



LANDSCAPE DESIGN STANDARDS
Evanston Campus

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01



OVERVIEW

Overview of Landscape Design Standards

Overall Northwestern University is committed to providing an optimal exterior environment that fulfills the mission, values and historical integrity of the University. In this 21st Century, the University is committed to reasonable and responsible landscape design standards in response to all aspects of Accessibility, Sustainability, while providing a unified and cohesive Learning Environment that is both functional and visually aesthetic.

These Landscape Design Standards are meant as a guideline for all related exterior site work in conjunction with restoration projects and new construction.

One of Northwestern's greatest landscape related assets is the Lake Michigan 'lake shore' transversing the eastern edge of the campus.

In addition to the Lake, the eastern edge cooling pond and 85 acres of lake-fill added in the 1960's provides a great visual respite with a distinct campus micro-climate.

This waterfront respite is particularly important as the overall Campus is land-locked and with limited opportunities for future building expansion. Since the University has limited expansion opportunities, thoughtful campus planning is paramount with the preservation of usable exterior space for learning and recreational use. To further this goal, Northwestern is committed to becoming less vehicular dependent and more pedestrian friendly.

The contents within this document provide a resource palette of hardscape and softscape for Evanston Campus Exterior. These Landscape Design Standards are a result of comprehensive discussion and analysis over an extended period of time. This is a living document and as such, a comprehensive review of Standards will be periodically evaluated and amended as-needed.

02



Campus CIRCULATION Standards





Concrete path



Asphalt path

Networks and Connectors

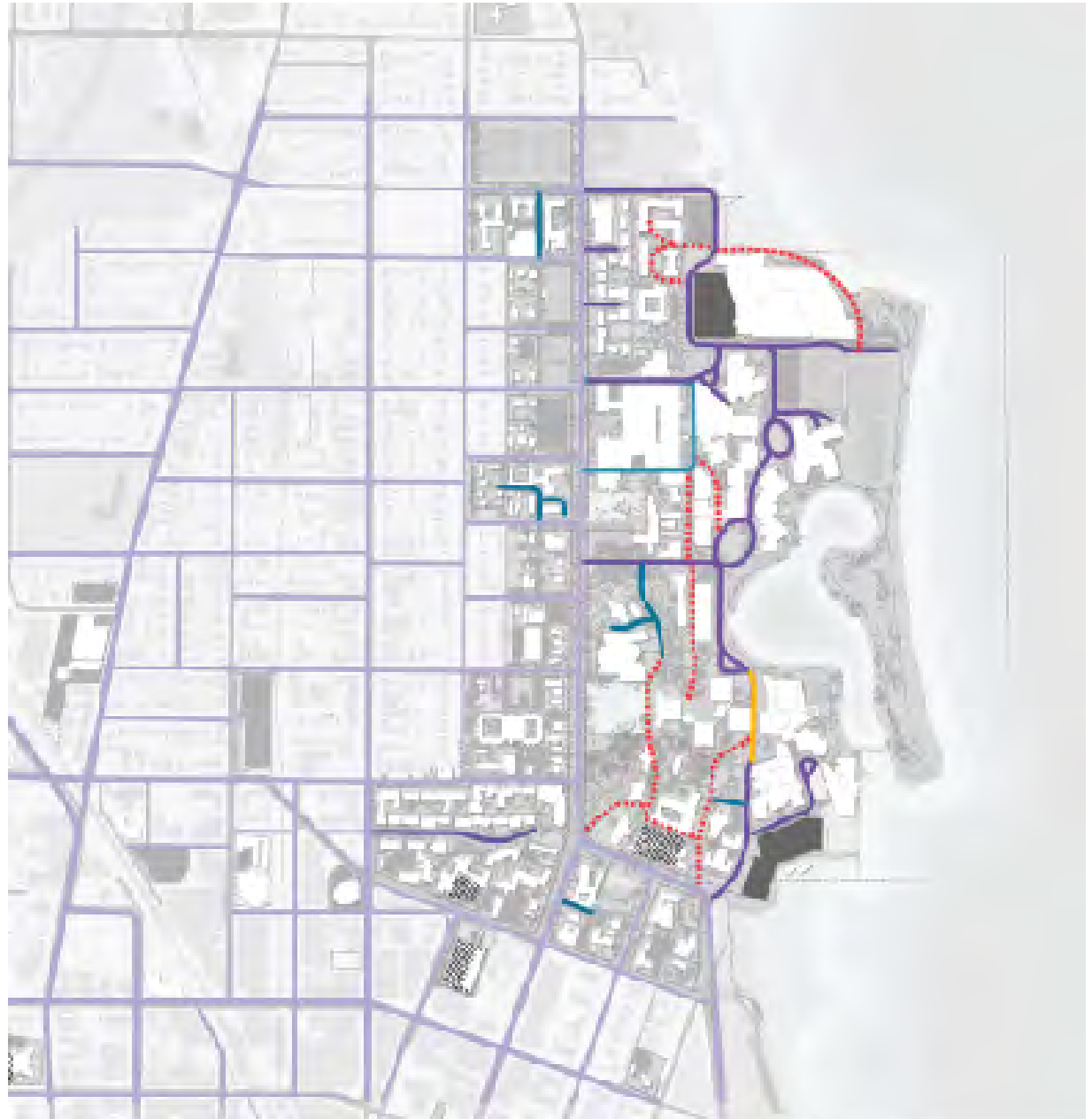
At present the network of Walks, Pathways and Roads are shared by varied modes of transport. One of the goals of these design standards helps define individual routes for each mode of transport. This is achieved through use of a specific landscape hard-scape and soft-scape material palette.

Vehicular Network

Existing Vehicular Network

Legend

- Campus Street: Publicly accessible
- Campus Restricted (for service/delivery)
- Restricted (gated)
- Fire/emergency and maintenance vehicles access only






Bicycle Network

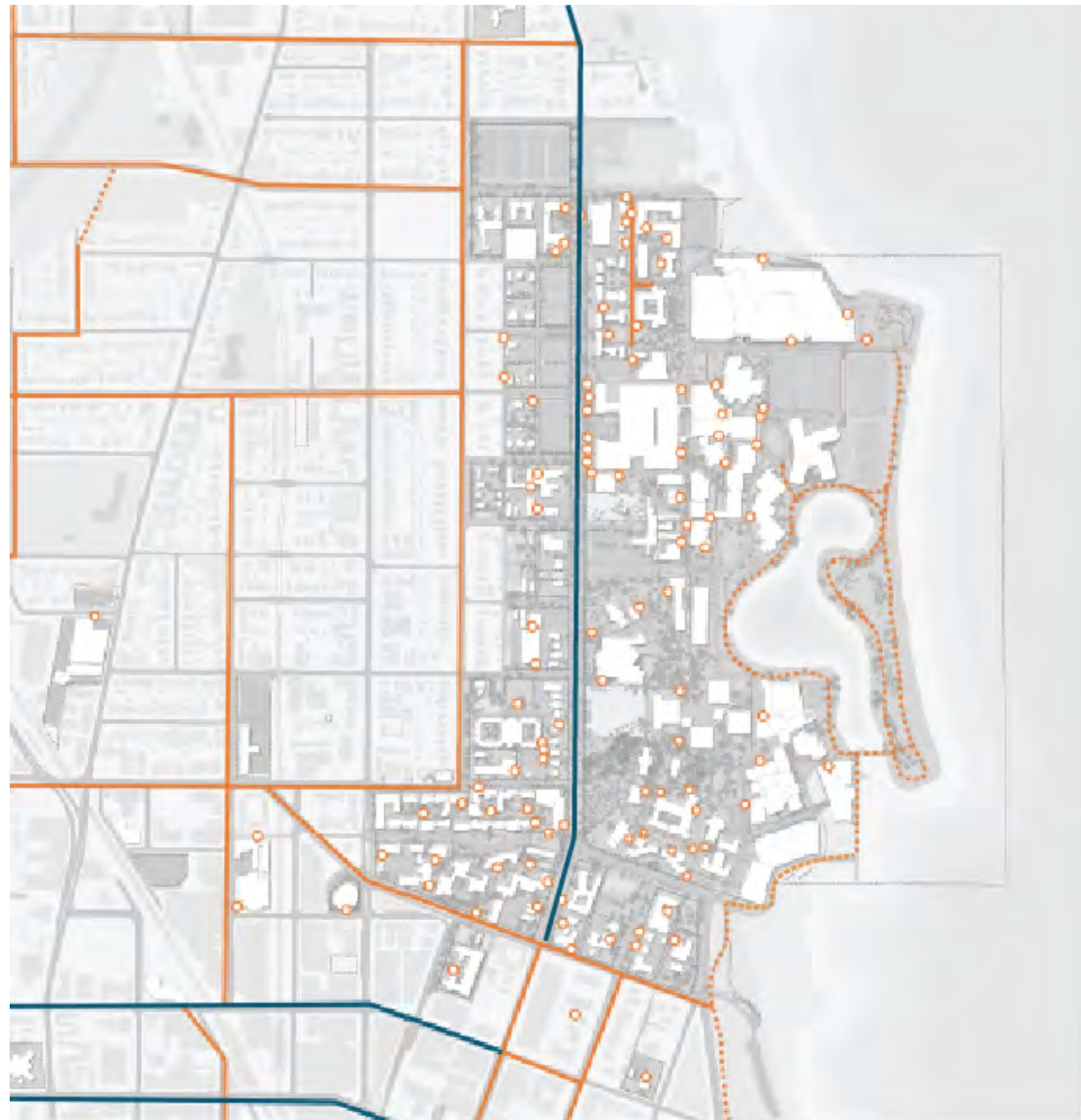
The current bicycle network includes the recent City of Evanston Bike Route installed on Chicago Avenue and Sheridan Road. On Campus the lake front path is often used to transverse from south to north but without separation from pedestrians.

The existing Campus has a comprehensive bike parking network with approximately 4500 bike parking locations.

Legend







-  Protected Bike Lane Bike Route
-  Lakefront Shared Use Path/Bike Route
-  Existing Bike racks

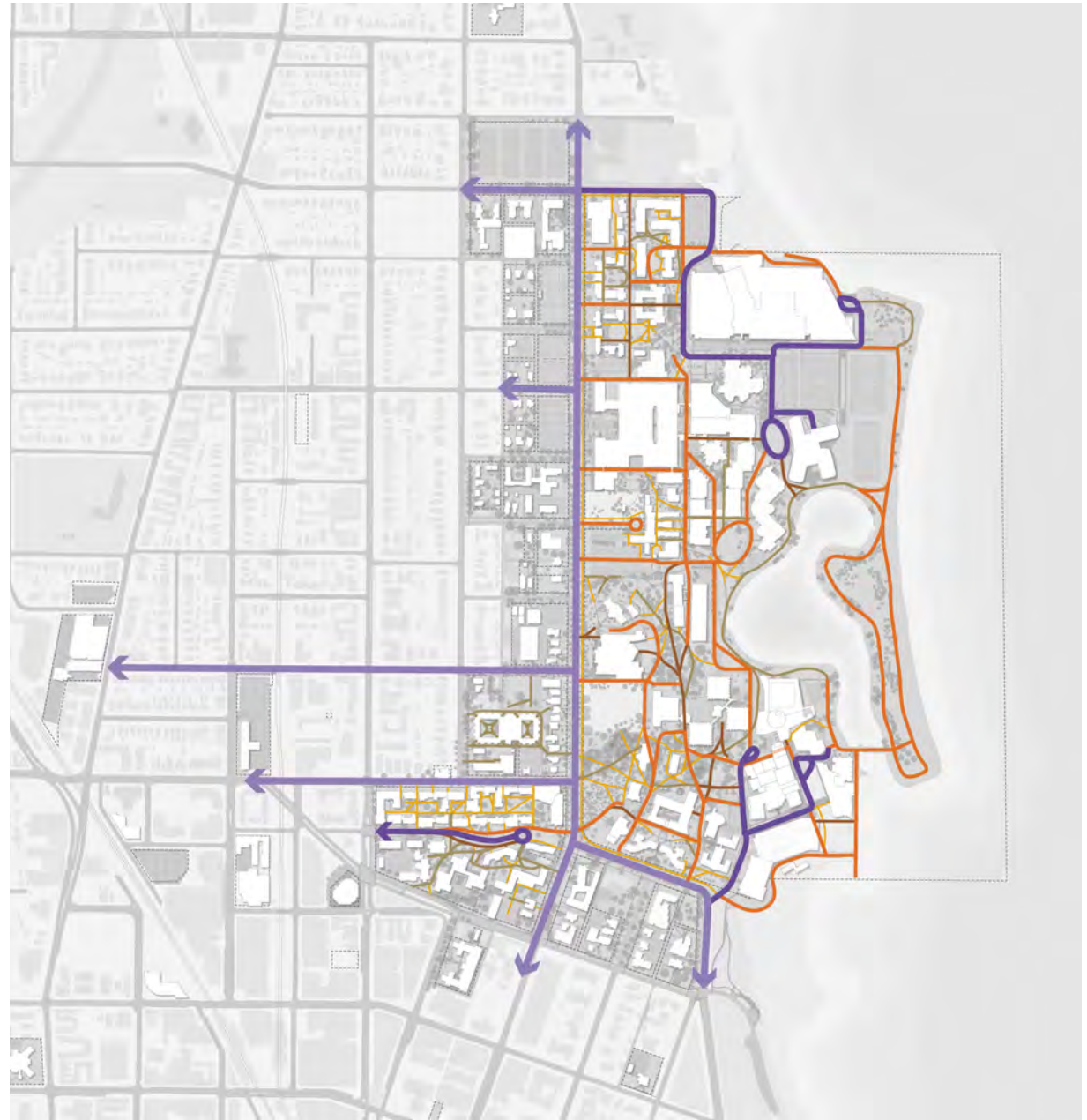
Existing Bicycle Network



Existing Pedestrian Network

Legend

-  City Street
-  Campus Street
-  Shared Use (Bicycle/ Pedestrian) Path
-  Existing Pedestrian Paths - Primary
-  Pedestrian Path - Secondary
-  Pedestrian Path Tertiary







Path Typologies

The width and use of the various types of paths are chosen based upon location on campus, considering character, scale, and volume of traffic. Materials are chosen with the intention of creating shared paths, introducing a clear hierarchy and division of uses within the path profile depending on the scale and use of the path.







Campus Street

TYPICAL CONDITION

Pathways identified as campus streets in campus circulation networks should be designed to accommodate major vehicular, bicycle, and pedestrian traffic in two directions. These streets connect city streets to parking facilities as well as key nodes on campus such as the Allen Center and the Arts Circle. This will ensure handicap access, as well as access for service and emergency vehicles. Campus streets shall include designated bike lanes of a width of 4' as well as sidewalks separated by tree lawns or raised planting strips adjacent to roadways. If the area is narrow, the tree-well area may need to paved with granite cobbles.

DETAIL SYMBOLS FOR DRAWINGS


PAVING

-  Cast in Place Concrete
-  Permeable Unit Pavers
-  Paving with Unit Pavers (Material TBD, eg. Brick Vs. Concrete)
-  If area can be expanded to 5' or more suggest using raised curb planting area. Alternate use granite cobbles for tree wells
-  Asphalt Paving
-  Granite or Precast Curb

FURNISHINGS

-  Bike Racks

LIGHTING

-  Lighting: Fixture Type and Height TBD by location and NU

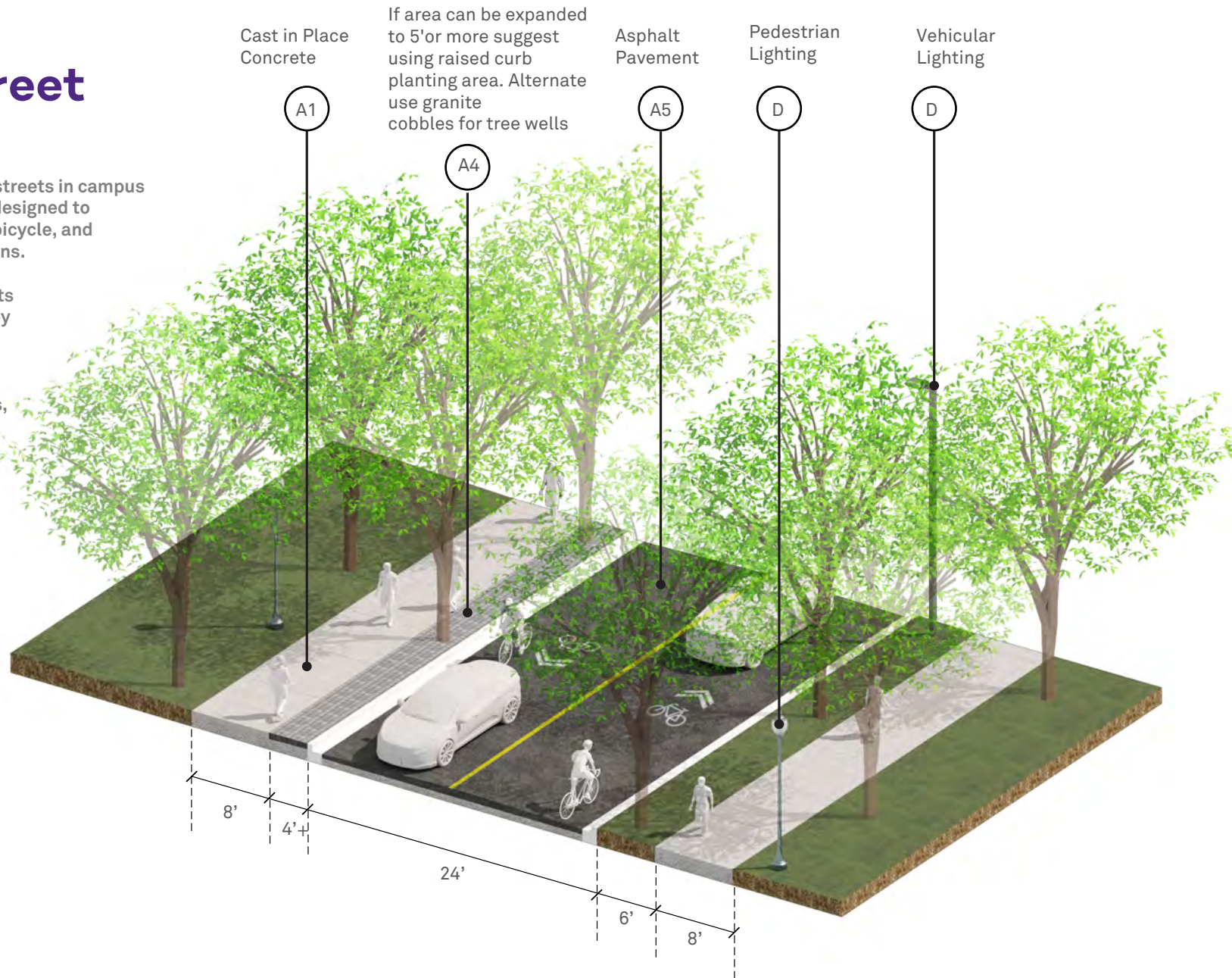
Campus Street

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Cast in Place Concrete

If area can be expanded to 5' or more suggest using raised curb planting area. Alternate use granite cobbles for tree wells

Asphalt Pavement

Pedestrian Lighting

Vehicular Lighting

A1

A4

A5

D

D

8'

4'

24'

6'

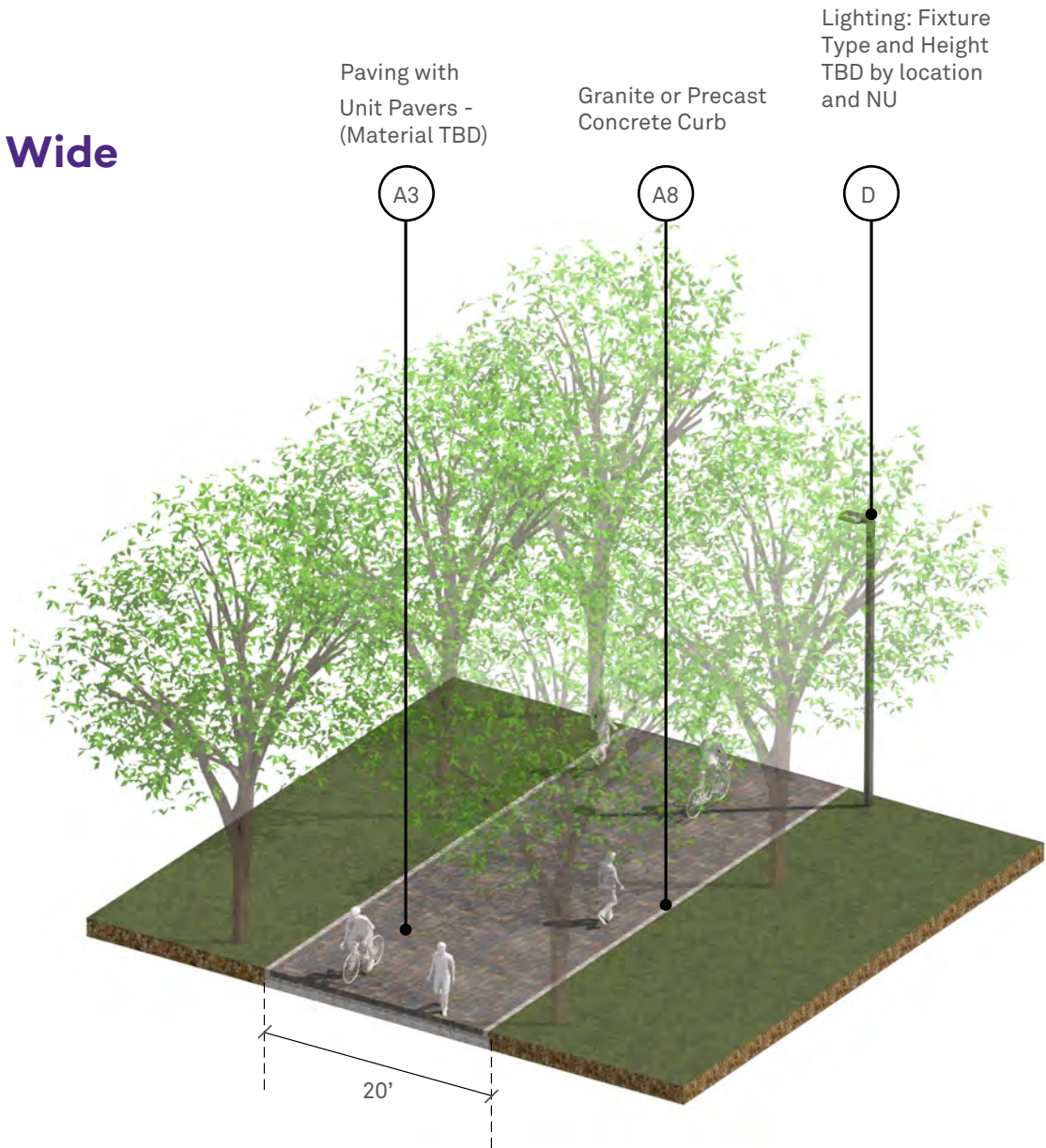
8'

Shared Use Path

Pedestrian / Bicycle Path, 20' Wide

TYPICAL CONDITION

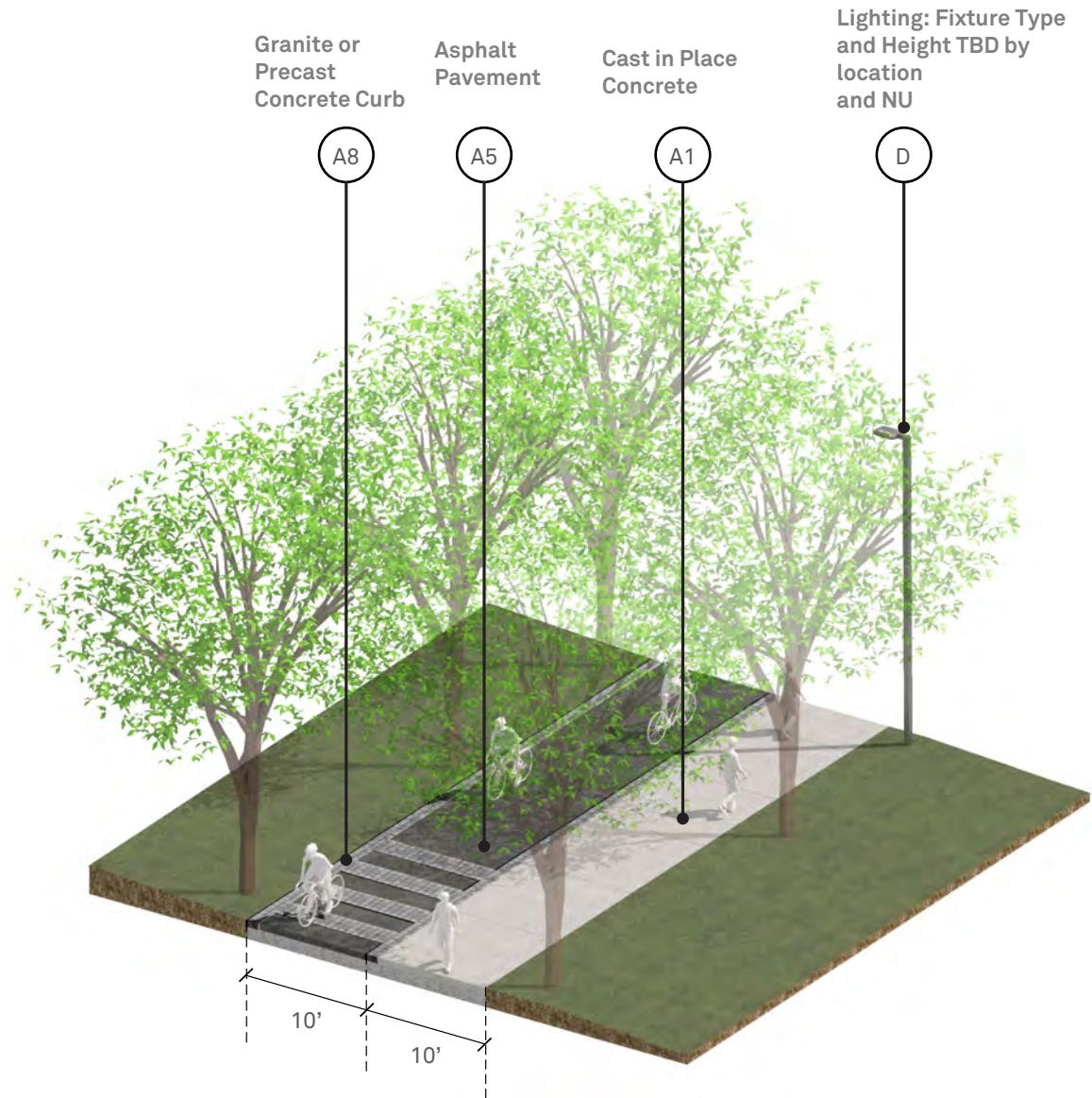
Pathways identified as shared use paths in the circulation network should be designed to accommodate major pedestrian, bike and service and emergency vehicle access. Shared use paths shall be twenty feet wide and paved with unit pavers. Flush granite or Precast concrete curbing will provide a defined edge on both sides of the pathway.



