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Chapter 3 - University Planning Standards

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CHAPTER 3 – UNIVERSITY PLANNING STANDARDS

Table of Contents

1. **Leed Equivalency** – page 1
2. **Site Design** – page 2
 - Limits of Construction
 - Tree Protection
 - Site Utility Impacts and Connections
 - Landscape Plan and Estimate
 - Snow Storage Plan
 - Erosion Control Plan/Storm Water
 - Site Stabilization by Contractor
 - Service Access
 - Trash Removal and Dumpsters
 - Fire Lanes
 - Bike Racks
 - Smoking
 - Outdoor Seating
 - Site Stairs
 - Walkways and Sidewalks
3. **Campus Transportation and Mobility** – page 6
 - Coordination with Parking infrastructure and Policies
 - Streets and Streetscapes
 - Bike Infrastructure
4. **Space Planning Standards** – page 9
 - Space Programming Guidelines
 - Classroom Standards
 - Measurement of Building Area
5. **Floor, Room, and Door Numbering** – page 22
6. **Accessibility Standards above ADA and Building Codes** (under development)

1. LEED EQUIVALENCY

Sustainable design is the only option for entities like the University of New Hampshire, where there is a campus that builds and renovates facilities that won't be sold off, that will need to be operated and maintained efficiently for a very long time, within a larger setting that needs to be safe, healthful, sensitive to the environment, and attractive. Enduring, Efficient, Effective, Adaptable, Engaging and Meaningful are the sustainable design principles that must guide every project. For the University of New Hampshire, this is overlaid by our culture of New England frugality, using every resource to its greatest extent, looking for the best long-term value, and being cautious with building experiments that may not hold up over the long life of a building.

While we do not require projects to seek LEED certification, every University project is expected to reflect these guidelines that will result in a completed project that is equivalent to at least the LEED silver standard. The effort to accomplish this will start early in project planning and continue through the completion of construction documents. During construction, it is expected that the general contractor/construction manager/design builder will provide some form of verification to the University to show compliance with the intent of the construction documents for things like construction waste recycling, regional origination of materials, certification of wood, etc. Building commissioning, comparable to LEED Fundamental Commissioning, is required of ALL projects, regardless of their size.

There are several reasons the University has chosen a LEED equivalent process rather than a formal LEED certification process for all major projects. LEED is a useful tool for us, however, by its very nature it wants to be applied across a very wide spectrum of building types (commercial, developer, public, and institutional). By doing this, it doesn't always align with the University's sustainable design values. For example our highest priority is durability, and LEED currently doesn't have any means to evaluate this for us. So, while achieving a LEED certified gold or platinum project is noteworthy, it doesn't indicate how well we have achieved our fundamental sustainable design goal of durability. Also, the LEED scoring system assigns points to some project attributes that don't make a substantive difference as viewed through our sustainability values and Northern New England climate considerations, and some have a cost that is hard for us to otherwise justify. Compliance with these guidelines does not preclude the University from deciding to seek formal LEED certification on selected projects.

Equivalency means that project planning, design and construction must be conducted in a manner that takes into account impacts to the surrounding environment and the site; accessibility and transportation impact; material choices and resource use; energy and water benchmarking and efficiency; and occupant health, productivity and well-being. New buildings and systems must be designed and constructed in a manner that minimizes site impact with a preference to repurpose previously developed sites, follows the University's precepts of Transportation Demand Management, utilizes environmentally preferable materials, facilitates integration into UNH's existing energy- and water-benchmarking systems, minimizes water and energy use, and protects indoor air quality.

2. SITE DESIGN

This section provides the University's standards for site planning and design that need to be incorporated into the design and construction documents.

1. LIMITS OF CONSTRUCTION

The Designer shall establish the limits of the construction site in coordination with the University. The Designer should indicate these limits on the design development drawings. The construction fence is intended to define & limit the area that can be used by the project for staging areas, material storage areas and on-site parking required by the project. Construction Staging Areas should be planned in the Design Development phase of the project and included

in the Design Development submittal. Off-site staging/lay-down areas: In areas of the campus where limited space is available for construction staging, the University will assist in identifying options available for off-site staging/lay-down area on a rental basis. Such off-site areas will also be reflected in the design development submitted.

2. TREE PROTECTION PLAN

The Tree Protection Plan must include a separate site plan showing all areas affected by the project. The Tree Protection Plan must show the location, species and size of all existing trees and landscape that may be negatively impacted by the project. The plan must indicate which trees and shrubs are to be removed, and which ones will remain. The plan should include protection measures for all tree and landscape impacts, including all utility connections for the project or new facility. One of the most important features of the Tree Protection Plan is to assess the impact of all utility excavation for the project on the tree and landscape areas that will remain on the site.

3. SITE UTILITY IMPACTS AND CONNECTIONS

UNH Energy and Campus Development will provide the Designer with existing site utility information for construction and renovation projects. This information shall be part of a full site survey, or shall be incorporated into a full site survey for the project. The University project manager will determine the extent of the survey needed. The design should include impacts and connections to all site utilities. Utilities include:

- A. Electric supply – University owned, managed by 3rd party
- B. Site lighting – University owned
- C. Telecommunications: phone, fiber optic, cable – all most all University owned, some public
- D. Steam, condensate return – University owned
- E. Heating hot water – University owned
- F. Water supply – University owned
- G. Sanitary sewer – primarily University owned, some Town owned
- H. Storm water – primarily University owned, some Town owned
- I. Natural gas – Northern Utilities owned
- J. Fire Pump distribution lines – University owned in limited locations
- K. Chilled water supply and return – University owned

4. LANDSCAPE PLAN AND ESTIMATE

The Designer is responsible for a landscape plan and estimate, as part of basic design services. Such plan will include repairs and restoration of all areas disturbed by project activity. The location and type of landscape material will be consistent with the snow storage plan in that salt-tolerant species will be located in areas adjacent to walks and other paved surfaces and in areas where snow will be pushed for storage and will be resistant to damage from accumulated snow. Site structures, lighting, etc. will be selected and located so as to be unlikely to be damaged by snow plowing operations.

5. SNOW STORAGE PLAN

For all projects that create or impact streets, driveways, or parking areas a snow storage plan should be developed in consultation with the University Grounds and Events department and must be approved by them. If there are site changes during construction that effect snow storage, the designer should submit design changes for review and approval.



