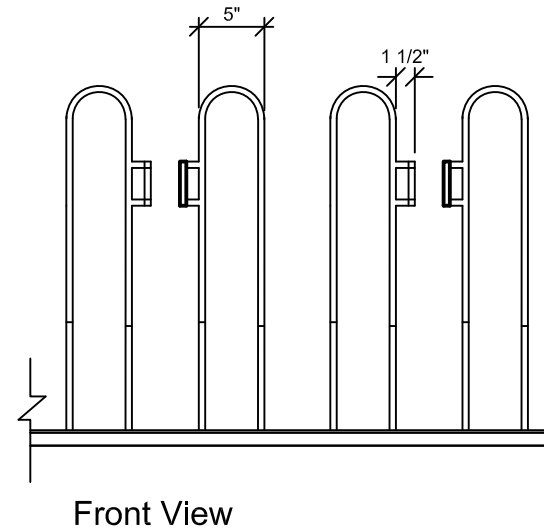
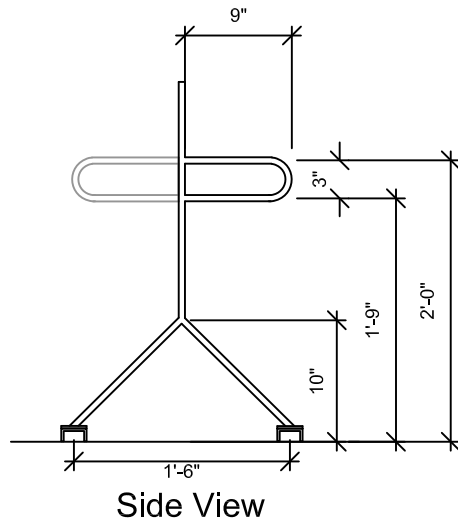
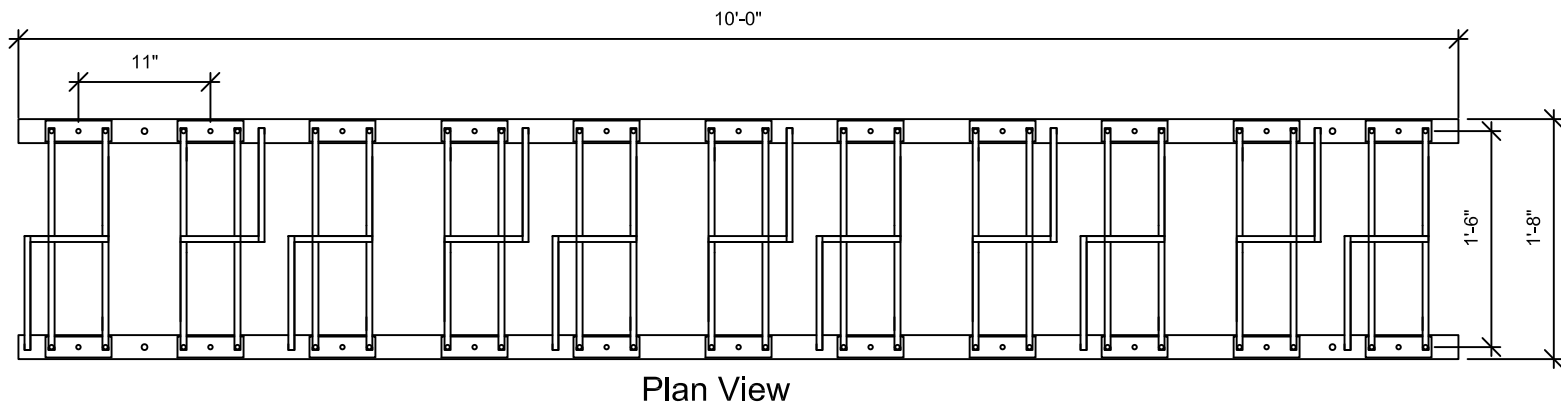
Front View

Notes:

1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.




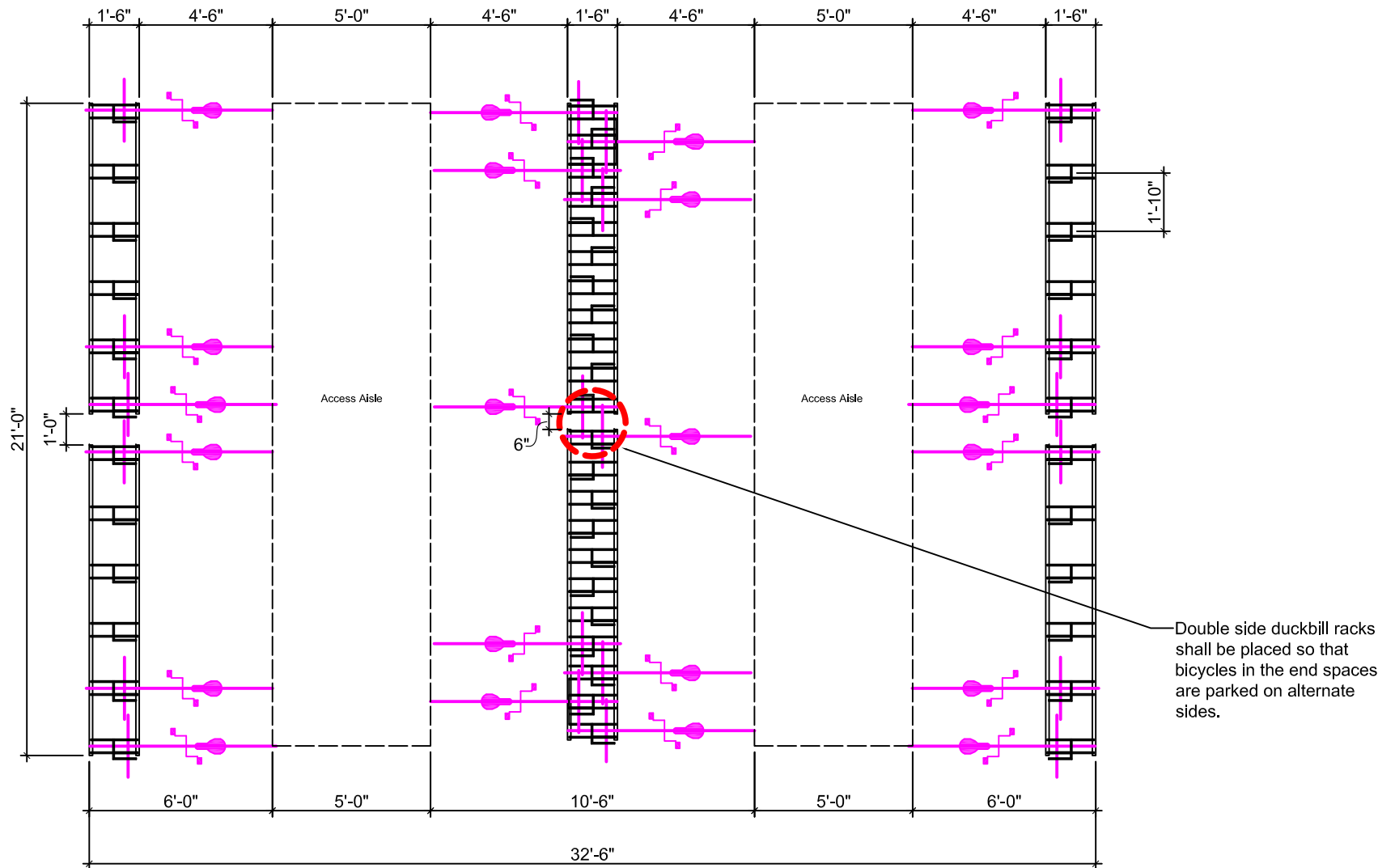
| | | |
|--|-----------------|------------------|
| Project: Campus Standard Bike Racks- Single-sided "Duckbill" | Designed By: UW | Date: 07-17-2020 |
| | Drawn By: ZJS | Scale: 1"=1'-0' |
| Drawing Title: Detail | Project No: | Sheet: D-1 |
| Building No.: N/A | Revision: Date: | |
| File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site Amenities\Bicycle Racks and Layouts\Duckbill Bike Rack\Duckbill Bike Rack Detail.dwg | JLB 04-27-2020 | Of: 3 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | JLB 05-20-2022 | |
| 21 North Park Street, 6th Floor Madison, WI 53715 | | |



Notes:


1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.

| | | | |
|--|---|--|-------------------|
|  <p>WISCONSIN UNIVERSITY OF WISCONSIN-MADISON</p> | Project: Campus Standard Bike Racks- Double-sided "Duckbill" | Designed By: UW | Date: 07-17-2020 |
| | Drawing Title: Detail | Drawn By: ZJS | Scale: 1"=1'-0" |
| | Building No.: N/A | Project No: | Sheet: D-2 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Bicycle Racks-Double duckbill | Revision: Date: | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | JLB 04-27-2020 | Of: 3 |
| | | JLB 05-20-2022 | |
| | | 21 North Park Street, 6th Floor Madison, WI 53715 | |



Notes:

1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.

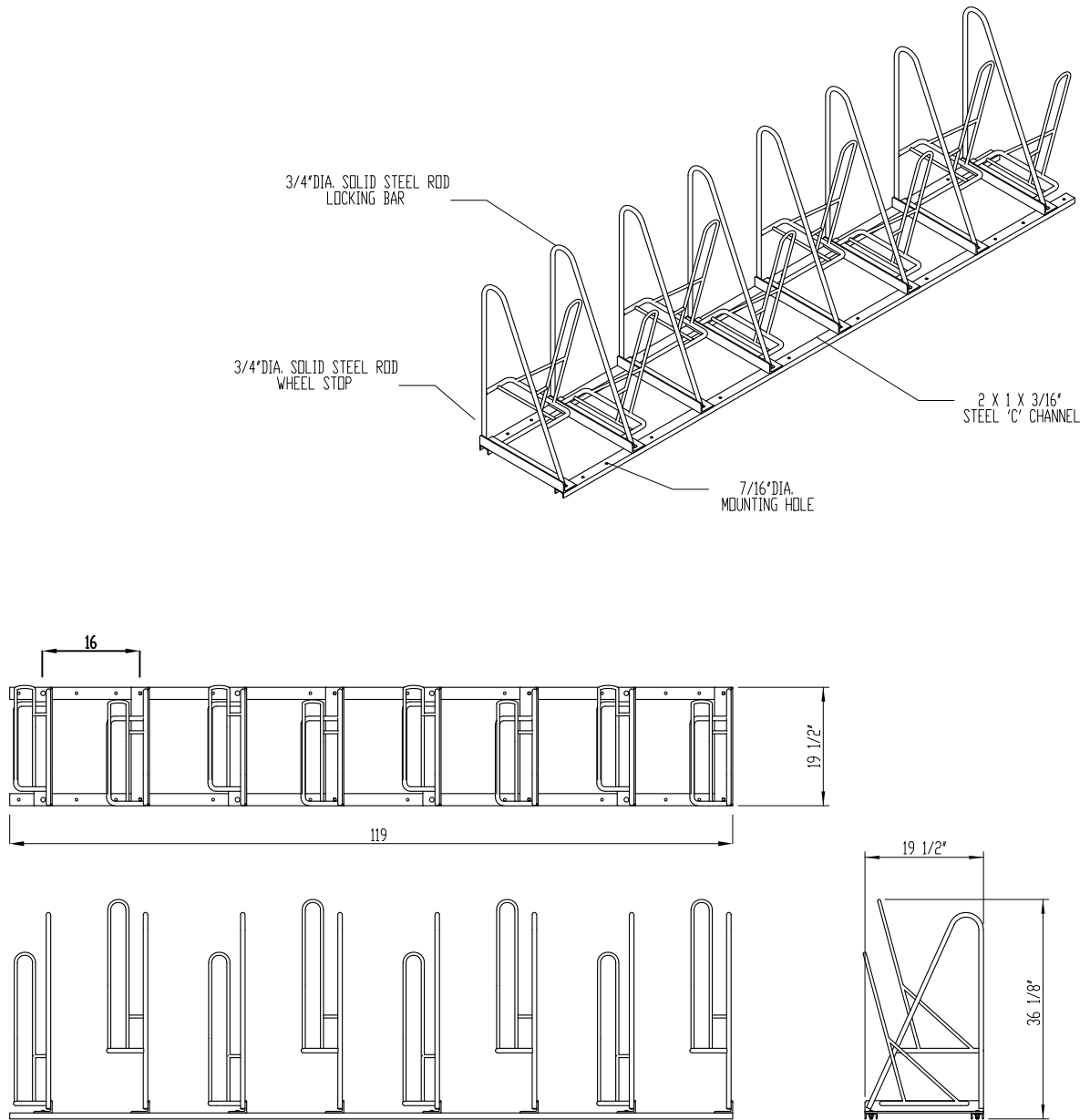
| | | | |
|--|--|--|------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard "Duckbill" Bike Racks | Design By: CS | Date: 01-16-2013 |
| | Drawing Title: Layout Plan | Drawn By: JTW | Scale: 1"=5'-0' |
| | Building No.: N/A | Project No: | Sheet: D-3 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site Amenities\Bicycle Racks and Layouts\Duckbill Bike Rack\Duckbill Bike Rack Layout.dwg | Revision: JLB | Date: 05-20-2022 |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | 21 North Park Street, 6th Floor Madison, WI 53715 | Of: 3 |



MADRAX DIVISION

GRABER MANUFACTURING, INC.
1080 UNIEK DRIVE
WAUNAKEE, WI 53597

P(800) 448-7931, P(608) 849-1080, F(608) 849-1081
WWW.MADRAX.COM, E-MAIL: SALES@MADRAX.COM



PRODUCT: RGT-8-SNG
DESCRIPTION: REGENT BIKE RACK
8 BIKE, SINGLE SIDED (PARK ONE SIDE)
DATE: 11/13/12
ENG: BLW


CONFIDENTIAL DRAWING AND INFORMATION IS NOT TO BE COPIED OR DISCLOSED
TO OTHERS WITHOUT THE CONSENT OF GRABER MANUFACTURING, INC.
SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

©2012 GRABER MANUFACTURING, INC. ALL PROPRIETARY RIGHTS RESERVED.

- NOTES:
1. INSTALL BIKE RACKS ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
 2. CONSULTANT TO SELECT COLOR/FINISH, SEE MANUFACTURER'S SPECIFICATIONS.
 3. SEE SITE PLAN FOR LOCATION OR CONSULT OWNER.