Pedestrian Paths

LAKEFRONT PATH

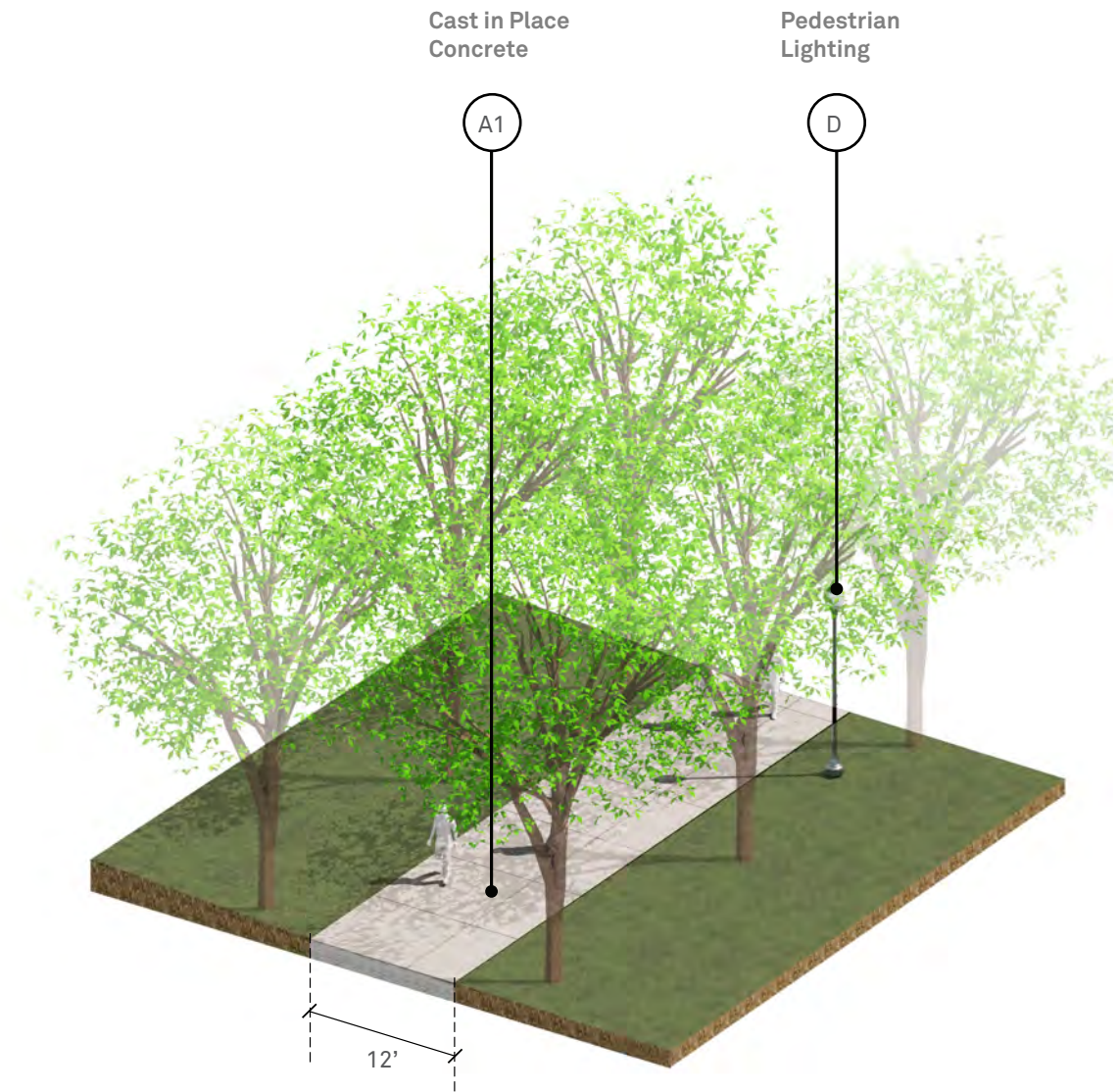
The shared use path located along the lakefront accommodates high volume pedestrian, bicycle and service and emergency vehicle access. The path shall be twenty feet wide, with ten feet of cast-in-place pavement dedicated to pedestrian use, and ten feet of asphalt pavement dedicated to bike use. Granite cobble bands will define the exterior edge of the asphalt pavement, and cobble “rumble strips” running perpendicular to the direction of travel will warn bikers of intersections with other paths or roadways ahead.



Pedestrian Paths

PRIMARY [10'-15' wide]

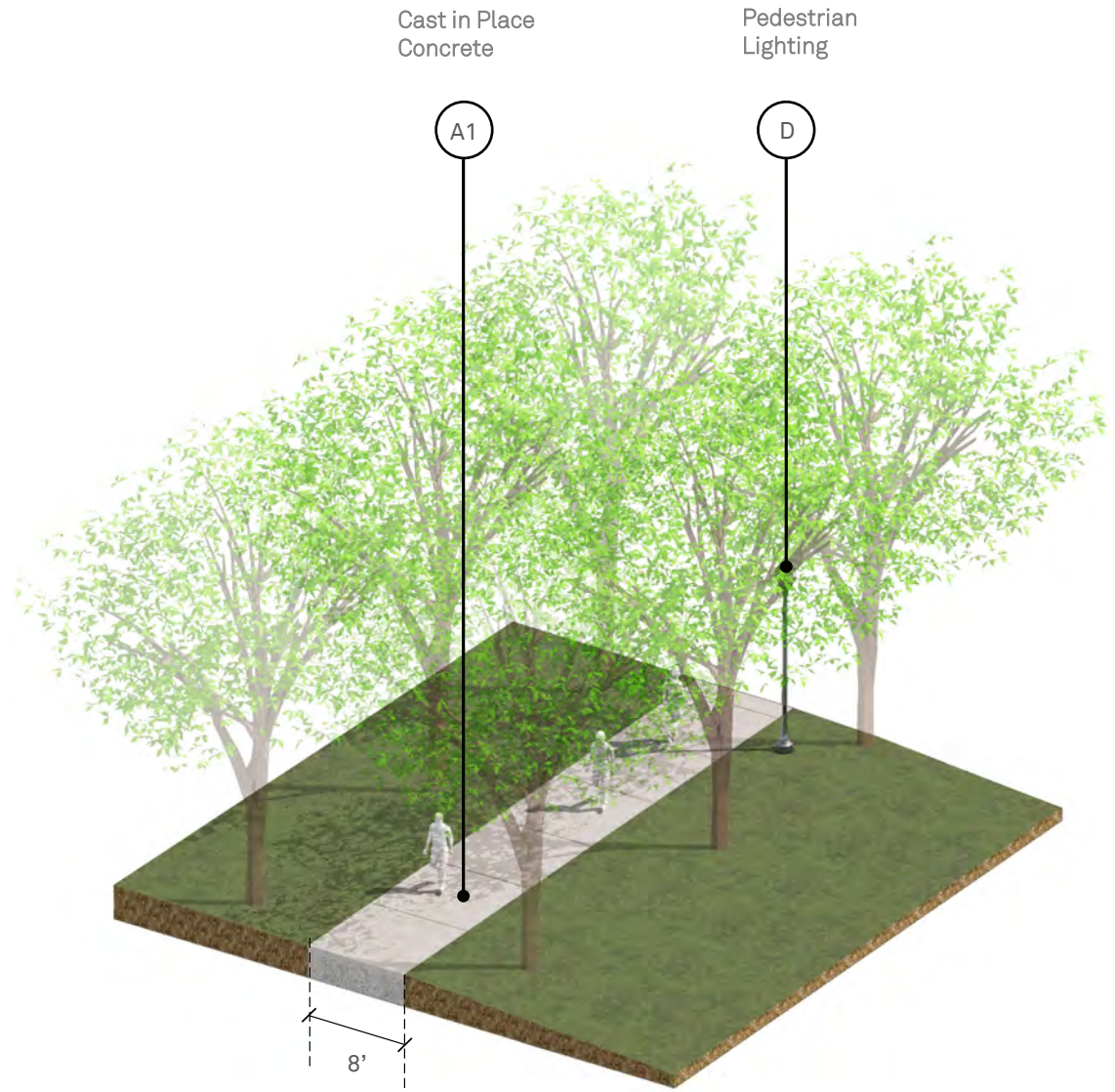
Circulation "Pedestrian Primary Paths" should be designed to connect pedestrian shared use paths within campus. These paths are 10'-15' wide and are not intended to accommodate bicycles. The width will still allow for service and emergency vehicle access.



Pedestrian Paths

SECONDARY [8'-12' wide]

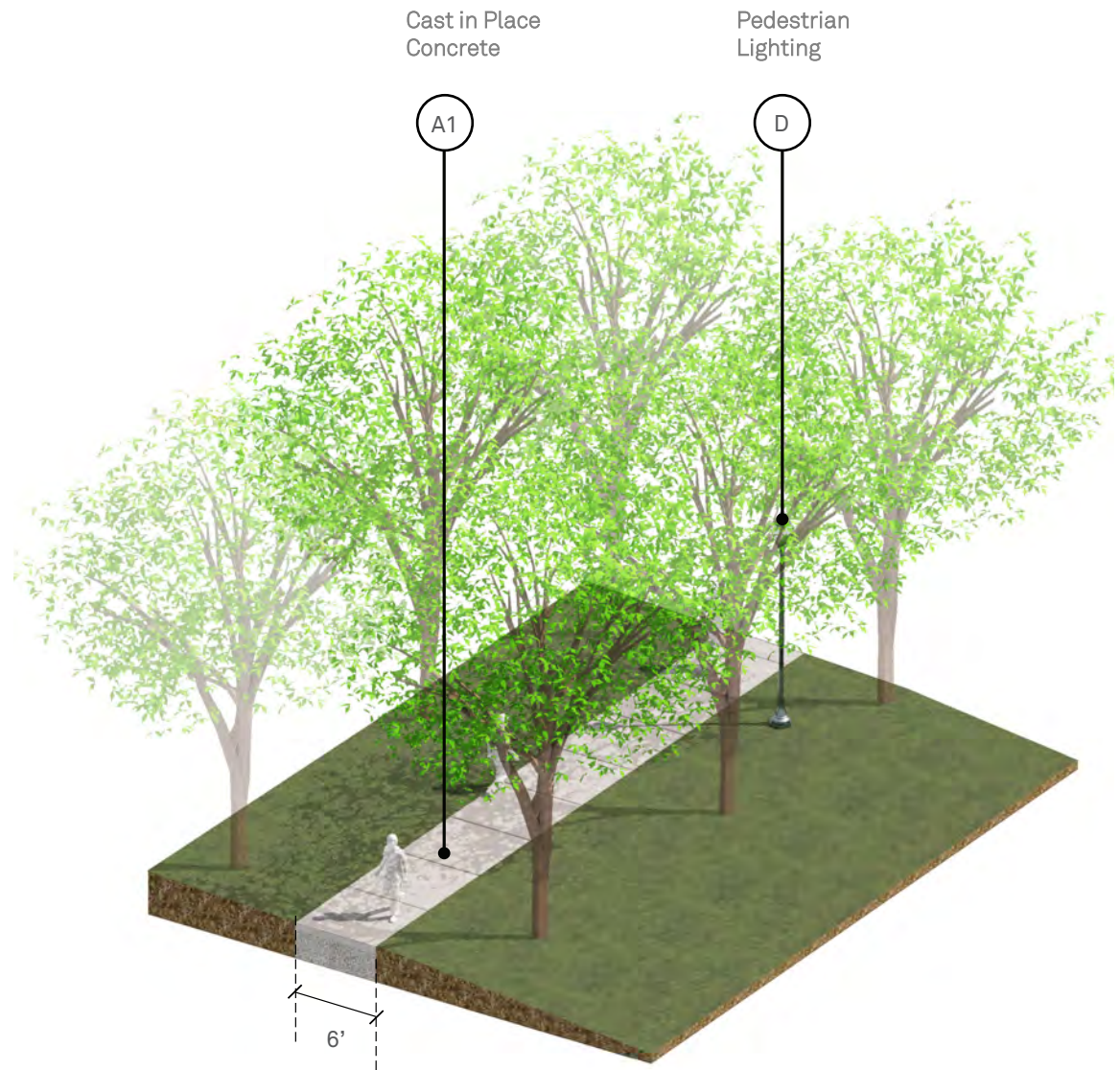
Circulation Pathways identified as "Pedestrian Secondary" are designed to connect pedestrian shared use paths and pedestrian primary paths with pedestrian tertiary paths within more intimate campus spaces. These paths are 8'-10' wide and are not intended to accommodate cyclists. The width will still accommodate service and emergency vehicle access.



Pedestrian Paths

TERTIARY [6'-8' wide]

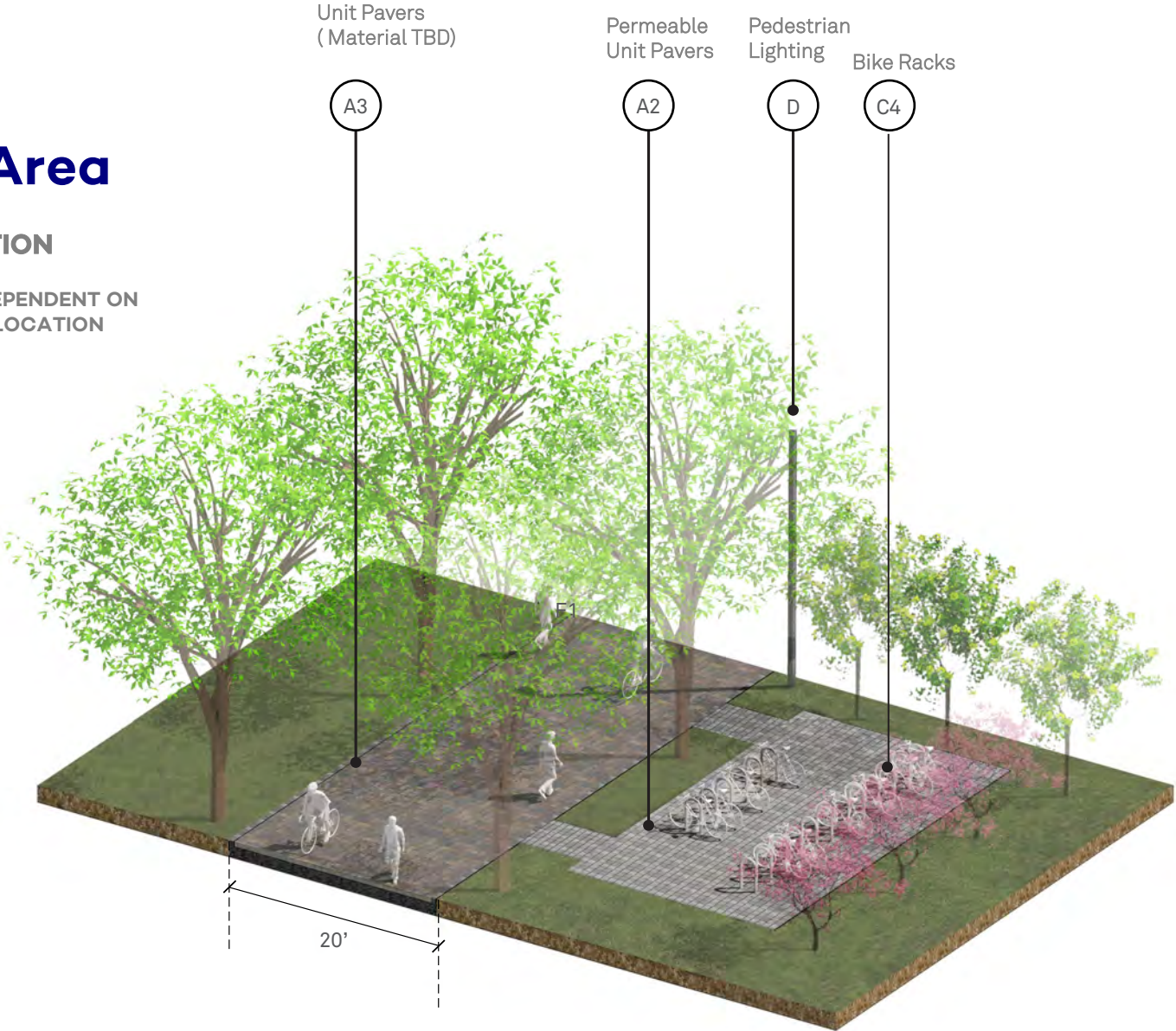
Circulation "Pedestrian Tertiary" paths are designed to connect all pedestrian paths with campus buildings and the most intimate campus spaces. These paths are 6'-8' wide and are not intended to accommodate cyclists. These paths are not meant to accommodate service and emergency vehicle access.



Bicycle Parking Area

TYPICAL CONDITION

SCALE VARIES AND DEPENDENT ON SPECIFIC NEEDS AND LOCATION



03

Detailed STANDARDS

Landscape Details

LANDSCAPE STANDARD -DETAILS

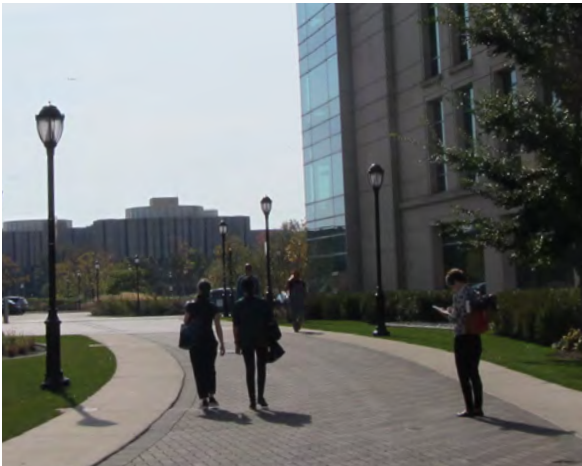
DESIGN STANDARD DETAILS FOR CREATING CONTEMPORARY, COHESIVE, AND FUNCTIONAL ASSEMBLIES AND EXTERIOR ENVIRONMENTS

The following landscape standard details have been selected to increase the cohesiveness and functionality of the campus landscape. Design criteria include visual compatibility with the character-defining elements of the existing campus, durability, provenance/source proximity, sustainable best practices, and an understanding of which applications have been successful or unsuccessful on campus to-date.





Concrete walk on campus



Concrete unit pavers on shared use path

◀ Brick paving at the Tech entrance

A. Paving Systems

This section includes guidelines for selecting landscape paving materials and associated recommended construction details. The selection of paving type should be determined according to both intended functional use and the character of each site and its immediate context. Section 03 of this report includes additional detail on the use of pavement materials as they relate to specific scales of campus pathways. In order to promote a unifying landscape environment throughout the campus, all paving, with the exception of brick, should be either a light-to-medium gray color or a warm buff color consistent with the Indiana limestone found in buildings throughout the campus.

A. Paving Systems

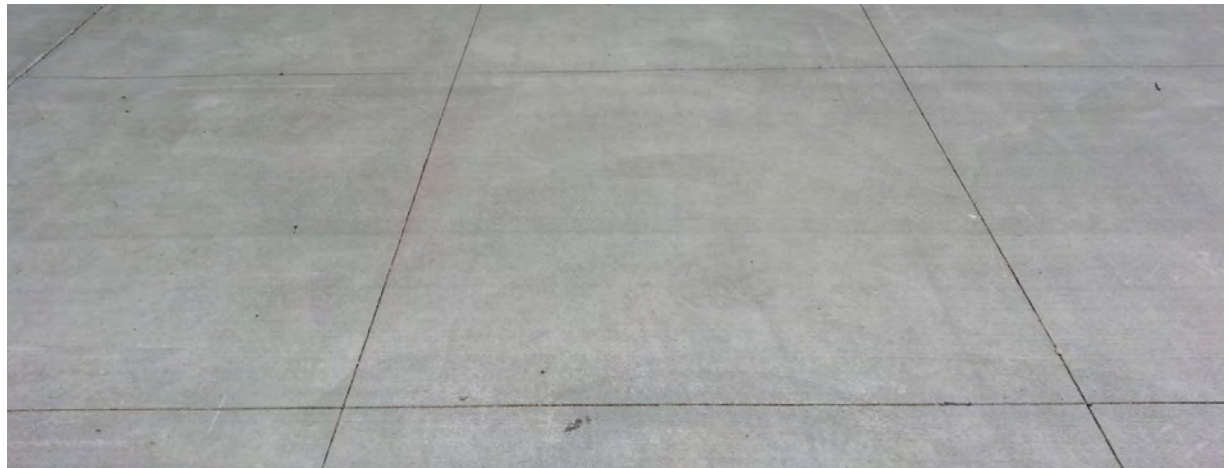
A.1.1 Concrete Pavement

Concrete pavement shall be the standard pedestrian path pavement material across campus, except for at shared-use paths. The primary concrete pavement application shall be cast-in-place concrete with a light broom finish and tooled joints running perpendicular to the walk length. Any future pavement repair or replacement should be made from score joint to score joint to make the repair less noticeable. Cast-in-place concrete pavement shall be used for circulation spaces, but should not be used at pedestrian gathering areas such as plazas and terraces.

