





# 2

# STREET & STREETSCAPE DESIGN

- 2A Complete Streets
- 2B Street Network
- 2C Intersections
- 2D Bicycle Facilities and Urban Trails
- 2E Pedestrian Facilities
- 2F Landscape Panel and Amenity Zone
- 2G Pavement Treatments
- 2H Building Zone
- 2I Utilities
- 2J Transit Shelters
- 2K Sustainable Street and Streetscape Design



**INTENT**

Streets are a vital component of livable, attractive communities and help to define the character of the CRDs and CRAs. How the streets and their associated components are implemented has an effect on the quality of life of the people who use them and on the economic vitality of their surroundings. Well-designed streets and their adjacent streetscapes can encourage the use of transit and support walking and bicycling, which results in healthier, more sustainable communities. Therefore, residents, employees, and visitors should have access to safe, convenient and attractive streets and streetscapes throughout their community—whether they are walking, driving, bicycling, or taking public transportation.

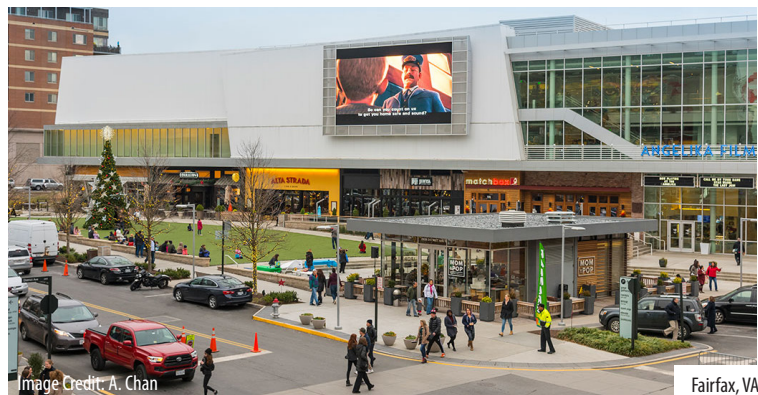
Excessive roadway widths and large amounts of pavement can detract from a compact, pedestrian-oriented environment. For example, wide travel lanes encourage excessive speeds, larger intersections make pedestrian crossing longer distances. Larger roadway pavements also contribute to the urban heat island effect and urban flooding issues. A balance must be achieved between accommodating all components of the street while minimizing the amount of land required for them to function. If all streetscape elements cannot be incorporated into a proposed project, designers should work with the County to understand priorities for the particular circumstance. Adequate width for the active

transportation facility and the provision of sufficient planting area for street trees are frequently the priorities for constrained streetscapes.

All streets should be designed for multimodal travel. There are certain locations, however, where a vehicular street is not necessary or desirable. In these instances, midblock facilities that support pedestrian connectivity are preferred. These pedestrian-only connections make walking more convenient and promote healthier, more sustainable lifestyles. Section 2L provides design information for these midblock facilities.



## INSPIRATION



The design of streets and streetscapes incorporates many elements that contribute to a high-quality environment, including pedestrian and bicycle infrastructure, streetscape furnishings, trees, and sustainable design features, as depicted in these images



## 2A COMPLETE STREETS

A Complete Streets approach to street design integrates people and placemaking into the planning of the active transportation networks to ensure that streets and their associated bicycle, pedestrian, and transit facilities are safe and comfortable for people of all ages and abilities. This approach balances the needs of different travel modes and supports land uses, local economies, and the environment. Complete Streets encompass both the roadway and the streetscape in an integrated manner intended to balance the needs of pedestrians, cyclists, transit riders, as well as drivers. The use of innovative designs that address environmental impacts and promote healthy communities is encouraged in the design of Complete Streets. Programs and policies that impact the design of Complete Streets include:

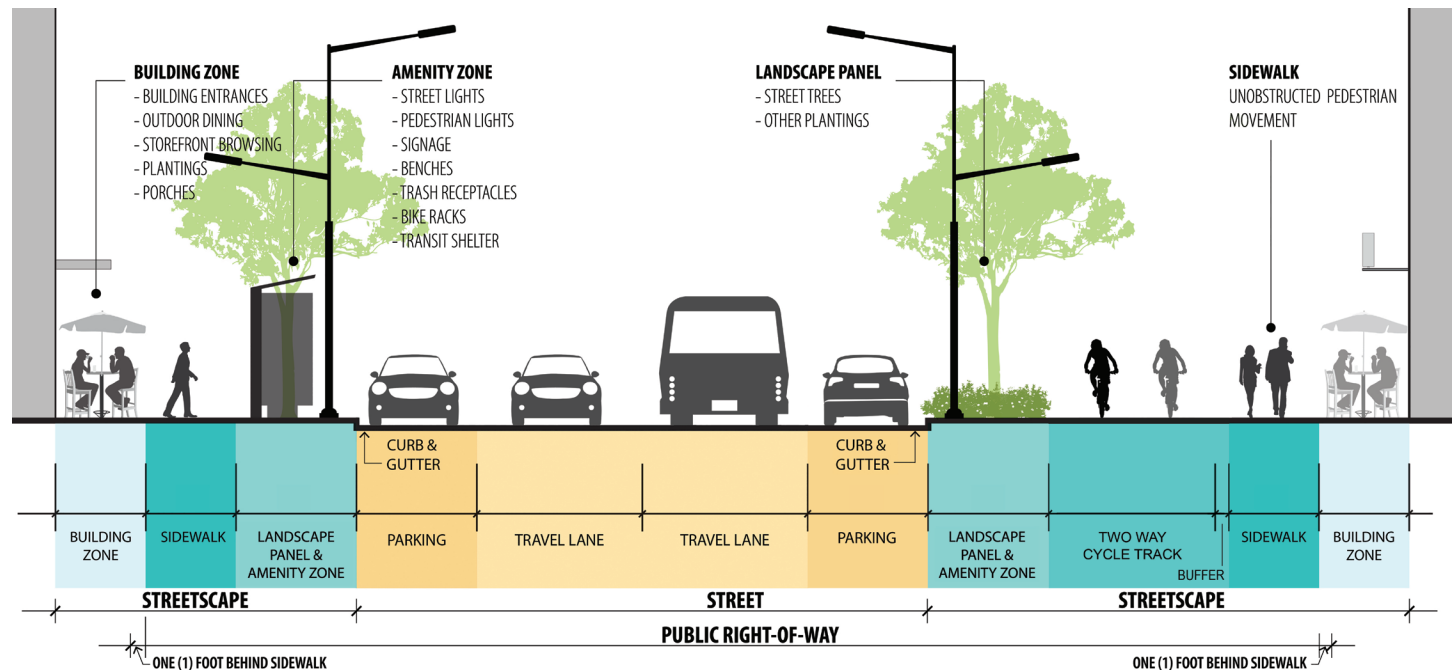
### ACTIVE FAIRFAX

Active Transportation refers to pedestrian, bicycle, and other non-motorized ways of traveling around Fairfax County. The County's Active Transportation Plan provides a comprehensive countywide facility network map for cycling, walking and other non-motorized travelers. An Active Transportation Toolkit and Facility Selection Matrix are available to assist with facility selection and design. [Active Transportation Toolkit](#)

### VDOT MULTIMODAL SYSTEM DESIGN GUIDELINES

VDOT, in conjunction with the Virginia Department of Rail and Public Transportation, has developed [Multimodal System Design Guidelines](#) to promote

**GRAPHIC 2: STREET AND STREETSCAPE COMPONENTS**





the integration of Complete Streets in Virginia's more urban areas. They include a functional classification system for public streets that is being applied in Fairfax County's activity centers, including its CRDs and CRAs. The Comprehensive Plan and/or the Volume II: District Design Guidelines provide information on functional classifications and cross-sections for the design of streets within each area. Cross-sections illustrate the location and dimensions of each component of the street's configuration. This chapter provides general information on quality street design and basic standards for instances where these standards are not provided in other documents.

## STREET AND STREETSCAPES MAINTENANCE

Non-standard streets and design elements will likely require private or County maintenance and are subject to VDOT approval. See Chapter 1D for more information on street maintenance requirements.

### Additional Resources

- [Manual on Uniform Traffic Control Devices \(MUTCD\)](#)
- [National Association of City Transportation Officials \(NACTO\) Urban Street Design Guide](#)
- [VDOT and Department of Rail and Public Transportation's Multimodal System Design Guidelines](#)
- [Public Right-of-Way Accessibility Guidelines](#)



Alexandria, VA

### BOTTOM

A transit boulevard with future BRT near Alexandria, Virginia  
Image Credit: Fullertography



## 2A.1

# STREET AND STREETSCAPE COMPONENTS

### STREET COMPONENTS

See *Graphic 2: Street and Streetscape Components Section* and *Graphic 3: Elements of Complete Streets* which represents prototypical examples with their various components.