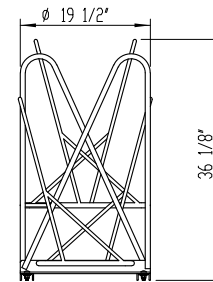
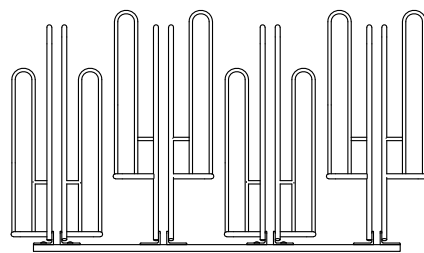
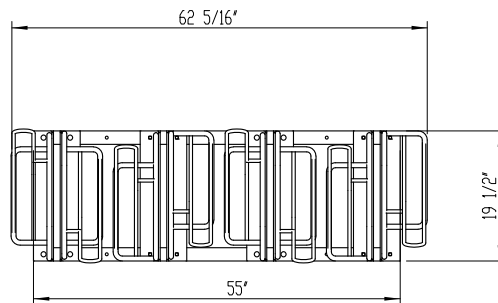
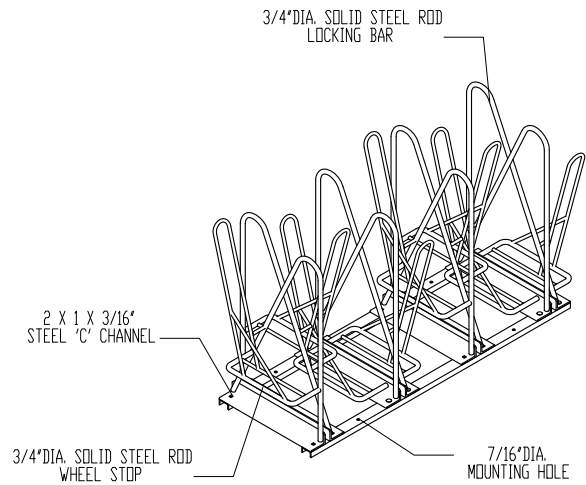
Notes:

1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.

| | | | |
|--|--|---|-----------------------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard Bike Racks- Single-sided 8-Stall "Regent" | Design By: Madrax Drawn: Madrax / JLB | Date: 05-20-2022 Scale: N/A |
| | Drawing Title: Detail | Project No: | Sheet: D-1 |
| | Building No.: N/A | Revision: Date: | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\ Site Amenities\Bicycle Racks and Layouts\ Regent Bike Rack\ Regent Bike Rack-8-SNG.DWG | ABC 00-00-0000 | Of: 4 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street 6th Floor Madison, WI 53715 | |



MADRAX DIVISION
GRABER MANUFACTURING, INC., FORMERLY TRILARY, INC
1080 UNIEK DRIVE
WAUNAKEE, WI 53597
P(800) 448-7931, P(608) 849-1080, F(608) 849-1081
WWW.MADRAX.COM, E-MAIL: SALES@MADRAX.COM



PRODUCT: RGT-8-DBL
DESCRIPTION: REGENT BIKE RACK
8 BIKE, DOUBLE SIDED (PARK BOTH SIDES)
DATE: 11/13/12
ENG: BLW


CONFIDENTIAL DRAWING AND INFORMATION IS NOT TO BE COPIED OR DISCLOSED TO OTHERS WITHOUT THE CONSENT OF GRABER MANUFACTURING, INC., FORMERLY TRILARY, INC. SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

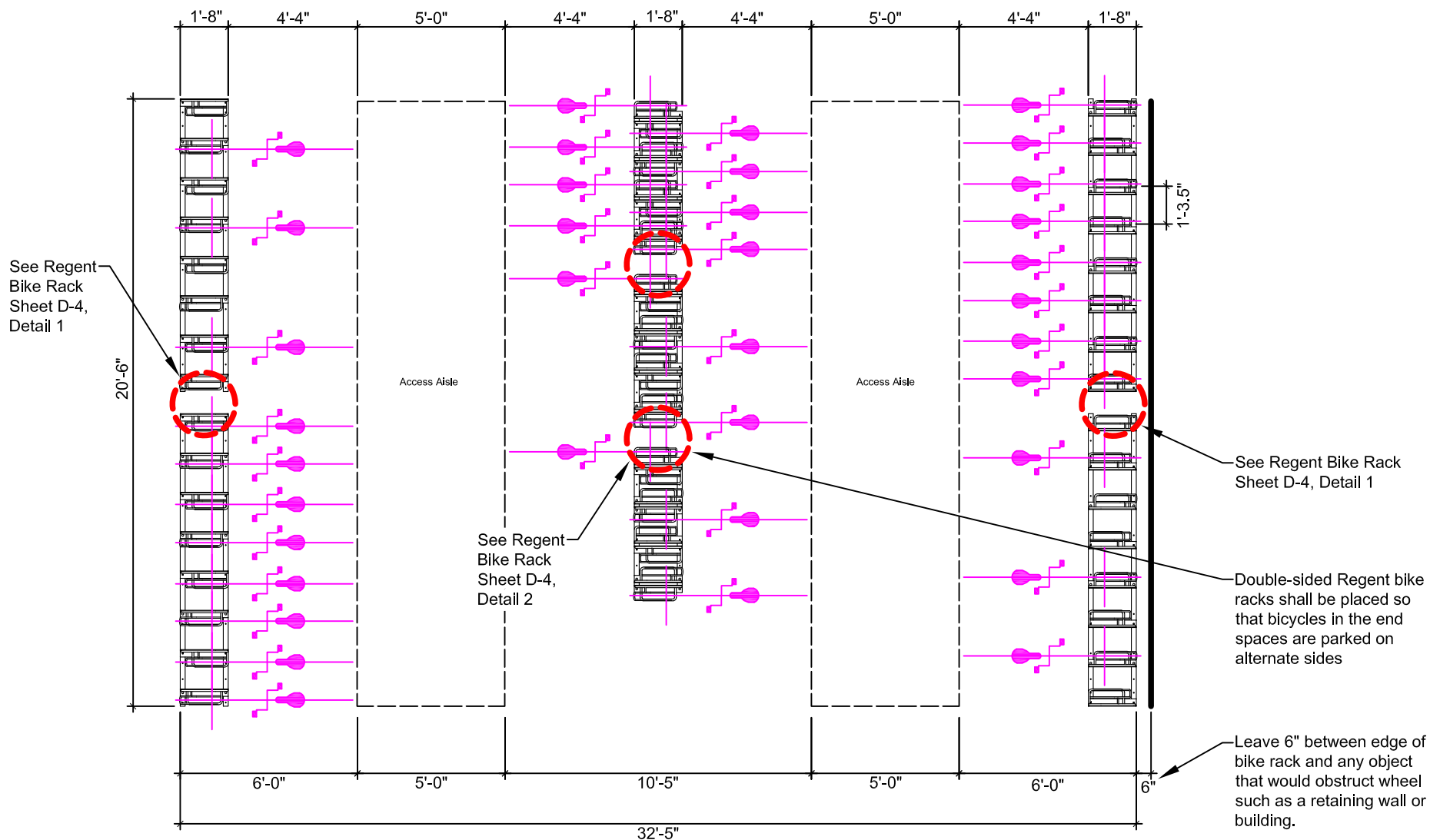
©2012 GRABER MANUFACTURING, INC., FORMERLY TRILARY, INC. ALL PROPRIETARY RIGHTS RESERVED.

- NOTES:
1. INSTALL BIKE RACKS ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
 2. CONSULTANT TO SELECT COLOR(FINISH), SEE MANUFACTURER'S SPECIFICATIONS.
 3. SEE SITE PLAN FOR LOCATION OR CONSULT OWNER.

Notes:


1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.

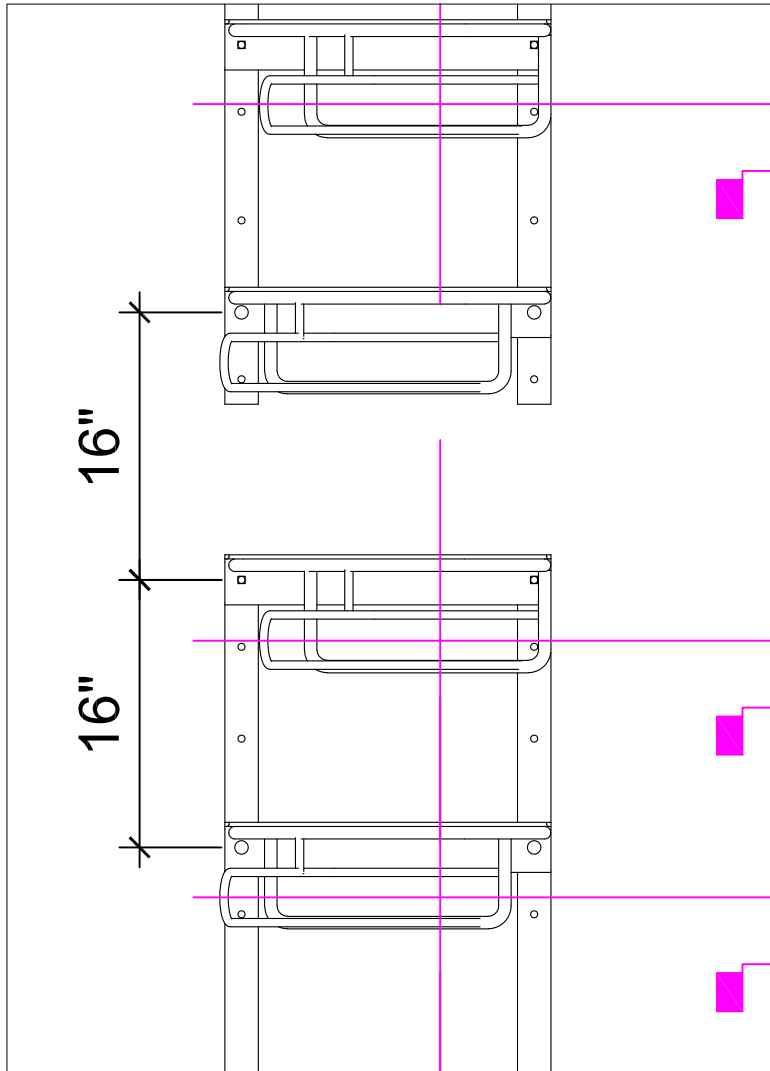
| | | | |
|--|---|--|-----------------------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard Bike Racks- Double-sided 8-Stall "Regent" | Design By: Madrax Drawn: Madrax / JLB | Date: 05-20-2022 Scale: N/A |
| | Drawing Title: Detail | Project No: | Sheet: D-2 |
| | Building No.: N/A | Revision: Date: | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\ Site Amenities\Bicycle Racks and Layouts\ Regent Bike Rack\Regent Bike Rack-8-DBL.dwg | ABC 00-00-0000 | Of: 4 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street, 6th Floor Madison, WI 53715 | |



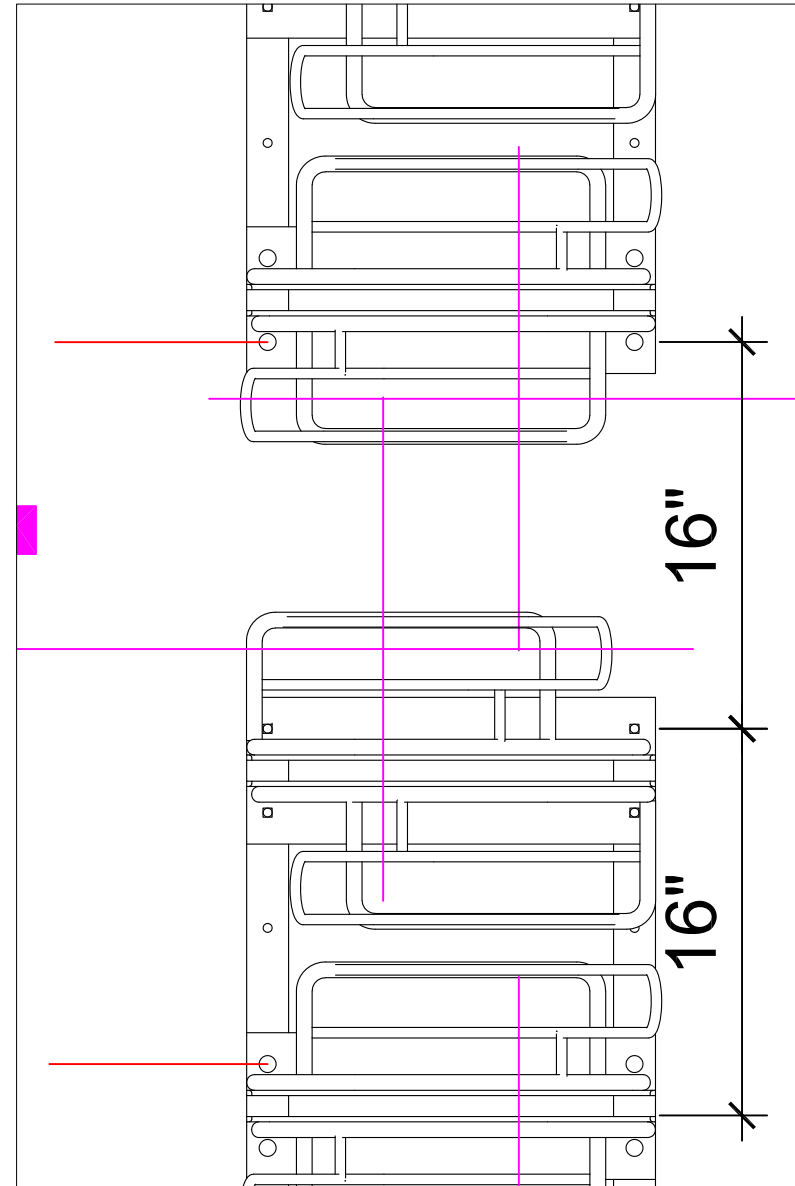
Notes:

1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.
2. Regent Bike Racks shall be placed so that "low" stall at the end of one rack is adjacent to "high" stall at the end of the next rack.

| | | | |
|--|--|---------------------------------|------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard "Regent" Bike Racks | Design By: CS | Date: 01-23-2013 |
| | Drawing Title: Layout Plan | Drawn By: JTW /JLB | Scale: 1"=5'-0" |
| | Building No.: N/A | Project No: | Sheet: |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site Amenities\Bicycle Racks and Layouts\Bicycle Rack\Regent Bike Rack Layout.dwg | Revision: Date: | D-3 |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | JLB 05-20-2022 HF 06-06-2022 | Of: 4 |




Detail 1 / Single-sided Regent Rack Spacing
No Scale



Detail 2 / Double-sided Regent Rack Spacing (No Scale)

Notes:

1. See *Guidelines for Planning and Design of UW-Madison Facilities*, Division 12 93 13 Bike Racks, for more information regarding bike rack campus standards.
2. Regent Bike Racks shall be placed so that "low" stall at the end of one rack is adjacent to "high" stall at the end of the next rack.

| | | | |
|--|---|--|--|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard "Regent" Bike Racks | Design By: CS Drawn By: JTW /JLB | Date: 01-23-2013 Scale: 1"=5'-0' |
| | Drawing Title: Layout Plan Details | Project No.: | Sheet: <div style="font-size: 2em; font-weight: bold; text-align: center;">D-4</div> |
| | Building No.: N/A | Revision: | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\ Details\ Site Amenities\Bicycle Racks and Layouts\Bicycle Rack\Regent Bike Rack Layout.dwg | JLB 05-20-2022 HF 06-06-2022 | |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | 21 North Park Street, 6th Floor Madison, WI 53715 | Of: 4 |

REVISIONS

| NAME | DATE | NOTES |
|------|------|-------|
| 1 | --- | --- |
| 2 | --- | --- |
| 3 | --- | --- |
| 4 | --- | --- |
| 5 | --- | --- |
| 6 | --- | --- |
| 7 | --- | --- |
| 8 | --- | --- |

CONFIDENTIAL INFORMATION
THESE DRAWING, SPECIFICATIONS
AND OTHER INFORMATION AND
DOCUMENTS ACCOMPANYING THEM
ARE THE CONFIDENTIAL AND
PROPRIETARY PROPERTY OF
WAUSAU TILE, INC. THE DRAWINGS
THEMSELVES SHALL BELONG TO
THE OWNER FOR USE ONLY ON
THE PROJECT. ANY ADDITIONAL USE
SHALL REQUIRE THE PRIOR
WRITTEN APPROVAL OF WAUSAU
TILE, INC. THE PROPRIETARY
INFORMATION CONTAINED WITHIN
THE DRAWINGS AND THE
DOCUMENTS IS AND SHALL REMAIN
THE SOLE PROPERTY OF WAUSAU
TILE, INC

UW MADISON

MADISON, WI

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
FRACTIONS $\pm 1/8"$

DRAWN BY: SKD

DATE: 5/29/14

MATERIAL:

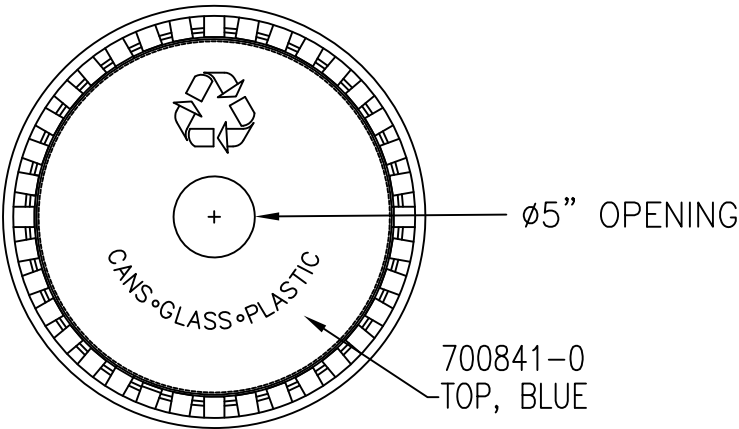
JOB NAME: UW MADISON

WEIGHT:

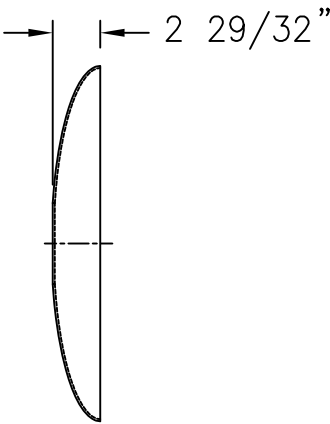
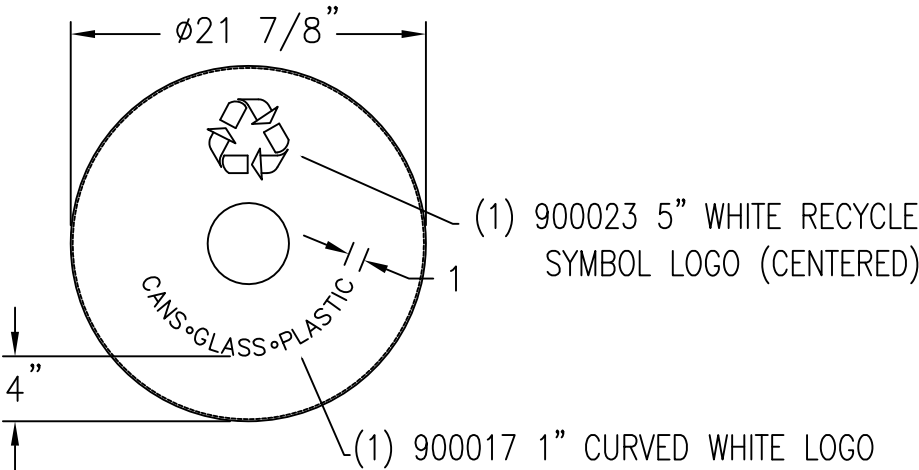
MIX DESIGN NO:
(90) BLACK
(0) BLUE

SHEET NO.