At some time in their life, almost all campus walks will be required to support service or construction vehicle traffic. Therefore it should be assumed that all walk pavements be designed to support service and construction vehicles unless the location strongly indicates otherwise. In general, pavement thickness for paths wider than 5 feet shall be designed to accommodate heavy vehicular loading. Concrete pavement thickness for paths less than 5 feet wide shall be designed for pedestrian loading except for areas that will require regular vehicular crossing or access. Reinforcing within the base slab shall be welded wire fabric or steel reinforcing as determined by the design engineer for each application. Base course depth for all pavements shall vary according to the pavement loading requirements and specific soil conditions at each site.

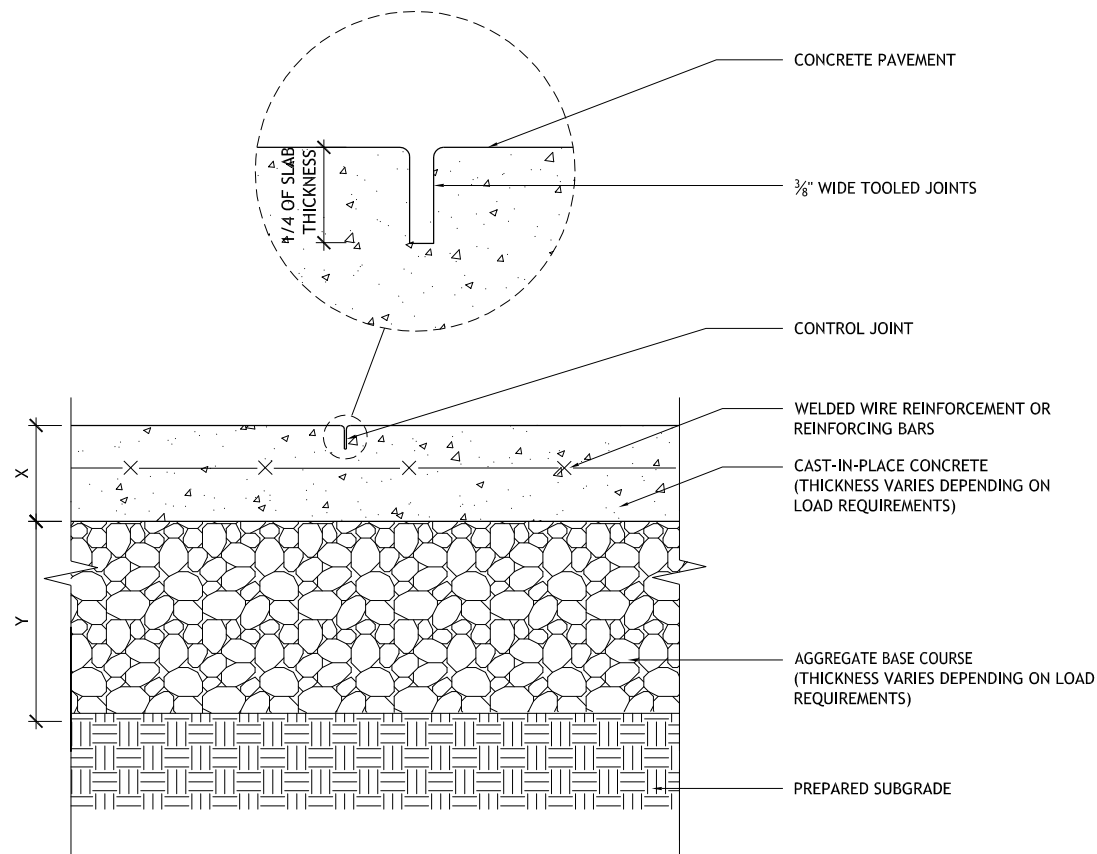


Concrete Walk, typical condition



Concrete Walk, Detail Condition

Detail: Concrete Pavement



Standards

MATERIAL:

- » Cast in place concrete

COLOR:

- » Natural light gray color, SRI 29 or higher

FINISH:

- » Light broom finish, perpendicular to direction of movement
- » Optional: Exposed aggregate finish

JOINTS:

- » 3/8" Tooled joints
- » Optional: 1/4" Saw-cut joints
- » Expansion joints with beveled slip joints at 30' on center unless otherwise noted

SETTING:

- » Thickness varies per use condition

A. Paving Systems

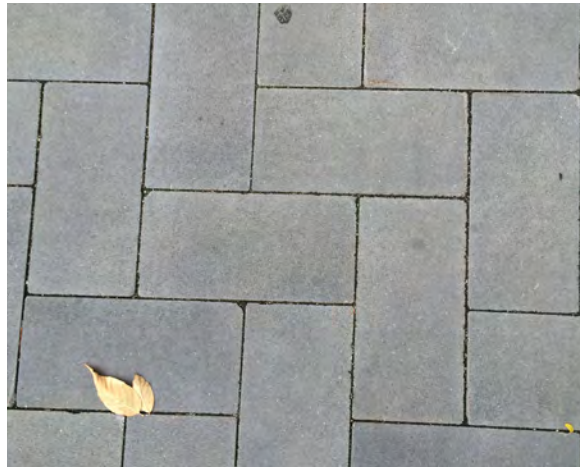
A.2.1 Unit Pavers: Concrete Unit Pavers

Concrete unit pavers shall be used in specialty areas designed to accommodate gathering, in terraces and plazas associated with individual buildings, and at share-use paths. Where landscape meets architecture, paving material selection shall be coordinated with exterior architectural materials and interior flooring materials to create one environment.

Concrete unit pavers may also be used in service and parking areas when it is important to signal the intent that pedestrians are welcome in these areas. For vehicular applications, including shared-use paths, concrete unit pavers shall be interlocking L-shaped pavers or rectangular pavers with a maximum size of 4" x 6" x 24". Plank-style pavers, larger slab pavers, or other paver styles may be utilized in pedestrian-only areas. Large, hexagonal pavers should not be used. As a general rule, marking pavements with donor names shall not be done. This practice incurs a long term maintenance cost and increased vulnerability of the pavement to damage.

Concrete unit paver finish shall be a standard, ADA compliant, slip-resistant finish. Concrete unit pavers shall have beveled edges. Pavers with rough or brushed finishes or pavers with vertical edges should not be used.

Concrete unit pavers shall be in the gray or buff color range, with an SRI value of 29 or greater to avoid heat island effect. Darker grey concrete unit pavers may be used as accents within paving patterns. Avoid brown, red or pink pavers.



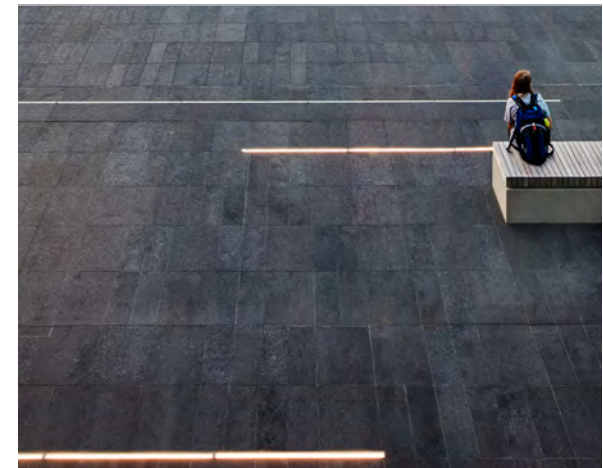
Herringbone



Running Bond

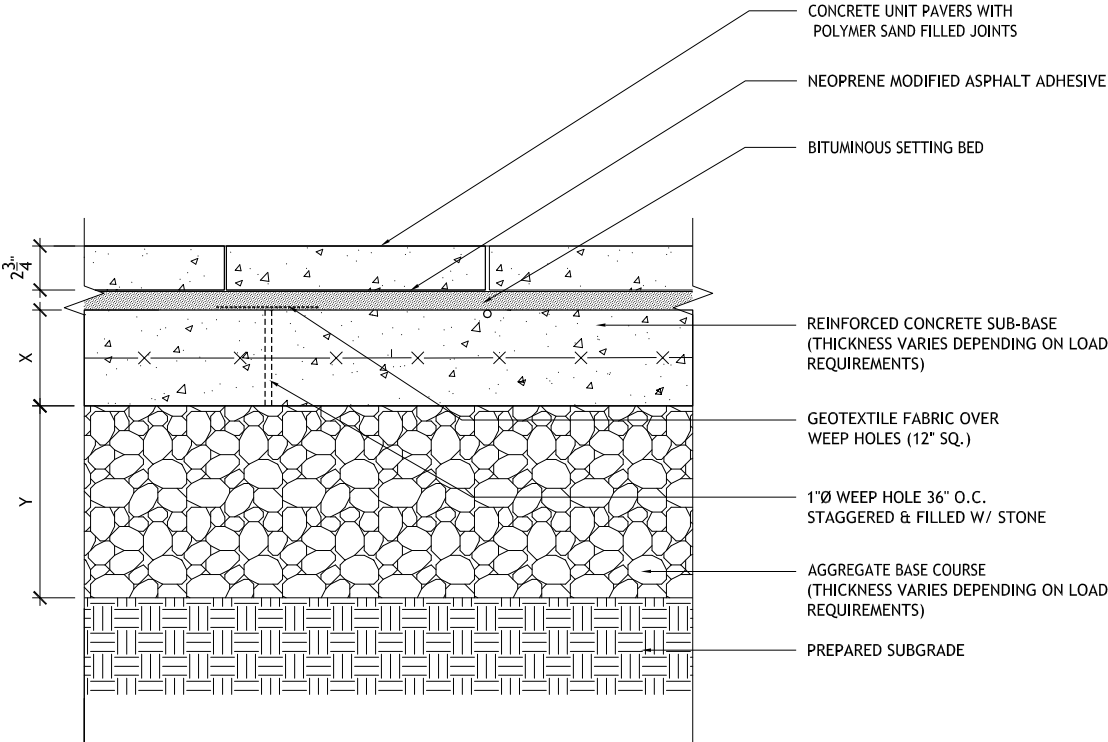


Linear Running Bond



Stacked Layout, Mixed Size Pavers

Detail: Concrete Unit Pavers on Bituminous Setting Bed



Standards

MATERIAL:

- » Concrete unit paver, recommended sizes:
 - Rectangular: 5" x 10" x 2 3/4" thick; 6" x 12" x 2 3/4" thick

COLOR:

- » Light Gray, SRI 29 or higher; Dark Gray accents

FINISH:

- » Standard, slip-resistant finish; beveled edges

PAVING PATTERN:

- » Running bond at walkways
- » Herring bone at drivable areas

JOINTS:

- » 1/8" polymer sand filled joints

SETTING BED:

- » 1" Bituminous Setting Bed with neoprene tack coat and weep holes

A. Paving Systems

A.2.2 Unit Pavers: Permeable Concrete Unit Pavers

Permeable concrete unit pavers shall be used in bicycle parking areas, and specialty areas that require pervious hardscape. Factors to consider in the decision to use pervious pavement should include subsurface soil conditions, maintenance implications, traffic loading and cost effectiveness versus other stormwater management methods.

Permeable concrete unit paver styles shall be small rectangular pavers or interlocking L-shaped pavers. Permeable concrete unit paver finish shall be a standard, ADA compliant, slip-resistant finish with a beveled edge. Pavers with rough or brushed finishes or pavers with vertical edges should not be used.

Permeable concrete unit pavers shall be in the gray or buff color range, with an SRI value of 29 or greater to avoid heat island effect. Darker grey concrete unit pavers may be used as accents within paving patterns. Avoid brown, red or pink pavers.



Interlocking



Running-bond

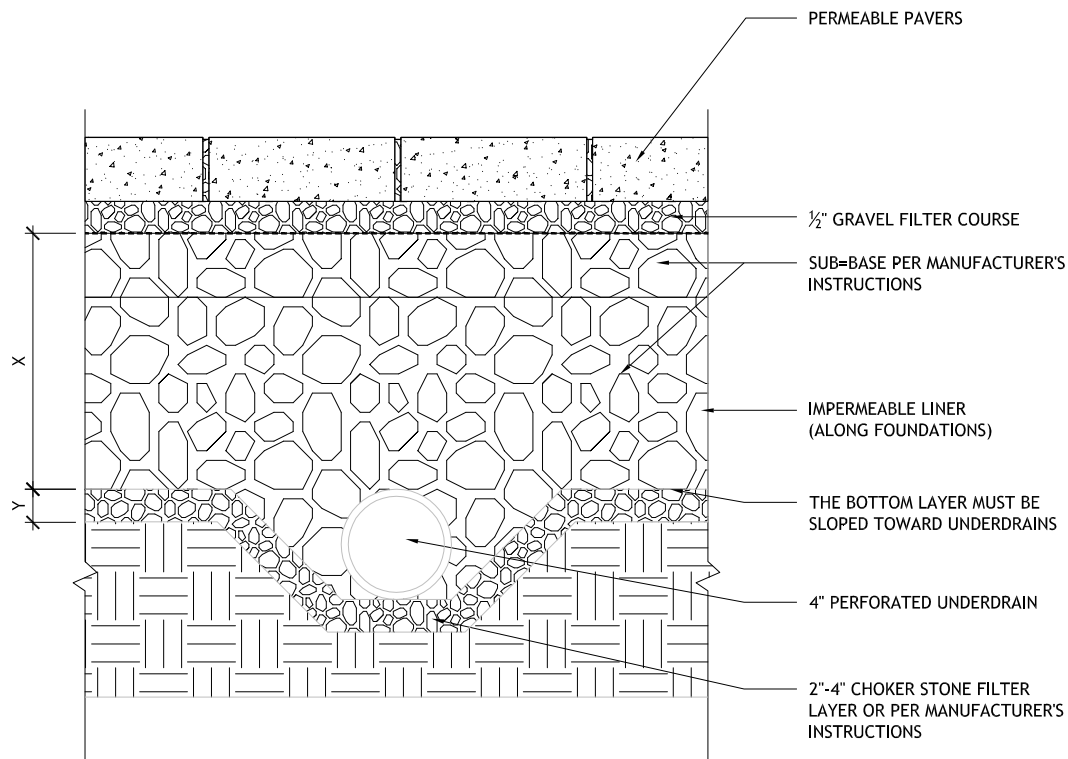


Herringbone



Herringbone - Parking Lot

Detail: Permeable Concrete Unit Pavers on Porous Setting Bed



Standards

MATERIAL:

- » Permeable concrete pavers, recommended sizes:
 - Hex: 8" x 8" x 3" thick
 - Rectangular: 5" x 10" x 2 3/4" thick; 6" x 12" x 2 3/4" thick

COLOR:

- » Light gray color, SRI 29 or higher

PAVING PATTERN:

- » Running bond at pedestrian areas
- » Herring bone at vehicular areas

SETTING BED:

- » Open-graded stone setting bed with perforated pipe

JOINTS:

- » 1/4" open-graded stone joints

SETTING BED:

- » As per detail

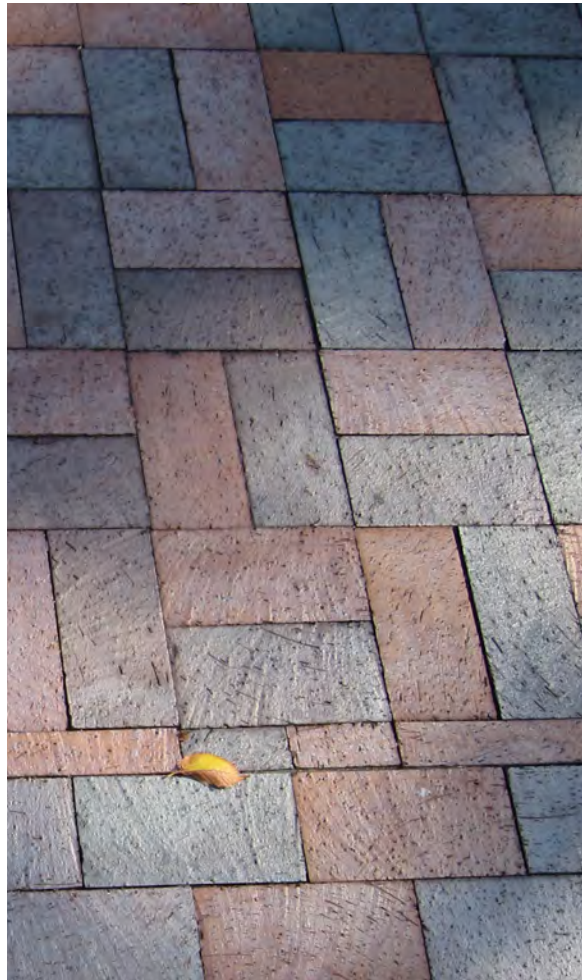
A. Paving Systems

A.3.1 Unit Pavers: Brick Unit Pavers

Brick pavers may be used at terraces and plazas associated with individual buildings which employ brick as a primary or accent facade material.

Brick pavers shall be installed in a herringbone pattern for vehicular areas. Running bond patterns, stacked bond, or other alternate paver layouts may be utilized in pedestrian-only areas.

The setting bed for brick unit pavers shall be a bituminous setting bed, but care should be taken to properly apply the 1/16" thick neoprene tack coat to the base of the pavers per manufacturer's instructions, and to properly set the bituminous setting bed per industry standards. Contractors installing pavers shall demonstrate experience in this installation type, as improper installations on campus have resulted in tack coats and/or bituminous settings seeping through paver joints.



Ironspot bricks in a double basketweave pattern

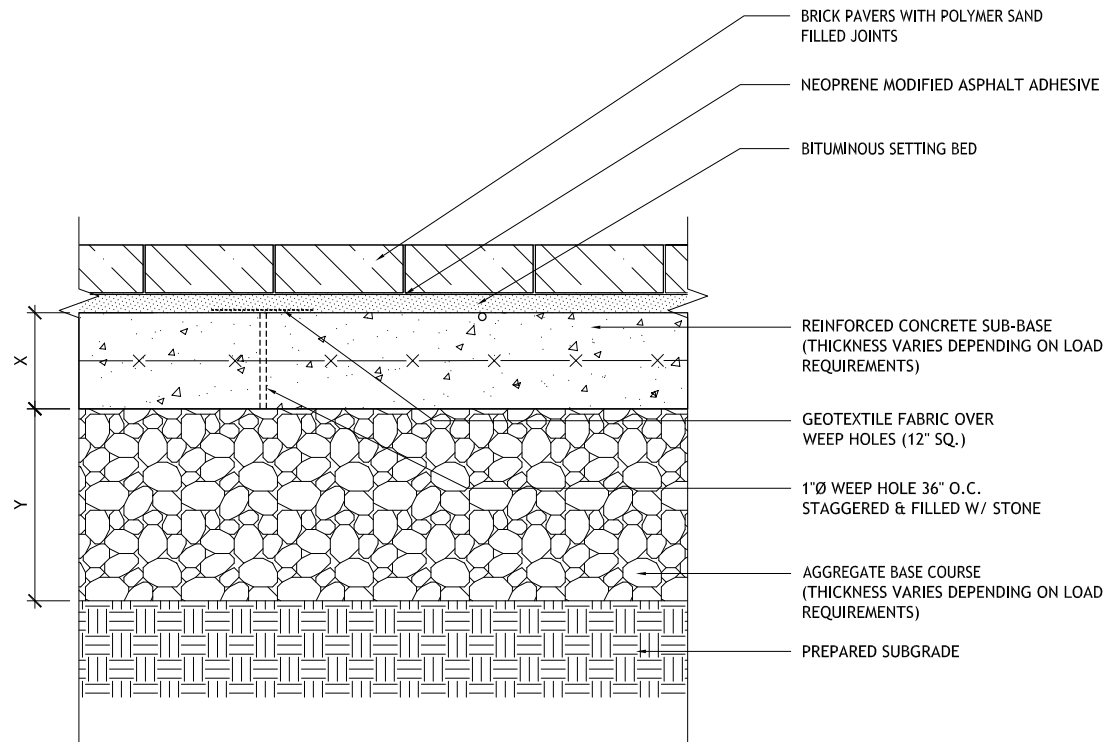


Ironspot bricks at the Tech entry plaza



Ironspot bricks in a herringbone pattern

Detail: Brick Unit Pavers on Bituminous Setting Bed



Standards

MATERIAL:

- » Brick wire-cut paver, recommended size:
 - 4" x 8" x 3" thick

COLOR:

- » Medium iron spot #47 or #77

FINISH:

- » Matt or velour finish
- » Square edge

PAVING PATTERN:

- » Running bond, or other options at pedestrian areas
- » Herring bone pattern at vehicular areas

JOINTS:

- » Sandswept, hand tight joints

SETTING BED:

- » 1" Bituminous Setting Bed with neoprene tack coat and weep holes

A. Paving Systems

A.4.2 Unit Pavers: Granite Cobbles

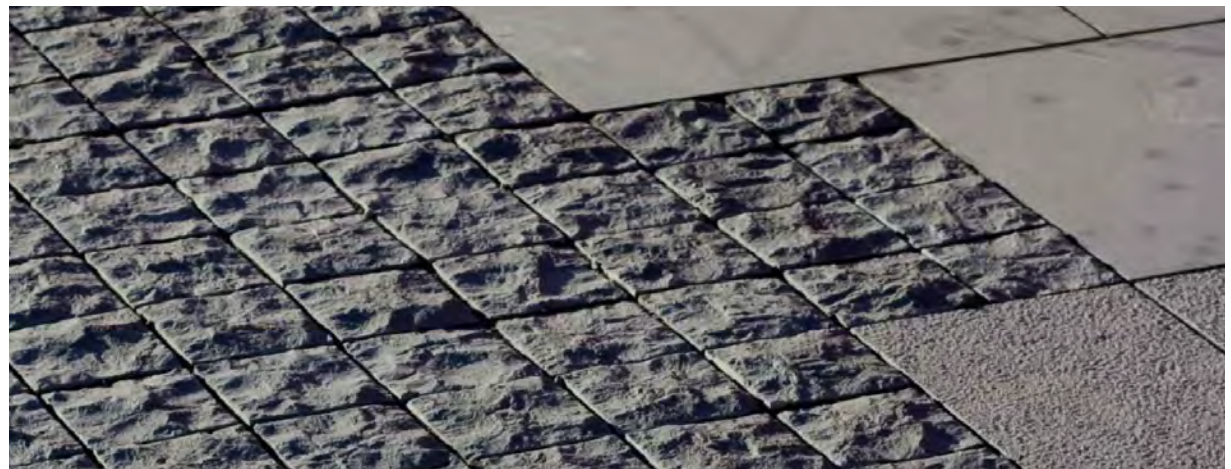
Granite cobbles may be used as accents or edging within plazas and as rumble strips for bicycle paths. Care should be taken to set cobbles flush to pavement and joints to avoid tripping hazard conditions.

The recommended setting bed for granite unit pavers is a latex-modified mortar setting bed with latex-modified mortar joints.

Granite shall be in the gray color range. Avoid beige, red or pink granites. Granites shall be sourced from quarries located within 500 miles of campus.