6. EROSION CONTROL PLAN/STORMWATER

An Erosion and Sediment Control Plan is required for all projects with over one acre of land disturbance or when otherwise indicated due to adjacency to streams, sensitive soils or vegetation, when the site has steep slopes or other factors where erosion or silt control is indicated. Clearly indicate which measures are temporary and which are permanent. Storm water runoff should be infiltrated on site wherever possible. Suggested methods to accomplish on-site infiltration include: pervious pavement (asphalt or concrete) with re-charge beds beneath, connection of roof leaders and storm drains to sub-surface infiltration beds, infiltration berms in undisturbed woodlands, infiltration beds or trenches. Storm water runoff may also be controlled with manufactured rain storage systems beneath parking areas or on rooftops or collected in cisterns for re-use in irrigation or as building gray water for toilet flushing or other non-potable uses.

All storm drain lines, roof downspouts and catch basins must be kept clean of dirt, debris, litter, and silt, at all times during construction or renovation. All lines and catch basins damaged during construction and or renovation must be repaired or totally replaced with equal size lines but no less than 6" PVC pipe. Soil erosion must be kept out of catch basin by implementing a control system before problem arises. Erosion Control Plans will make Contractors responsible for lines and catch basins outside of building site and staging areas damaged or clogged by project activity.

7. SITE STABILIZATION BY CONTRACTOR

Final grading, storm water connections and temporary seeding is part of the project and needs to be identified in the construction documents. All grading and clearing shall be done in a manner that prevents damage to trees that are to remain on site.

8. SERVICE ACCESS

Site plans must carefully anticipate and provide for appropriate service and delivery vehicle access and parking and discourage parking on walkways and landscaped areas. Specific parking space must be provided that is convenient to the most direct entrance to elevators, mechanical, electrical, and telecom rooms. Identify layouts and details of walkways that will discourage service and delivery vehicles from driving and parking where they shouldn't.

9. TRASH REMOVAL AND DUMPSTERS

Site design shall consider trash removal, recycled material storage and removal and dumpster locations. The amount of space needed and amount or type of containers will be determined by the size of the building, its intended use and the proximity of other dumpster locations. All dumpster locations shall also be accessible to large refuse removal vehicles. When possible, dumpsters should serve multiple buildings. Dumpsters and compactors shall be compatible with those presently used on campus. Dumpsters and compactors shall be located in areas for efficient service and be hidden from public view. At all buildings, site design will also provide suitable space for recycling containers.

10. FIRE LANES

All buildings constructed shall be accessible to Fire Department Apparatus by way of fire lanes meeting the design requirements of both the State Building Code and the State Fire Code. Such fire lanes shall be constructed of concrete or asphalt, unless otherwise approved by the authority having jurisdiction. All required fire lanes and access roads shall maintain a vertical

clearance of at least 13 feet and 6 inches. The minimum inside turning radius of the paved surface shall be 30 feet. The minimum outside radius shall be 56 feet due to vehicle off-tracking. It is a challenge on campus to provide necessary emergency vehicle access while limiting other unauthorized vehicles. Bollards are generally used only on pathways that are not fire lanes. Frequently vertical curbing is used to limit non-emergency vehicles on fire lanes. Any vertical curbs restricting access to fire lanes shall be no higher than 4 inches tall.

11. BIKE RACKS

The University prefers bike racks to be in pods adjacent to major bike routes/pathways, near to but separated from building entrances. Pods should serve multiple buildings when possible, and should have multiple bike racks. The University has standard bike rack types as described in Chapter 5, Division 12, Section 12 9300. These racks should be placed on a surface material that distinguishes it from the primary travel path that it attaches to. The bike rack area should be 7 feet deep, this should allow safe and secure bike storage even during winter plowing conditions. See Chapter 3, Section 3, subsection 3 'Bike Infrastructure' for quantity of bike racks.

12. SMOKING

The University policy prohibits smoking within 20 feet of any building. Outside of residence halls a butt bin should be provided in a suitable location in the vicinity of each building entrance, 20 feet beyond the building. Outdoor benches, as well as butt bins, should be placed to be at least 30 feet away from any operable windows or building air intakes. See Chapter 5, Division 12, Section 12 9300 for standard bins.

13. OUTDOOR SEATING

Outdoor seating is an essential element of the campus. Durability and maintainability are as important as appearance and comfort. Granite is commonly used either as a traditional 3 piece unit or a single solid slab to establish an edge to a congregating space or along a walkway. The solid slab should be used in multiple units to create a wall, rather than a series of small monuments. Wood or Steel benches should be avoided, but cast aluminum or recycled plastic benches can be used judiciously in landscaped areas and courtyards. Examples of all of these are shown in Chapter 5, Division 12, Section 12 9300. Tables and benches are highly desired in the vicinity of residence halls. Common picnic tables should be avoided, but other commonly manufactured units similar to those shown in Chapter 5, Division 12, Section 12 9300 are acceptable. Benches or tables should be placed on pavers or paved surfaces and not on grass.

14. SITE STAIRS

While site stairs are often unavoidable, every effort should be made to minimize their use. When site stairs are necessary they should be either made completely of concrete with no steel nosing or stone elements, or solid granite slabs on concrete stringers and footing. Granite sitting on concrete treads will quickly deteriorate due to heavy salt use and the frequent freeze/thaw that results from this. Site stairs should have open sides to facilitate snow removal and the design should insure runoff is directed away from the top of the stairs to reduce ice build-up and erosion.

15. WALKWAYS AND SIDEWALKS

Sidewalks are pedestrian only pathways directly beside a road. Walkways are all other pedestrian only pathways. For both the minimum width to ensure proper snow plowing is 7 feet. Most should be 8 feet, and major pathways should be 10 ft to allow pairs of people to pass each other without going off the paved surface. In the campus core, vertical granite curbing is frequently used at islands and corners to keep snow plows on the pathways and to discourage pedestrians from cutting corners. Orientation and layout of walkways across landscaped areas should relate to desired walking destinations and not to formal geometry unless landscaped barriers can be created to keep pedestrians on the walkways. Generally, pedestrians can be persuaded to go around small raised planting areas or rock outcrops, fences or walls. Raised beds should rise at least 24" above walkway grade. Sidewalks shall be concrete, unless otherwise approved in advance. Walkways can be concrete or asphalt. Walkways between Main Street and the buildings that face Main Street are typically concrete. Pavers are used selectively in focus areas and along primary pathways like Library Way and Academic Way.