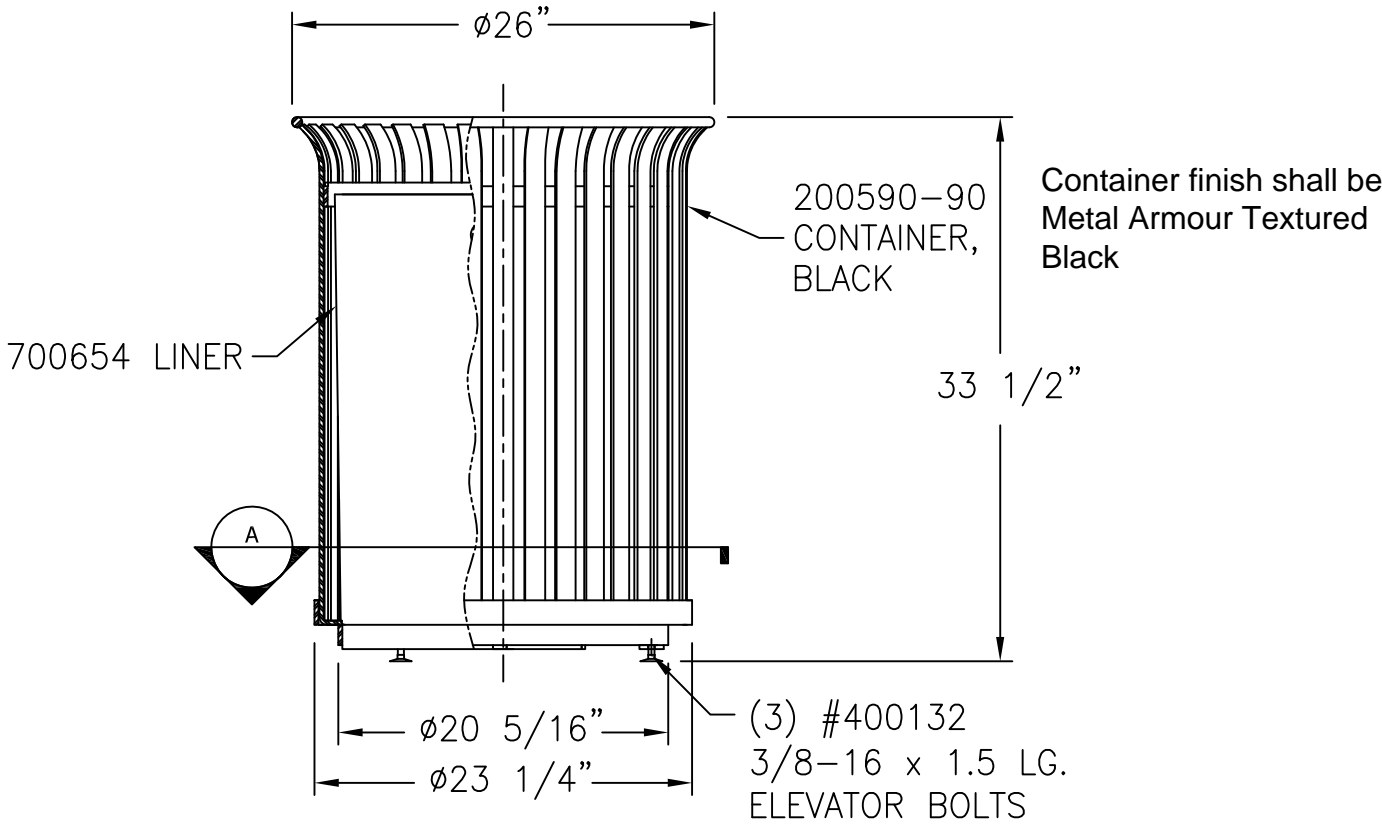
MF3252



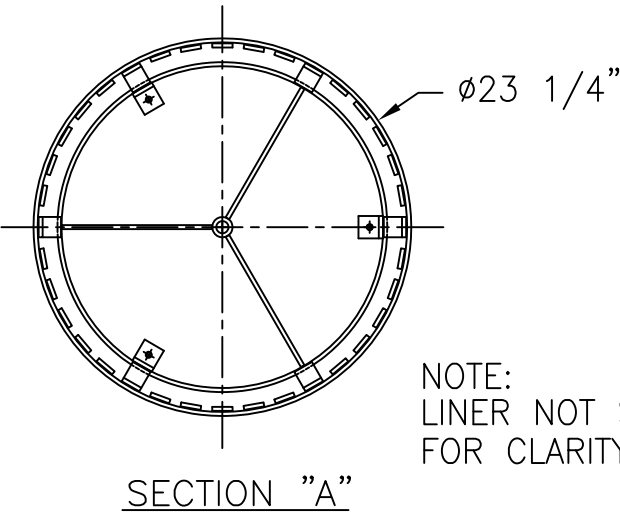
TOP VIEW



22" SPUN ALUMINUM TOP W/5" HOLE



ELEVATION VIEW



SECTION "A"

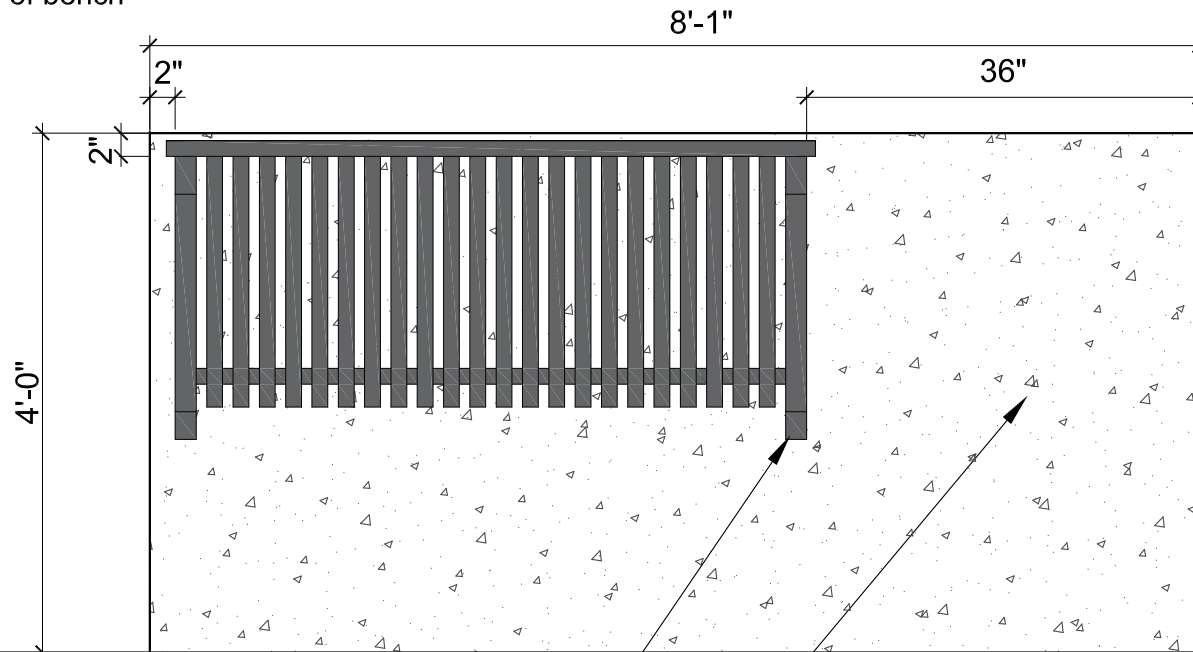
SIGN BELOW IF DRAWINGS ARE
APPROVED W/ MARKED CHANGES

APPROVED: _____

DATE: _____

(SIGNATURE ABOVE ILLUSTRATES ACCEPTANCE OF DIMENSIONS SHOWN.)

***Measure the 2" from outside edge of bench feet



Lawn, Groudcover, or Planting Bed

Concrete pad. Install per UW-Madison Design Guidelines. See Notes.

Metal-Armor Bench, MF2207

Wausau Tile, 5'-0" flat steel bench with matte black metal armor coating. See Notes. See UW-Madison Design Guidelines


Sidewalk or Hardscape Area

Companion Seating Space

Between 36"-48" wide, shown at 36"x48".

Notes

1. Concrete pad shall be 10'-0" long if installing a 6'-0" standard bench.
2. When possible control joints shall align with existing hardscape joints. Follow UW-Madison Design Guidelines
3. Anchor bench using stainless steel theft resistant hardware. Anchor bolts and sleeves. Mason drill holes into concrete. Secure hardware with clear epoxy if necessary.
- 4.. Concrete flatwork shall follow UW-Madison Design Guidelines.

| | | | | | |
|--|---|-----|---|------------|----------------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Companion Seating for Campus Standard Bench | | Designed By: VT | | Date: 08-01-2006 |
| | | | Drawn By: LAM/MRB | | Scale: Not to Scale |
| | Drawing Title: Layout and Detail | | O.S.M.: | | Sheet: L-1 |
| | Building No.: | | Revision: | Date: | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site Amenities\Benches\Companion Seating Detail.dwg | | MRB | 06-20-2014 | |
| | | JLB | 07-01-2022 | | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | | 21 North Park Street 6th Floor Madison, WI 53715 | | Of: 1 |



Shutdown/Impairment Form

See the following attachment

UTILITY SHUTDOWNS & LIFE SAFETY SYSTEM IMPAIRMENTS

UTILITY SHUTDOWN

For utility shutdowns (outages) affecting campus buildings, the Contractor shall fill out the Utility Shutdown Form on the following page. Coordination with UW Plumbing, Electrical, Steamfitter, and/or Digital Controls group is necessary to ensure an outage is scheduled and all necessary precautions are taken to ensure research and building operations remain operational. GC or Subcontractor shall provide all the necessary information approximately two (2) weeks in advance of a planned utility outage.

LIFE SAFETY SYSTEM IMPAIRMENT

Impairment of a life safety system shall require the GC or Subcontractor to electronically submit their impairment request online. Impairment form links can be found on the UW EHS website at www.ehs.wisc.edu under the fire and life safety section. Links to the forms are also provided below. Submittal of a planned impairment shall be submitted no more than 48 hours in advance of the planned impairment. Project Contacts for the online form are found on page 3 of this form.

IMPAIRMENT LINKS

Fire Protection Impairment Form

<https://ehs.wisc.edu/fire-life-safety/fire-protection-uw-impairment-form/>

Fire Protection Impairment Fire Watch

<https://ehs.wisc.edu/fire-life-safety/fire-protection-uw-impairment-fire-watch-form/>

Fire Protection Impairment FAQ

<https://ehs.wisc.edu/wp-content/uploads/sites/1408/2020/09/Fire-Protection-Impairment-FAQ-update-10-29-2020.pdf>

Hot Work Schedule Form

<https://ehs.wisc.edu/hot-work-permit-scheduling-form/>

Hot Work Fire Watch

<https://ehs.wisc.edu/fire-life-safety/hot-work-fire-watch-form/>

EH&S Points of Contact:

John Rindfleisch (608) 598-0052 john.rindfleisch@wisc.edu

Jeff Schiller (608) 225-7693 jeff.schiller@wisc.edu



UTILITY SHUTDOWN FORM

PROJECT NAME

PROJECT NUMBER

The contractor performing an outage shall complete all fields below and send to the appropriate contacts on the following page. Description of work and disruption/impact should be complete and inclusive of all significant aspects of the work.

Notice Date:

[Click or tap here to enter text.](#)

Contractor performing outage:

[Click or tap here to enter text.](#)

Foreman's Name & Phone Number:

[Click or tap here to enter text.](#)

Foreman's Email:

[Click or tap here to enter text.](#)

Room Number(s) and/or Locations:

[Click or tap here to enter text.](#)

Crew Size:

[Click or tap here to enter text.](#)

Dates/Times of Work:

[Click or tap here to enter text.](#)

Description of Work: (add attachments as needed for detailed description, plan images, or photos)

[Click or tap here to enter text.](#)

Disruption / Impact to Building Operations:

[Click or tap here to enter text.](#)

UTILITY SHUTDOWN CONTACTS

The contractor performing an outage shall send this outage form to all Project Contacts and appropriate Physical Plant contacts.

PROJECT CONTACTS

UW Project Manager

[Click or tap here to enter text.](#)

UW Construction Field Representative

[Click or tap here to enter text.](#)

DFD Project Manager (when applicable)

[Click or tap here to enter text.](#)

DFD Field Rep (when applicable)

[Click or tap here to enter text.](#)

Facility Manager

[Click or tap here to enter text.](#)

PHYSICAL PLANT CONTACTS

UW PLUMBING SHOP

Pete Dahl

pete.dahl@wisc.edu

Chad Hellenbrand

chad.hellenbrand@wisc.edu

UW ELECTRIC SHOP

Jeff Folk

jeffrey.folk@wisc.edu

Russ Whitehead

russell.whitehead@wisc.edu

Bruce McIntosh

bruce.mcintosh@wisc.edu

Todd Kiley

takiley@wisc.edu

Adam Melka

adam.melka@wisc.edu

UW STEAMFITTERS

Ed Corcoran

edward.corcoran@wisc.edu

Dan Stanford

dan.stanford@wisc.edu

DIGITAL CONTROLS GROUP

Dale Krause

dale.kraus@wisc.edu



Power Outage Planning Form

See the following attachment

Power Outage Planning

Completed form required for power outage on UW Madison Campus
UW Electric Shop - Approved (Yes , No)

Electrician Name
Company

Date
Contact Phone #

Building
Address

Number

1. **Requested Outage Date**

2. **Time of Day**

3. **Reason for outage**

*Include copies or photos of panel schedules for all the affected panels to your Supervisor and ok times and dates with the building manager.

4. **Work order Number**

5. **Project #**

Bldg Manager

Electric Shop Contacts

Todd Kiley 444-6590

Russ Whitehead 265-3904

Bruce McIntosh 444-4380

Adam Melka 235-1702

Electric Shop Senior Manager- Jeff Folk-----

D-265-3905 C-444-4928

Electrical Engineer- Dan Volk-----

C-577-3068

Contact (BEFORE and AFTER) shutdown!!!