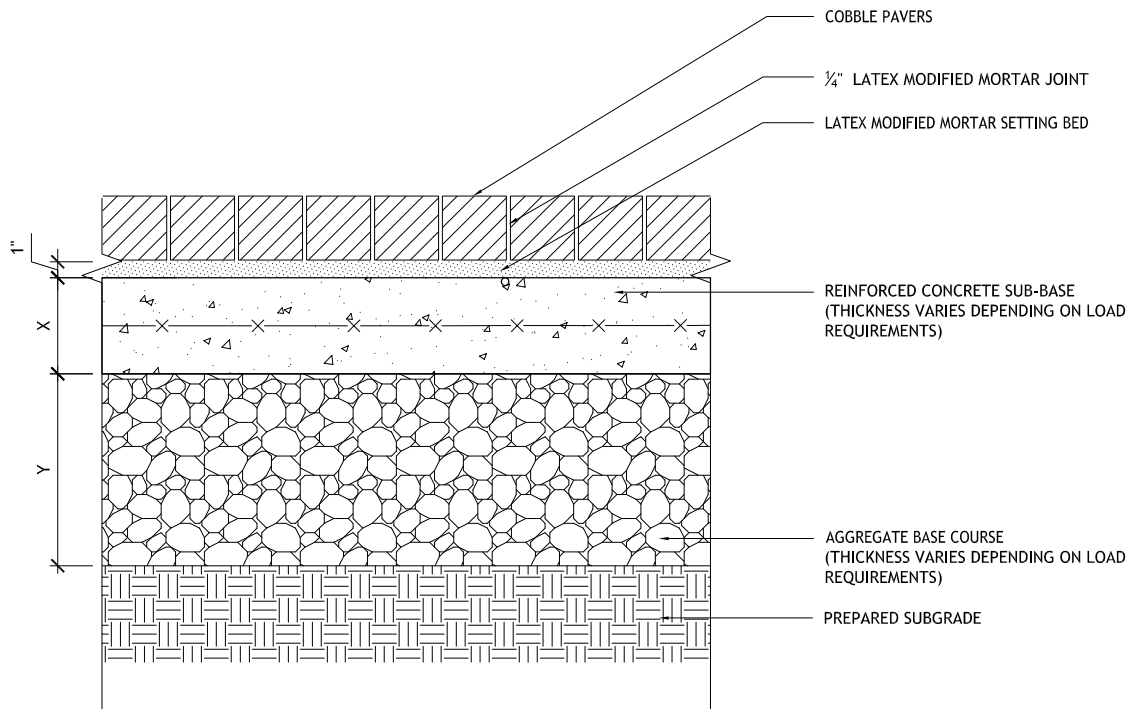


Granite Cobbe Detail



Granite cobbles as pavement accent

Detail: Granite Cobble on Mortar Setting Bed



Standards

MATERIAL:

- » Granite cobble paver, recommended size:
 - Cube: 4" x 4" x 4" thick

COLOR:

- » Blue/gray

FINISH:

- » Thermal or waterjet or tumbled

PAVING PATTERN:

- » Running bond at crossings
- » Standard bond at edges

JOINTS:

- » 1/4" latex modified mortar joint

SETTING:

- » 1" latex modified mortar setting bed
- » Cast-in-place reinforced concrete base

A. Paving Systems

A.5.1 Asphalt Pavement

Asphalt pavement shall be used only in campus roadways and services drives. Asphalt pavement patches shall not be used in any location that is not within an asphalt pavement.

For roads, asphalt pavement thickness shall conform to IDOT pavement standards and be determined by the design engineer for each application.

All Roadways require concrete curbs.



Asphalt roadway

Detail: Asphalt Pavement

Standards

MATERIAL:

- » Asphaltic concrete pavement

COLOR:

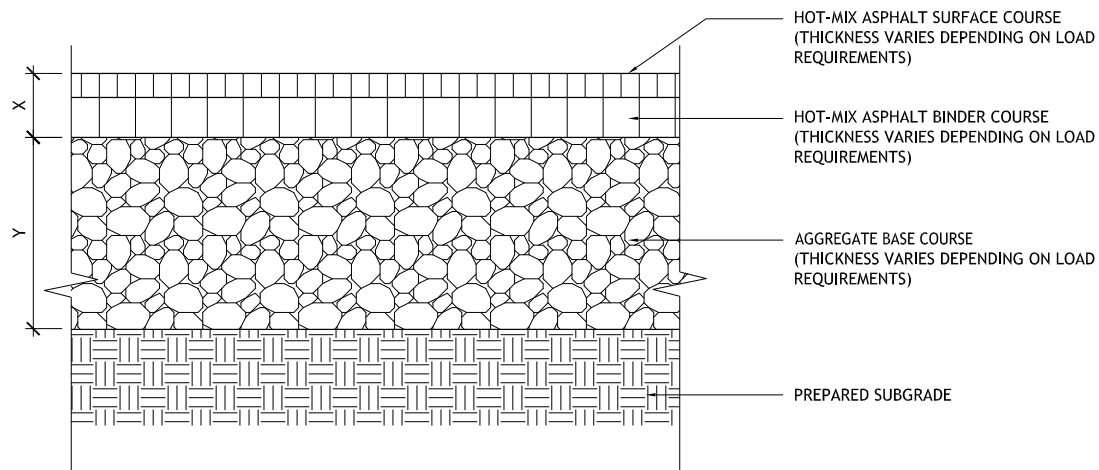
- » Standard color

FINISH:

- » Rolled

SETTING BED:

- » As required for loading



A. Paving Systems

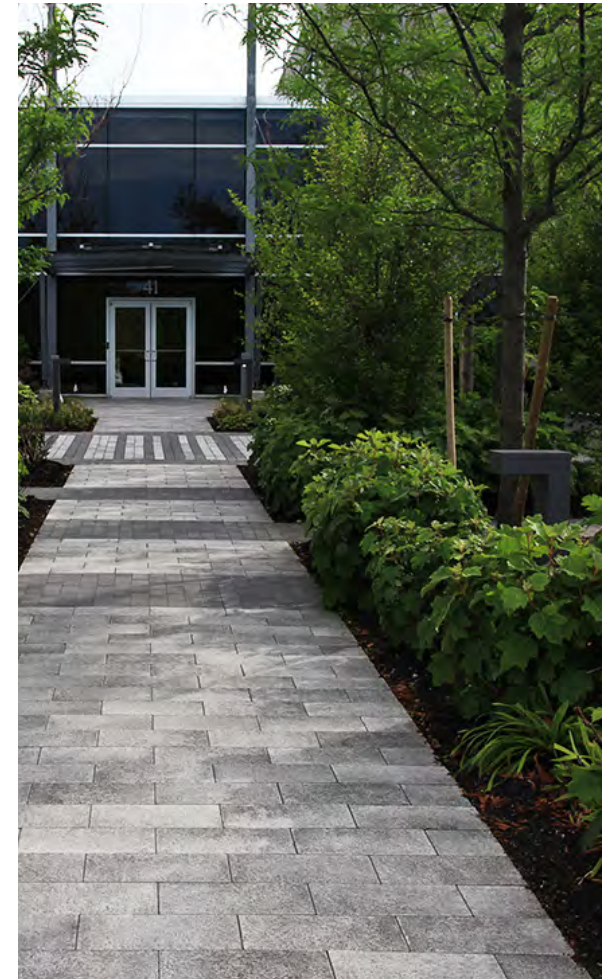
A.6.1 Pavement Edging Systems

In applications where unit pavers meet another flush pavement, a flush granite or concrete curb shall be used as a paver restraint. In applications where a planting bed meets a flush paved condition, metal edging or a flush or vertical granite curb shall be used to demarcate bed edges. Informal stone or concrete cobble curb edges shall not be used in these applications. Bed edges shall be straight lines or simple curves sympathetic with adjacent architecture and site context. Elaborate ornamental planting bed shapes shall not be used.

Expansion joints shall be employed where two separate paving materials interface that utilize concrete as a pavement or base condition.

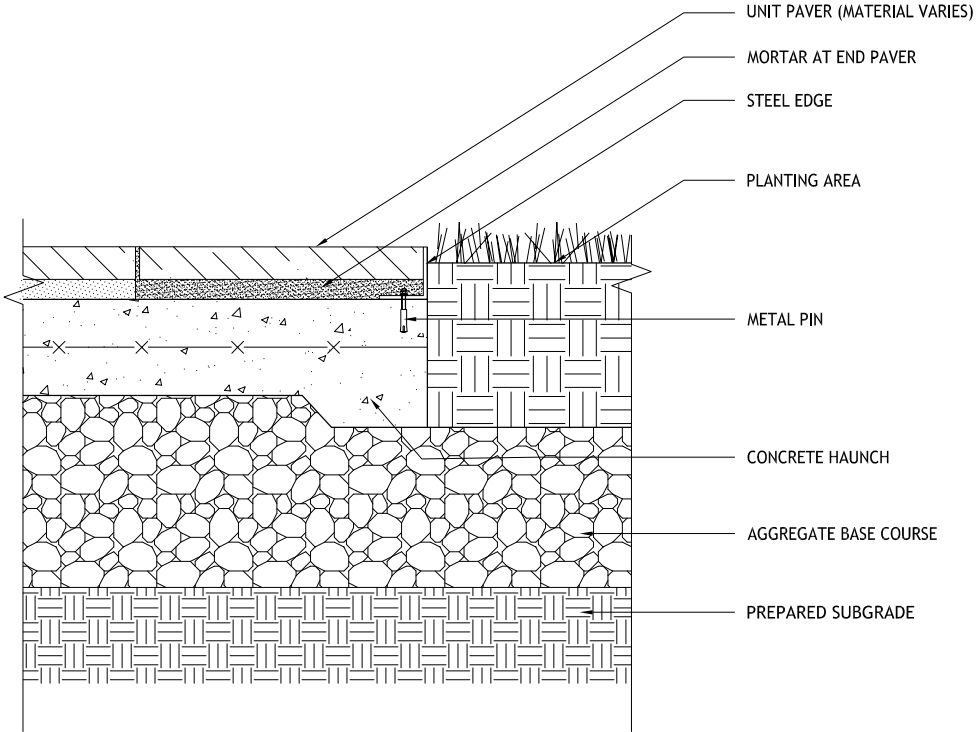


Flush curb edging at unit pavers



Flush steel edging at unit pavers

Detail: Steel Edging at Planting Edges



Standards

MATERIALS:

- » Metal edge (option): Stainless Steel L-Channel
- » Metal edge (option): Aluminum L-Channel

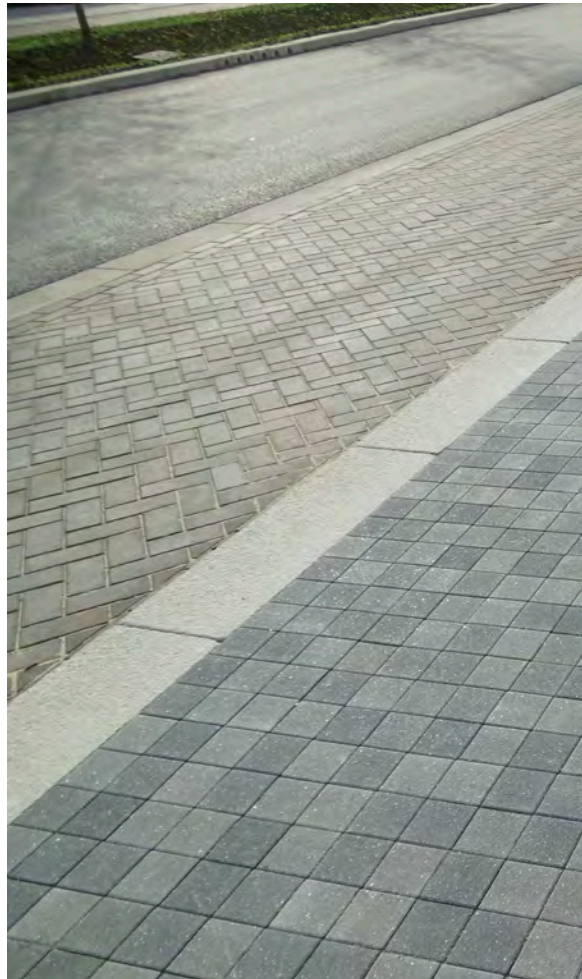
SIZE/DIMENSIONS

- » As shown on detail

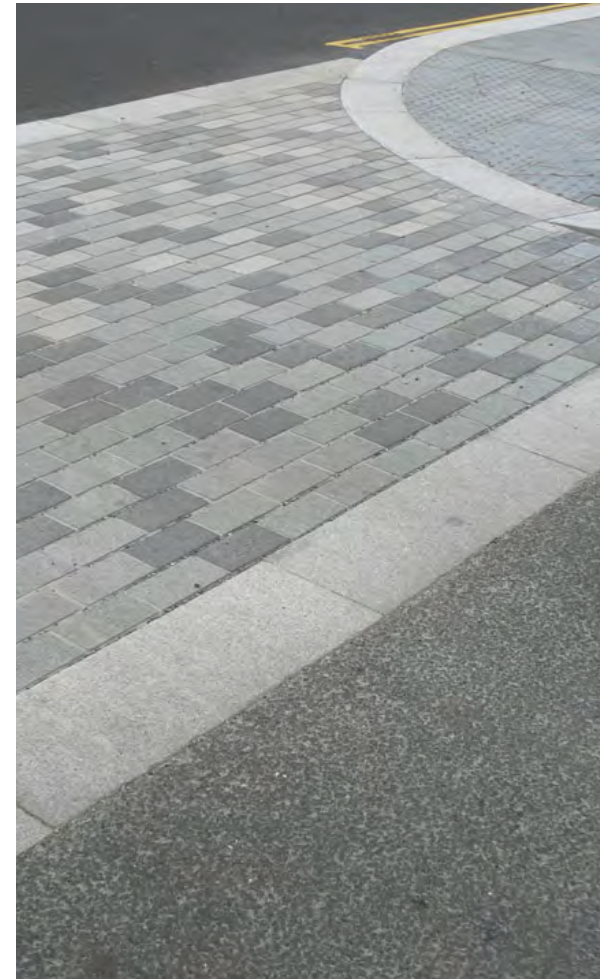
INSTALLATION:

- » As per detail

Flush curbing shall be used as a unit paver restraint edge.

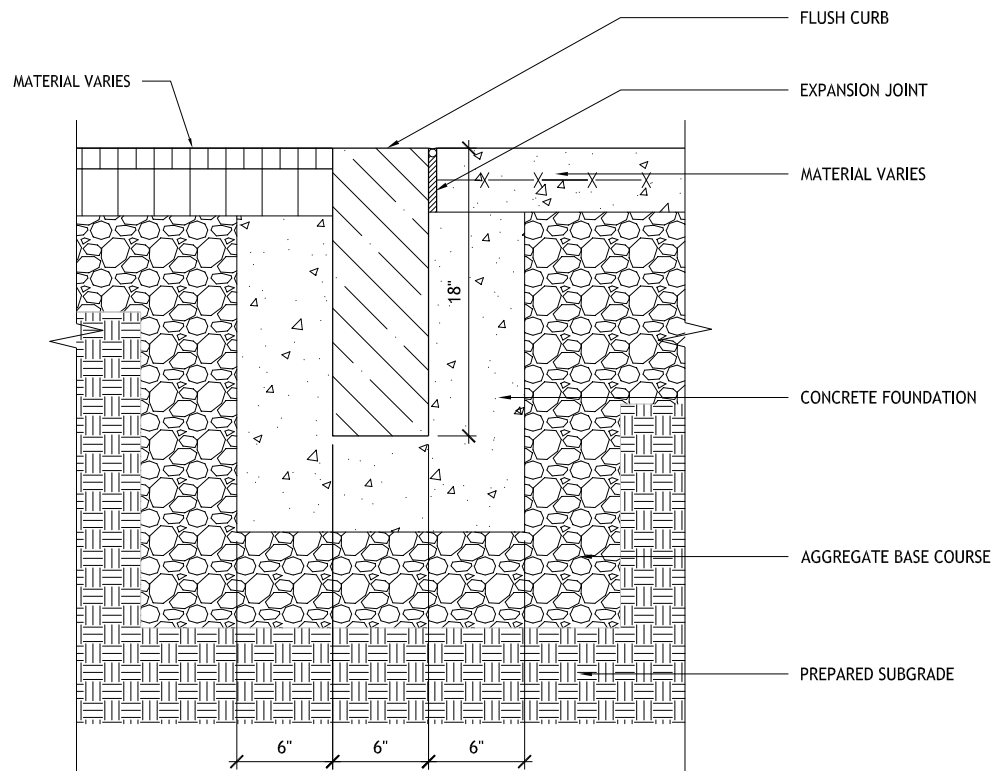


Flush Granite Curb at Walkway Edge



Flush Granite Curb at Unit Pavers

Detail: Flush Curb



Standards

MATERIALS:

- » Granite

FINISH/PATTERN:

- » Thermal finish on exposed faces

JOINTS

- » 1/4" Mortar joints

SIZE/DIMENSIONS

- » As shown on detail

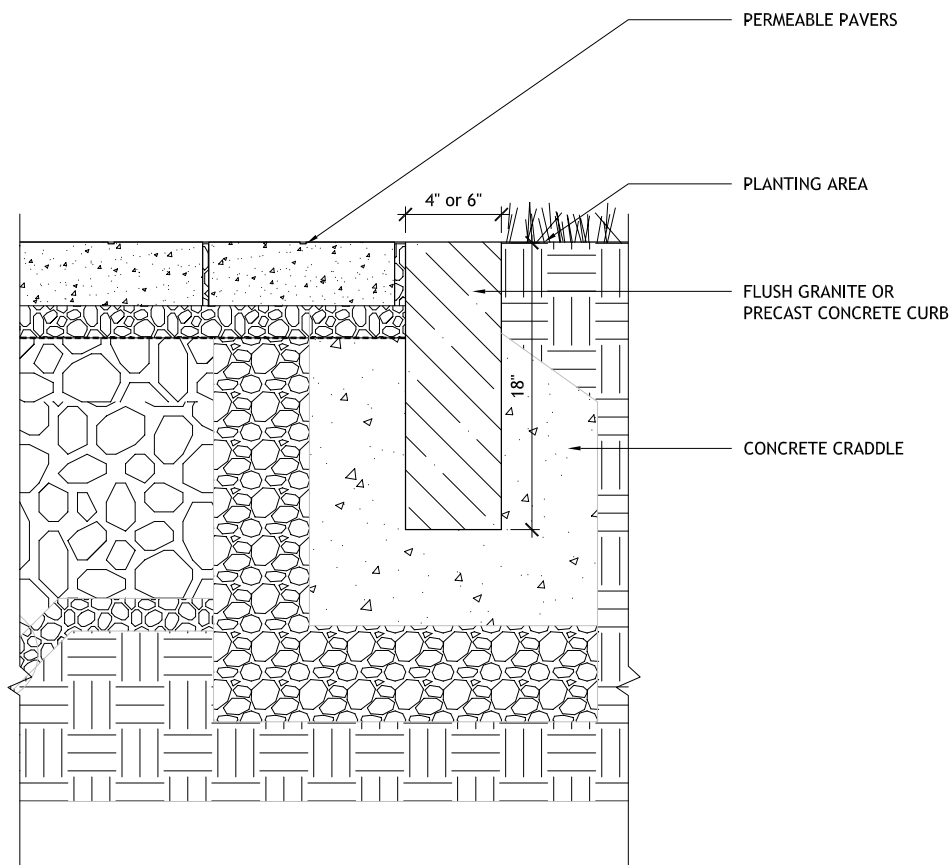
SETTING BED/SET CONDITION:

- » Cast-in-place oncrete cradle

INSTALLATION:

- » As per detail

Detail: Permeable Unit Pavers Edge Restraint



Standards

MATERIALS:

- » Granite or Precast Concrete

FINISH/PATTERN:

- » Thermal finish on exposed faces for granite
- » Smooth finish for precast concrete finish

JOINTS

- » 1/4" Mortar joints

SIZE/DIMENSIONS

- » As shown on detail

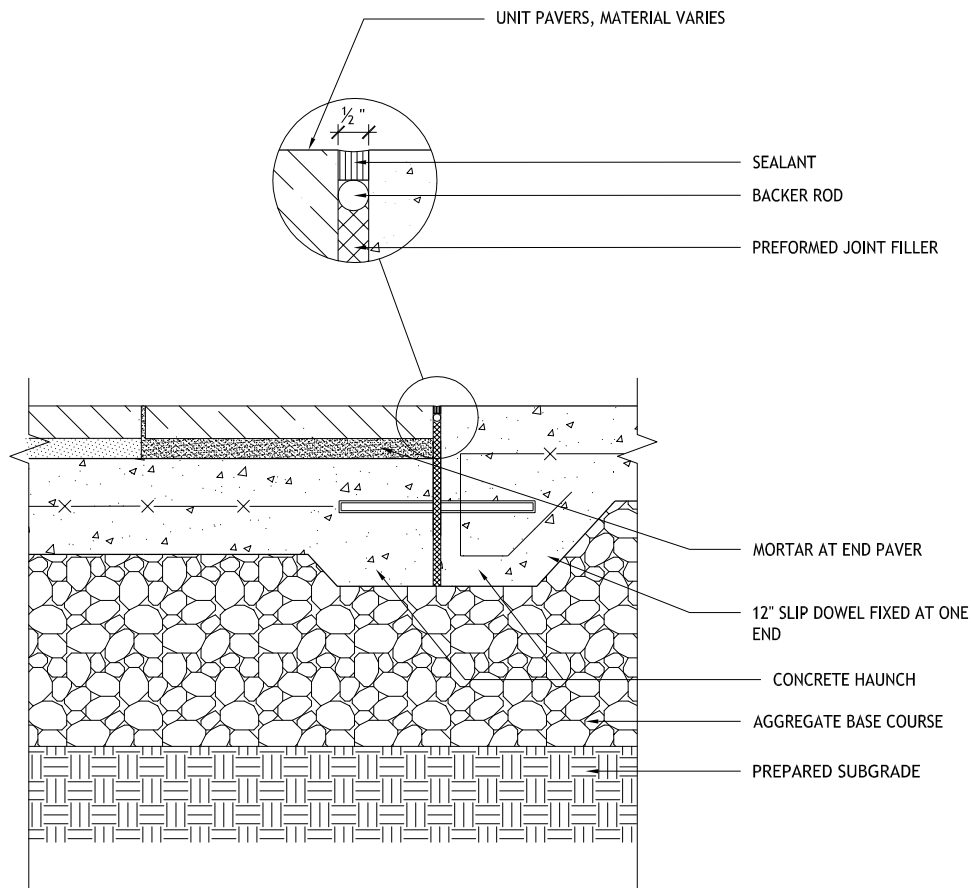
SETTING BED/SET CONDITION:

- » Cast-in-place oncrete cradle

INSTALLATION:

- » As per detail

Detail: Pavement Edge Expansion Joint



Standards

MATERIAL:

- » Joint sealant, non-sag
- » Backer Rod

COLOR:

- » Color to match pavement condition

INSTALLATION:

- » As per detail

A. Paving Systems

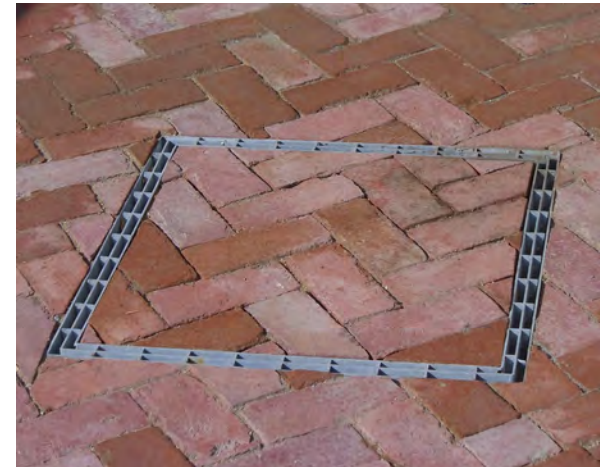
A.7.1 Utility Paver Cover

Utility paver covers shall be used only in specialty plaza areas that employ unit paving. Avoid use of utility paver covers for areas along shared-use paths or in areas with frequent vehicular traffic.

Utility paver covers shall be developed in sizes as required to cover entire conventional utility frames and grates. Paver covers shall be set in vertical or horizontal alignment with paving orientation in rectilinear or orthogonal paving patterns.