3. CAMPUS TRANSPORTATION AND MOBILITY

This section lays out standards for campus streetscapes, site plans and infrastructure affecting the movement of pedestrians, cyclists, vehicles and transit vehicles on the University campus. It focuses on general mobility and transport – not ADA accessibility. This section lays out several key design goals and transportation policy principles which should be addressed in new and retrofit/reconstruction projects. Although not every project can accommodate the ultimate goal expressed below each project should address goals and make incremental movement towards the standards expressed. In all cases, University streetscapes should balance safety, efficient design, durable materials and emissions and traffic impacts with the overall campus sustainability and transportation goals. In addition, University streetscapes should be developed in collaboration with Town of Durham and NHDOT/regional goals and standards where they physically tie together.

1. COORDINATION WITH PARKING INFRASTRUCTURE AND POLICIES

All University campus development affecting streetscapes, travel ways and parking infrastructure shall be developed and designed in coordination with the University's overall transportation, energy and master plan principles. On a parking and access side this will include a long-term goal to consolidate core-campus parking rather than create building specific parking; reduce private vehicle access to core campus and ongoing efforts to more efficiently provide short-term and service vehicle access while limiting vehicle travel ways in the core walking campus. Projects which affect parking and or bike/pedestrian infrastructure should be reviewed by Campus Planning for best fit with existing University parking and transportation policies. Additionally, changes to parking and or streetscapes affecting transit (fixed or ADA) routes, shelters or access must be reviewed by University Transportation Services. In all cases, University project designs should strive to reinforce the walking campus, enhance transit and bicycle access and promote overall transportation and energy goals.

2. STREETS AND STREETSCAPES

The University Campus Master Plan and Transportation polices mandate a systems approach which calls for Complete Streets designed for all modes with strong deference given to safely



accommodating pedestrian and cyclist traffic in the core campus area. Complete streets require that our ideal *standard street profile* include:

- A. **Vehicle lanes** sized to promote the controlled travel at or below posted speed limits. In almost all cases this will be 11' measured and marked from centerline to the fog lines delineating edge of vehicle lane in all but the smallest internal streets. (It is imperative that striping be done from centerline out with any margins being left at the edge of the pavement.) Typically, University campus streets will be engineered and developed with a 25 mph *or less* speed limit. Core campus streets not serving as collectors may have speed limit postings less than 25 mph to reflect the pedestrian nature of these streets.
- B. **Bicycle lanes and street markings for bikes** - The University seeks to improve the safety of bicyclists in Durham by expanding the network of dedicated bike lanes and/or safe shared vehicle lanes on our streets. Lane markings are an important part of a complete street framework developed across the shared University-Town of Durham street network. Bike and shared lane delineations should be reviewed by both the University and Town of Durham Traffic Safety Committees.
 - 1) In new street construction or resurfacing, when existing corridor width permits, dedicated bike lanes should be installed. These lanes should be a minimum of four feet and maximum of six feet wide and be marked with the Durham standard bike lane symbol set (See Chapter 5, Division 32, Section 32 1216 Attachment B) between vehicle lane stripe and edge of pavement fog line.
 - 2) In cases where existing street corridor or right-of-way are inadequate for dedicated bike lanes, the street may be designated at the start of a corridor as a shared lane 'sharrow' marking (See Chapter 5, Division 32, Section 32 1216 Attachment C) installed in the vehicle lane.
- A. **Transit pullouts, shelters and other system improvements** are to be designed and installed in consultation with University Transportation Services (UTS) and Campus Planning. The University strives to provide first class infrastructure for our transit users. The University has adopted standard templates for bus pullouts which may include University approved shelters, bike racks, signage/schedule displays, granite curbing, recycling and trash containers and safety phones as well as University standard signage. The length of the transit pullout will be determined by the number and size of buses that are expected to use the pullout, as determined by UTS. Standard University bus pullouts, site designs and shelters can be found in Chapter 5, Division 10, Section 10 7300.
- B. **Pedestrian crossings and sidewalks** are designed to be fully accessible, provide highest degrees of safety, visibility and convenience of use in order to promote our priority of a walking campus. Pedestrian safety is always given a higher priority than vehicular flow. Locations of crosswalks should be based on pedestrian desire lines and major flows. Grading with landscaping and/or benches, bollards and chains should be used to help steer pedestrians to crosswalks and deter jaywalkers. Crosswalks will be delineated with continental zebra stripes (See Chapter 5, Division 32, Section 32 1216) and, if volumes warrant, be upgraded to include textured or raised surface materials and or supplemental signage and lighting. Core campus sidewalks adjacent to streets should be constructed of concrete. Paths, trails and non-adjacent sidewalks



- shall consider use of other materials such as asphalt or, preferably permeable materials. Where possible and meeting ADA standards, stone dust may be considered for low volume pedestrian trails and paths that do not require snow removal.
- C. **Traffic Control signage and posts** are designed to utilize the full flexibility of MUTCD standards for low speed road networks. We strive to use highly reflective or diamond grade, not engineer grade, materials that are durable and well installed on University standard posts. Alternatives to aluminum sign stock may be considered. Signage size is dictated by campus location with core campus using smaller standard signs on 4x4 wood posts stained black. Outside of core campus, standard highway signs with standard posts are acceptable. All signs are installed with theft-deterrent hardware. U-channel posts are discouraged in all cases in favor of square metal posts used by UTS set in sleeves. Traffic control signage must be reviewed by University Campus Planning based on the recommendations of the University Traffic Safety Committee.
 - D. **Street name signage** is white highly reflective text on MUTCD standard highly reflective green reflective background on extruded aluminum stock. All street intersections should have signage in compliance with E911 standards and the official campus map. Fonts and font format are to University standard. Street name signs are installed on 2 3/8" galvanized posts set in concrete and signs are secured with theft-deterrent hardware.
 - E. **Wayfinding signage** is the blue post and panel signage and will comply with University material, content and style standards. These signs are procured from an approved University vendor. All wayfinding signage is approved by the Campus Planning office.
 - F. **Pavement paint** will be installed on new pavement as high reflectivity thermoplastic. Subsequent over paints will be done with high quality reflective paints with high solid content for durability. (See Chapter 5, Division 32, Section 32 1216.)
 - G. **Lighting** – The University carefully designs lighting systems on our campus and in streetscapes to provide safety while respecting the night-sky beauty of our rural campus. Further information can be found in Chapter 5, Division 26, Section 26 5600.