Doit Platform-----

263-2648 email (ns-field-repair@doit.wisc.edu)
email (noc@doit.wisc.edu)

UW Police-----

262-2957
262-4524 Fax (262-9768)

UW Electric Shop
Physical Plant – Facilities Planning & Management



UW Electric Shop
Physical Plant – Facilities Planning & Management


401E Service Building University of Wisconsin-Madison 1217 University Avenue Madison, Wisconsin 53706-1589
608/262-6146 FAX: 608/265-3435 TTY: 608/265-4450

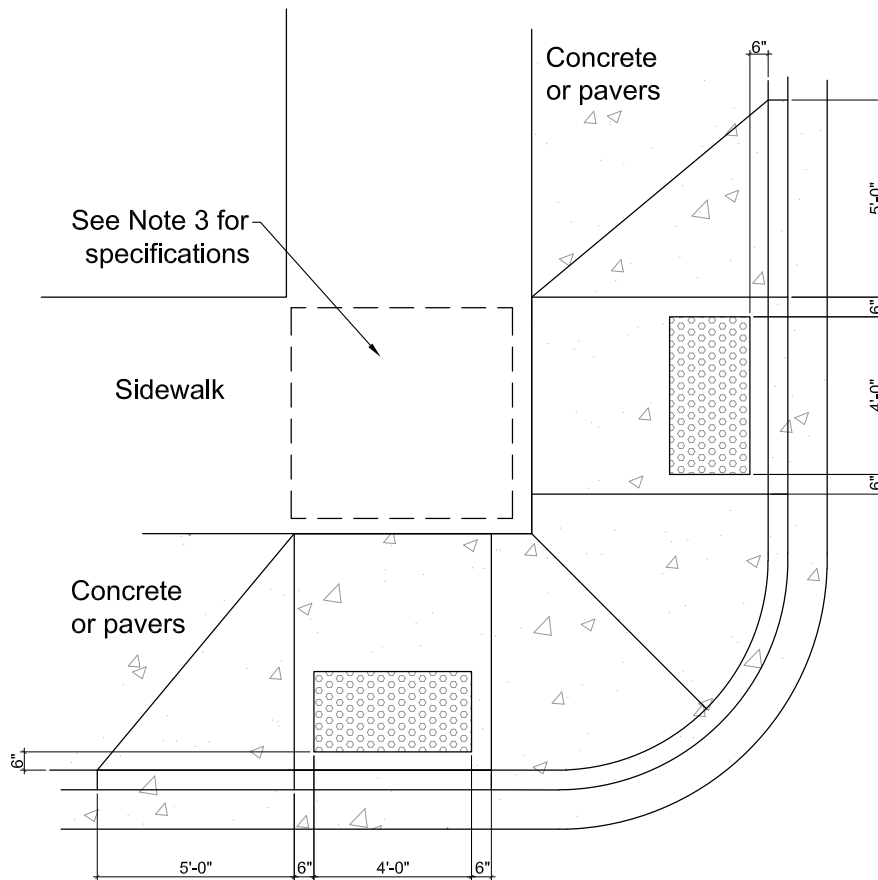


Division 32 - Appendix

See the following attachment




| | | | | |
|--|--|---|------------------|------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard Curb Cut | Designed By: N/A | Date: 06/2017 | |
| | Drawing Title: Standard Ramp | Drawn By: TD | Scale: NTS | |
| | Building No.: N/A | Project No: | | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site\Curbs-Cuts-Truncated Domes\Curb & Ramp Details Ver2_2018.dwg | Revision: JLB | Date: 06-30-2022 | Sheet: D-1 |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | 21 North Park Street, 6th Floor Madison, Wisconsin 53715 | | Of: 3 |



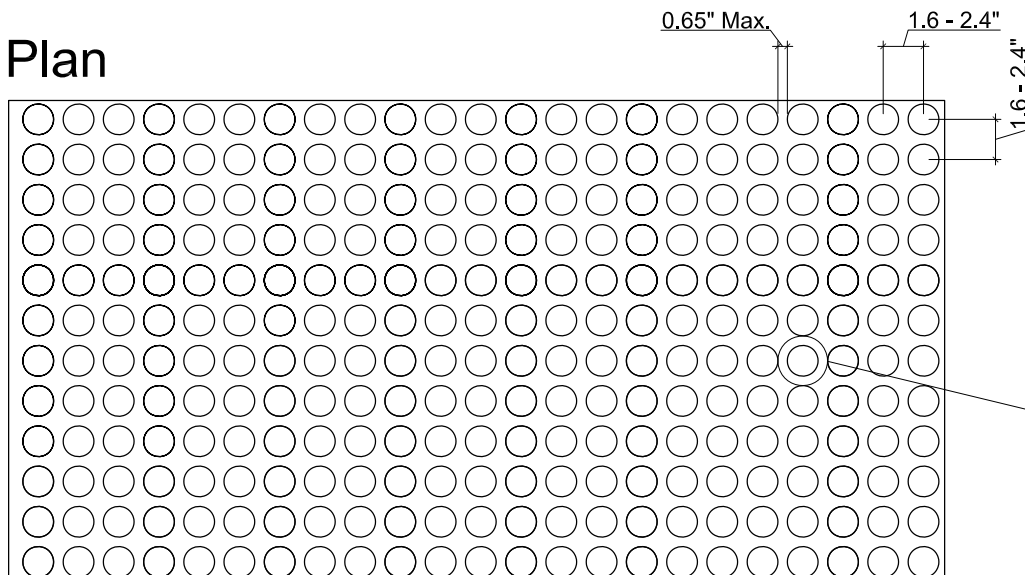
A
D-10 Paired Perpendicular Ramps
Scale: Not to Scale

Notes

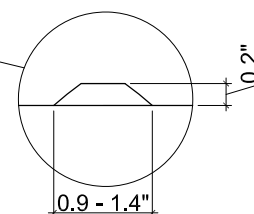
1. This detail shall only to be used when there is pedestrian cross traffic over curb ramps.
2. Paired perpendicular ramps as shown above shall be used at all times, including cases where other ramps in the intersection are single diagonal, unless clearly infeasible or another design is specified. Single diagonal use to be approved by UW Transportation Services and the office of Campus Planning and Landscape Architecture.
3. Ramp runs shall be 8.3% (1:12) or less. Landings at the top of a ramp run shall be level and at least 48" x 48". Where provided, curb ramp flares shall not be steeper than 1:10.
4. Surface texture of the ramp shall be obtained by coarse brooming transverse to the slope.
5. Remove concrete to nearest joint in reconstruction projects.
6. Diagonal or corner type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a clear space 48 inches (1220 mm) minimum outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings shall provide 48 inches minimum clear space within the markings. Diagonal curb ramps with flared sides shall have a segment of curb 24 inches long minimum located on each side of the curb ramp and within the marked crossing.
7. Detectable Warning Plate
 - a. Detectable warning plate shall be cast iron Neenah Foundry # R-4984. No substitutions.
 - b. Detectable warning plate shall have a natural color finish.
 - c. Truncated domes shall have a base diameter of 0.9" minimum to 1.4" maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum and a height of 0.2".
 - d. Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6" minimum and 2.4" maximum, and a base-to-base spacing of 0.65" minimum, measured between the most adjacent domes on square grid.
 - e. The detectable warning plate shall be located so that the edge nearest the curb line is 6" minimum and 8" maximum from the curb line.
8. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the curb ramp shall not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.

| | | | |
|--|---|---|-------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard Curb Cut | Designed By: N/A | Date: 06/2017 |
| | Drawing Title: Paired Perpendicular Ramps | Drawn By: TD | Scale: NTS |
| | Building No.: N/A | Project No: | |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site\Curb-Cuts-Truncated Domes\Curb & Ramp Details Ver2_2018.dwg | Revision: 01 | Date: 06-09-2022 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street, 6th Floor Madison, Wisconsin 53715 | |
| | | | Sheet: D-2 |
| | | | Of: 3 |

Plan



Section



A

D-12


Standard Truncated Dome Surface

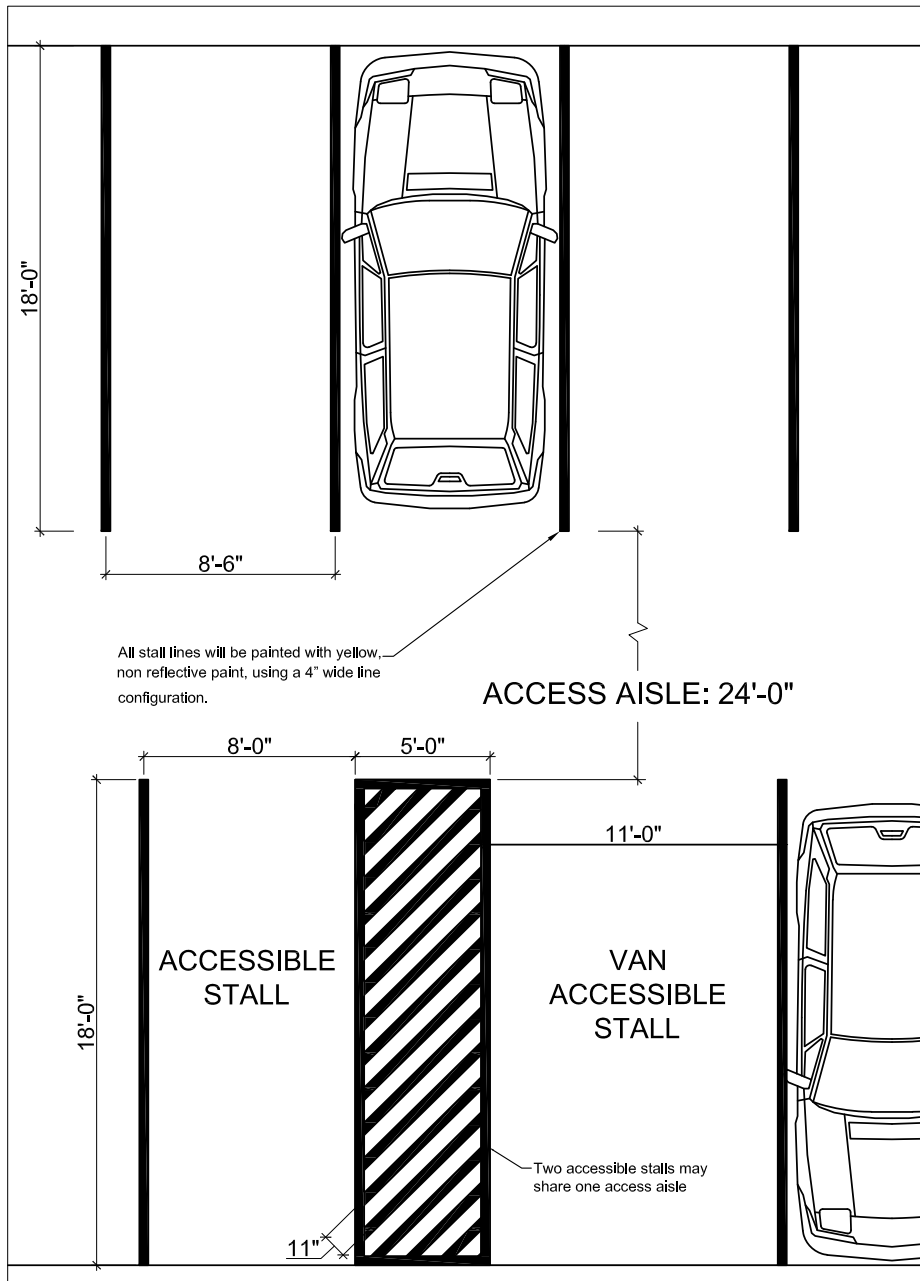
Scale: Not to Scale

Notes

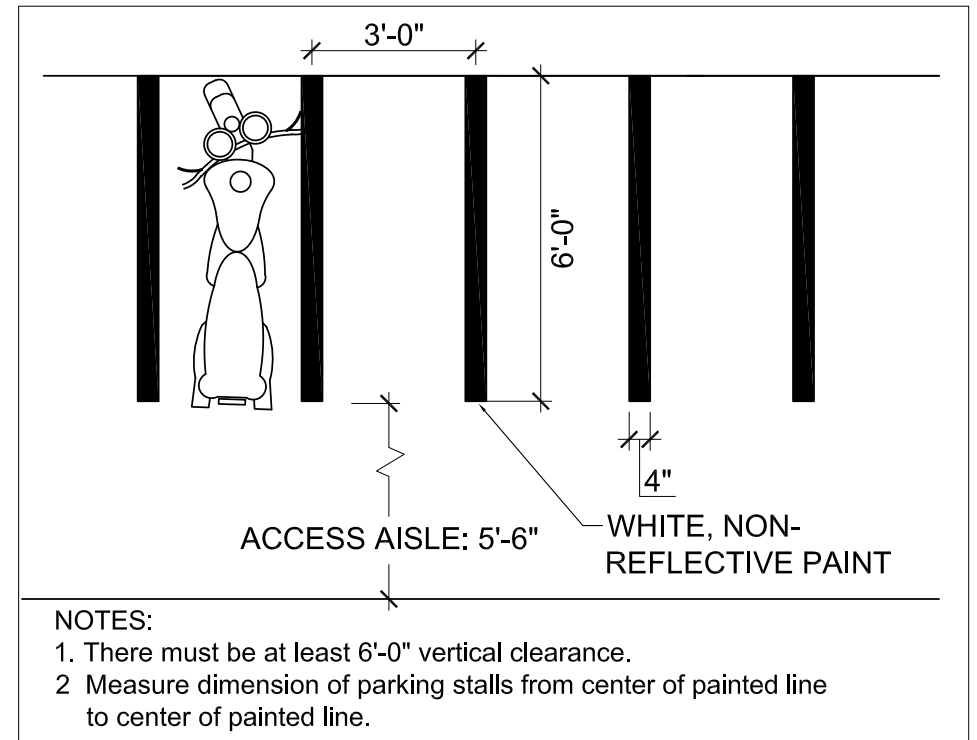
1. Detectable warning surface

- Detectable warning surface shall be cast iron Neenah Foundry # R-4984. No substitutions.
- Detectable warning surface shall have a natural color finish.
- Truncated domes in a detectable warning surface shall have a base diameter of 0.9" minimum to 1.4" maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum and a height of 0.2".
- Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6" minimum and 2.4" maximum, and a base-to-base spacing of 0.65" minimum, measured between the most adjacent domes on square grid.
- The detectable warning surface shall be located so that the edge nearest the curb line is 6" minimum and 8" maximum from the curb line.

| | | | |
|--|--|---|------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: Campus Standard Curb Cut | Designed By: N/A | Date: 06/01/2017 |
| | Drawing Title: Standard Truncated Dome Surface | Drawn By: TD | Scale: NTS |
| | Building No.: N/A | Revision: JLB | Date: 06-30-2022 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site\Curbs-Cuts-Truncated Domes\Curb & Ramp Details Ver2_2018.dwg | 21 North Park Street, 6th Floor Madison, Wisconsin 53715 | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | Sheet: D-3 Of: 3 | |




1
C-1 **VEHICULAR PARKING STANDARDS**
SCALE: NOT TO SCALE

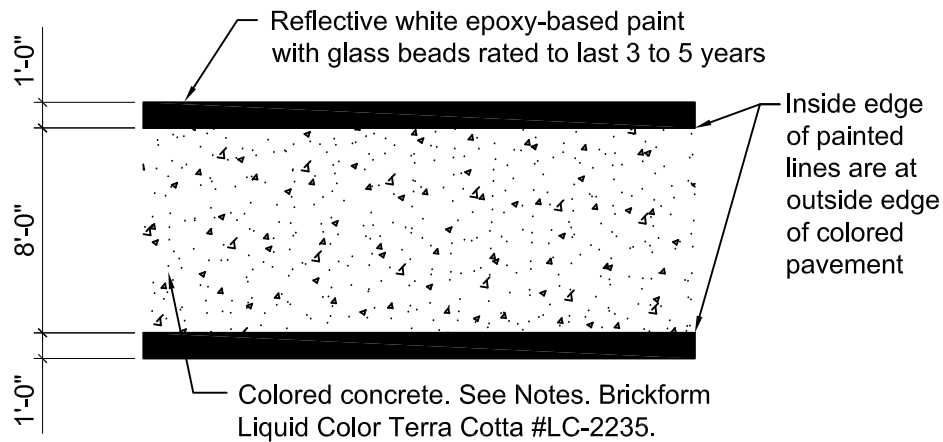


2
C-1 **MOPED PARKING STANDARDS**
SCALE: NOT TO SCALE

NOTE:

1. There must be at least 7'-4" vertical clearance; 8'-4" is desired for first-floor parking ramp and van accessible areas.
2. Accessible stalls shall not have ADA logos painted on them.
3. Measure dimension of parking stalls from center of painted line to center of painted line.

| | | | |
|---|---|---|----------------------------|
|  <p>WISCONSIN UNIVERSITY OF WISCONSIN-MADISON</p> | Project: Campus Standard Parking Stall Dimensions | Designed By: <small>Transportation Services</small> RJR | Date: 07-23-2010 |
| | Drawing Title: Moped & Vehicular Stall Layout | O.S.M.: | Scale: NTS |
| | Building No.: N/A | Revision: JTJW / JLB | Date: 1-15-2012 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Parking Stalls\Parking stall details_July 2010.dwg | HF | 06-09-2022 |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | 21 North Park Street 6th Floor Madison, WI 53715 | Sheet: C-1 Of: 1 |



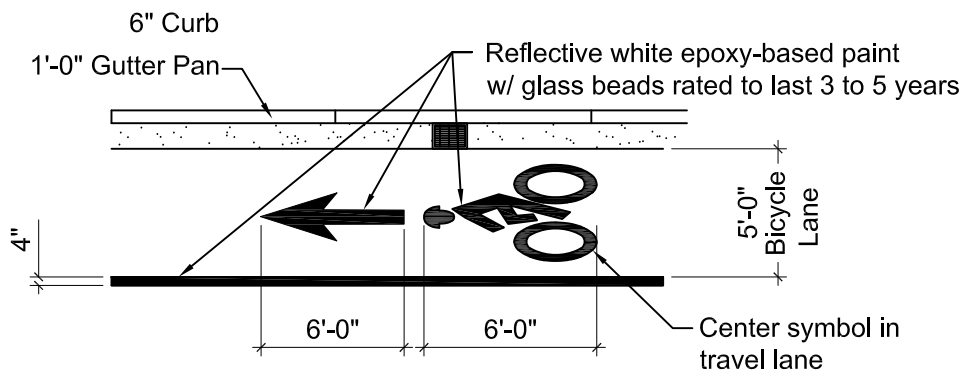
Colored Concrete Major Crosswalk Notes:

1. Colored concrete will be Brickform Liquid Color Terra Cotta #LC-2235.
2. Control joints will be hand tooled. Depth equal to 1/4 inch per 1 inch of concrete thickness. No expansion joints. Tooled then sawn unless tooling can obtain required depth and is approved by UW-Madison project manager.
3. Control joints will be spaced evenly and uniformly with no areas greater than 80 square feet.
4. Medium, broom finish perpendicular to pedestrian traffic flow.
5. Seal after concrete cures.