Paver Grate

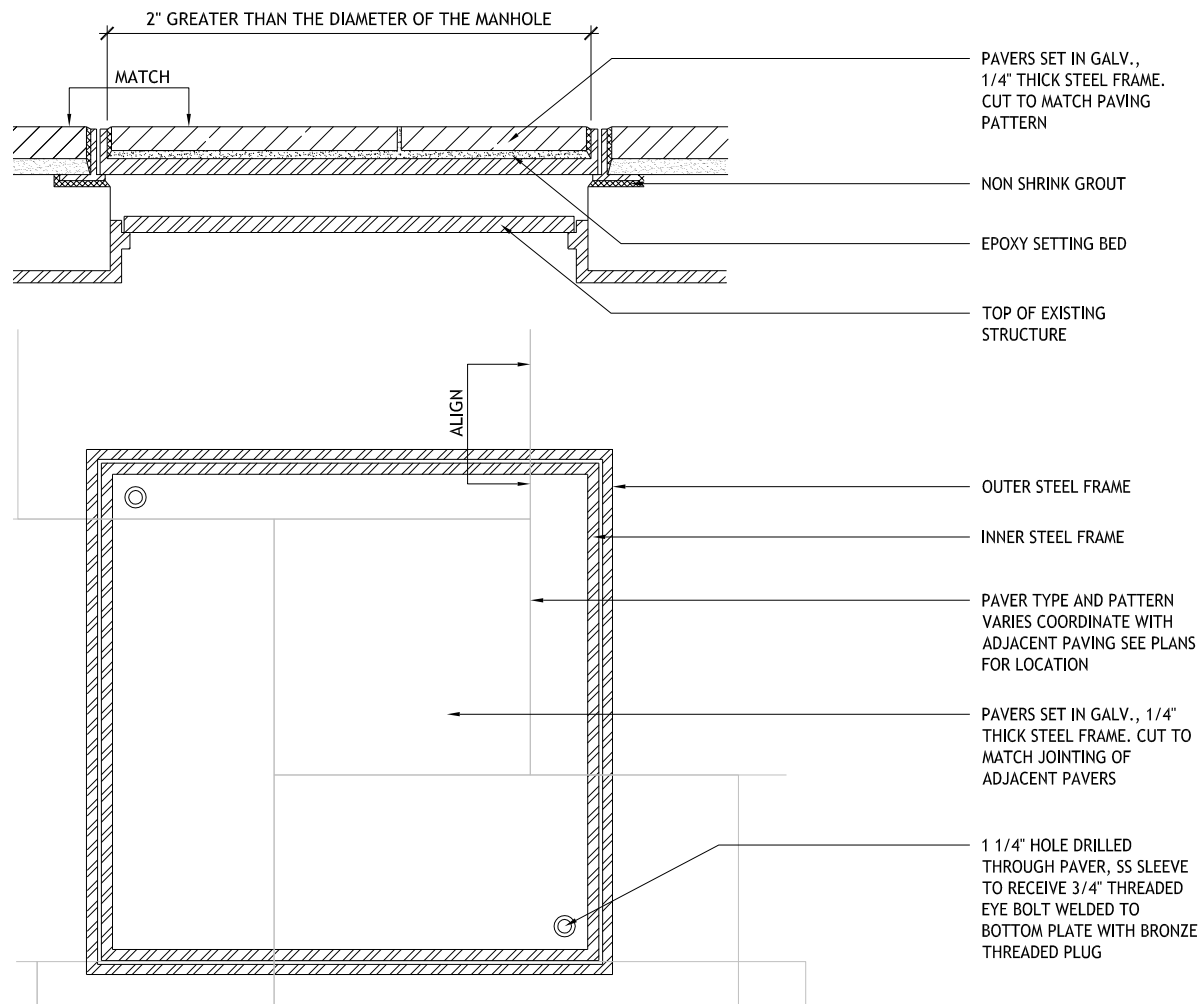


Paver Grate



Paver Grate

Detail: Utility Paver Cover



Standards

MODEL:

- » Varies, custom built

MANUFACTURER:

- » WunderCovers
- » www.wundercovers.com

MATERIAL/COLOR:

- » Galvanized Steel Frame

FINISH:

- » Unit Pavers to match context

INSTALLATION:

- » Per manufacturer's recommendation

A. Paving Systems

A.8.1 Curbing: Raised Curb

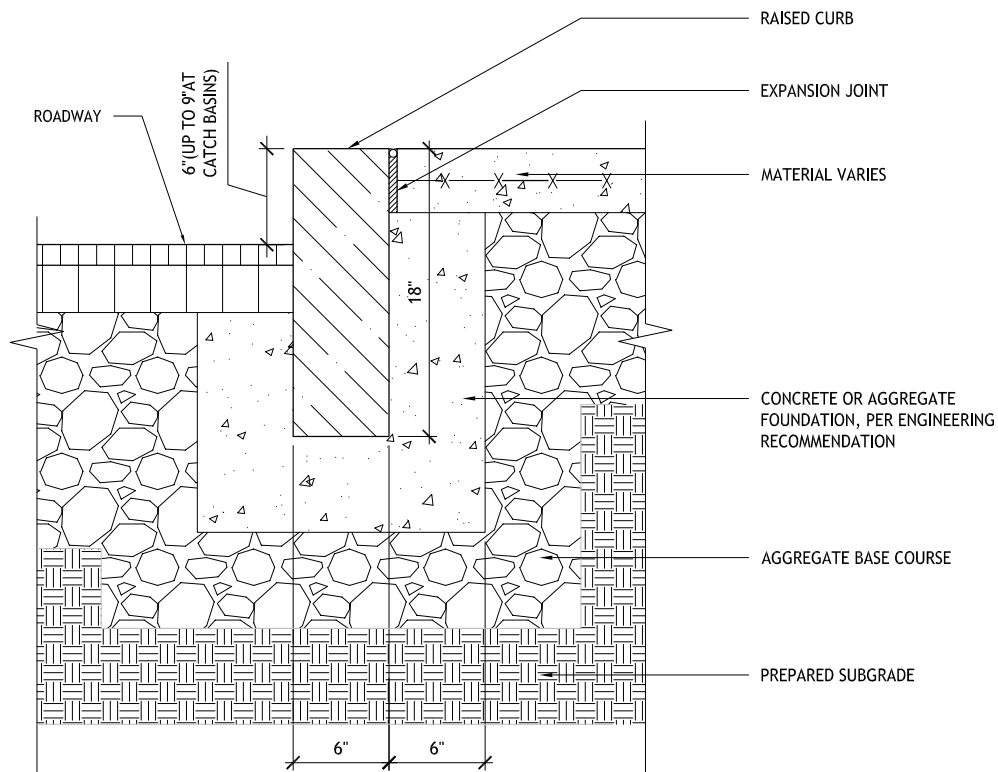
Raised curbing shall be used along campus streets and service driveways and shall be granite or precast concrete. Concrete curb and gutters or asphaltic concrete curbing shall not be used except in temporary paving conditions.

Raised curbing shall be set 6" above finished roadway grade except at catch basins or other drainage structures where curb reveal may extend to 9" as required.



Raised Granite Curb at Campus Street

Detail: Raised Curb



Standards

MATERIALS:

- » Granite or Precast Concrete or Reinforced Cast-In-Place Concrete

FINISH/PATTERN:

- » Granite Finish: Thermal finish on exposed faces
- » Concrete Finish: Smooth finish

JOINTS

- » Granite and Precast joints: 1/4" Mortar joints
- » Concrete joints: 1/4" Tooled joints

SIZE/DIMENSIONS

- » As shown on detail

SETTING BED/SET CONDITION:

- » Cast-in-place concrete cradle or aggregate base per engineering recommendation

INSTALLATION:

- » As per detail

A. Paving Systems

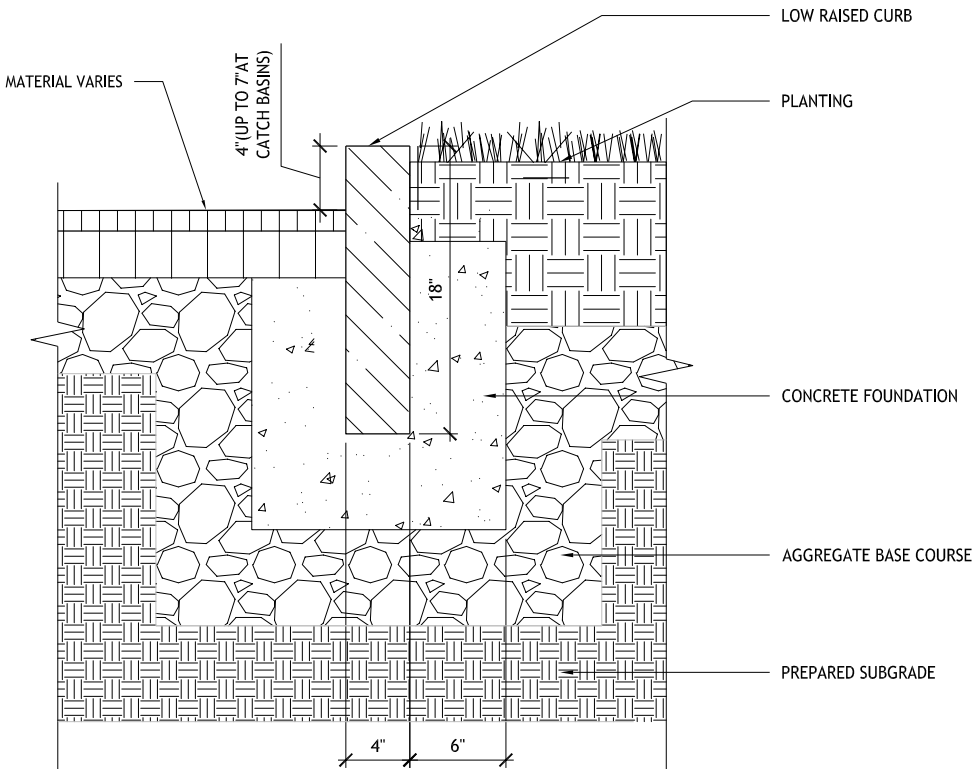
A.8.2 Curbing: Low Raised Curb

4" raised granite curbing may be used at planting bed edges. Low raised curbs shall not be used at roadways and driveways.



Low raised granite curb at planting bed

Detail: Low Raised Curb



Standards

- MATERIALS:
 - » Granite or Precast Concrete
- FINISH/PATTERN:
 - » Thermal finish on exposed faces for granite
 - » Smooth finish for precast concrete finish
- JOINTS
 - » 1/4" Mortar joints
- SIZE/DIMENSIONS
 - » As shown on detail
- SETTING BED/SET CONDITION:
 - » Cast-in-place oncrete cradle
- INSTALLATION:
 - » As per detail

A. Paving Systems

A.9.1 Pavement Over Structure

In pedestrian-only spaces located above subsurface structures, such as over garages or on building roof decks or terraces, stone or precast concrete unit pavers shall be used. The use of limestone, sandstone or other more porous stones should be avoided.

Pavers on structure shall be in the gray or buff color range, with an SRI value of 29 or greater to avoid heat island effect. Avoid brown, red or pink pavers.



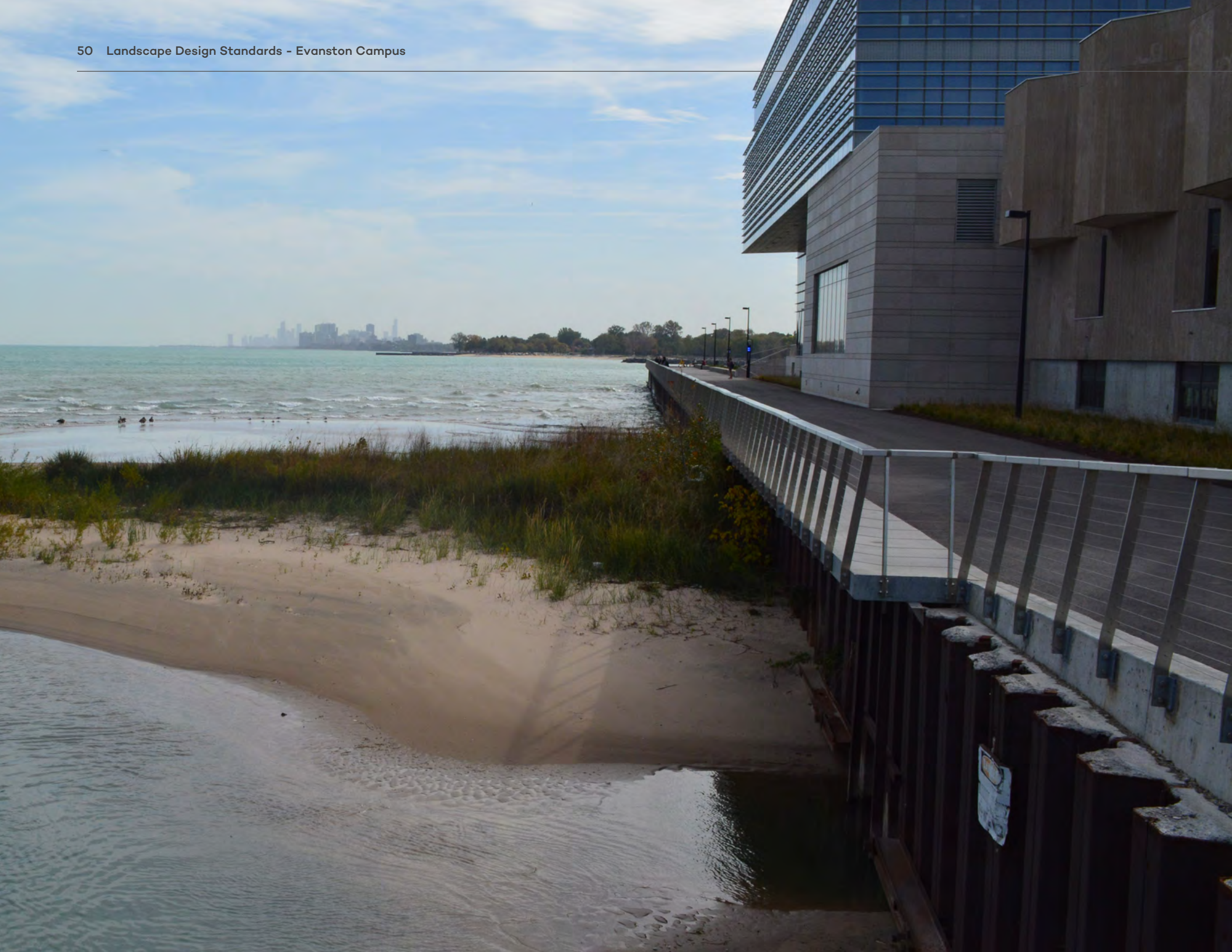
Pavers on roof deck example in Boston

A. Paving Systems

A.10.1 Snow Melt

Snow melt systems should be used at all building entries, stairs, plazas, along with vehicular and pedestrian accessibility ramps. When possible snow melt should be incorporated into major pedestrian circulation routes.

Snow melt systems help reduce winter snow maintenance and use of salt and chemical de-icing agents thus reducing the environmental impact for living systems on land and in waterways impacted by wind and run-off.





Stairs and hand railings at Deering Library entrance



Stairs at Tech Plaza

B. Site Structures

The Northwestern campus includes site structures built over the course of the University's history; these site features, which include stairs, ramps, railings, fences, screens, walls, water features and bridges, employ a range of design expressions and materials. In some cases, the site structures were designed as part of a larger architectural composition, and contribute to the character of their campus neighborhood.

The following section establishes guidelines for the detailing and materiality of site structures to increase the quality and continuity of the Northwestern campus environment. The selected style is neutral, elegant, and durable, and has been selected to be compatible with both the campus' historic architecture and more recent contemporary building projects. While the guidelines promote a sense of cohesion through materiality and detailing, they also allow sufficient flexibility so that design elements may respond to their particular site context.

B. Site Structures

B.1.1 Site Stairs: Cast-in-Place Concrete

Cast-in-place concrete stairs may be used to accommodate grade transitions in secondary landscape areas. Cast-in-place concrete stairs shall not be used at highly trafficked pedestrian gathering areas or at primary building entrances, unless concrete is the primary building facade material, as they are susceptible to degradation from wear and from deicing salts.

Concrete stairs shall have a minimum 15" wide stair tread and a maximum 6" high stair riser. This is deliberately a flatter proportioned step than typical interior steps, and is more gracious for landscape applications. Variations in tread/riser dimensions are acceptable provided they also conform to the equation: $2 * (\text{Riser inches}) + \text{Tread inches} = 24 \text{ inches (min) - 25 inches (max)}$.

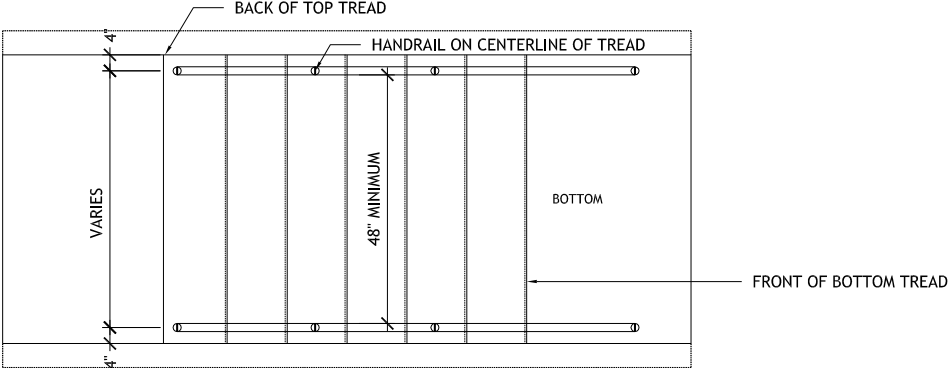
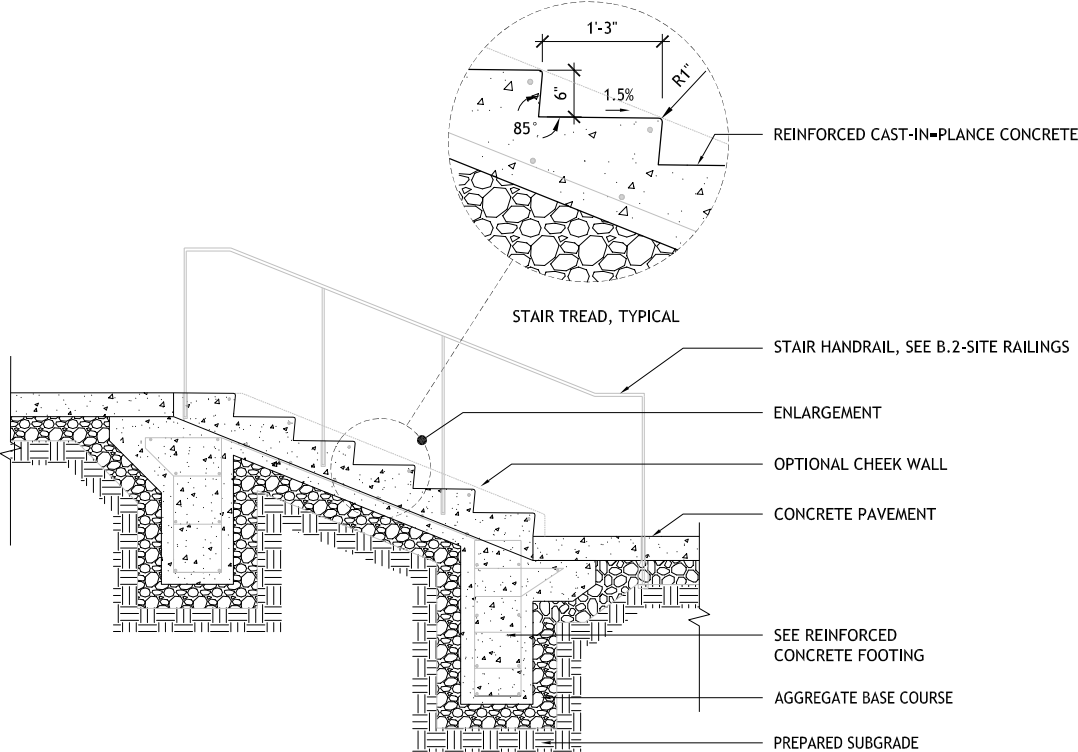
Color for concrete stairs shall be standard color, with an SRI value of 29 or greater. If colored concrete or concrete color additives are used, careful consideration should address how the color may change over time to avoid drastic color discrepancies with surrounding Architecture and/or materials.

Stairs shall conform to International Building Code, Illinois Accessibility Code, ADA Standards for Accessible Design, and other applicable design standards.



Concrete stair at the University Main Library

Detail: Cast-in-place Concrete Stairs



Standards

MATERIALS/FINISH:

- » Reinforced cast-in-place concrete with light broom finish

JOINTS

- » N/A

SETTING BED/SET CONDITION:

- » N/A

INSTALLATION:

- » As per detail - Reinforcing and footing design shall be as determined by design engineer

B. Site Structures

B.1.2 Site Stairs: Granite or Precast Concrete

Granite or precast concrete stairs shall be used to accommodate grade transitions in primary landscape areas, gathering areas, at the entrances of historic buildings, and at new buildings. Stairs shall be constructed in proportions appropriate to their site context.

Treads for granite or precast concrete stairs shall be solid treads. Avoid the use of stone or precast as cladding on a concrete base, as these conditions are susceptible to degradation from deicing salts and standard wear.

Where possible, precast concrete or granite stairs shall be set with full depth and length solid treads. If stair width requires jointing of treads, jointing shall either be aligned uniformly at each step or offset at every other step at mid-point of lower tread. Inconsistent joint patterns should not be used.

Granite or precast concrete stairs shall have a minimum 15" wide stair tread and a maximum 6" high stair riser. This is deliberately a flatter proportioned step than typical interior steps, and is more gracious for landscape applications. Variations in tread/riser dimensions are acceptable provided they also conform to the equation: $2 * (\text{Riser inches}) + \text{Tread inches} = 24 \text{ inches (min) - } 25 \text{ inches (max)}$.

Granite treads shall be in the gray color range. Avoid beige, red or pink granites. Granites shall be sourced from quarries located within 500 miles of campus. Concrete stair color shall be standard color, with an SRI value of 29 or greater.