The Campus Planning staff will assist the project team in planning for construction impacts to pedestrians and traffic and should be involved from the start of designing any streetscapes as part of any projects and will serve as the liaison between individual project designs and the Traffic Safety Committee. The Committee should review and approve any new or modified street designs or traffic impacts.

3. BIKE INFRASTRUCTURE

Bike Infrastructure shall be considered an important accommodation on all core campus development or reconstruction projects. The University currently has a bike infrastructure (parking) deficit. Projects should meet University goal of 5% occupancy accommodation for on-site parking. Where practical, projects should exceed that percentage goal and consider indoor bike storage accommodation in design. Campus Planning can assist project managers and designers in procuring feedback from the bike community. See Chapter 3, Section 2. Site Design, Subsection 11. 'Bike Racks' for arrangements of bike racks.

4. SPACE PLANNING STANDARDS

This section includes information about the University's standards for space programming, building area calculations to be used during design. It is essential that the design team familiarize themselves with these standards and utilize them as closely as possible, and identify any deviations from these standards.

1. SPACE PROGRAMMING GUIDELINES

The following are guidelines for programming and design of some typical space types on campus. For new construction, these should be specifically followed, in renovations they should serve as a target within the constraints of an existing structure.

A. Offices

- 1) Faculty offices – 130 ASF each; Emeriti Faculty – two per 130 ASF office, when provided.
- 2) Academic Departmental Chair office – 150 ASF each, when specific offices are designated for the department chair.
- 3) Dean office – 220 ASF each; Associate Dean – 150 ASF
- 4) Vice President, Associate and Assistant VP office – 220 ASF
- 5) Administrative Director or department head office – 150 ASF for division/departments greater than 10 FTE staff; 130 ASF for all others
- 6) PAT/OS/Post Doc – 1) those requiring an office, 110 ASF each; 2) those requiring a workstation in an open office environment, 48-56 ASF each, (not including circulation space; and requires an adjacent private meeting space for every 10 workstations).
- 7) Departmental Administrative Suites – provided for departments with 10 FTE faculty or greater; departments with 10 FTE faculty or less will share with another department.
- 8) Admin/Reception – 180 ASF per Department (1 staff person and 2 visitors); 240 ASF per department (2 staff persons and 2 visitors); additional 20 ASF per visitor.
- 9) Admin Support space in addition to Reception – 140 ASF – mail, copier, printer, work area, office supplies, and files.
- 10) Departmental Conference Room – one 12-seat, 240 ASF, room for dept with 10 or more FTE faculty or staff. Departments with fewer than 10 FTE faculty or staff are allocated 150 ASF.

B. Residence Halls

- 1) Single bedroom – 110 ASF
- 2) Double bedroom – 180 ASF
- 3) Hall Director Apartment – 240 ASF living/dining, 75 ASF kitchen, 25 ASF coat closet, 120 ASF small bedroom plus 12 ASF closet, 160 ASF large bedroom plus 24 ASF closet, and bathroom
- 4) Each residence hall shall include a main building lounge, floor lounges, laundry room, community kitchen, vending, office, separate office reception, and public restrooms



C. Building Support Spaces

- 5) Telecom – building entrance room as required in Mechanical area; and one 4'x8' closet per floor, stacked. Additional maybe necessary if furthest outlet is more than 250 feet away. The room shall have double doors onto the corridor (two 3 foot doors). Preliminary planning must anticipate the need for telecommunication spaces, rooms and closets. Early involvement of University Telecommunications is essential to insure requirements are being adequately anticipated. Chapter 5, Division 16, Section 16741 provides detailed requirements for telecommunications installation.
- 6) Electrical – building entrance room as required in Mechanical area; and one closet per floor, (area as required by engineers), stacked.
- 7) Housekeeping – one closet per floor, 16 ASF each with a floor-mounted mop basin; one 60 ASF addition to a floor closet in the building for equipment. Every closet shall be provided with a minimum of two shelves (4 l.f. each) and a minimum of six 12" O.C. wood dowel pegs for hanging mops, brooms, etc. Building telecom panels or mechanical equipment shall not be located in housekeeping closets.
- 8) Building Stock Storage Space – 100-200 ASF, related to the size of the building and owners stock required by the construction contract; can be a caged area within Mechanical Room / Penthouse space, but is preferred to be a separate space. This material is typically unique to the building and is best kept in the building rather than being removed to a central storage area where its identity with a particular building may be lost. Some shelving should be provided so material can be organized and the space efficiently used. Metal warehouse type shelving is appropriate. The size of the area will depend on the building. Owner's stock storage space is considered program space.
- 9) Recycling Stations – allow for one on each floor of non-residential building that will accommodate two University standard recycling totes. Recycling stations will be clearly designated on floor plans and attention will be given to location, the rating of surrounding walls and doors, etc. to insure compliance with life safety codes. Stations will not be in stairways or in hallways that are essential means of egress. Residence halls must include suitable space for recycling totes storage outside the building.
- 10) Vending – one alcove for up to three machines for buildings under 75,000 GSF. Buildings over 75,000 GSF may need an additional alcove, depending upon the types of functions and configuration of the building. Appropriate ventilation will be provided.
- 11) Fire Command – 40 ASF; in a code compliant location approved by the local fire authorities.
- 12) Kitchenette – 40 ASF; quantity per building as required but generally not more than one per floor for floor plates up to 15,000 GSF; include sink, microwave, refrigerator, but no stoves or ranges. The kitchenette may be combined with a shared workspace for copiers/printers, office supplies, etc.
- 13) Confined Space - Entry into confined space, as defined by OSHA, requires special training use of specialized safety equipment and at least two individuals, one of whom remains outside the space at all times. Maintenance access to such space is obviously more difficult, time-consuming, and expensive, therefore confined spaces, as defined by OSHA, within buildings should be avoided to the greatest degree possible. It is

critical that the design team clearly identify any such spaces on their design review drawings and require OSHA-compliant markings on signage at entry points.