*** Concrete pattern mold used in older colored concrete crosswalks is Ashlar Cut Slate Brickform Texture Mats, Mold #FM-3125.

1 Colored Concrete Major Crosswalk

Detail NTS



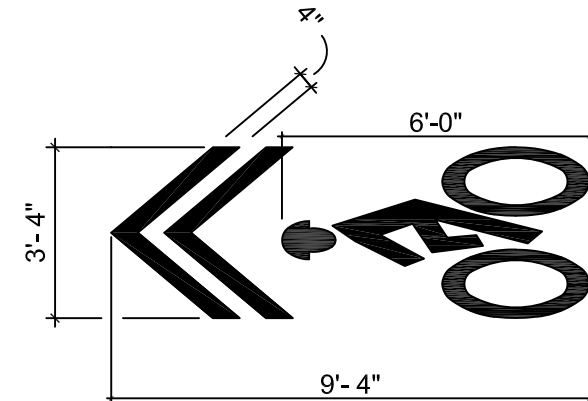
3 Bicycle Lane

D-1

Detail
NTS

General Notes:

1. All other pavement markings (those without detail drawings) shall be designed with consultation with UW-Madison Transportation Services.
2. White pavement markings shall be reflective epoxy-based paint with glass beads rated to last 3 to 5 years.




Notes:

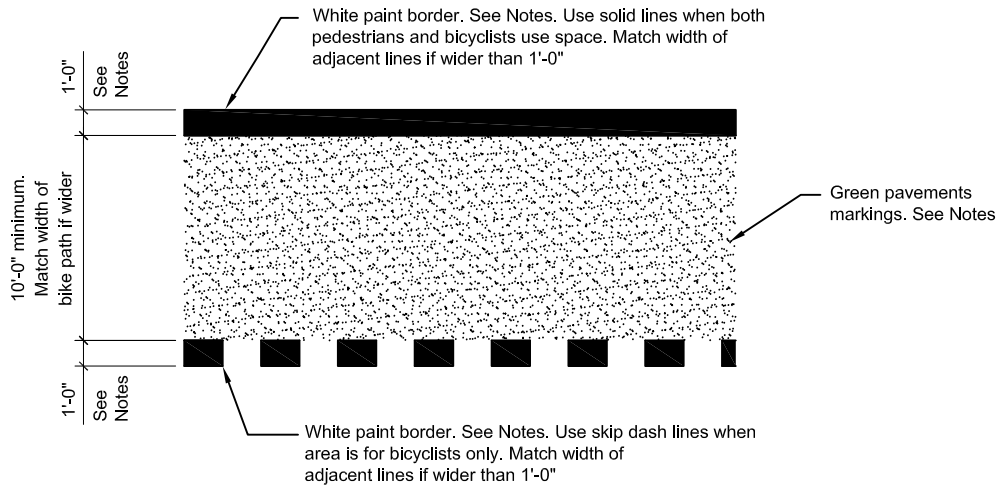
1. Arrows, pedestrian, and bicycle shall be solid, non-reflective, white paint
2. White paint borders on path crossings shall extend from gutter pan to gutter pan.
3. Chevrons shall point in direction of vehicular travel.
4. Center symbol in travel lane.

2 Bike Shared Lane Marking

D-1

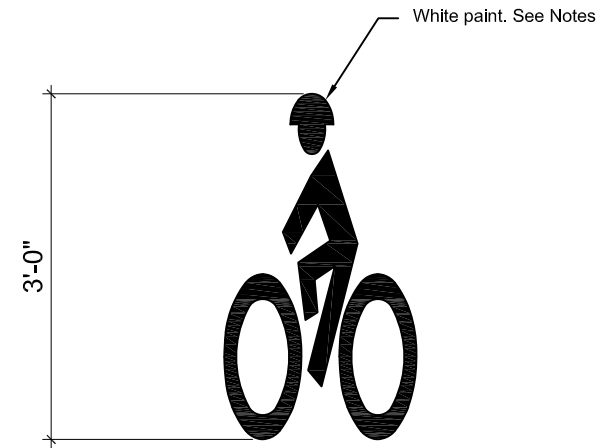
Detail
NTS

| | | | | | |
|--|----------------|--|-----|---|-----------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: | CAMPUS STANDARD PAVEMENT MARKINGS | | Designed By: N/A | Date: 5-25-2018 |
| | | | | Drawn By: JMS & RDK | Scale: |
| | Drawing Title: | CROSSWALK & BIKE LANE DETAILS | | O.S.M.: | NTS |
| | Building No.: | N/A | | Revision: | Date: |
| | File: | L:\ACAD\PLANNING\Details, Title Blocks, Blocks\ Details\Site\Pavement Markings\Pavement Marking Details.dwg | | JLB / HF | 07-05-2022 |
| | | | JLB | 09-28-2022 | D-1 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | | | 21 North Park Street 6th Floor Madison, WI 53715 | |
| | | | | Of: | 5 |



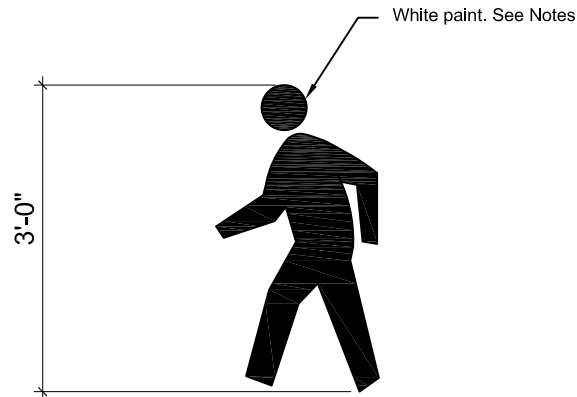
1 Green Bike Path Crossings

Detail
NTS



2 Bike Symbol for Path Crossings

Detail
NTS




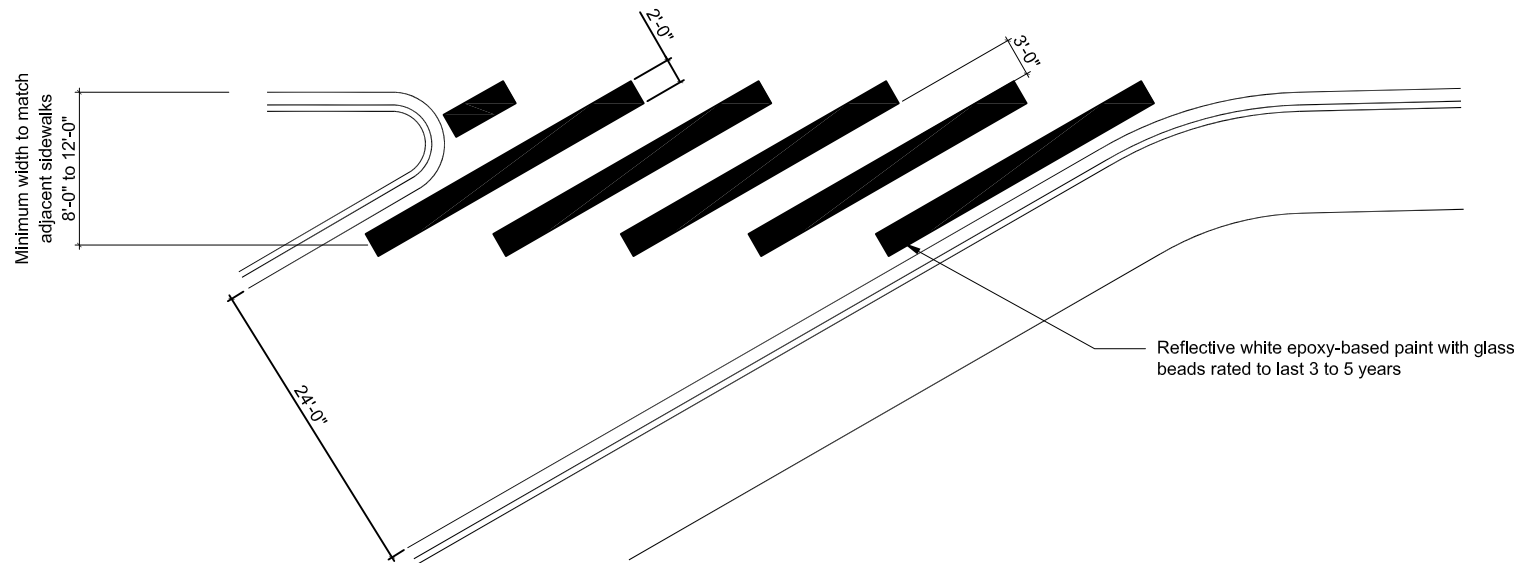
3 Pedestrian Symbol for Path Crossings

Detail
NTS

Notes:

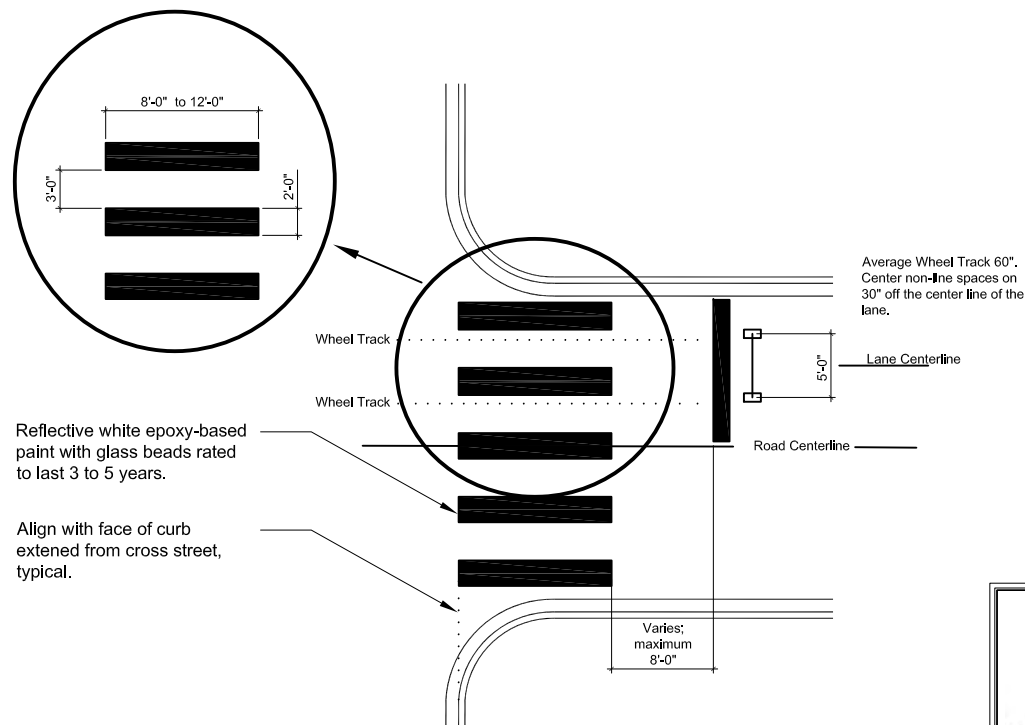
1. White paint borders on path crossings shall extend from gutter pan to gutter pan.
2. White pavement markings shall be reflective epoxy-based paint with glass beads rated to last 3 to 5 years.
3. Green pavement markings shall be Color-Safe™ by Transpo Industries, Inc., "Bike Lane Green" color.
4. Bike and pedestrian icons shall be oriented to face motor vehicle traffic. Use campus standard icons.
5. Bike path widths should be 10'-0" minimum.
6. Width of paint border for path crossing can be 1'-6" wide if context warrants it.

| | | | | | |
|--|---|---|---------------------|------------|-------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: CAMPUS STANDARD PAVEMENT MARKINGS | | Designed By: N/A | | Date: 5-16-2006 |
| | Drawing Title: GREEN BIKE PATH CROSSING DETAILS | | Drawn By: JMS & RDK | | Scale: NTS |
| | Building No.: N/A | | O.S.M.: | | Sheet: D-2 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Pavement Markings\Pavement Marking Details.dwg | | Revision: | Date: | |
| | | | GFM | 06-02-2015 | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | JLB / HF | | 07-05-2022 | |
| | | 21 North Park Street 6th Floor Madison, WI 53715 | | Of: 5 | |



1 Continental Crosswalks - Angled

Not to Scale




2 Continental Crosswalks - Perpendicular

Not to Scale

Notes:

1. Continental crosswalks shall have 24 inch wide, 8 to 12 foot long crossbars, placed parallel to vehicle traffic flow.
2. The minimum crossbar width should match the larger of the adjacent sidewalks.
3. The spacing or gap between the crossbars is 24 to 36 inches. This can vary to minimize contact with vehicle tires. These distances may vary within one crosswalk (the spaces do not need to be exactly consistent).
4. Begin crossbar layout with one bar centered on the road centerline and work toward curbs.
5. Crossbar edge matches face of curb of cross street.

| | | | | | | |
|--|---|--|---|-------|------------------|------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: CAMPUS STANDARD PAVEMENT MARKINGS | | Designed By: N/A | | Date: 03-10-2020 | |
| | | | Drawn By: RHJ | | Scale: NTS | |
| | Drawing Title: Continental Crossing | | O.S.M.: | | | |
| | Building No.: N/A | | Revision: | Date: | | Sheet: D-3 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Pavement Markings\Pavement Marking Details.dwg | | JLB / HF 07-05-2022 | | | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | | 21 North Park Street 6th Floor Madison, WI 53715 | | | Of: 5 |

White Paint Border

Reflective white epoxy-based paint with glass beads rated to last 3 to 5 years.

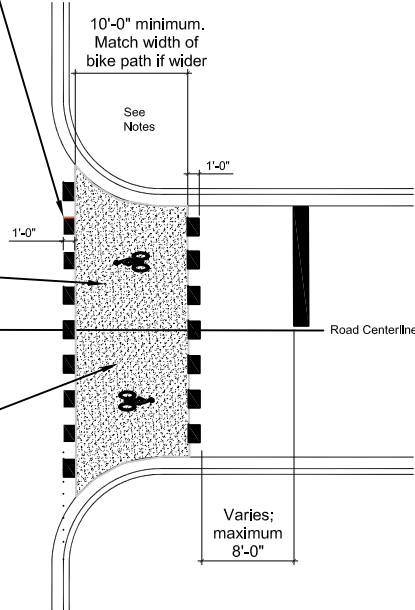
Use skip dash lines when area is for bicycles only. Match width of adjacent lines if wider than 1'-0".

Green Pavement Marking

Color-Safe™ by Transpo Industries, Inc., "Bike Lane Green" color.

White Paint Bike Symbol

Reflective white epoxy-based paint with glass beads rated to last 3 to 5 years.



Notes:

1. White paint borders on path crossings shall extend from gutter pan to gutter pan.
2. Bike and pedestrian icons shall be oriented to face motor vehicle traffic. Use campus standard symbols.
3. Width of paint border for path crossing typically 12" but can be 1'-6" wide if context warrants it.

1 Green Bike Path Crossing (Bicycles Only) D-4 Not to Scale

White Paint Border.

Reflective white epoxy-based paint with glass beads rated to last 3 to 5 years.

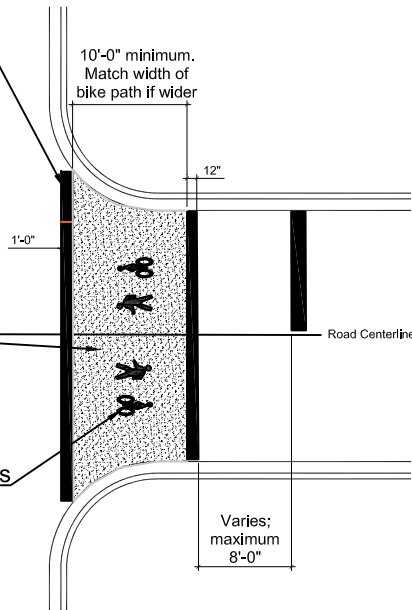
Use skip dash lines when area is for bicycles only. Match width of adjacent lines if wider than 1'-0".

Green Pavement Marking

Color-Safe™ by Transpo Industries, Inc., "Bike Lane Green" color.

White Paint Bike & Ped Symbols

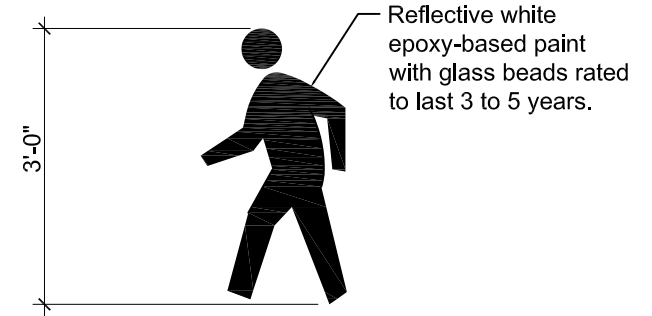
Reflective white epoxy-based paint with glass beads rated to last 3 to 5 years.