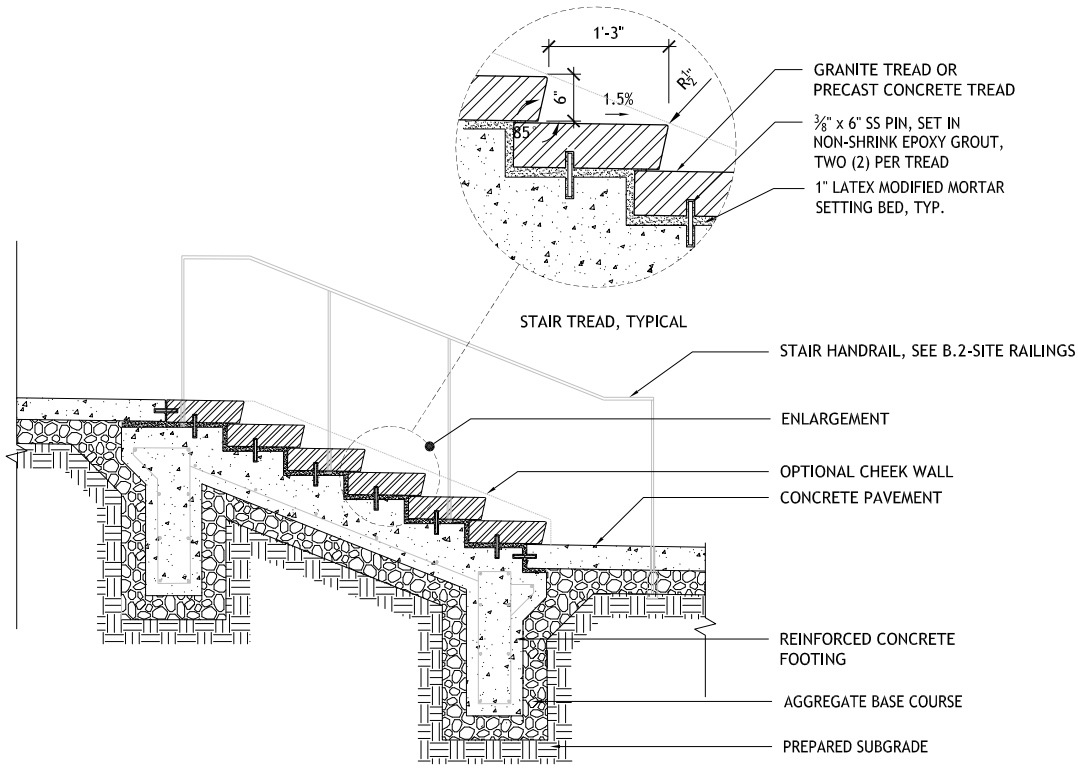


Granite stair at Deering Library entrance



Granite stair at Tech entrance

Detail: Granite or Precast Concrete Stairs



Standards

MATERIALS/FINISH:

- » Treads/Risers (option): Granite with Thermal or Waterjet finish top and riser face
- » Treads/Risers (option): Precast Concrete with slip resistant finish top and riser face

JOINTS

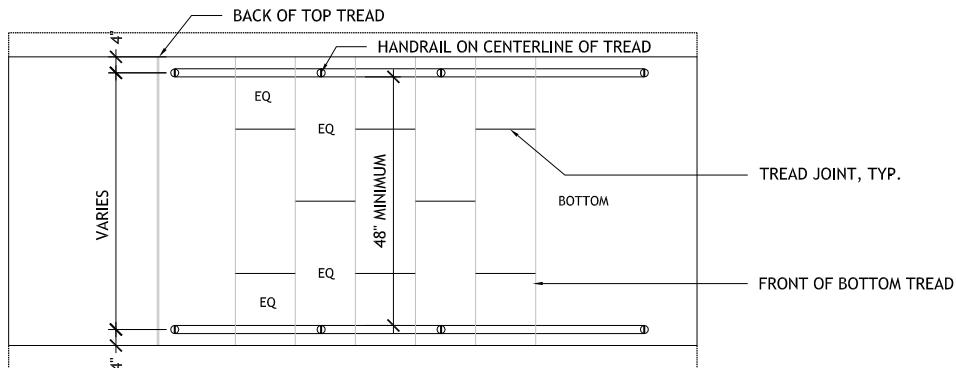
- » 1/4" latex modified mortar joint, color to match tread

SETTING BED/SET CONDITION:

- » " Mortar Setting Bed with stainless steel pin as per detail

INSTALLATION:

- » As per detail - Reinforcing and footing design shall be as determined by design engineer



B. Site Structures

B.2.1 Hand Railings: Standard

Standard hand railings shall be used at all concrete and granite site stairs that are not at the entrance of historic buildings or within a historic context. Where required, intermediate posts and rails shall meet structural requirements and applicable standards, but should be kept to a minimum to create a simple profile.

Hand railings shall conform to International Building Code, Illinois Accessibility Code, ADA Standards for Accessible Design, and other applicable design standards.



Stainless Steel Handrail at Shephard Hall

B. Site Structures

B.2.2 Hand Railing: Historic Context

When adding stairs, ramps, and hand railings within an historic architectural setting, hand railings shall be designed to be compatible with the materials and design of adjacent architecture, and shall also conform to International Building Code, Illinois Accessibility Code, ADA Standards for Accessible Design, and other applicable design standards.

In most situations simple rails are preferred over ornamental rails, which interrupt the continuity of the campus environment with small-scale, singular design expressions. The use of double or multiple posts for hand railings should be avoided, unless matching an existing condition. The railing's metal color and finish may be matched to existing metals within the adjacent architecture to achieve a sense of cohesion.

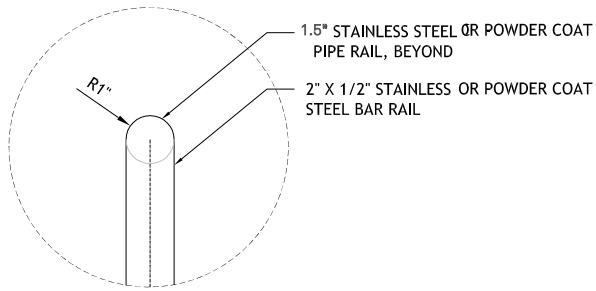
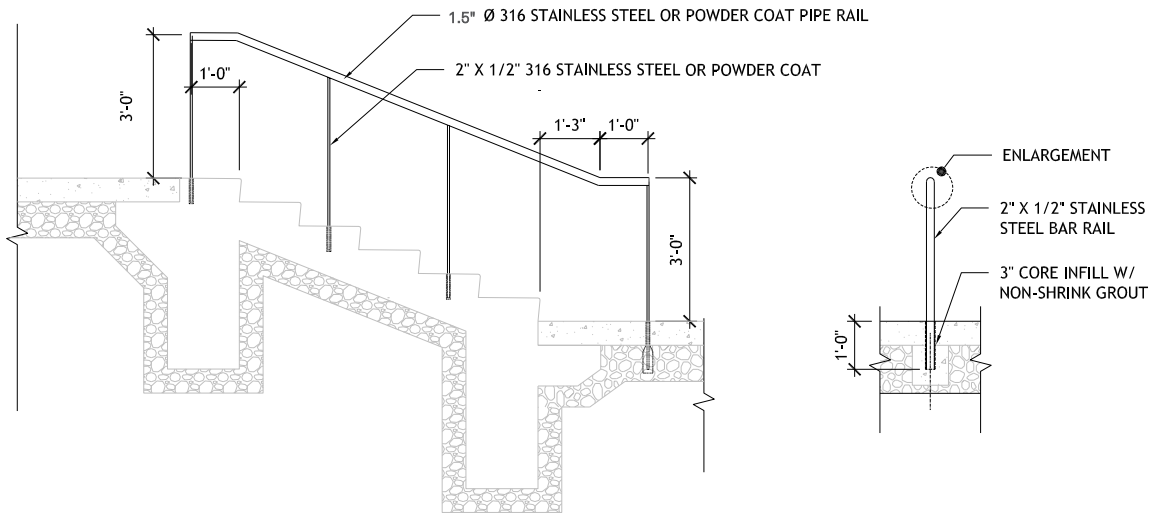


Handrails at Deering Library stairs are ornamental and compatible with the character and materials of the historic architecture.



Detail of Deering Library hand rails.

Detail: Hand Railings: Standard



HANDRAIL, TYPICAL

Standards

MATERIALS:

- » Rails + Posts (option): 316 Stainless Steel
- » Rails + Posts (option): Galvanized Steel
- » NOTE: For Historic Buildings Actual Rail Design Configuration and Material May Deviate in order to respect the Architecture (eg. Deering Library Bronze Handrail)

FINISH/COLOR:

- » Rails + Posts: Brushed finish for Stainless Steel
- » Rails + Posts: Powder-Coat finish with selected color for Galvanized Steel

SIZES:

- » Rails + Posts: As noted on detail

INSTALLATION:

- » As per detail - Embedment and footing design shall be as determined by design engineer per each condition

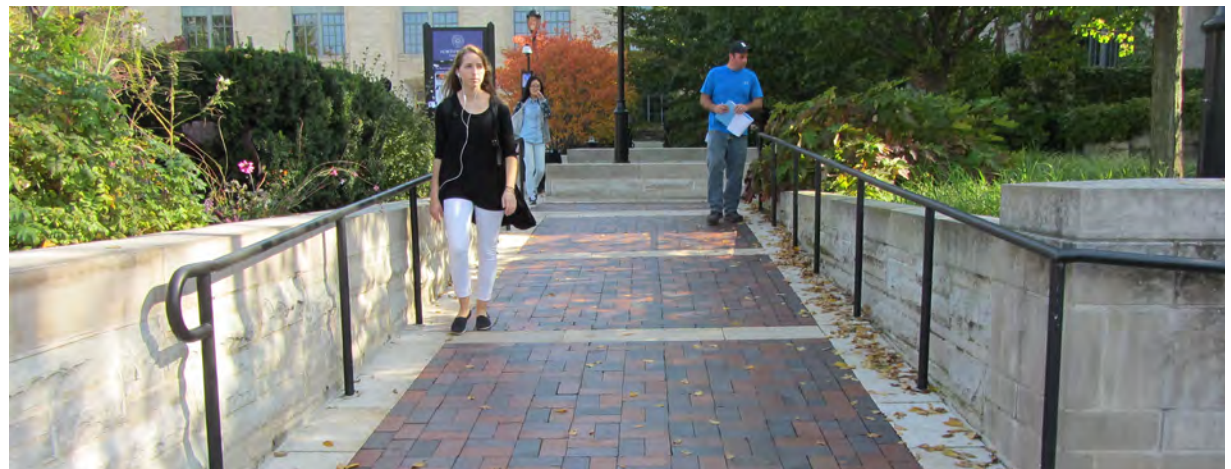
B. Site Structures

B.3.1 Accessible Ramps and Railings

ADA accessible ramps shall be used for all accessible routes accommodating slopes greater than 1:20. The pavement of ADA accessible ramps cast in place with concrete surface or below grade for alternate paving surface.

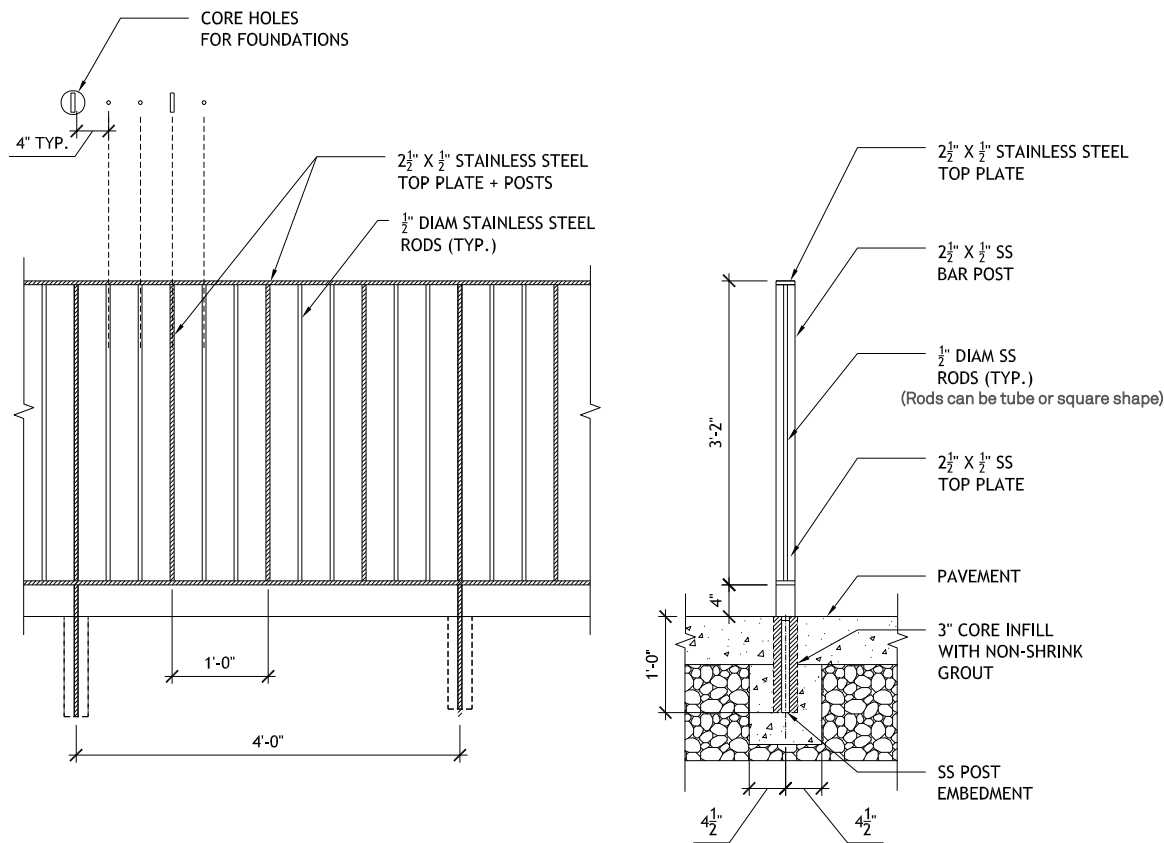
ADA accessible ramps and hand railings should meet International Building Code, Illinois Accessibility Code, ADA Standards for Accessible Design, and other applicable design standards.

Width of ramp should consider maneuverability for motorized wheelchairs for any ramp turns



ADA accessible ramp at Tech Plaza - Rails cast in place concrete with paver surface treatment

Detail: Guardrail, Standard



Standards

MATERIALS:

- » Rails + Posts: 316 Stainless Steel
- » Rods: 316 Stainless Steel or Painted Steel

FINISH:

- » Rails + Posts: Brushed finish
- » Rods: Brushed Finish or Painted Steel

SIZES:

- » Rails + Posts: As noted on detail
- » Rods: As noted on detail

INSTALLATION:

- » As per detail - Embedment and footing design shall be as determined by design engineer per each condition

B. Site Structures

B.4.2 Guardrails: Waterfront

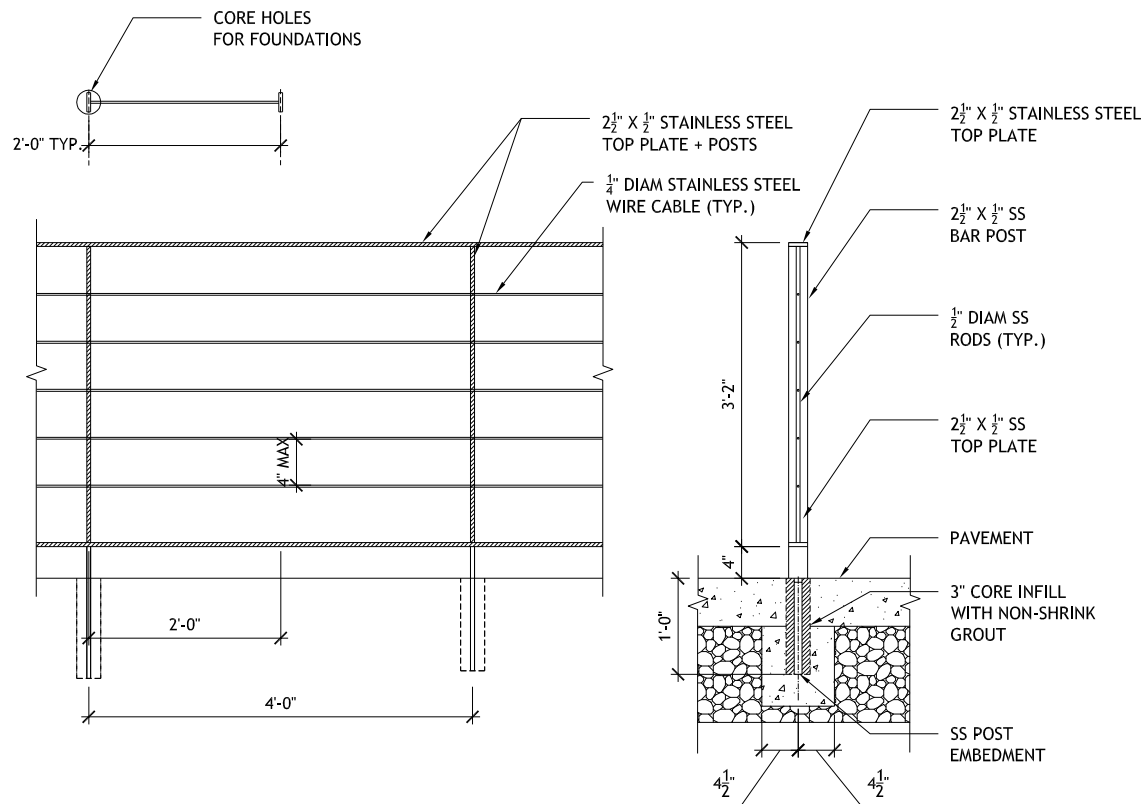
Waterfront guardrails shall be used at any site areas requiring guardrails along the lake or pond waterfront, including at the edges of walkways, bridges, and overlooks.

Waterfront guardrails shall conform to International Building Code and other applicable design standards, and be designed by an engineer to sustain all applicable loading requirements.



Cable guardrail along the Lakefront at the Bienen School of Music landscape

Detail: Guardrail, Waterfront



Standards

MATERIALS:

- » Rails + Posts: 316 Stainless Steel
- » Cables + Hardware: 316 Stainless Steel

FINISH:

- » Rails + Posts: Brushed finish
- » Cables + Hardware: N/A(as supplied)

SIZES:

- » Raila + Posts: As noted on detail
- » Cables + Hardware: As noted on detail

INSTALLATION:

- » As per detail - Embedment and footing design shall be as determined by design engineer per each condition

B. Site Structures

B.5.1 Site Fences: Sheridan Road

This detail shall only be installed along Sheridan Road in areas already defined by an existing fence or as required across the campus at restricted areas. Aside from these applications, fences should not be used in order to create a welcoming and inclusive campus environment.



Ornamental fencing between Northwestern's oak grove and the Sheridan Road streetscape

B. Site Structures

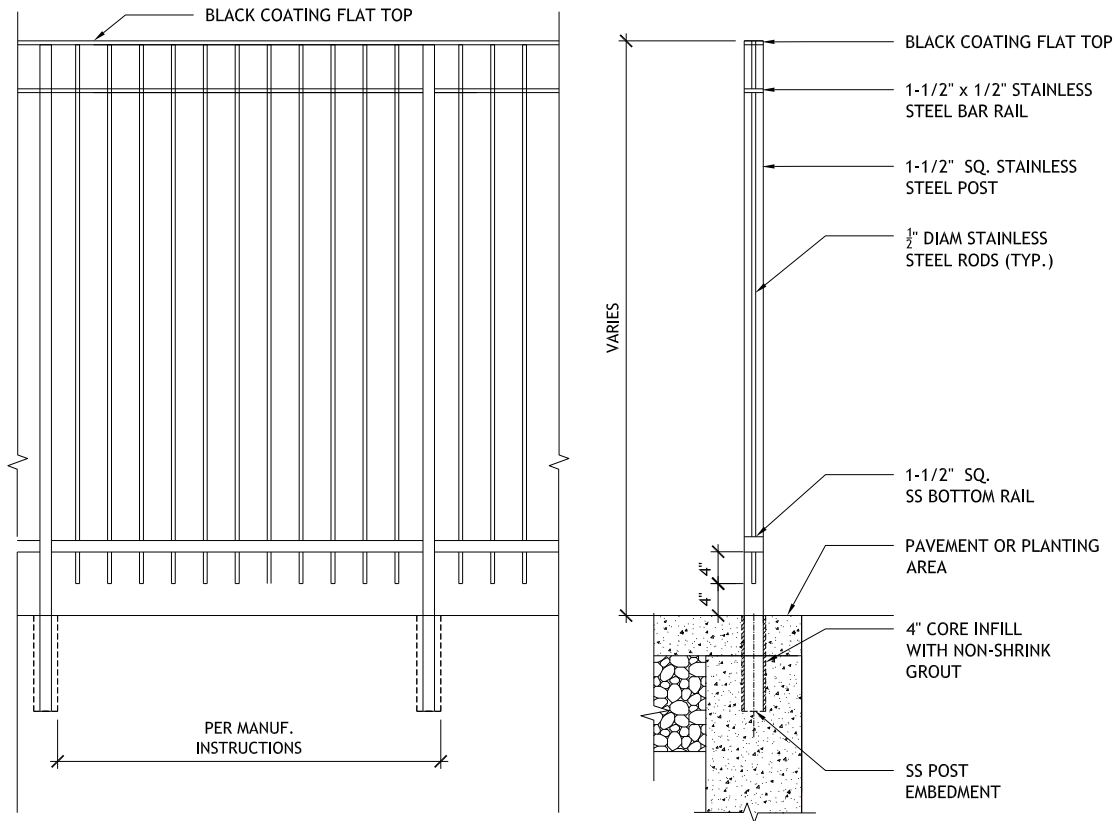
B.5.2 Site Fences: Athletics

Athletic style fencing shall be installed around athletics facilities, sports fields, and other sports related areas as required. The use of chain link fencing, wood fencing, or other fencing in these areas should be avoided.



Example of athletics fencing

Detail: Athletic Fencing



Standards

MATERIALS:

- » Rails + Posts: Aluminum
- » Rods: Aluminum

FINISH/COLOR:

- » Rails + Posts: Black
- » Rods: Black

STYLE

- » Saybrook fencing style, 6ft height minimum

SIZE:

- » Rails + Posts: As noted on detail
- » Rods: As noted on detail

INSTALLATION:

- » As per detail - Embedment and footing design shall be as determined by design engineer per each condition

B. Site Structures

B.6.1 Site Screens: Wood and Metal

Site screen enclosures shall be utilized to screen transformers, air conditioning units, dumpsters, and other aesthetically disruptive functional elements present in the landscape.

For areas around academic buildings and within the academic core, site screens shall be metal fencing or site walls. Site walls used for visual screening purposes shall be permanent structures that adopt the scale, pattern, and quality of construction of their immediate architectural context. Metal fencing shall be painted steel in a neutral color to be compatible with adjacent facade materials. Screens and walls shall be of a height sufficient to block views to utility appurtenances or dumpsters.



Architectural site wall screen's service area at Willard Residential College. Where possible, integrate screen wall with adjacent architecture



Metal refuse site enclosure at 560 Lincoln Student Residence

B. Site Structures

B.7.1 Site Walls: Concrete Seat Walls and Retaining Walls

Concrete site walls may be employed adjacent to modern or contemporary buildings or outside of historic areas.

Seat walls are encouraged as a way to create informal meeting and gathering places at locations that naturally attract people, such as at building entrances. Seat walls should be generously sized to allow for comfortable informal use. Where concrete walls are intended as seat walls, wall width shall be a minimum of 18", and between 16" - 24" high to allow for comfortable seating conditions.

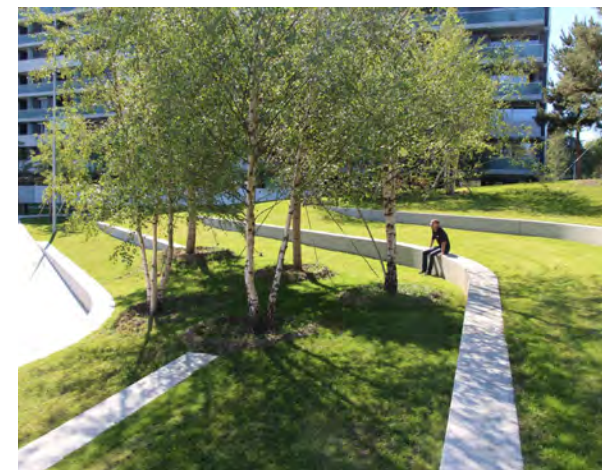
The finish for concrete walls shall be either a smooth finish with patched form holes or board form finish similar to the finished employed at the Sailing Center Building.