- 14) Building Services – Interior layouts and circulation patterns will provide for efficient building services including access for routine maintenance and repair of systems including secure access to roof-top mounted equipment, trash and recycling material handling, staging and pickup, and deliveries (mail, supplies, catering, etc.).

2. CLASSROOM STANDARDS

The following are standards developed and adopted by the university's Classroom Maintenance Committee with representatives from Facilities Project Management (FPM), Facilities Asset Management, Academic Technology Audio Visual Services (AVS), Registrar's Office, Affirmative Action Office, Faculty Senate and others constituents. For new construction these should be specifically followed, in renovations they should serve as a target within the constraints of an existing structure.

The intent of this document is to codify the attributes that, in concert with each other, make up the best design for various types of learning spaces. It is the hope of this committee that architects, construction management firms and contractors can use this to understand the UNH classroom requirements. Follow these standards where conditions allow when altering existing conditions.

A. General Classroom Characteristics

1) Location

- a. When possible, classrooms with capacity over 100 people, or a group of smaller classrooms should be concentrated on the entry levels of buildings and other classrooms should be located upon accessible routes of buildings to provide easy access for all users of the building and equipment.
- b. Classrooms should be located away from, or well isolated from noise generators, such as mechanical rooms or student gathering places.

2) Size

Room Type	Room Utilization of a 42 hr week	Station Utilization	Station Size (room area/seat)
Auditorium tiered no tables	80% +	65-80%	12-16 sf
Collaborative/lecture tiered with tables	80% +	65-80%	20-22 sf
Collaborative/hybrid flat floor no tables	80% +	65-80%	16-20 sf
Collaborative/hybrid flat floor with tables	80% +	65-80%	20-22 sf
Problem based learning – fixed tables	80% +	65-80%	25-27 sf



Computer/ Instructional	80% +	65-80%	20-25 sf
Instructional Science Labs	50% +	80%	Varies by discipline

- a. In rooms with student tables, layouts should take into consideration adequate passage for faculty to move through the rows and scattered seating for students of size.
- b. The teaching wall should be at least 9' high, and allow for a projection screen large enough to display images of adequate size, and shall be placed high enough off the floor (48" min a.f.f to the bottom of the screen) to provide unobstructed sight lines (see section on Projection Screens).

3) Orientation

- a. The major entry is preferred at the rear of the room.
- b. Windows are preferred at the sides of classrooms, not at the front or back.

B. Classroom Surfaces and Finishes - The following are the standard materials that shall be used, unless other alternative materials are specifically approved by the UNH Project Manager. Avoid conflicting color choices for room finishes that will result in poor video (white or reflective, gloss paint, extremely dark/light/saturated colors).

1) Walls:

- a. Avoid creating rooms that have all hard surfaces that result in unwanted sound reverberation. If necessary, provide acoustical treatment, using fabric-covered acoustical panels to create an NC rating between 20 and 30.
- b. Wherever moveable seating is used, chair rails should be installed on all appropriate walls wherever possible, 25" to 33" above the floor.
- c. Teaching wall shall be free from fire alarm strobes, alarm panels or any other components that would interfere with a contiguous wall space across the entire teaching wall (items less than 40" a.f.f excepted).
- d. Air diffusers should not create airflow that would allow the projection screen to move.
- e. Walls shared between rooms should have gypsum wallboard that extends above the suspended ceiling and to the structural deck.
- f. When walls are newly constructed as part of a project, the walls shall form an acoustic envelope, e.g. Layers of empty air between the layers of material to absorb noise, and/or wall insulation to achieve STC ratings consistent with ANSI S12.60-2002, which states:
 - STC-45 if the adjacent space is a corridor, staircase, office or conference room
 - STC-50 if the adjacent space is another classroom
 - STC-53 if the adjacent space is a restroom



- STC-60 if the adjacent space is a music room, mechanical equipment room, cafeteria, gymnasium or indoor pool.
- 2) Window Shades:
 - a. Light-filtering window shades (3%- 5% transparent) shall be provided, and opaque window shades (a.k.a. room darkening shades) are provided only by special request. Motorized window shades shall be Crestron brand or equal. Manual shades shall be chosen based primarily on their long term reliability. Horizontal, vertical blinds or shade channels to block light gap (black out shades) are strongly discouraged as they either cause noise and distraction or fail prematurely.
 - b. Pay particular attention to classrooms where there may be direct sunlight on the display surface that may require a higher degree of darkening capability.
 - 3) Floors:
 - a. Careful consideration to noise, durability, reliability, staining should be considered. Hard surface is preferred when possible, understanding that it creates a more noise-reflective surface. Carpet is acceptable.
 - b. Aisle areas and the area at the front of the room may be carpeted; carpeting under fixed seating should be avoided.
 - 4) Ceilings should be light in color. Acoustical properties should be considered.
 - 5) Doors:
 - a. Doors should have a glass panel that allows someone to see if a room is occupied, but avoids corridor distractions for people in the room.
 - b. Doors should have no ventilation louvers because of noise distractions.
 - c. Classrooms with 100 or more person capacity should have at least one mechanically assisted door opener.

C. Classroom Fixtures and Furniture

- 1) Marker Boards
 - a. All marker boards shall be whiteboards or glass boards. White boards shall be steel backed, porcelain coated with a matte white finish to reduce problems with glare. Chalk boards are only allowed by exception.
 - b. In general, every available square foot of the teaching wall should be covered in whiteboard from 36" a.f.f. to 84" a.f.f and classrooms supporting language teaching should have marker boards on at least one adjacent wall.
 - c. Marker boards shall be provided with a full width tray. A map rail with cork insert is recommended
 - d. Marker boards shall be placed so they can be used when the projection screen is in use.
- 2) Projection Screens
 - a. Common for all types:



- 1) As a general rule, projection surfaces should be Unity Gain/Matte to reduce brightness skewing from off-axis viewing (viewing from an angle)
 - 2) When selecting an install location, be mindful of the effect the screen will have on (and affected by) nearby assets, such as chalk/white boards, room controls, switches, lighting, etc.
 - 3) The distance between the projection screen and the first row of seats should be at least one times the width of the projected image, and the distance between the screen and the last row of seats should be at most six times the height of the projected image. Screen size will be determined by AVS based on room size, ambient light, viewing angles, ceiling height, etc. Consideration will be given to installing screens that will accommodate upcoming changes in video aspect ratio (i.e., for high definition display).
 - 4) Screens larger than 96" in width are recommended to have motorized controls; all others can be manual pull-down style.
 - 5) Screens shall be installed to allow the lowest side of the projected image to be at least 4' above the floor. The bottom edge of the screen should be no lower than 44" from the floor.
 - 6) Projection screen shall be placed so they can be used concurrently with marker boards. It is preferred that the height of the teaching wall allow for a full height projection screen above the top of the marker board.
 - 7) Do not cover any controllers, input plates, switches, etc.
 - 8) Screen should be mounted far enough in front of chalk/white board so that it does not make contact with the chalk/white board tray.
 - 9) Projection surfaces should have an aspect ratio of 16:10.
 - 10) Recessed screens should be mounted with threaded rod or unistrut attached to the structural ceiling.
 - 11) Wall mounted screens should have brackets appropriate for the size and weight of the screen. Use appropriate fastening hardware for the type of wall. e.g., toggle-bolts for sheetrock.
- b. Manual Pull Screens - Purchase durable models with features that maximize longevity. UNH AV Services recommends DaLite screens with Controlled Screen Return, Auto-Return, or similar mechanism, such as DaLite's Model C.
- c. Mechanical Screens
- 1) UNH AV Services recommends DaLite mechanical screens.
 - 2) Ensure that the screen supports RS232 serial control to allow integration with present or future room control devices.
 - 3) Mechanical screens must be controlled with either a physical quiet low-voltage control motor or programmatically through a room control panel.
 - Integration into a single room control panel should be in addition to a redundant manufacturer's control for the screen.



- In either case, all controls should be mounted 48" above finished floor and be in close proximity to other devices and controls an instructor would use during a class session.
 - d. Fixed Screens are typically not used, but in situations where there is **no tolerance for rippling** or screen movement and a tensioned, mechanical screen is not feasible. e.g. a small classroom or conference room with a short-throw projector.
- 3) Seating
- a. Moveable seating either tables and chairs, or tablet-arm chairs, are recommended for rooms seating 48 or fewer. The preferred tablet armchair has casters, a swiveling tablet that can be either left or right handed with under seat storage.
 - b. Tablet-arm chairs including fixed auditorium seating shall have cup holders.
 - c. Casters are preferred for all non-fixed seating. Coordinate caster selection with flooring material.
 - d. Tiered floors shall be provided in rooms seating 75 or more.
 - e. Three stackable side chairs per classroom are recommended for lecturers and guests.
 - f. Tablet-arm chairs (if they don't have swivel left/right-handed feature) or fixed seating should have a minimum of 10% of the seats accommodating left handed students.
 - g. Tablet-arms should provide a minimum of 250 square inches of working surface.

A. Instructor's station - table and lectern, or podium

- 1) Provide one adjustable height chair and one wall-mounted coat hook for the instructor in all classrooms.
- 2) AC receptacles w/USB charging ports should be conveniently located near the instructor station.
- 3) The following user available inputs should have wall boxes and finished plates very near the Instructor station. These should not be occupied by any permanent room equipment. These boxes need to connect to a/v displays/projectors/speakers as determined for each classroom, see paragraph H Audiovisual Systems.
 - a. HDMI
 - b. VGA
 - c. 3.5 mm audio
 - d. RCA if necessary
- 4) Appropriate length user cables should be included in the accessories drawer/tray or attached to connectors and wrapped neatly with a cable management device on the wall.
- 5) In classrooms with just a basic digital display or a ceiling mounted projector, provide a table, **that is a minimum of 34" wide, 24 deep, and 30" high with a lectern/podium,**



separate or attached, that is a minimum of 20” wide, 20” deep, and 39” high. The KI All Terrain Mobile lectern <http://www.ki.com/products/name/instruct-all-terrain-mobile-lectern/> has been well received at UNH for this purpose.

- 6) In classrooms designated as SuperTEC or computer instruction, where technology for the instructor needs to be stored, provide a podium that is a minimum of 34” wide, 24” deep, providing an ADA compliant fixed height, or be adjustable to that height with minimal effort, plus a lockable cabinet for equipment that is a minimum of 21” wide, 30” deep, and 39” high. The unit must have designated drawer(s) or tray(s) for the storage of accessories, and be locked if necessary.
 - a. The Spectrum Freedom One Freedom One Sit-to-Stand Lectern that includes an attached equipment rack cabinet <http://www.spectrumfurniture.com/en/products/freedom-one-sit-to-stand-lectern/> has been well received for this purpose.
 - b. Be conscious of student and faculty sightlines when selecting the location of the instructor station. Also consider what those sightlines will be when the room is full of people.
 - c. Consider adding local lighting to instructor station.
 - d. Devices that instructors will need to interact with should be located in the instructor station, including but not limited to:
 1. USB Ports
 2. Computer
 3. DVD
 4. Keyboard/mouse
 5. Room controls
 6. Microphones
 7. Document Camera

B. Classroom Mechanical Systems (HVAC)

- 1) Temperature Controls
 - a. Provide in accordance with other UNH Design Standards and UNH Energy policies.
 - b. Temperature controls should not be accessible to room occupants.
- 2) Ventilation
 - a. Adequate ventilation to be provided by demand control ventilation as described in Section 23 0000 in spaces that are mechanically ventilated.
 - b. Operable windows are required in classrooms that are not mechanically ventilated, and are preferred in classrooms with mechanical ventilation, where they shall have window switches as described in Section 23 0000..
 - c. For tiered instructional spaces displacement ventilation systems are preferred when possible.
- 3) Noise & Audio Reflectivity
 - a. Refer to Classroom Surfaces and Finishes above.