The following street components are located in the right-of-way:

- **Medians** are the strip of land between the travel lanes of opposing traffic on a divided street. They can also be used as a buffer between modes (such as to provide a barrier between cyclists and moving vehicles) or to separate local and through traffic. Medians can include plantings and can accommodate transit facilities, pedestrian pathways and refuges, turn lanes, street lighting, and signage.
- **Travel lanes and turn lanes** are lanes for the movement of vehicles. A turn lane may be incorporated within the travel lane or provided as an additional exclusive lane. On streets without bicycle facilities, vehicles must share the travel lane with cyclists.
- **On-street bicycle facilities** are lanes and trails designed for the movement of cyclists. They can be designed as dedicated facilities (such as a cycle track) for the exclusive use of cyclists or shared with other modes (see *Graphic 3*).
- **Curb and gutter** are continuous facilities that separate the street from the adjacent streetscape, help control vehicles from departing the roadway, and control stormwater runoff.

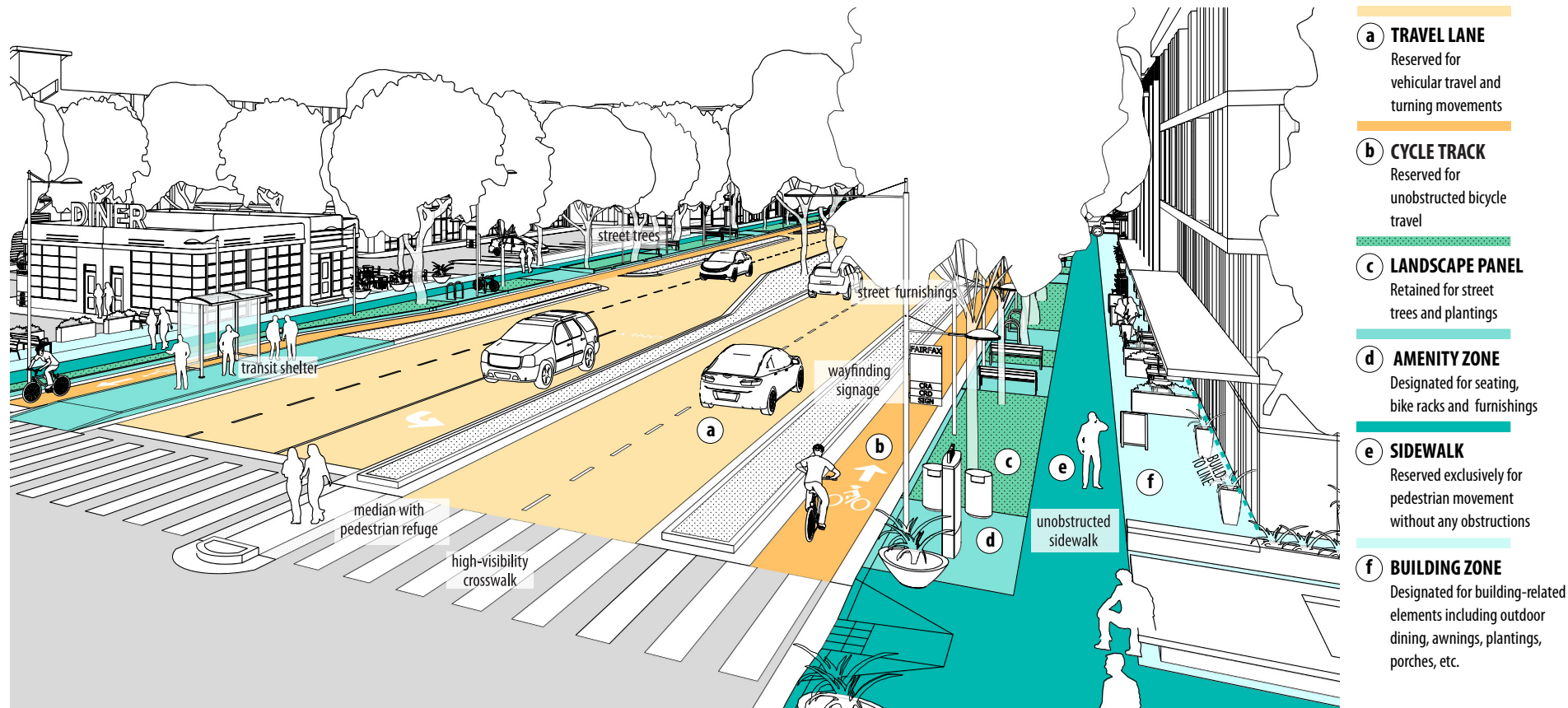
### STREETSCAPE COMPONENTS

The following streetscape components are typically located within the right-of-way on public streets:

- **Landscape panel:** the area adjacent to the street, which includes space for street trees, plantings, streetlights, and signage.
- **Amenity zone:** the paved area (constructed of porous or impermeable hardscape materials) located within the Landscape Panel designated for pedestrian and bicycle amenities including seating, bicycle racks, bus shelters, and other street furnishings. Amenity Zones are generally the same width as the Landscape Panel and can range in length depending on furnishing requirements.
- **Off-street bicycle facilities, shared use facilities, and associated buffers:** may include off street cycle tracks with parallel sidewalk or shared use facilities for pedestrian and cyclists (see *Graphic 2*). One specialized type of shared use facility for urban areas is the 'Urban Trail'. Urban Trails support bi-directional bicycle and pedestrian travel similar to paved multi-use trails but with a distinct urban aesthetic. Urban Trails are a space-saving alternative to cycle tracks.
- **Sidewalk:** the hardscape area reserved exclusively for pedestrian movement that is clear of any obstructions.



GRAPHIC 3: ELEMENTS OF COMPLETE STREETS



The following is located outside of the right-of-way on private property:

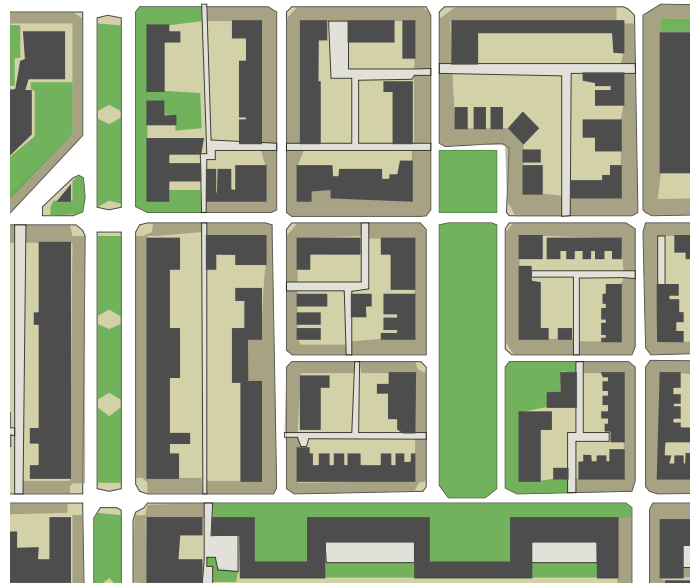
- **Building zone:** the area between the sidewalk and the face of the building that is designated for building-related elements including entrances, outdoor dining, browsing, plantings, transit shelters, and residential porches or stoops. The width of the Building Zone varies depending on the street type. On all streets,

a 1-foot VDOT maintenance easement should be included adjacent to the sidewalk in the Building Zone.

## 2B STREET NETWORK

The planned street networks in the CRDs and CRAs are designed to support local circulation while allowing for maximum development potential. When well-connected, the street network provides alternative options for navigating an area by supporting travel by multiple modes of transportation.

The planned street network should be considered early in the initial conceptual design phase of a development proposal. The Comprehensive Plan and the Volume II: District Design Guidelines describe both the existing and planned street network including street cross-sections, street configurations, and required rights-of-way for the various street types.



**RIGHT**  
An urban grid of streets that provides a well-connected street network with smaller scaled blocks to encourage walking and biking  
Image Credit: Fairfax County

### DESIGN PRINCIPLES

**Establish a multimodal circulation system as the primary organizing feature of the development.**

As specified in the Comprehensive Plan, the urban design vision for the CRDs and CRAs calls for the creation of a safe, multimodal circulation system consisting of a well-coordinated network of streets, sidewalks and bicycle facilities, with an emphasis on pedestrian, bicycle and transit mobility. The design of a site should fully consider the needs and convenience of the active transportation users through the provision of sidewalks and bicycle facilities that encourage walking and biking and that reduce dependency on vehicular trips.