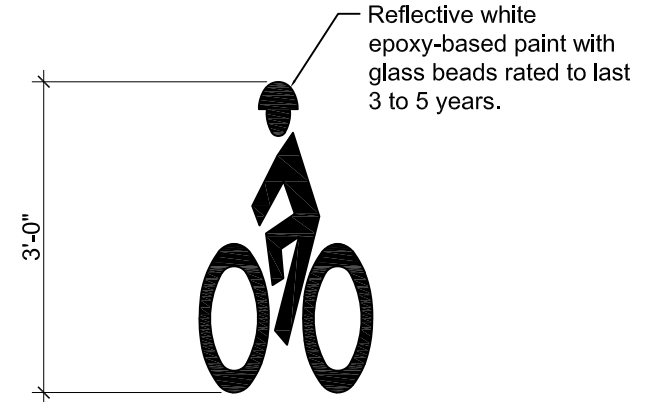
Notes:

1. White paint borders on path crossings shall extend from gutter pan to gutter pan.
2. Bike and pedestrian icons shall be oriented to face motor vehicle traffic. Use campus standard symbols.
3. Width of paint border for path crossing typically 12" but can be 1'-6" wide if context warrants it.


2 Green Multi-Use Path Crossing D-4 Not to Scale

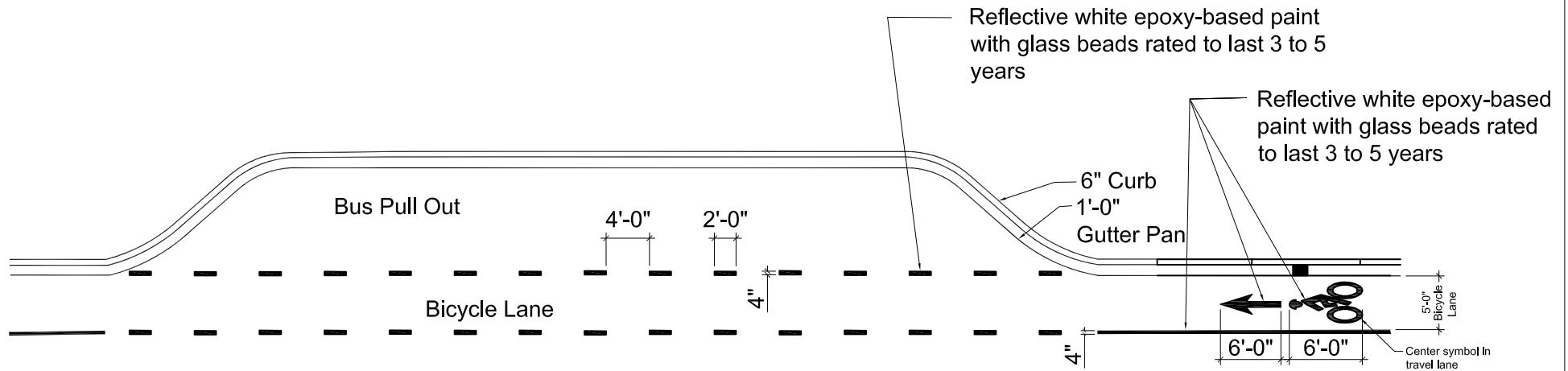


3 Pedestrian Symbol for Path Crossings D-4




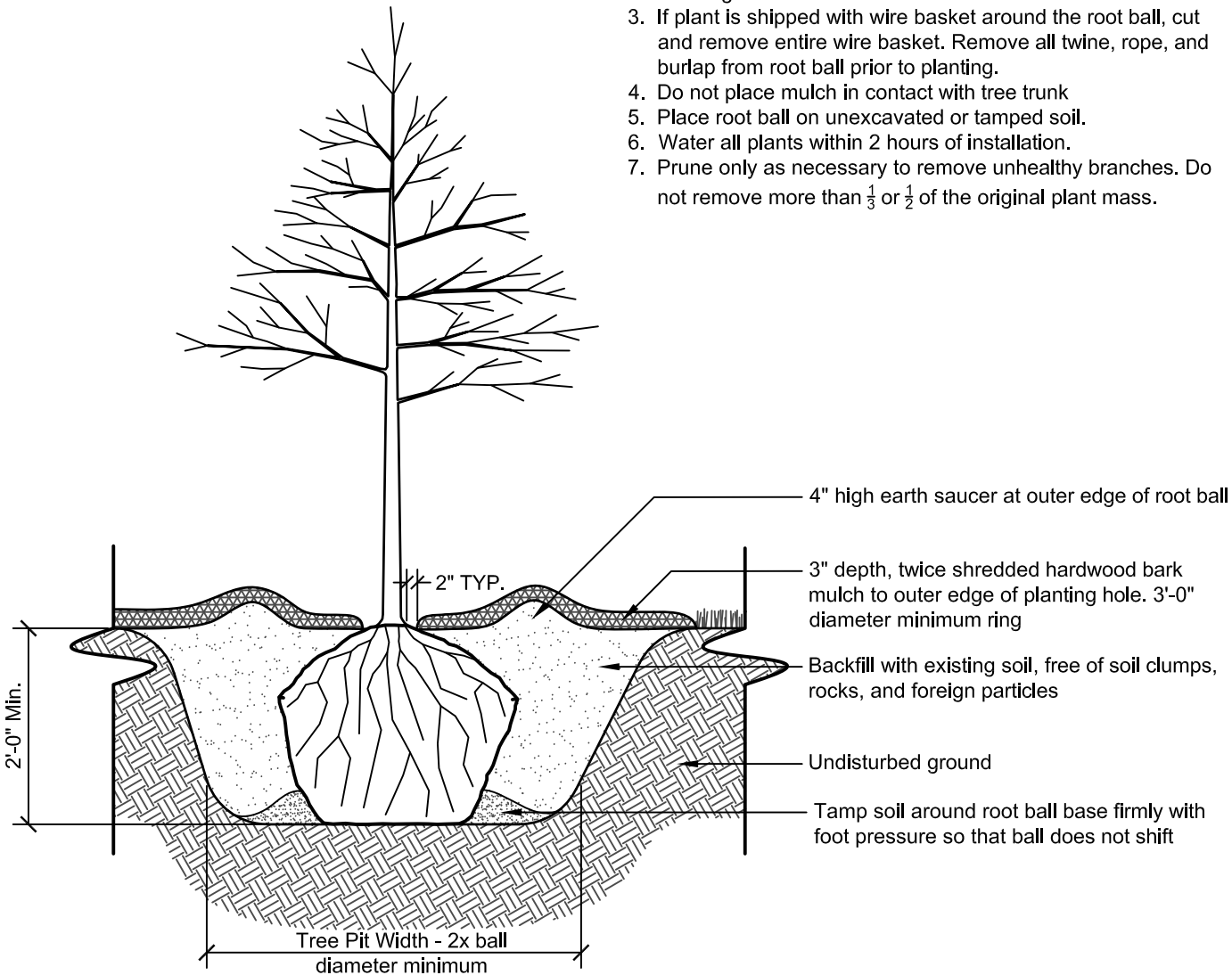
4 Bike Symbol for Path Crossings D-4

| | | | |
|---|---|---|------------------|
|  | Project: CAMPUS STANDARD PAVEMENT MARKINGS | Designed By: N/A | Date: 03-10-2020 |
| | Drawing Title: GREEN PATH CROSSING DETAILS | Drawn By: RHJ | Scale: NTS |
| | Building No.: N/A | O.S.M.: | Sheet: D-4 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Pavement Markings\Pavement Marking Details.dwg | Revision: JLB / HF | Date: 07-05-2022 |
| | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | 21 North Park Street 6th Floor Madison, WI 53715 | Of: 5 |



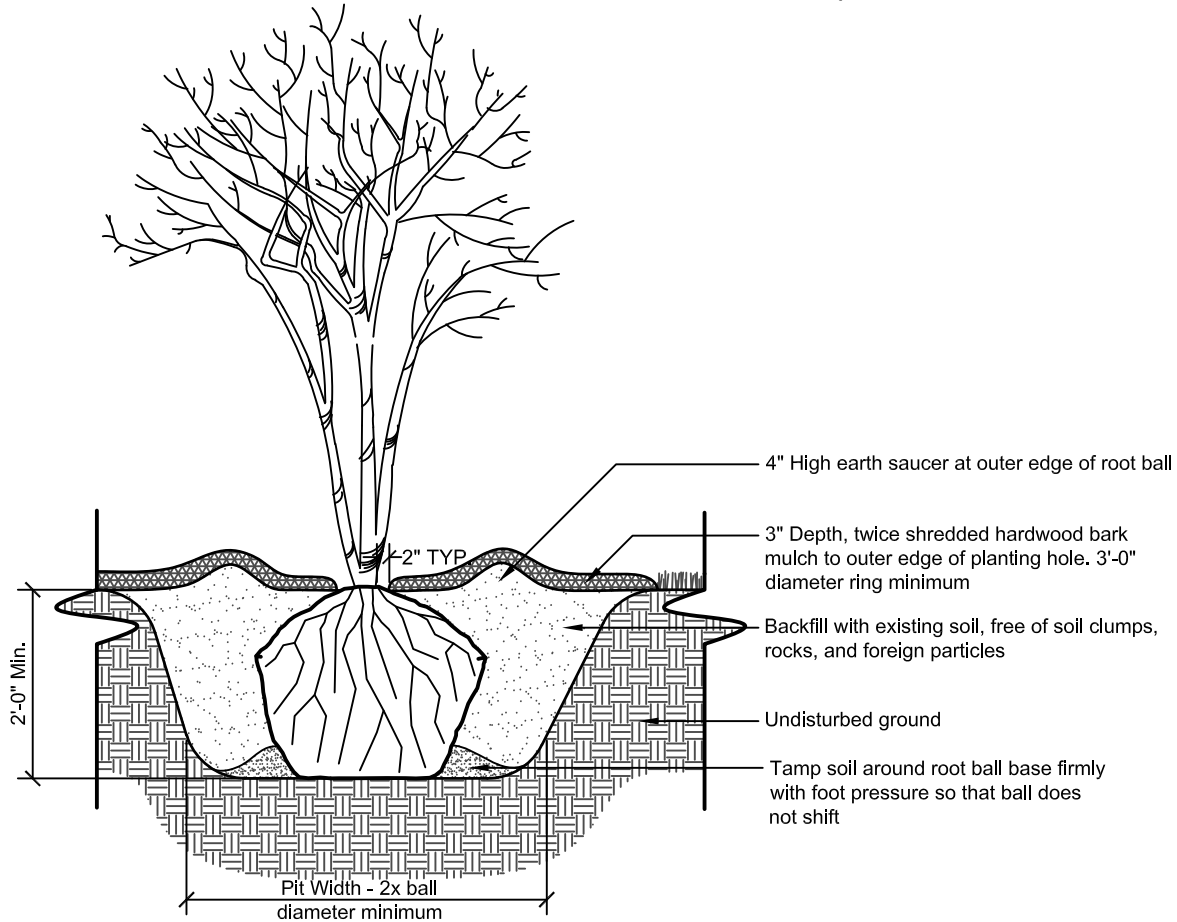
1 Bicycle Lane at Bus Pull-out and Road
D-5 Not to Scale

| | | | | | |
|--|--|---|--------------------|-------|------------------|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | Project: CAMPUS STANDARD PAVEMENT MARKINGS | | Designed By: N/A | | Date: 03-10-2020 |
| | Drawing Title: GREEN PATH CROSSING DETAILS | | Drawn By: RHJ | | Scale: NTS |
| | Building No.: N/A | | O.S.M.: | | Sheet: D-5 |
| | File: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\ Details\Pavement Markings\Pavement Marking Details.dwg | | Revision: JLB / HF | | |
| | | | | | |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street 6th Floor Madison, WI 53715 | | Of: 5 | |




1
C-1 **BALL AND BURLAP TREE PLANTING DETAIL**
SCALE: NOT TO SCALE

- NOTES:
1. Plant each tree such that the base of the root flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
 2. Depth of the planting hole shall be determined and dug after the root flare is located. Planting hole shall be no deeper than the height of the root ball.
 3. If plant is shipped with wire basket around the root ball, cut and remove entire wire basket. Remove all twine, rope, and burlap from root ball prior to planting.
 4. Do not place mulch in contact with tree trunk
 5. Place root ball on unexcavated or tamped soil.
 6. Water all plants within 2 hours of installation.
 7. Prune only as necessary to remove unhealthy branches. Do not remove more than $\frac{1}{3}$ or $\frac{1}{2}$ of the original plant mass.



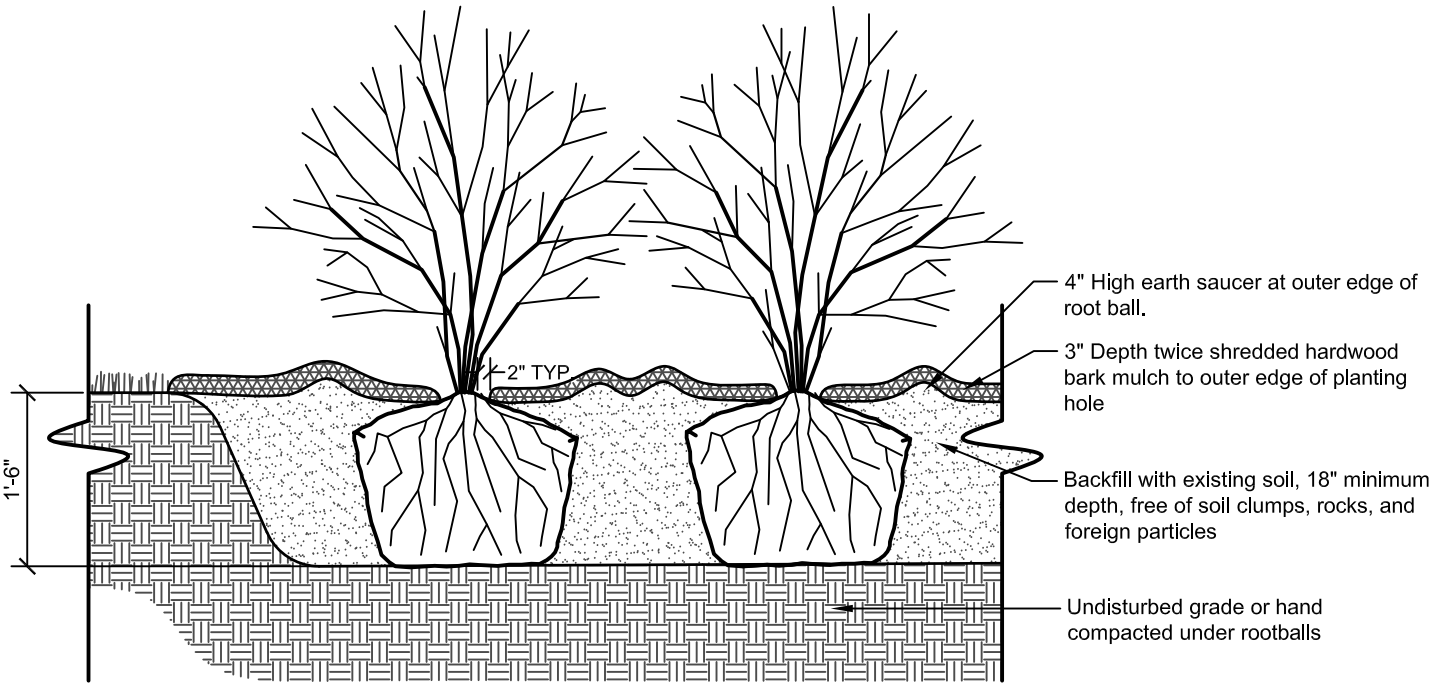
2
C-1 **BALL AND BURLAP MULTI-STEM PLANTING DETAIL**
SCALE: NOT TO SCALE

- NOTES:
1. Plant each tree such that the base of the root flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
 2. Depth of the planting hole shall be determined and dug after the root flare is located. Planting hole shall be no deeper than the height of the root ball.
 3. If plant is shipped with a wire basket around the root ball, cut and remove entire wire basket. Remove all twine, rope, and burlap from root ball prior to planting.
 4. Do not place mulch in contact with stems.
 5. Place root ball on unexcavated or tamped soil.
 6. Water all plants within 2 hours of installation.
 7. Prune only as necessary to remove unhealthy branches. Do not remove more than $\frac{1}{3}$ of the original plant mass.