- b. Noise from fans or equipment serving the room should not be higher than 40db.
- C. Classroom Lighting Systems** - Lighting shall be designed to create a variety of zones within each classroom of 24 or more, as follows:
 - Overall light for the classroom.
 - Note-taking, controlled lighting that only illuminates the seating area of the classroom when there is image projection or digital display at the instruction wall.
 - Lighting for the marker board area with controls to allow for use of the projection screen concurrently.
 - Lighting for the instructor's station.
 - More discussion is necessary in rooms with course capture functionality.
- 1) Lighting Levels
 - a. Provide 30 foot candles on writing surfaces.
 - b. Reduce general overall lighting by 30% for note taking during media presentations, with no light on the projection screen. Ability to further dim to 5% is preferred but not required.
 - c. Lighting control can be accomplished with switching or with Crestron scene controls, as described below. Refer to Section 265100.1.1.L for requirements about daylight harvesting.
 - d. Note taking light levels must be designed to avoid washing out visually projected images.
- 2) Lighting Controls
 - a. The lighting controls shall be uniform, from classroom to classroom within each building. UNH Audiovisual Services Crestron Control systems integrate well with Crestron Lighting Controls.
 - b. All light switches shall be clustered, simple to use, with clearly labeled functions on the switch plates.
 - c. Controls for some of the room lighting shall be located near the major entrance doors, and duplicated near the presentation area.
 - d. Controls for note taking and presentation area lighting shall be adjacent to the presentation area.
 - e. Vacancy sensors shall be used to shut off classroom lighting during prolonged unoccupied periods.
- 3) Light Fixtures
 - a. Light fixtures shall be laid out in a reflected ceiling plan in coordination with audiovisual projection systems to prevent obstruction of the projected image. Pendant lights should run perpendicular to the projection surface. If possible, make sure they are at least 3" away from the projector regardless of which way they are running.



D. Classroom Electrical Systems

- 1) Circuits and Conduits
 - a. Low voltage cables (e.g. audio, video, and control cables) are all required to run in a separate conduit from any AC wiring.
 - b. As much as possible, audio, video, and control electrical circuits should be fed from “clean” legs from the transformer free of high inductive loads. To the extent possible, there should be no elevator motors, compressor motors, blower motors, or other electrical devices on the side of the power transformer that feeds the media equipment. All power activating AV/ Media equipment shall run on the same circuit or same phase.
- 2) Electrical Outlets
 - a. Provide Utility or convenience electrical outlets on separate circuits from the audiovisual equipment; e.g. circuits for overhead transparency projectors, video microscopes, vacuum cleaners, etc.
 - b. There should be at least one duplex outlet on each wall.
 - c. Provide power at tiered seating, tables or fixed auditorium seating on a case by case basis.
 - d. Mount power and audio/video outlets on vertical surfaces rather than a tabletop or the floor to avoid the intrusion of water and debris.

E. Audiovisual Systems

- 3) Common for All Display Devices
 - a. Source Connectivity
 - 1) Required input ports: 1x HDMI, HD/Base-T
 - 2) Preferred: 2x HDMI, HD/Base-T
 - 3) Optional: DisplayPort
 - b. Features
 - 1) Serial (RS232) control, either through a DB9 or RJ45 port.
 - 2) HDCP Compliant
 - 3) 1080p minimum resolution
 - 4) Crestron RoomView Connected Preferred
 - 5) Contrast ratio, black level, and color correction options with special consideration for rooms in which visual arts or media studies coursework occurs.
 - 6) Mounting hardware should have security/locking features to prevent theft.
- 4) LCD/DLP Projectors
 - a. Features
 - 1) Classroom projectors should output a minimum of 3500 lumens, adjusted according to room lighting conditions.



- 2) Classroom projectors/screen combinations should have a Viewing Angle of ~120 degrees in order to accommodate students sitting at the edges of the room.
- 3) Projectors should have vertical and horizontal offset, lens shift, and keystone adjustment controls.
- b. Position and Mounting
 - 1) Ceiling Projector mounting height should be based on vertical offset allowances and occupant head clearance.
 - 2) Projectors should be mounted in a position where the horizontal offset is close to zero and the zoom range is close to the halfway point.
 - 3) Short-Throw projectors should be mounted with hardware specifically designed for short and ultra-short, wall-mounted projectors. Do not adapt ceiling mounting hardware for short-throw wall-mount usage.
 - 4) Rooms with significant vibration require special consideration pertaining to camera, projector, and ceiling microphone mounting to reduce image movement and unwanted sound transmission
 - 5) Ceiling mounts should be attached to the structural components in the room. Mounts resting in suspended ceiling should be supported by restraining cables attached to ceiling trusses.
- 5) Monitors
 - a. Position and Mounting
 - 1) Size and Viewing Angle should be appropriate for the room and application. Generally, minimum size should be viewing distance / screen height = ~6.
 - 2) For standard-size rooms (30' X 25'), the center of the display should be within 6" of 64" a.f.f for comfortable viewing angle, assuming there are no line-of-sight obstructions.
 - 3) For smaller rooms (12' X 18'), the center of the display should be within 6" of 54" a.f.f for comfortable viewing angle if line of sight appropriate.
 - 4) An articulating arm mount should be used where appropriate.
 - 5) A tiltable mount is preferred to adjust against glare from overhead lighting.
 - 6) If video camera is desired at location under or over monitor, the monitor position will be on a case by case basis.
- 6) Speakers and Amplification
 - a. Size, type, sound pressure, frequency response, and placement of speakers should appropriately match the room and application. e.g. do not use desktop computer speakers for a lecture hall.
 - b. Do not place microphones in front or in the proximity of speakers.
 - c. Program audio and voice reinforcement (microphones) should be passed on separate lines and will be handled by separate amplifiers and speakers.
 - d. Amplifiers should be sized according to the power needed to produce ~ 55dB SPL for room occupants.



- e. When possible/practical, speakers used for videoconferencing applications should be placed relative to the display so the audio imaging seems to naturally emanate from with the video of the participants at the remote site.
- 7) Microphones - Lecture halls, auditoriums and any large space in general, should have a dedicated array of microphones which include:
 - a. Two rechargeable wireless lavalier-style microphones.
 - b. One or more wireless handheld microphones.
 - c. One or two XLR connections for other audio sources.
- 8) PA Outputs - Rooms with speech reinforcement systems should have at least one PA output available (assistive listening, press feed, record out or streaming).
- 9) Video Cameras (when required)
 - a. Pan, Tilt, Zoom (PTZ)
 - b. Streaming Capable (preferred)
 - c. Zoom Range as appropriate for function of camera
 - d. Remotely Powered (preferred)
 - e. 1080p minimum resolution

3. MEASUREMENT OF BUILDING AREA

Measurement of building area is required during the planning and design process to calculate cost per square foot, to ensure that we are maintaining the building program, and to evaluate the net to gross sf ratio of the building. In order that determination of building area be consistent from project to project, the following methodology is adopted.