Concrete seat wall with a board form finish

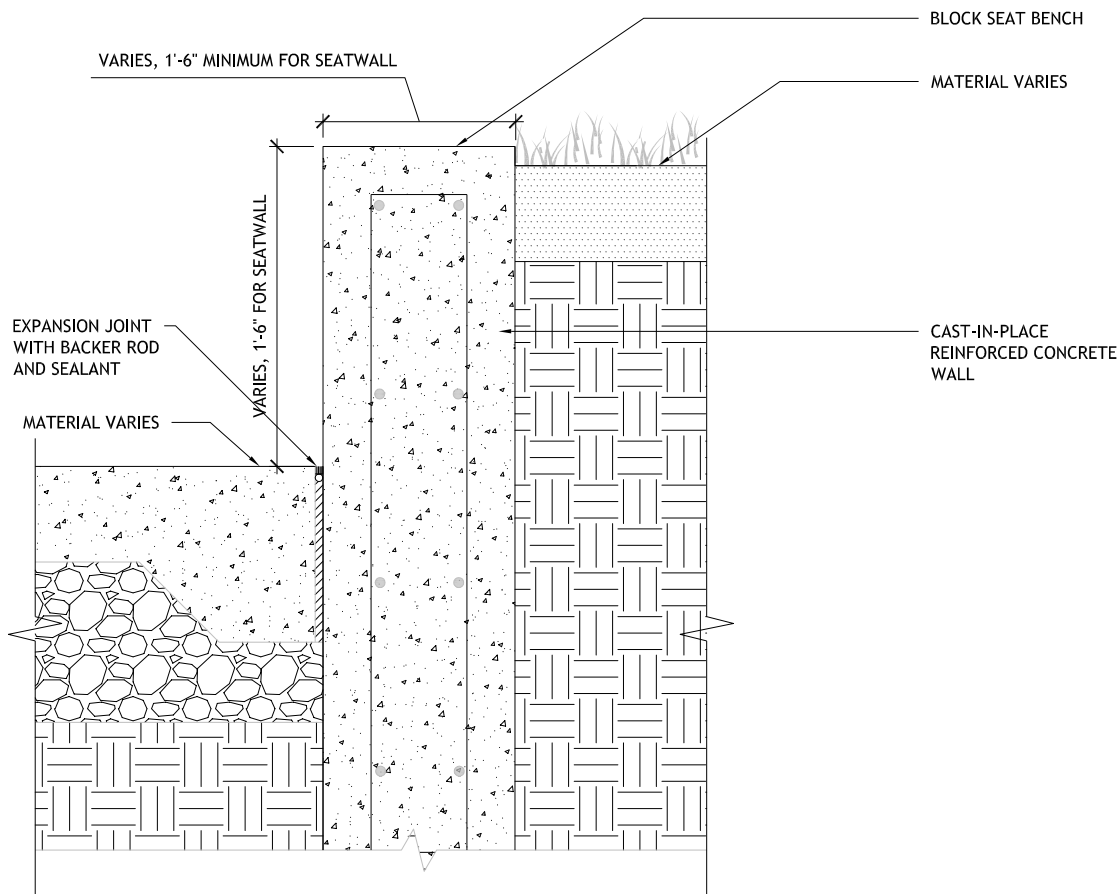


The Northwestern Sailing Center has a board form finish that is compatible with the look and feel of the Indiana limestone used in campus buildings



Concrete seat wall: smooth finish

Detail Concrete Wall



Standards

MATERIALS:

- » Cast-in-place Reinforced Concrete

FINISH:

- » Standard form finish
- » Board form finish

JOINTS

- » 1/4" Chamfered edged corners
- » Expansion joints at 30' O.C.

COLOR:

- » Standard concrete color
- » Avoid use of colored concrete additives

INSTALLATION:

- » As per detail - Reinforcing, wall thickness, and footing design shall be as determined by design engineer per each condition

B. Site Structures

B.7.2 Site Walls: Limestone Retaining Wall

Limestone site retaining walls shall be installed adjacent to buildings that utilize limestone finishes or in areas of campus designated as historic, where soil retaining height exceeds 48".

Limestone site retaining walls shall be limestone veneer with a limestone cap extending min. ½" beyond the face of limestone cladding. The limestone cap shall include drip edge to minimize water drip across limestone cladding.

Limestone shall be a buff colored Indiana limestone.



Existing limestone wall at Acessibility ramp - Sorority Quads at South Campus

Standards

MATERIALS:

- » Cap: Limestone or Cast Stone with a 2% wash to ensure drainage
- » Cladding: Buff Indiana Limestone color (University Hall is used as Color Standard. Color may vary depending on project and location.)

FINISH/PATTERN:

- » Cap: Thermal Finish top. Edge Treatment will depend on location and project
- » Cladding: Split Face or Natural Finish (Exact Split Face Projection Detail TBD by Project and Location)
- » Cladding Pattern: Random Ashlar Pattern

JOINTS

- » Cap: 1/4" latex modified mortar joint
- » Cladding: 1/8" - 1/4" air void joints

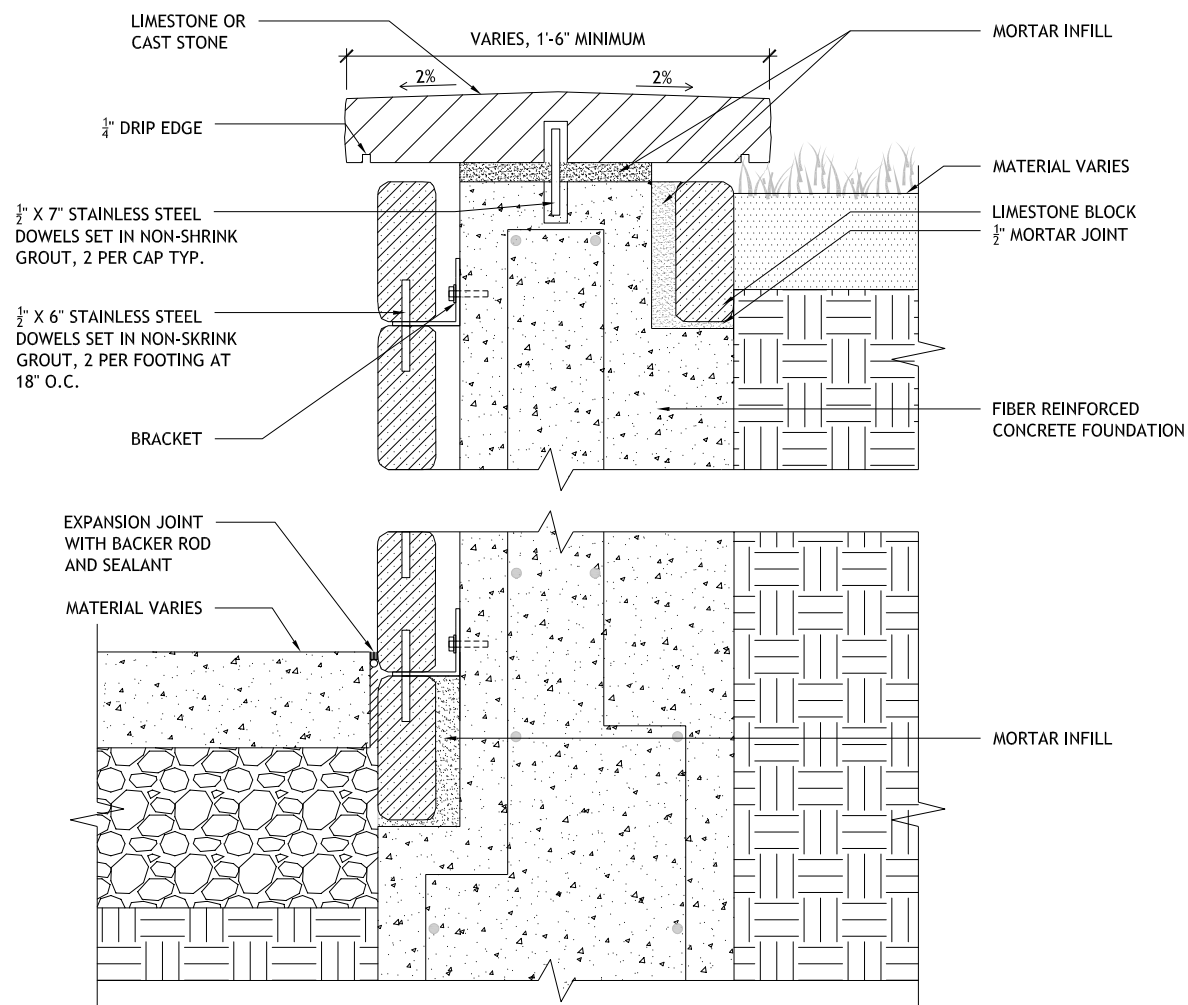
SETTING BED/SET CONDITION:

- » Cap: 1" Mortar Setting Bed
- » Cladding: Stainless Steel cladding brackets, and pins as per detail

INSTALLATION:

- » As per detail - Reinforcing and footing design shall be as determined by design engineer

Detail: Limestone Wall - Pinned Cladding



B. Site Structures

B.7.3 Site Walls: Limestone Seat Wall

Limestone seat walls shall be installed adjacent to buildings. These can also be incorporated in conjunction with accessibility ramps or retaining walls.

Seat walls are encouraged as a way to create informal meeting and gathering places at locations that naturally attract people, such as at building entrances. Seat walls should be generously sized to allow for comfortable informal use. Where limestone walls are intended as seat walls, limestone or granite cap for the wall shall be a minimum of 18" thick, and between 16" - 24" high to allow for comfortable seating conditions. Seat walls also serve as architectural low walls helping to define pedestrian pathways and designated spaces.

Limestone seat walls shall be limestone veneer with a granite cap that extends ½" beyond the face of limestone cladding. The limestone or granite cap shall include drip edge to minimize water drip across limestone cladding.

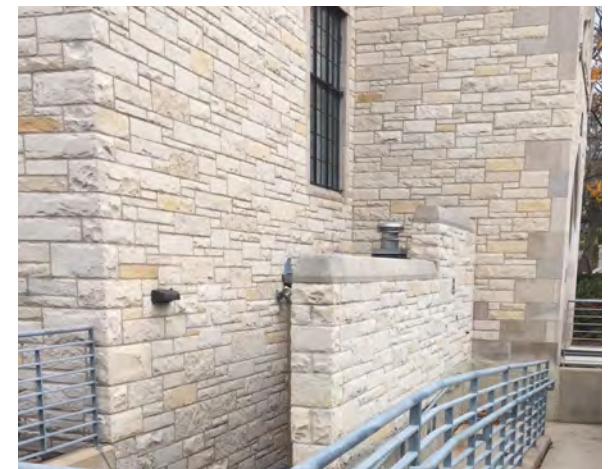
Limestone shall be a buff colored Indiana limestone or limestone that matches the University Hall facade. Granites for the cap stone shall be a gray or buff colored stone. Avoid red, beige, or pink as cap stone colors. All granite shall be sourced from quarry locations within 500 miles of campus.



Limestone seat wall with granite cap at Deering Library

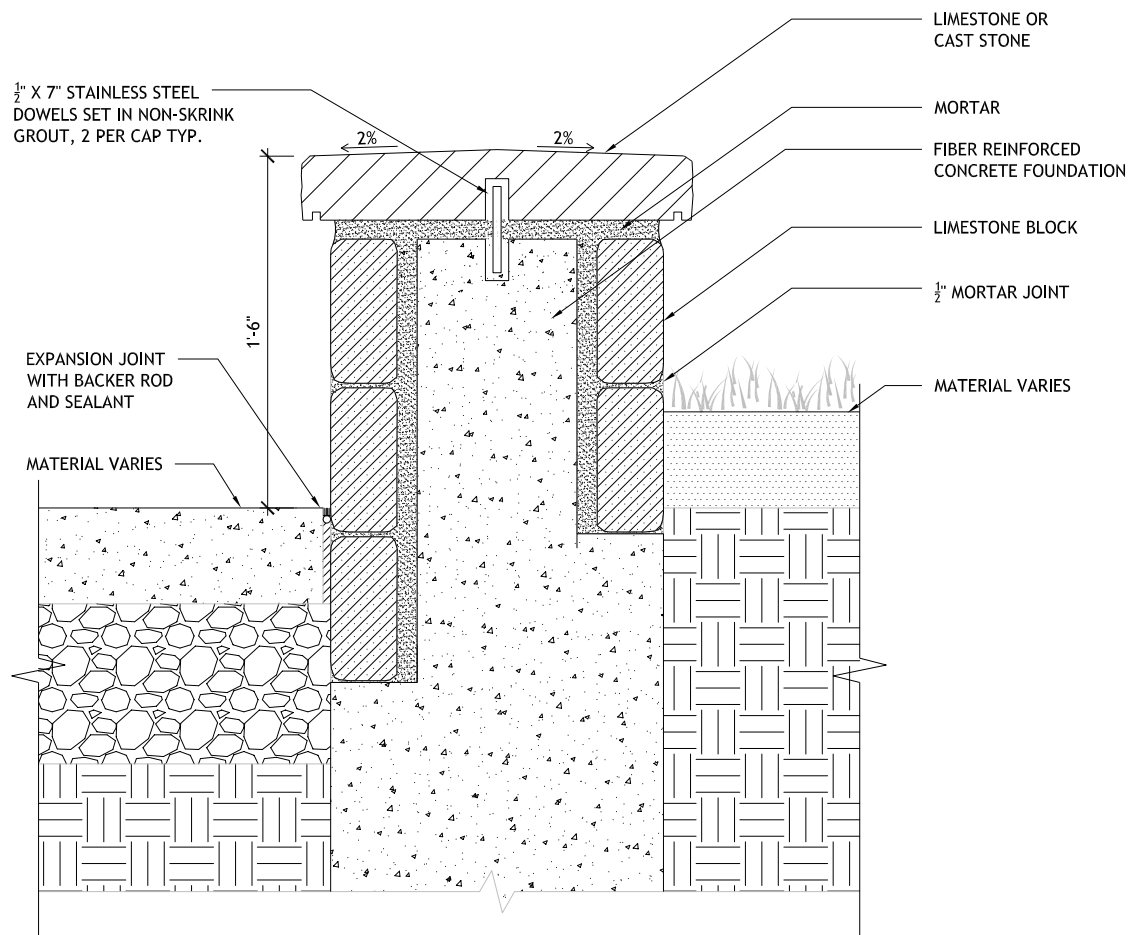


Limestone seat wall with granite cap at Deering Library



Limestone wall cladding

Detail: Limestone Seat Wall - Mortared Cladding



Standards

MATERIALS:

- » Cap: Limestone or Cast Stone with a 2% wash to ensure drainage
- » Cladding: Buff Indiana Limestone color (University Hall is used as Color Standard. Color may vary depending on Project and Location)

FINISH/PATTERN:

- » Cap: Thermal Finish Top, Edge Treatment may vary depending on Project and Location
- » Cladding: Split Face or Natural Finish (Exact Split Face Projection Detail TBD by Project and Location)
- » Cladding Pattern: Random Ashlar Pattern

JOINTS

- » Cap: 1/4" latex modified mortar joint
- » Cladding: 1/4" Mortar joints

SETTING BED/SET CONDITION:

- » Cap: 1" Mortar Setting Bed
- » Cladding: 1" Mortar Backing

INSTALLATION:

- » As per detail - Reinforcing, wall thickness, and footing design shall be as determined by design engineer per each condition

B. Site Structures

B.7.3 a Site Walls: Skate Guards

For seat-wall benches or other flat surfaces enticing for skate borders use skate guards. Determine appropriate skate board guard based on surface material and overall site design.



Notched skate deterrent



"Hemi" GrinderMinder



Embedded fin skate deterrent





Pedestrian lighting



Bicycle racks on campus

C. Site Furnishings

This section establishes campus standards for exterior seating, trash and recycling receptacles, bollards, bicycle racks, emergency phones and newspaper dispensers to increase the quality and continuity of the Northwestern campus environment. Criteria for selection include visual compatibility with the character-defining elements of the existing campus, durability, provenance/ source proximity, and an understanding of which applications have been successful or unsuccessful on campus to-date.

While the guidelines aim to promote consistency, quality, and a clear identity for the Northwestern campus, complete uniformity is not desired. Certain self-contained areas of the campus, such as courtyard spaces, have been identified as appropriate locations for greater visual variety and design expressions varying from the general guidelines.

C. Site Furnishings

C.1.1 Movable Site Tables and Chairs

Exterior seating shall be organized to allow for respite, contemplation and the enjoyment of the outdoor campus environment. When feasible, seating shall be movable for flexible use to facilitate and support small group gatherings for study, eating, and conversation.

Bench seating or seat walls shall be provided to facilitate the practical need for convenient seating at pickup, drop-off and waiting areas. Site table and chairs may be installed at exterior plaza areas, courtyards, and informal exterior seating areas with sufficient area to accommodate table and chairs. In areas with limited space, chairs without tables can be installed.

In enclosed courtyard spaces directly associated with adjacent building programs, other high quality movable tables and chairs may be used to create a distinct identity for that place within the campus.



C.2.1 Site Litter and Recycling Receptacles

Site litter and recycling receptacles shall be installed at exterior plaza areas, courtyards, informal exterior seating areas, and along pathways at key pedestrian crossroads.

Receptacles shall also be installed in close proximity to building entrances but located in a manner so that they are not visible from the interior of the building or placed in locations where they obstruct prominent elements of exterior facades.

The graphics will be digitally printed onto a pressure sensitive 21.625" Diameter

Black

14.5" Outer Diameter

Clear ← 21.625" Lid Diameter → White



CUSTOM GRAPHICS
APPLICATION: LID SIZE: LID COLOR:
DECAL SIZE:
VINYL MATERIAL COLOR: PRINTED
COLOR(S):



Standards

MODEL:

- » Model#: DYN-336 Receptacles
- 36 Gallon
- Side-Opening

MANUFACTURER:

- » Victor Stanley
- » www.victorstanley.com

COLOR:

- » Black

FINISH:

- » Polyester powdercoat finish

INSTALLATION:

- » Per manufacturer's recommendation
- » Recycling Receptacles: Provide a side-access plate with recycle holes, and standard graphics and text to indicate recycling.

C. Site Furnishings

C.3.1 Campus Benches: Typical

The typical campus benches shall be installed at exterior plaza areas, courtyards, informal exterior seating areas and along pathways not located within the Lakefront.

Care should be taken to ensure site benches are installed on level surfaces and ADA accessible.

Benches shall be surface mounted, set level and be harmoniously integrated with the geometries of surrounding buildings and landscape elements.

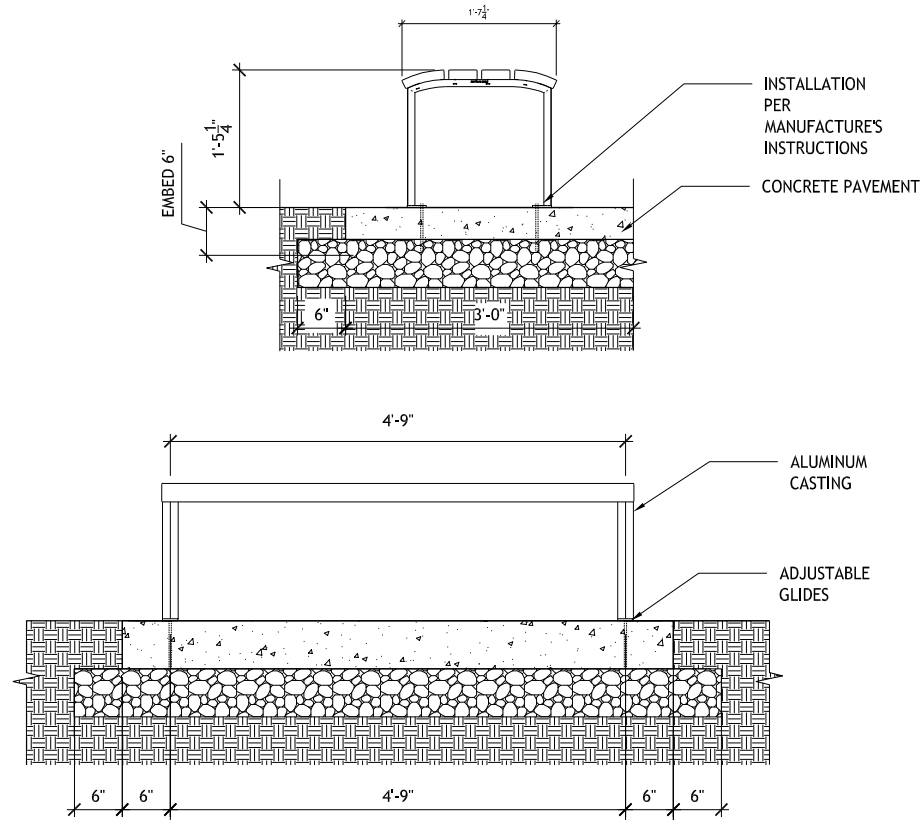
Wood bench with back



Wood bench without back



Detail: Bench, Typical



- Backless and Backed styles

COLOR/MATERIAL:

- » Jarrah or other sustainable wood (as supplied)

FINISH:

- » N/A (as supplied)

INSTALLATION:

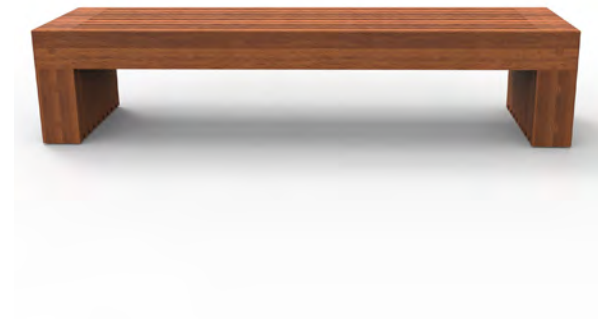
- » Surface mounted with stainless steel anchor bolts set into concrete foundation or pavements

C. Site Furnishings

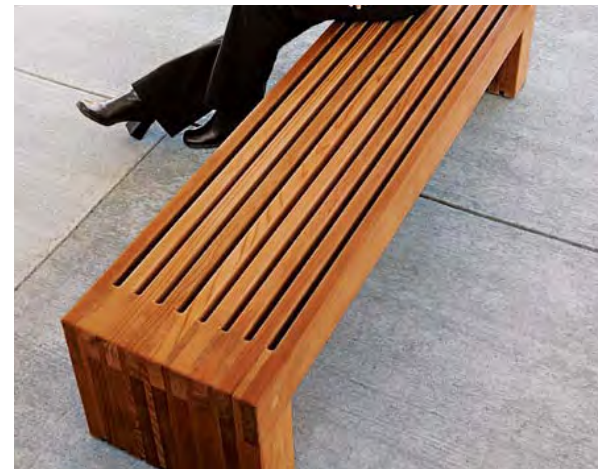
C.3.2 Campus Bench:

Benches with wood seats (with or without backs) can also be used. Benches placed near the lakefront shall take advantage of views to the water.

Care should be taken to ensure site benches are installed on level surfaces. Benches shall be surface mounted, set level and be harmoniously integrated with the geometries of surrounding buildings and landscape elements.