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
|  WISCONSIN UNIVERSITY OF WISCONSIN-MADISON | | | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | | 21 North Park Street 6th Floor Madison, Wisconsin 53715 | | |
| Project: | | | Drawing Title: | | | Building Number: | | |
| Date: | | | Designed By: | | | Drawn By: | | |
| 10/05/2015 | | | DN | | | DN | | |
| Revision No.: | | | Date: | | | By: | | |
| 1 | | | 06/30/2022 | | | JLB | | |
| Graphic Scale: | | | North: | | | Sheet: | | |
| | | | | | | C-1 | | |
| | | | | | | Of: 5 | | |

NOTES:

- 1. Plant each shrub such that the root flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
- 2. Depth of the planting hole shall be determined and dug after the root flare is located. Planting hole shall be no deeper than the height of the root ball.
- 3. If plant is shipped with a wire basket around the root ball, cut and remove the wire basket. Remove all twine, rope, and burlap from all root balls.
- 4. Place root ball on unexcavated or tamped soil.
- 5. Do not place mulch in contact with stems.
- 6. Water all plants within 2 hours of installation.
- 7. Prune only as necessary to remove unhealthy branches. Do not remove more than $\frac{1}{3}$ of the original plant mass.



3

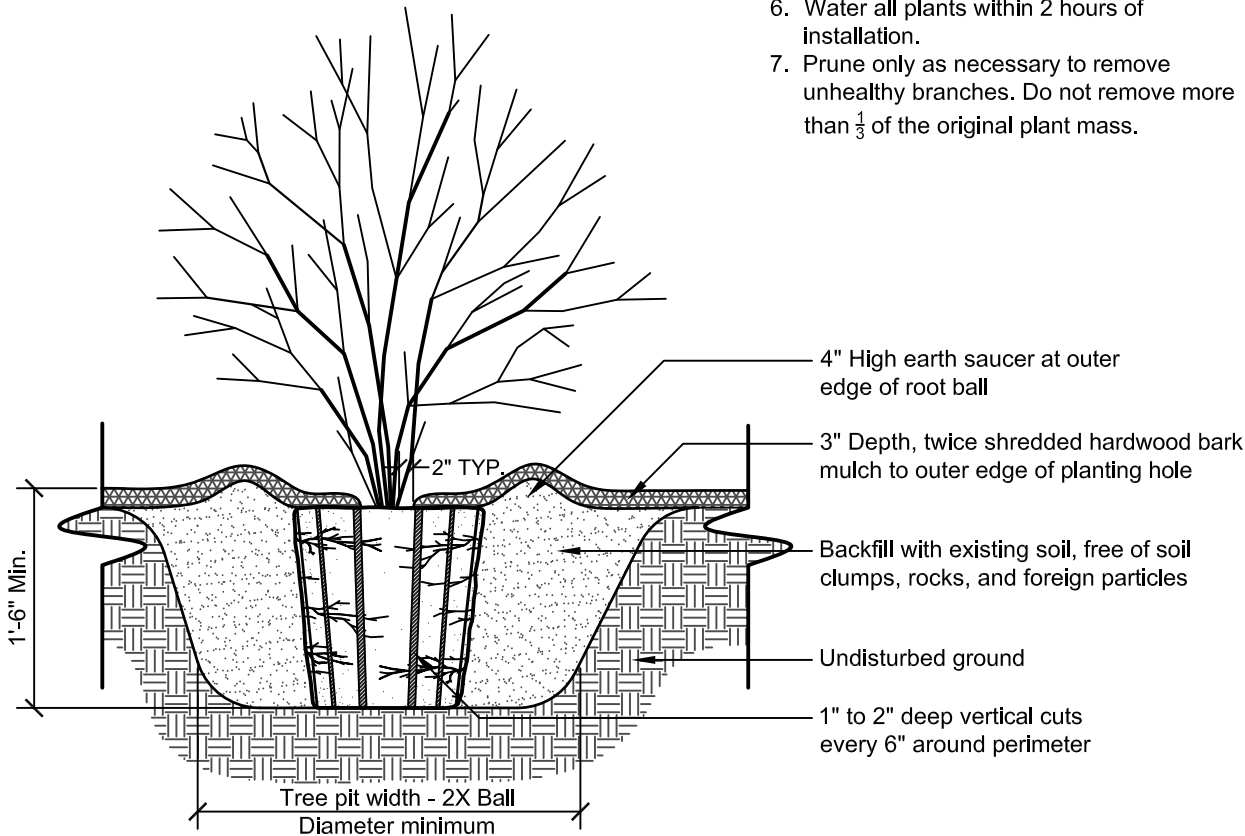
C-2

BALL AND BURLAP SHRUB PLANTING DETAIL

SCALE: NOT TO SCALE

NOTES:

- 1. For 3 to 10 gallon containers: Make 1" to 2" deep vertical cuts every 6" around the circumference of the root ball before planting.
- 2. Plant each shrub or perennial such that the root flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
- 3. Planting hole shall not be deeper than the height of the root ball.
- 4. Do not place mulch in contact with stems.
- 5. Place root ball on unexcavated or tamped soil.
- 6. Water all plants within 2 hours of installation.
- 7. Prune only as necessary to remove unhealthy branches. Do not remove more than $\frac{1}{3}$ of the original plant mass.




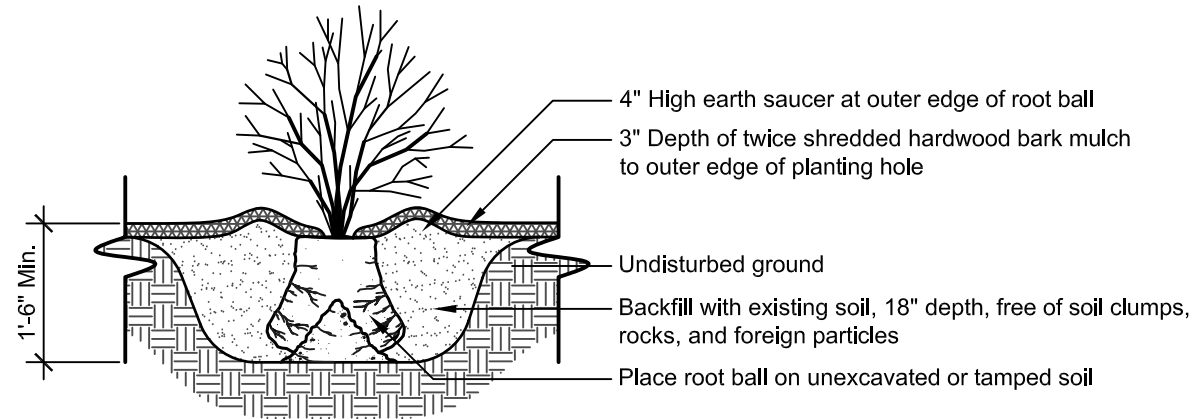
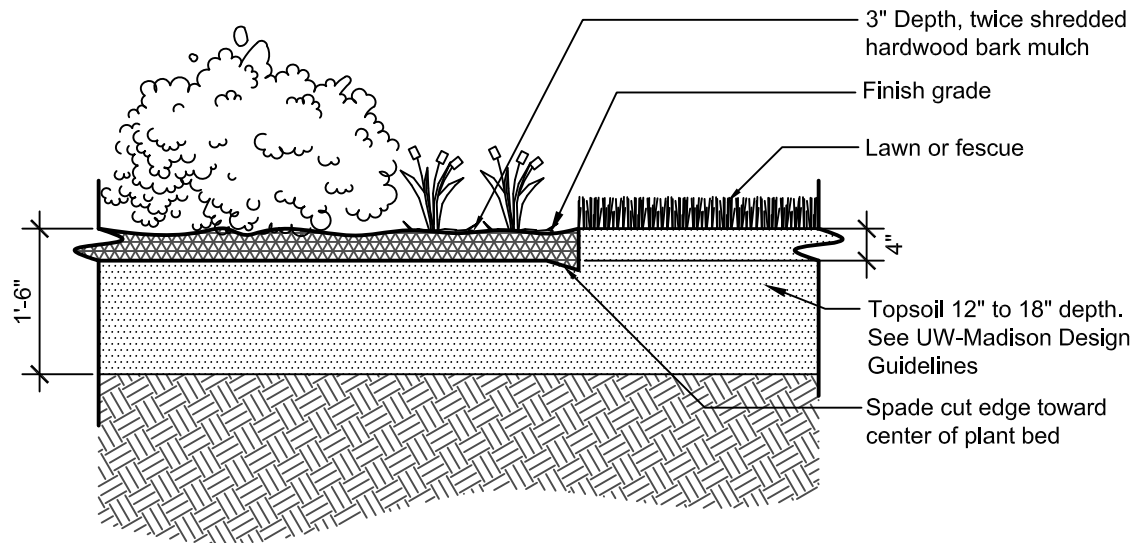
4

C-2

LARGE CONTAINER PLANTING DETAIL

SCALE: NOT TO SCALE

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| <div><div>WISCONSIN</div><div>UNIVERSITY OF WISCONSIN-MADISON</div></div> | | | FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | | 21 North Park Street 6th Floor Madison, Wisconsin 53715 | | |
| Project: | | | Drawing Title: | | | Building Number: | | |
| Date: | | | Designed By: | | | Drawn By: | | |
| Revision No.: | | | Date: | | | By: | | |
| Graphic Scale: | | | North: | | | Sheet: | | |
| | | | | | | C-2 | | |
| | | | | | | Of: 5 | | |



NOTES:

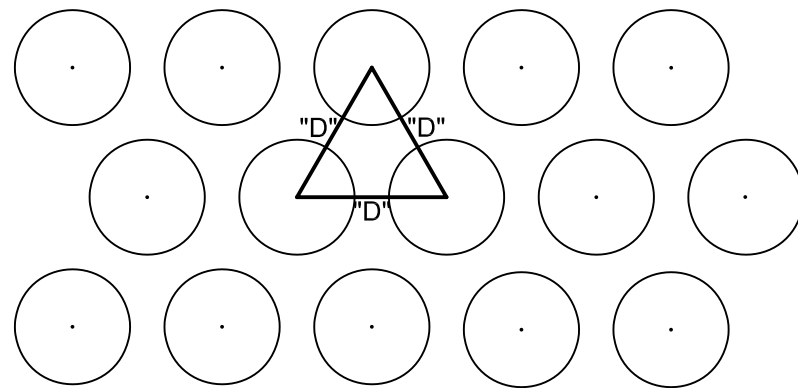
1. For 1 to 2 gallon containers: butterfly root ball. Sever lower $\frac{1}{3}$ to $\frac{1}{2}$ of root ball with a single cut. Spread open severed root ball and place against bottom of the mounded planting hole.
2. Plant each shrub or perennial such that the stem flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
3. Planting hole shall be no deeper than the height of the root ball.
4. Do not place mulch in contact with stems or on top of perennials.
5. Water all plants within 2 hours of installation.
6. Prune only as necessary to remove unhealthy branches. Do not remove more than $\frac{1}{3}$ of the original plant mass.

5

PLANTING BED EDGE DETAIL

C-3

SCALE: NOT TO SCALE



Sidewalk, hardscape, or planting bed edge

D=Dimension of plant spacing as indicated on site plan.

6

PLANT SPACING DETAIL

C-3

SCALE: NOT TO SCALE

7

SMALL CONTAINER PLANTING DETAIL

C-3

SCALE: NOT TO SCALE



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

FACILITIES PLANNING AND MANAGEMENT
Campus Planning & Landscape Architecture

21 North Park Street | 6th Floor
Madison, Wisconsin 53715

Project: Campus Standard Planting Details

Drawing Title: Planting Details

Building Number:

File Location:
L:\ACAD\PLANNING\Details Title Blocks
Blocks\Details\Plants\Planting\PlantDetails_01.10.22.dwg

Date: 10/05/2015

Project Number:

Designed By: DN

Drawn By: DN

Revision No.:

Date:

By:

1

06/30/2022

JLB

Graphic Scale:

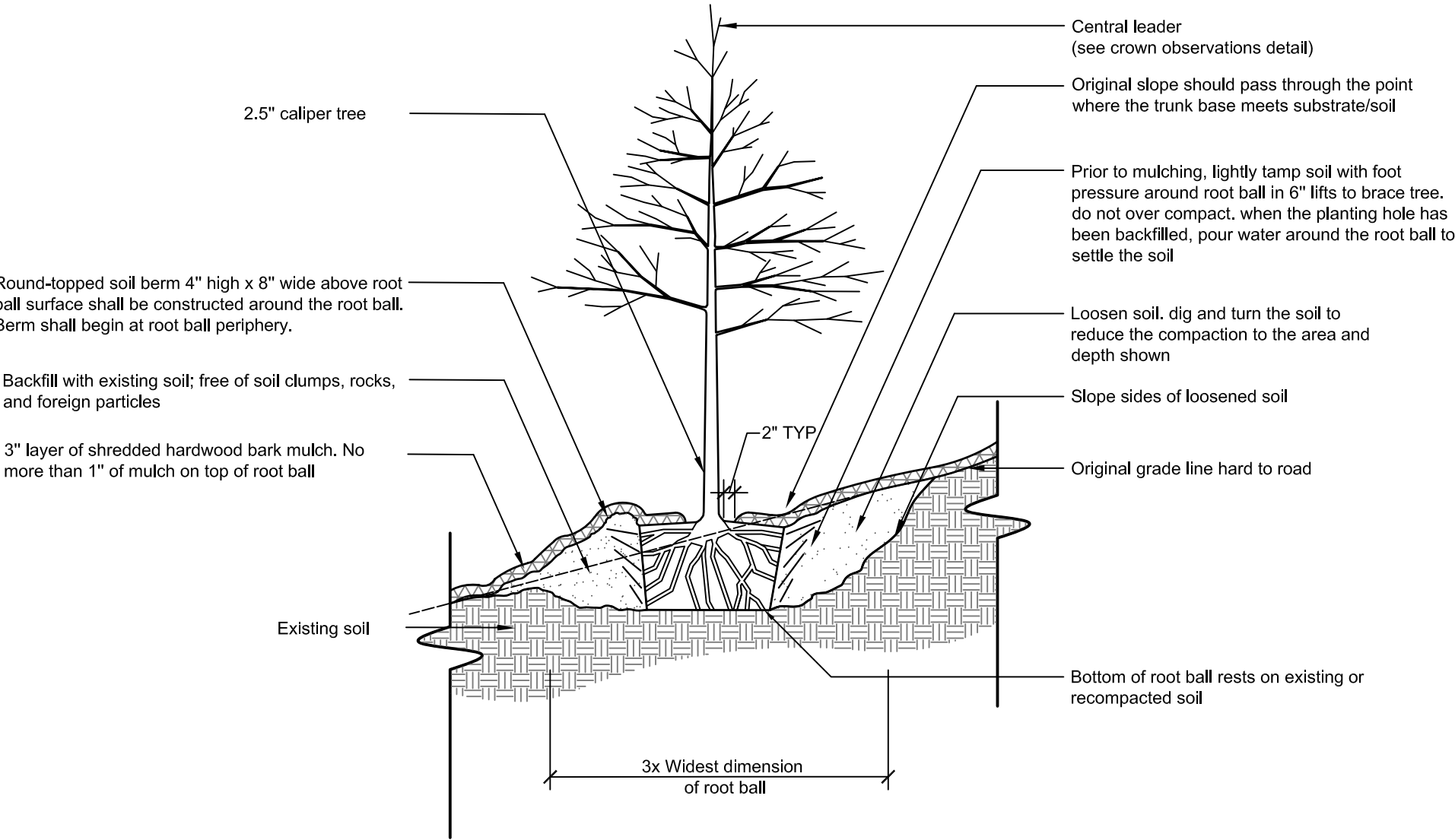
North:

Sheet:

C-3

Of: 5

- Notes:
1. Plant each tree such that the base of the root flare is visible at the top of the root ball. Do not cover the top of the root ball with soil.
 2. Depth of the planting hole shall be determined and dug after the root flare is located. Planting hole must be no deeper than the height of the root ball.
 3. If plant is shipped with a wire basket around the root ball, cut and remove entire wire basket. Remove all twine, rope, and burlap from root ball prior to planting.
 4. Do not place mulch in contact with stems.
 5. Place root ball on unexcavated or tamped soil.
 6. Water all plants within 2 hours of installation.
 7. Prune only as necessary to remove unhealthy branches. Do not remove more than 1/3 of the original plant mass.
 8. References: UW-Madison Standard Tree Planting Detail & April 2018 Landscape Architecture Magazine. P64.