Measurement of building area is based on the standards established in AIA D101, Methods of Calculation Areas and Volumes of Buildings and the Post-Secondary Education Facilities Inventory and Classification Manual published by the National Center for Education Statistics, publication 92-165. The key measurements and their basis are described below:

- a. *Architectural Area or Gross Area* - The area of a building is the sum of the areas of the floors of the building, measured from the exterior faces of exterior walls or from the centerline of walls separating buildings. This area includes basements, mezzanines, intermediate floors and penthouses, provided that these areas have minimum of seven feet headroom height. Paved or finished covered areas shall be included at ½ the measured area. Balcony areas count fully but floor openings or upper spaces in double high rooms are not counted. See Figure 1 below for further definitions.
- b. *Net Assignable Area* - Spaces within a building used for or assigned to the buildings intended function(s) or program. This space is measured from the interior faces of the enclosing walls.
- c. *Net to Gross* - The difference between net and gross area is comprised of four types of space; Building Service (cleaning and public hygiene), Circulation, Mechanical, and Structural Area.

Designers will include in the Life Safety and Building Code Analysis data on the drawings a summary of Gross Area and Net Assignable area for each project.

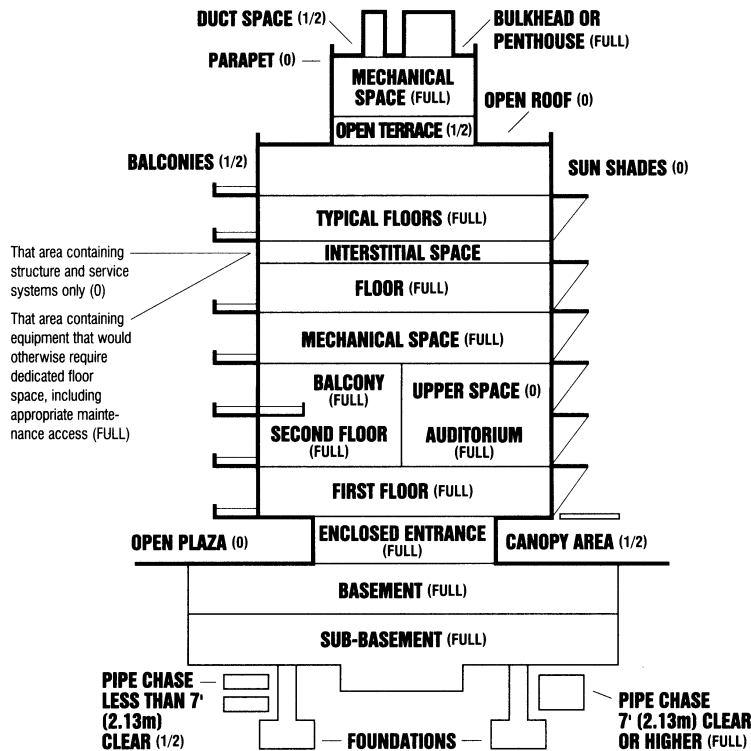


Figure 1: Architectural Area Calculation

5. FLOOR, ROOM, AND DOOR NUMBERING

Permanent floor, room, and door numbering shall be fully incorporated into the Construction Documents for use by the Contractor. Room numbering will be assigned by the University office of Campus Planning and it is anticipated that the permanent numbering will be shown on the DD submittal. To accomplish this, all floor plans must be submitted to Campus Planning prior to the DD submission. The design team must keep in mind that changes to door locations and room configurations will often affect the room numbering. The design team must coordinate all layout changes with Campus Planning after permanent room numbering is established, including during construction, so that the room numbering can be updated and all affected schedules adjusted as required.

Each permanent room number shall be unique and consistent with the University standard numbering system as follows:

1. Floor Designations: For buildings that have multiple at-grade entrance levels, the lowest level accessible at grade shall be designated Ground Level. For buildings that have a single at-grade level, that level shall be designated Level One. Floors below the lowest at-grade level shall be designated Basement, Sub-Basement, and Sub-Sub-Basement. Floors above shall be designated numerically in order starting with Level One. If there is a partial or secondary level between these primary levels, it shall be designated Intermediate to the level directly below.



2. Permanent Room/Space Numbering Sequence:

- a. Room numbering on each floor shall be similar to the method used to assign addresses on a street, odd numbers on the left, even numbers on the right in the direction of ascension. This shall provide a sense of direction or movement from one end of the building to the other.
- b. Gaps in the numbering shall occur so that the numbering sequence across a corridor is always ascending. For example, if there are four rooms on the left before there is a room on the right on Level 1, the left-hand rooms shall be numbered 101, 103, 105, and 107. The right-hand room shall be numbered 108 even though it is the first room on that side of the corridor. A series of large rooms shall also include gaps for future subdivisions, similar to street numbering.
- c. Nested rooms (rooms not directly on a corridor, which are entered from another room) shall have the same room number as the lowest numbered room they are entered from, plus a letter suffix designated in a clockwise sequence around the room. An example is Room 108A is off of Room 108, Room 108AA is off Room 108A.
- d. Each building shall be reviewed separately to determine where it is best to start the numbering sequence so that it progresses across the floor as a continuous numbering string. Wing designations are to be used only when room numbering would require numbers higher than 99 or where a continuous numbering string is not practical.
- e. Each separate sign type required on the project shall be obtained from a single manufacturer.

3. Non-Assignable Space Such as Corridors, Stairs, Vestibules, and Elevators: These spaces shall be designated '00' with the following suffixes: (the * indicates a letter to differentiate between similar types of spaces on each floor. An example is a corridor on Level 2 would be designated as 200CRA, a second corridor on that floor would be 200CRB).

- a. CR* (corridor).
- b. ES* (elevator shaft).
- c. LB* (lobby).
- d. ST* (stairway).
- e. VS* (vestibule).

10) Permanent Door Numbering: When a room has only one door, the door number shall be the same as the room. When a room has multiple doors, each door will be designated with a decimal number in a clockwise sequence starting with the main door to the room. For example room 125 has two doors that are numbered 125.1 and 125.2. When there is a communicating door between two rooms, it receives a number using the room number of the room it swings into.

6. ACCESSIBILITY STANDARDS ABOVE ADA AND BUILDING CODES

Under Development. To include corridor door magnetic hold opens, automatic entry and vestibule doors, residence halls to include some bathrooms that can accommodate quadriplegics with assistant care provider, all buildings to include transgender restrooms,