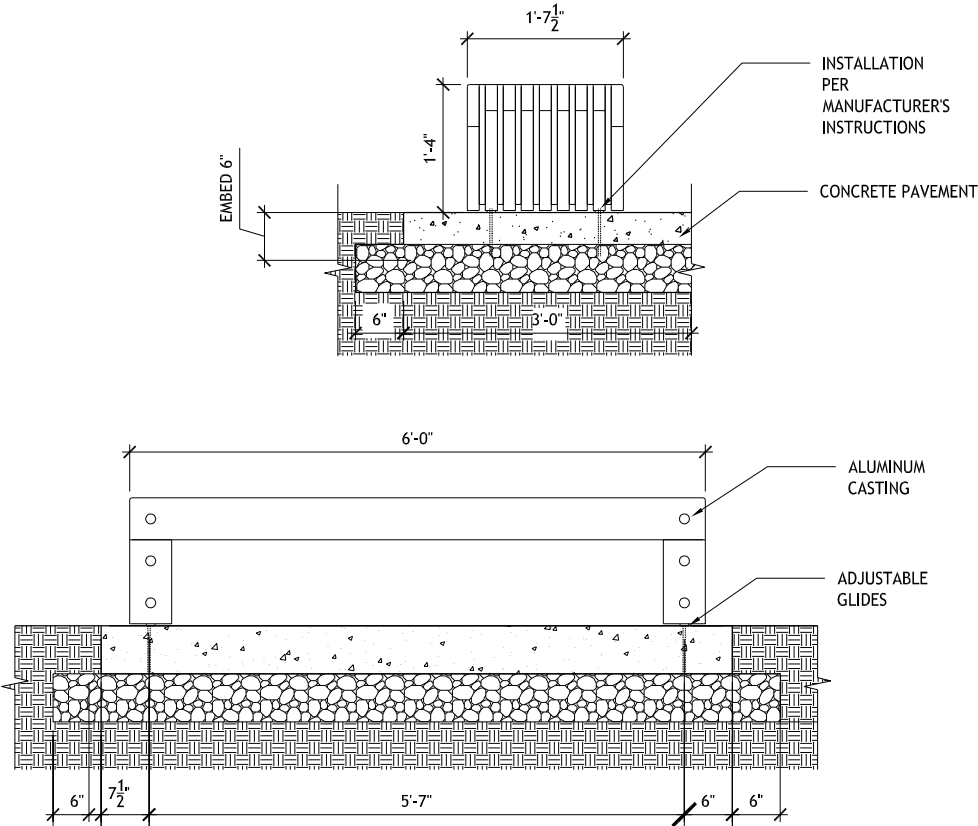


Bench without back



Bench with back

Detail: Bench



» Palisade Bench

- 72" Length

- Backless

MANUFACTURER:

» Landscape Forms, Inc.

» www.landscapeforms.com

COLOR/MATERIAL:

» Jarrah wood (as supplied)

FINISH:

» N/A (as supplied)

INSTALLATION:

» Surface mounted with stainless steel anchor bolts set into concrete foundation or pavements

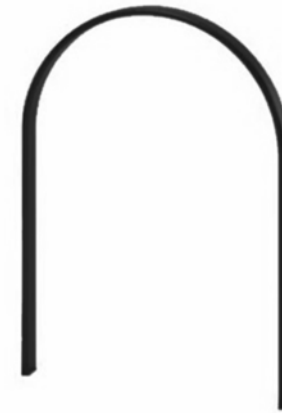
C. Site Furnishings

C.4.1 Bicycle Racks

Bicycle racks shall be installed in groups with a minimum of 10 bicycle racks co-located in designated bicycle parking areas.

Where possible, large bicycle parking areas shall have permeable unit pavers to allow for increased drainage in these areas. Bicycle racks shall be embedded into concrete footings below the pavers, and positioned perpendicular to building facades where possible to allow access from both sides. Spacing between racks shall be 12' anchor to anchor, and 18" away from adjacent walls.

If bicycle racks are located within expanded cast-in-place concrete walkways, racks shall be embedded directly into the concrete pavement.

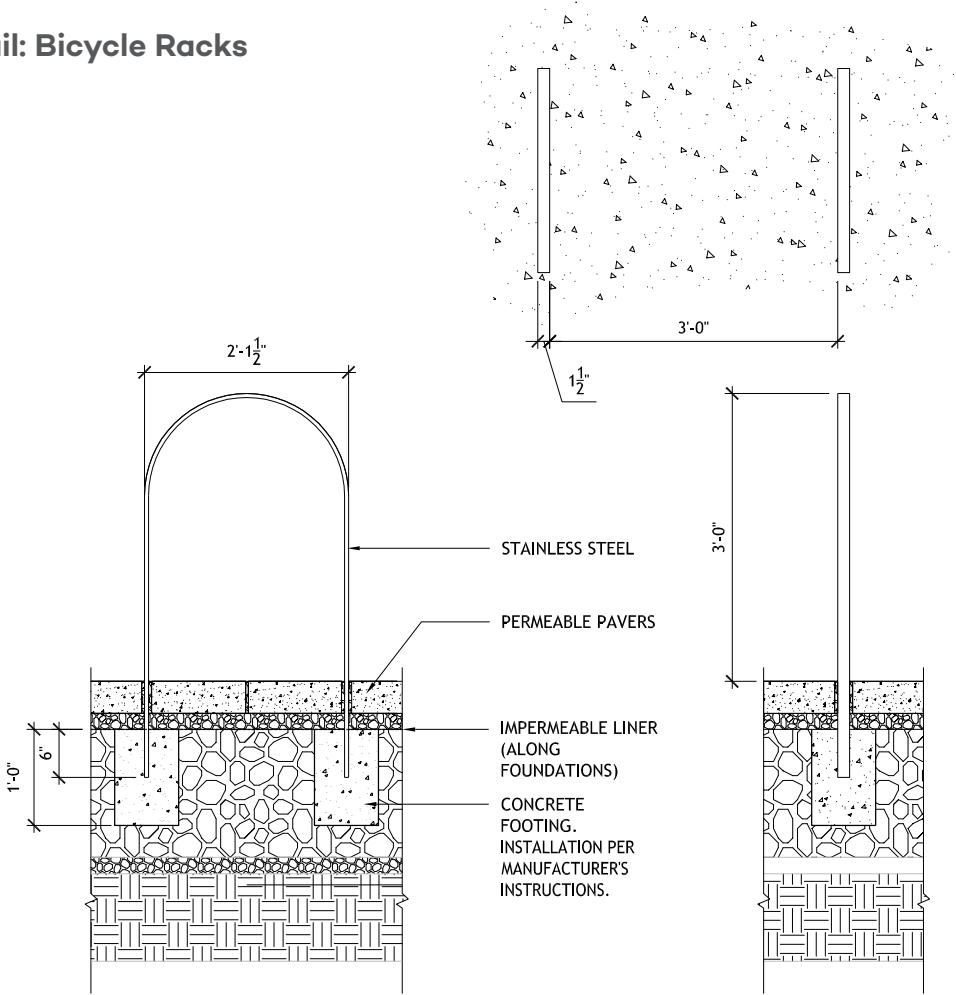


Bicycle rack



Bicycle rack installation on campus

Detail: Bicycle Racks



Standards

- MODEL:
- » BRH5381 Bike Rack
 - In-ground model
- MANUFACTURER:
- » Wabash Valley
 - » www.wabashvalley.com
- COLOR:
- » Black
- FINISH:
- » Polyester powdercoat finish
- INSTALLATION:
- » In-ground per manufacturer's recommendations

C. Site Furnishings

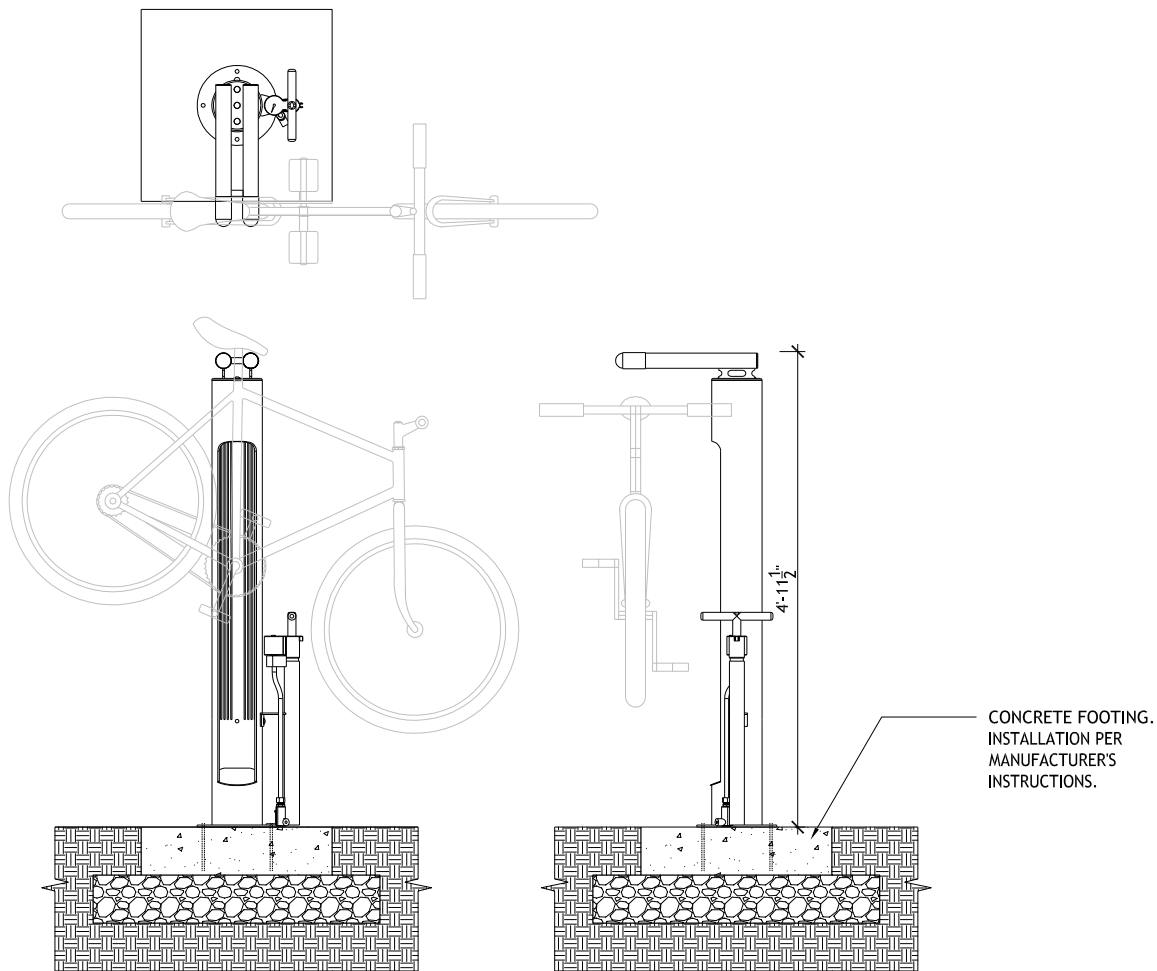
C.4.2 Bicycle Repair Station

Bicycle repair stations shall be installed in "to be determined" designated "high use" bicycle parking areas. Placement will be determined on a project basis and with future bike infrastructure planning.

Bicycle repairs stations should be placed a minimum of 6 feet away from adjacent structures, bicycle racks, or trees to allow sufficient space to utilize the repair station.



Detail: Bicycle Repair Station



Standards

MODEL:

- » Fixit Bike Repair Station
- Bicycle pump option

MANUFACTURER:

- » Dero
- » www.dero.com

COLOR:

- » Black

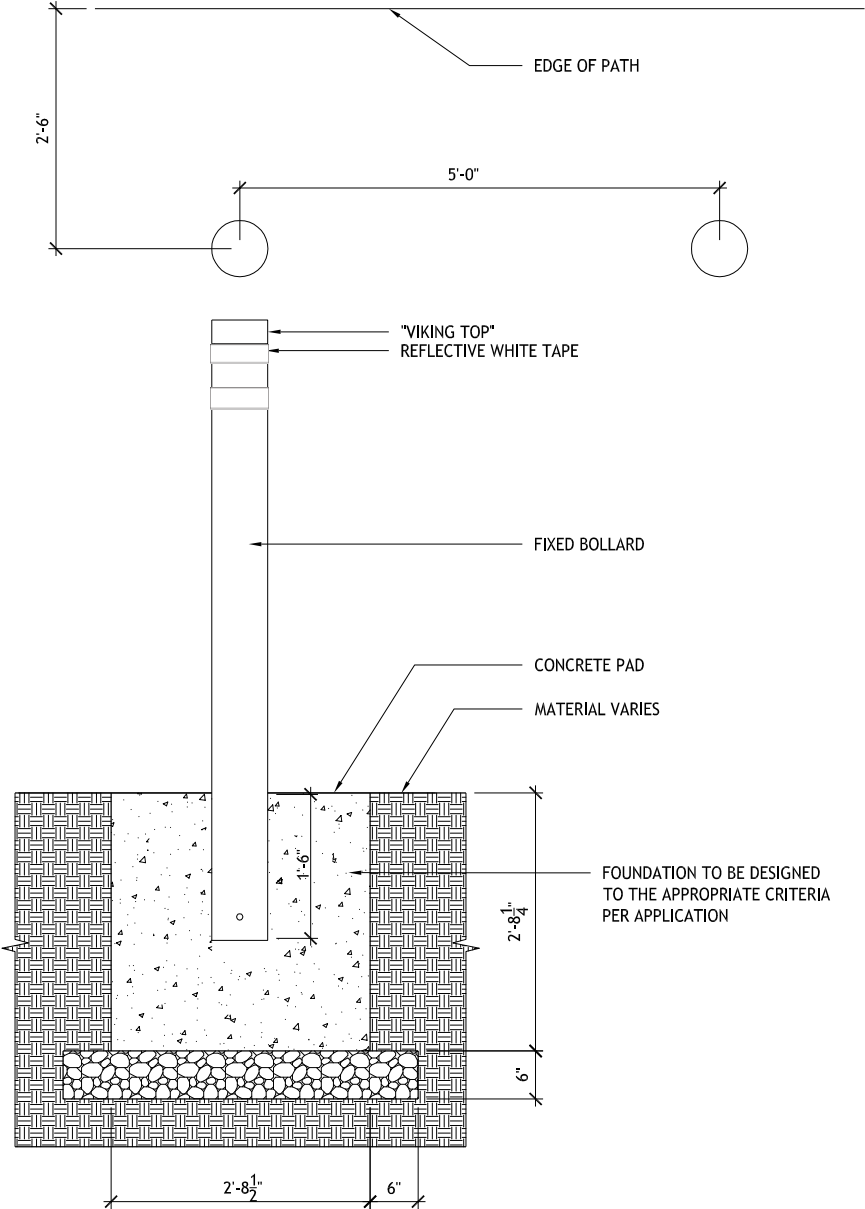
FINISH:

- » N/A (as supplied)

INSTALLATION:

- » Per manufacturer's recommendations

Detail: Fixed Bollards



Standards

MODEL:

- » SSP04040 4" diameter bollard
 - 36" exposed height
 - Flat "Viking" top
 - Reflective white tape

MANUFACTURER:

- » Calpipe Security Bollards
- » www.calpipebollards.com

COLOR/MATERIAL:

- » Stainless steel

FINISH:

- » Brushed finish (as supplied)

INSTALLATION:

- » Per manufacturer's recommendations
- » Reference detail for spacing

C. Site Furnishings

C.5.2 Site Bollards: Removable

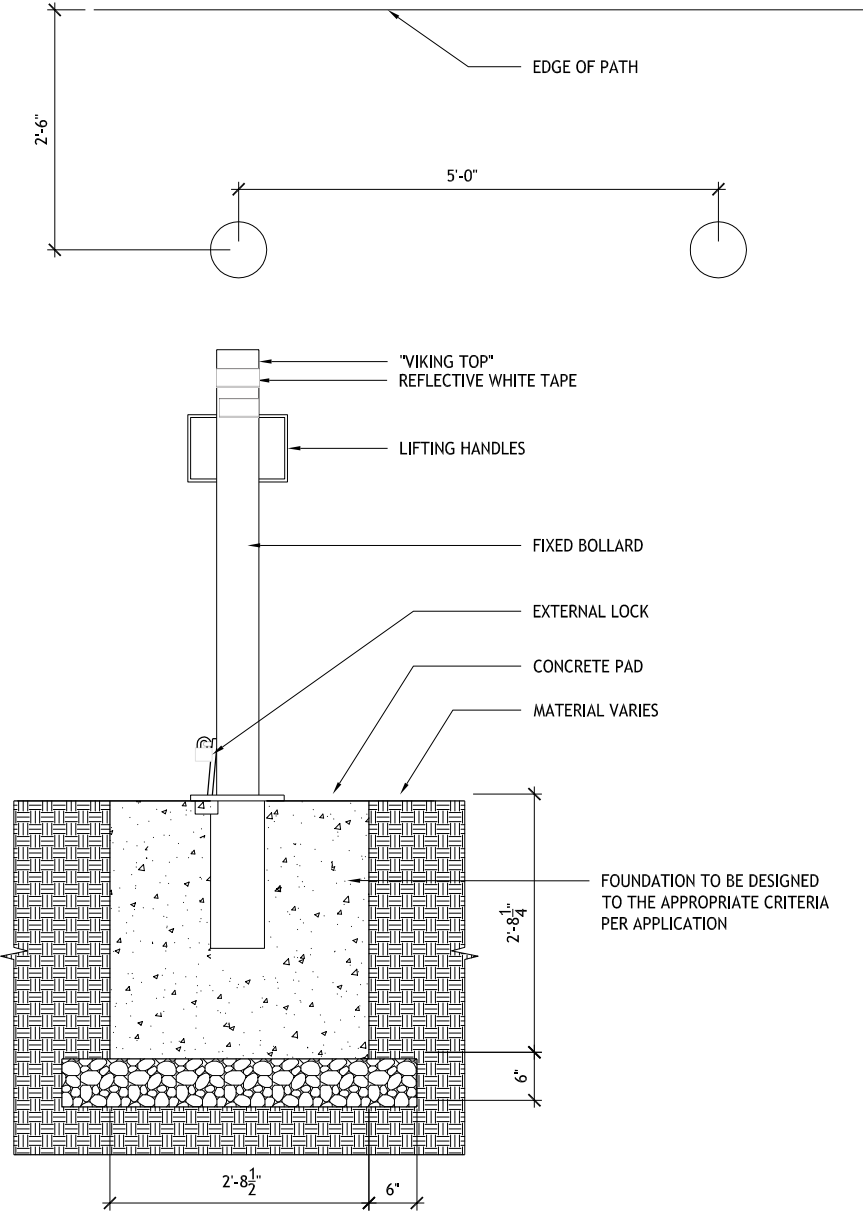
Removable site bollards shall be installed at shared-use pathways that allow restricted access for service and emergency vehicles. Removeable site bollards shall be installed in locations most likely to be approached by emergency responders.

Removeable site bollard stanchions shall be located in adjacent planted area where bollards may be placed when they are removed from the pathway for vehicular access, or during the winter to allow ease of snowplowing. The stanchions shall be installed in a cast-in-place concrete base.



Removable bollard

Detail: Removable Bollards



Standards

MODEL:

- » SSP04040 4" external padlocking removable bollard and stanchions
 - 36" exposed height
 - Lift hoops, both sides
 - Flat "Viking" top
 - Reflective white tape

MANUFACTURER:

- » Calpipe Security Bollards
- » www.calpipebollards.com

COLOR/MATERIAL:

- » Stainless steel

FINISH:

- » Brushed finish (as supplied)

INSTALLATION:

- » Per manufacturer's recommendations
- » Reference detail for spacing

C. Site Furnishings

C.6.1 Emergency Phones

Emergency phones shall be installed along pathways at key locations that are visible from angles along pathways.



Existing campus emergency phone

Standards

MODEL:

- » PLC-B Emergency Telephone
 - Camera mount option

MANUFACTURER:

- » Ramtel
- » www.ramtel.com

COLOR/MATERIAL:

- » Stainless steel (as supplied)

FINISH:

- » N/A (as supplied)

INSTALLATION:

- » Per manufacturer's recommendations





▲ Campus Standard Type B Fixture

D. Site Lighting Background

The University has implemented a labor-saving GE LightGrid software system, an integrated software that allows staff to monitor fixtures remotely for burnt-out bulbs or malfunctions and remotely control brightness levels. The new exterior fixtures are equipped with photocells that detect light, so they automatically dim or brighten based on the amount of sunlight. The GE LightGrid dashboard tools also allows staff to set temporary schedules for special events, such as turning lights on or off around sports fields for games.

D.1.1 Site Lighting Fixtures

There are two primary campus standard light fixtures: Type A, an "acorn" globe style fixture suited to pedestrian areas, and Type B, a neutral "shoebox" style fixture, appropriate for streetscapes, parking areas, and service areas. Both lights employ LED lamps; Type A is a partial cut-off fixture, and Type B is a cut-off fixture that is dark sky compliant.

Type A Fixture



FIXTURE:

- » Manufacturer: Lumec
- » Model: Lumec L80-80W48LED4K-T-PC-CS
- » Voltage: To be determined
- » Wattage: 80W
- » Distribution: To be determined
- » DMG driver
- » RCD7
- » BKTX finish
- » Color: Black

POLE:

- » Manufacturer: Lumec
- » Model: RA61U-12-GFI-M-BKTX
- » Height: Varies
- » Color: Black
- » Consider specifying outlets in pole bases for general power where needed

Type B Fixture



FIXTURE:

- » Manufacturer: Current by GE
- » Model: Evolve
EAN-B-0-C3-7-40-A-A-BLCK
EAN-B-0-D3-7-40-A-A-BLCK
- » Type: Asymmetric Wide
- » Voltage: 120-277
- » Wattage: 70W or 89W
- » LED Color Temperature: 4000K
- » ANSI C136.41, 7-pin PE
- » Color: Black

POLE:

- » Manufacturer: Current by GE
- » Model: Steel Square Straight Area
Lighting Pole A-S-S-S
- » Material: Steel
- » Height: Varies
- » Color: Black
- » Consider specifying outlets in pole bases for
general power where needed

Light Grid System Components for Type A and B Fixtures

LIGHTGRID GATEWAY:

- » Manufacturer: Current by GE
- » Model: LightGrid Gateway
ELWG-0-C-XX-G-C
- » Voltage: 120/277

LIGHTGRID NODE:

- » Manufacturer: Current by GE
- » Model: LightGrid Node
ELWM-0-A-5-U-G-5-X-X
- » Voltage: 120/277
- » Wattage: 450W
- » ANSI Dimming
- » 0.5% Utility Grade

E. Landscape Typologies/PLANTING

The landscape serves the campus both functionally and aesthetically. The landscape guides geographical function and helps unify the campus with varied Architectural building style. Overall the landscape palette should be simple, engaging, and serve to help with campus function, transitional spaces and Architectural edges and entries.

Northwestern is limited with land area, thus when possible maximize open space for both passive and active recreation. One of Northwestern's greatest natural assets is Lake Michigan. In addition, the campus is further enhanced with 80 acre landfill and "cooling pond" water feature constructed in the 1960's on the eastern edge of the campus. As such, all future landscape related design projects should enhance and preserve water-views and visual open space. Design efforts should also maximize both north and south shoreline view-sheds with special emphasis on south shoreline views linking the visual geography and skyline of the City of Chicago.

The landscape design unless deemed as a "special" or "unique" project or garden should be minimal in maintenance. If a project engages a high maintenance landscape design, 'said project' will need to provide 'long term' funding for perpetual maintenance. In this same light siting for higher maintenance designated spaces needs to integrate into long term goals for campus planning.

Northwestern also does not support individual plant material or other landscape related donations -(eg. trees, benches)-due to lack of land area and anticipated future 'new' and 'restoration' of both above ground building and below ground infrastructure construction. These facts make it impossible to guarantee perpetuation of this type of University gift.

Northwestern Landscape design solutions should thoughtfully integrate optimal 'Accessibility' and 'Sustainability' design solutions while avoiding "a cookie-cutter" main stream approach. Accessibility and Sustainability should blend into the campus landscape fabric seamlessly and "matter of fact" while addressing campus building, infrastructure, and existing geographical relationships.

Expand specific project site envelopes to assess the campus landscape holistically while optimizing functional and aesthetic relationships within existing landscape transitional zones. Consider landscape design "layered" approach to guide circulation and keep traffic on paved surface as intended.

Every effort should preserve existing healthy significant trees, historically important landscape spaces and landmarks. In general and when appropriate, Northwestern has interest to perpetuate the original Oak grove and related Oak Savannah species. Plant selection should be adaptable to specific geographical micro-climate, soil structure and proposed landscape function.

In general Tree Planting sizes are as follows in order to acclimate to the site and thrive over time. Canopy Trees should be planted at 2.5" - 3.5" cal. Ornamentals at 7' to 9' height., and evergreens at 8'-12' height. Recommended spacing for ground cover, perennials, ornamental grasses should be between 6" and 24" depending on species and initial plant size. Specific plant spacing should discourage growth of weed species during plant establishment and site acclimation.