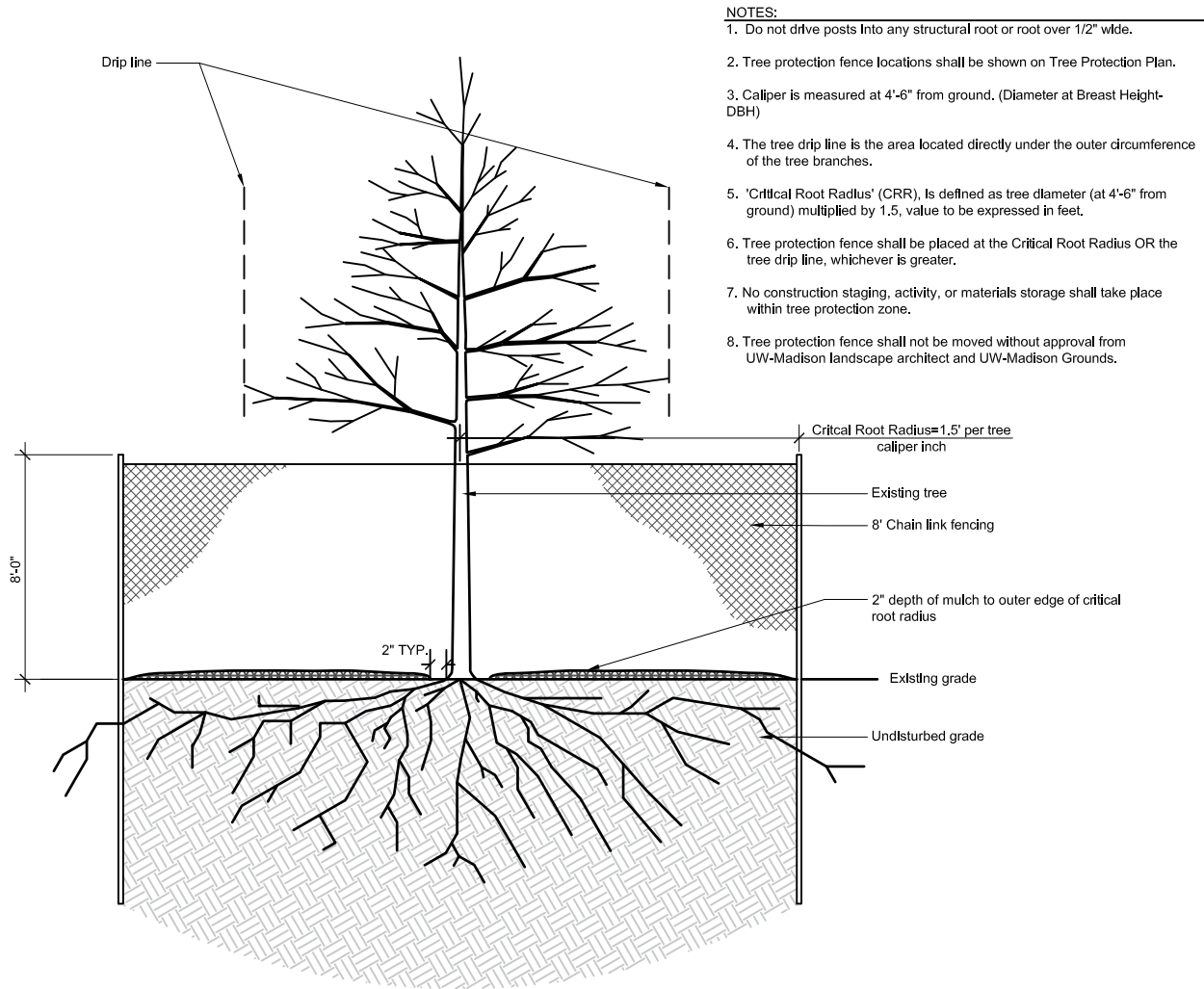
8 Tree planting on slope

C-4 Scale: not to scale

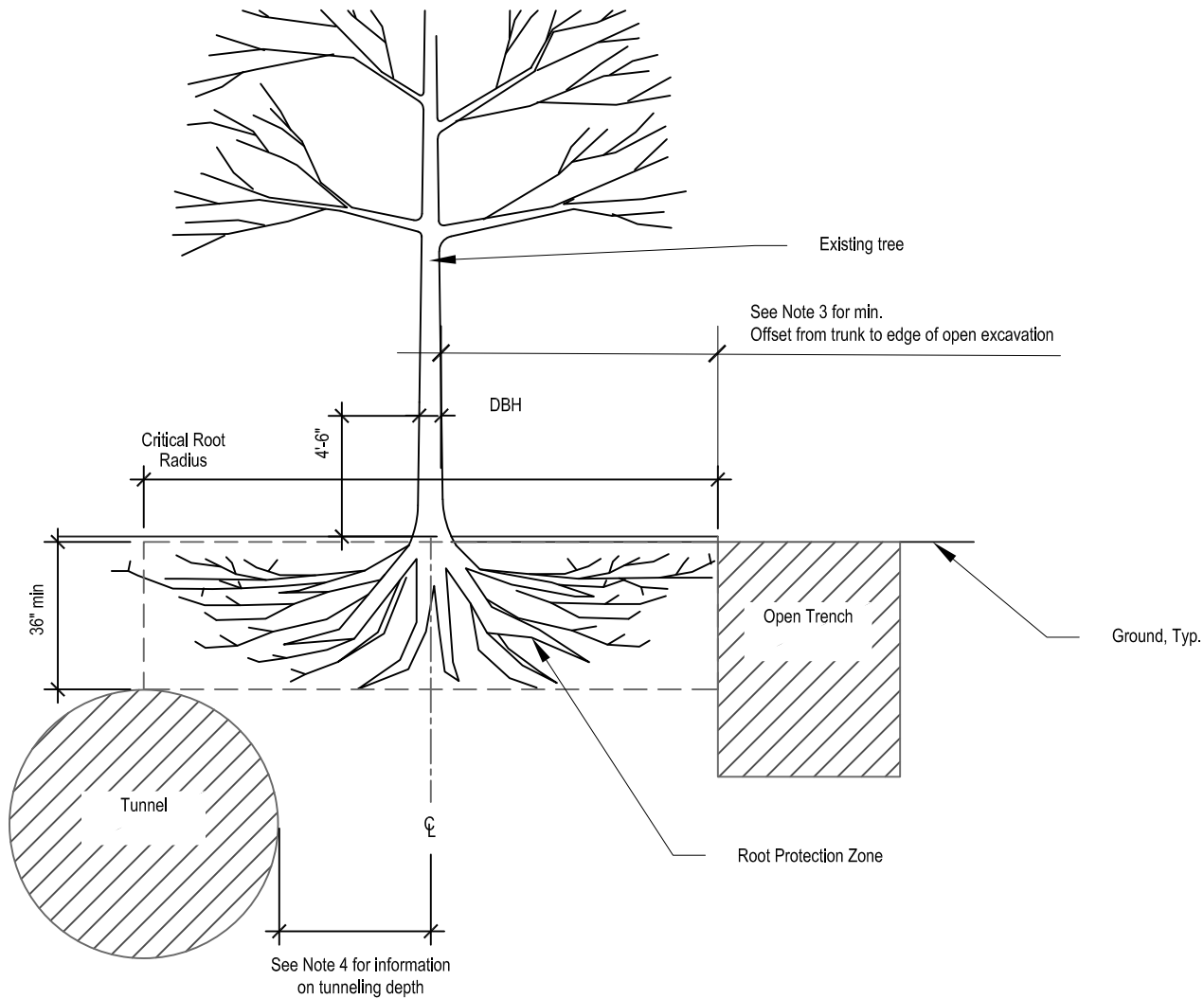


FACILITIES PLANNING AND MANAGEMENT
Campus Planning & Landscape Architecture
21 North Park Street | 6th Floor
Madison, Wisconsin 53715

| | | | | | | | |
|----------------------------------|------------|--------------------------------|--|------------------|--|---|--|
| Project: | | Drawing Title: | | Building Number: | | File Location: | |
| Campus Standard Planting Details | | Tree on Slope Planting Details | | | | L:\ACAD\PLANNING\Details Title Blocks Blocks\Details\Plants\Planting\PlantDetails_01.10.22.dwg | |
| Date: | | Project Number: | | Designed By: | | Drawn By: | |
| 06/25/2018 | | | | N/A | | CL | |
| Revision No.: | Date: | By: | | Graphic Scale: | | North: | |
| 1 | 06/30/2022 | JLB | | | | Sheet: | |
| | | | | | | C-4 | |
| | | | | | | Of: 5 | |



- NOTES:
1. Do not drive posts into any structural root or root over 1/2" wide.
 2. Tree protection fence locations shall be shown on Tree Protection Plan.
 3. Caliper is measured at 4'-6" from ground. (Diameter at Breast Height-DBH)
 4. The tree drip line is the area located directly under the outer circumference of the tree branches.
 5. 'Critical Root Radius' (CRR), is defined as tree diameter (at 4'-6" from ground) multiplied by 1.5, value to be expressed in feet.
 6. Tree protection fence shall be placed at the Critical Root Radius OR the tree drip line, whichever is greater.
 7. No construction staging, activity, or materials storage shall take place within tree protection zone.
 8. Tree protection fence shall not be moved without approval from UW-Madison landscape architect and UW-Madison Grounds.



- NOTES:
1. DBH [Diameter Breast Height]: The trunk diameter measured at 4'-6" above ground level.
 2. CRR [Critical Root Radius]: The surface area surrounding the trunk containing the roots that provide water and nutrient uptake to the tree. It is defined as tree diameter (at 4'-6" from ground) multiplied by 1.5, value to be expressed in feet.
 - a. Disturbing greater than 25% of the CRR is unacceptable unless authorized by UW-Madison landscape architect.
 - b. The cluster of larger roots immediately surrounding the trunk which provides tree stability (root plate) shall be protected from damage at all times
 3. Cleanly hand-cut any exposed roots within the open trench using clean and sharp tool. Do not rip or tear.

| Tree diameter @ DBH | Min distance from tree trunk to open trench |
|---------------------|---|
| Less than 6 inches | 6-Feet |
| 6-9 Inches | 9-Feet |
| 10-14 Inches | 14-Feet |
| 15-19 inches | 19-Feet |
| More than 19 inches | Dia. @ DBH x 1-1.5 (Feet) |

4. Tunnels within the CRR must be a minimum of 36" below surface grade and a minimum of 24" laterally away from trunk of tree.
5. Provide supplemental water for protected trees. 1" per week when no rainfall. Do not apply N-P-K fertilizers.

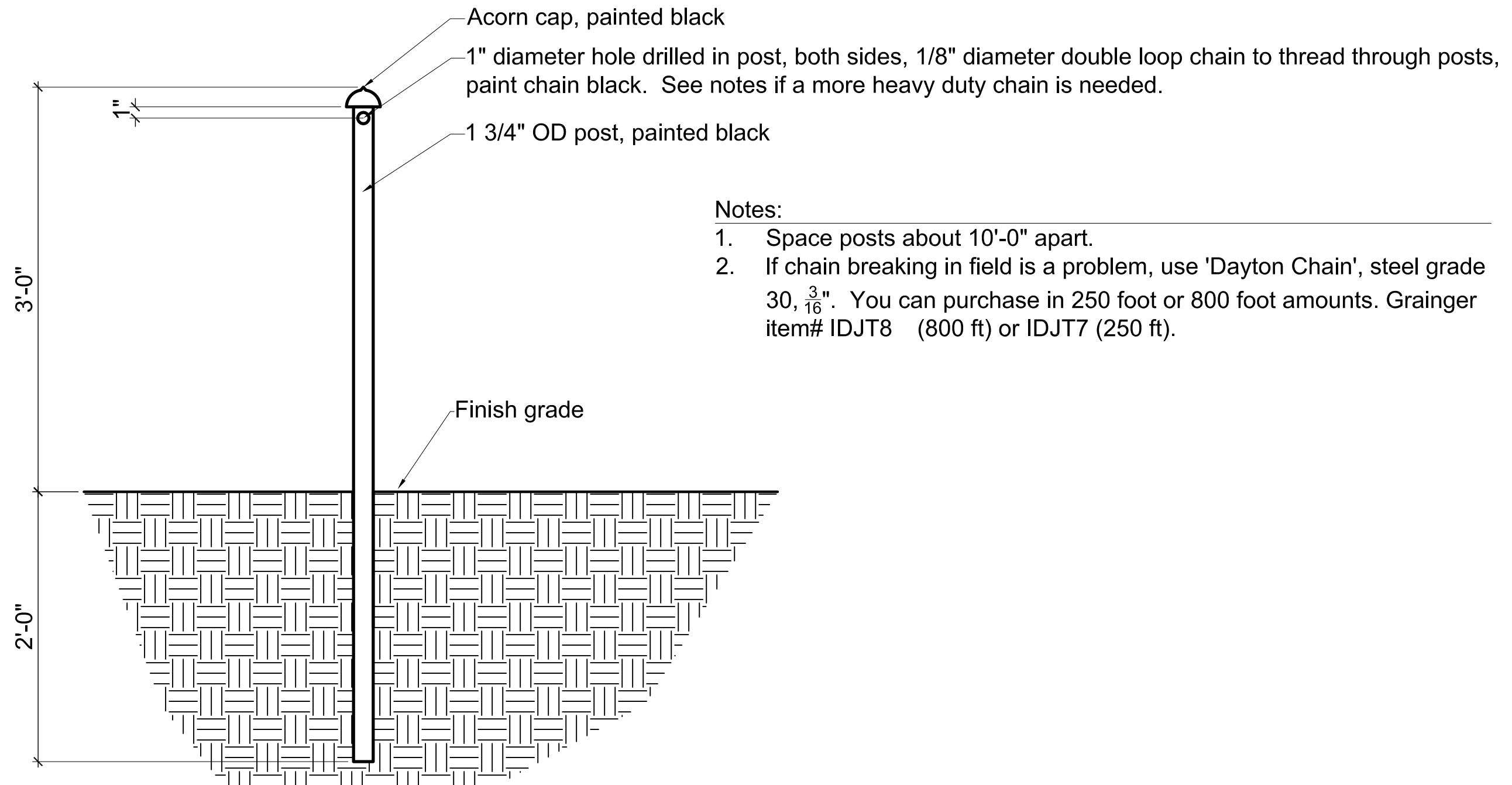
1 C-5 TREE PROTECTION FENCE DETAIL

SCALE: NOT TO SCALE

2 C-5 TREE PROTECTION FENCE DETAIL

SCALE: NOT TO SCALE

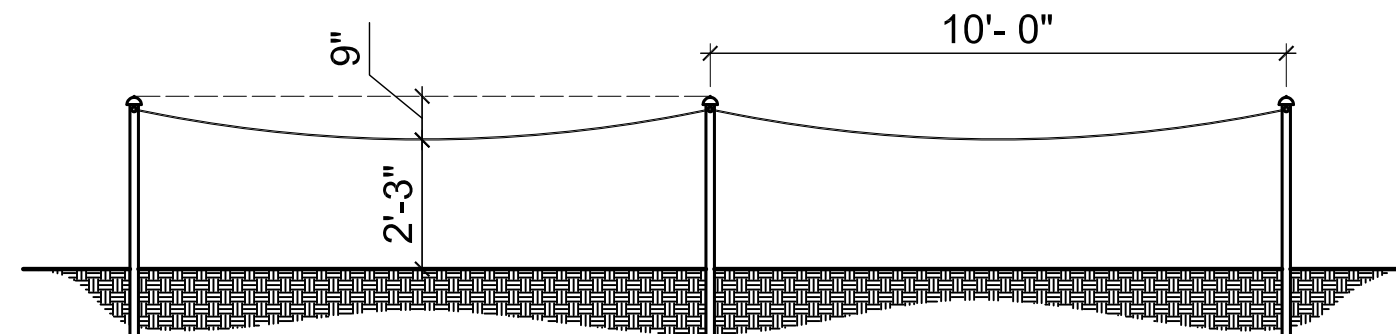
| | | | | | | | | |
|--|--|------------|------------------------|-----|------------------|--|---|--|
| Project: Campus Standard Tree Protection | | | Drawing Title: Details | | Building Number: | | File Location: L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Plants\Planting\PlantDetails_01.10.22.dwg | |
| Date: 10/05/2015 | | | Project Number: | | | | | |
| Designed By: CPLA | | | Drawn By: CPLA | | | | | |
| Revision No.: | | Date: | | By: | | | | |
| 1 | | 06/30/2022 | | JLB | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Graphic Scale: | | | | | | | | |
| North: | | | Sheet: C-5 | | | | | |
| | | | Of: 5 | | | | | |



Notes:


1. Space posts about 10'-0" apart.
2. If chain breaking in field is a problem, use 'Dayton Chain', steel grade 30, $\frac{3}{16}$ ". You can purchase in 250 foot or 800 foot amounts. Grainger item# IDJT8 (800 ft) or IDJT7 (250 ft).

Post and Chain Barrier 1"=10'- 0"



Chain Detail NTS

Note: Chains shall sag in between posts. Chain shall be approximately 2'- 3" above grade in the center.

| | | | |
|---|---|---|-------------------------------|
|  | Project: | Designed By: GRS | Date: |
| | Post and Chain Barrier | Drawn By: LAM | Scale: |
| | Drawing Title: Construction Detail | O.S.M.: | |
| | Building No.: | Revision: | Date: |
| | File: | 1 | 1-15-2012 |
| | L:\ACAD\PLANNING\Details, Title Blocks, Blocks\Details\Site amenities\Fencing\Post and Chain Barrier Detail.dwg | 2 | 06-09-2022 |
| FACILITIES PLANNING AND MANAGEMENT Campus Planning & Landscape Architecture | | 21 North Park Street 6th Floor Madison, WI 53715 | Sheet: L-1 Of: 1 |