**Create an efficient local street network with pedestrian-scaled blocks.** In general, a network of local serving streets that form smaller, walkable development blocks is the most successful approach to improving local circulation and promoting walking. Pedestrian-scaled, well-defined development blocks also support the efficient layout of developments.

These design principles apply to all development and redevelopment within CRDs and CRAs, including infill developments with townhomes and stacked townhomes.



## DESIGN STRATEGIES

### 1 MULTIMODAL AND COMPLETE STREETS

- A. Proposed developments should incorporate the recommended multimodal street network that provides the necessary transportation infrastructure for people of all ages and abilities. Plans should depict circulation routes for each transportation mode to ensure there are no route gaps.
- B. Streets should be designed to minimize and mitigate conflicts between travel modes by limiting the number of driveways and access points, determining the most suitable locations for frequent and convenient pedestrian crossings and signals, and ensuring that pedestrians can easily access uses without having to walk unnecessarily across travel ways or parking areas.



Arlington, VA

- C. On-street parking should be incorporated on all streets where space permits to provide convenient parking for businesses and residents, disperse parking, buffer pedestrians, and in certain instances, buffer cyclists from moving vehicles.
- D. Lane widths for vehicle travel should be no more than 11 feet to manage vehicle speeds, shorten crossing distances for pedestrians, reduce the extent of impervious pavement, and increase space for sidewalks and streetscape amenities.
- E. Transit shelters should be provided at all transit stops. See section 2K (“Transit Shelters”) for additional detail regarding the location and design of transit shelters.
- F. Pedestrian-scaled lighting, trees, and furnishings should be incorporated on all streets for pedestrian safety and comfort. See section 2F (“Landscape Panel and Amenity Zone”) for additional detail regarding pedestrian-scaled lighting and furnishings.

### 2 BLOCK DESIGN

- A. New blocks formed by the street network should facilitate the efficient use of space. These should be regularly shaped blocks that maximize the use of developable land, support walking, are adaptable, and are easy to navigate.

#### LEFT

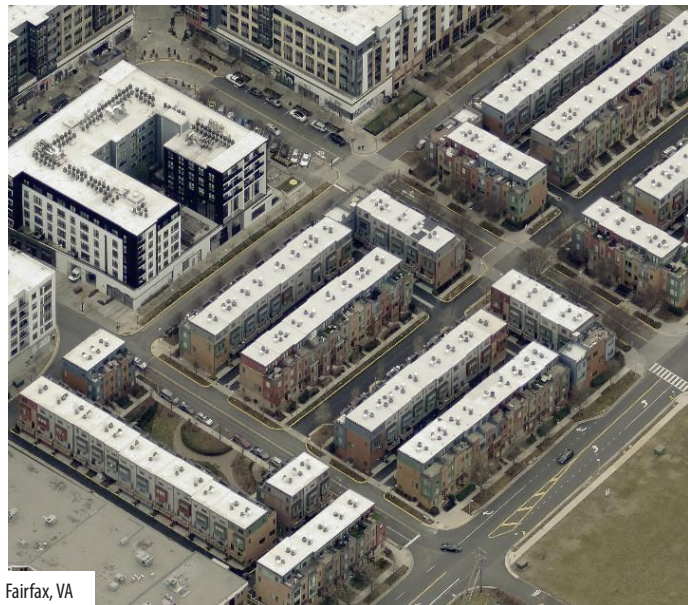
A complete street with cycletrack, on street parking, narrow lanes, trees, and pedestrian amenities  
Image Credit: Arlington County Government

## DESIGN STRATEGIES (CONTINUED)

- B. Blocks should generally be between 300–600 feet in length, while the perimeter of a block should not exceed 2,000 feet. Midblock connections, including breaks in buildings and pedestrian passages through buildings, may be appropriate for long blocks (see section 2B.1).
- C. For residential infill development, the following strategies apply.
  - i. Extend the infill community's street network to the surrounding neighborhood's street network to avoid isolating the new community and provide a cohesive network.
  - ii. When designing new development, orient new streets to align with or logically extend the existing street network. Incorporate multiple connection points to improve circulation and distribute traffic efficiently.
- D. Avoid the use of dead-end streets/cul-de-sacs. Where they cannot be avoided, use the following design measures to improve connectivity and enhance placemaking.
  - i. Connect dead-end streets to neighboring streets and trails with dedicated walking/ biking paths, providing residents a direct route to nearby destinations.

### LEFT

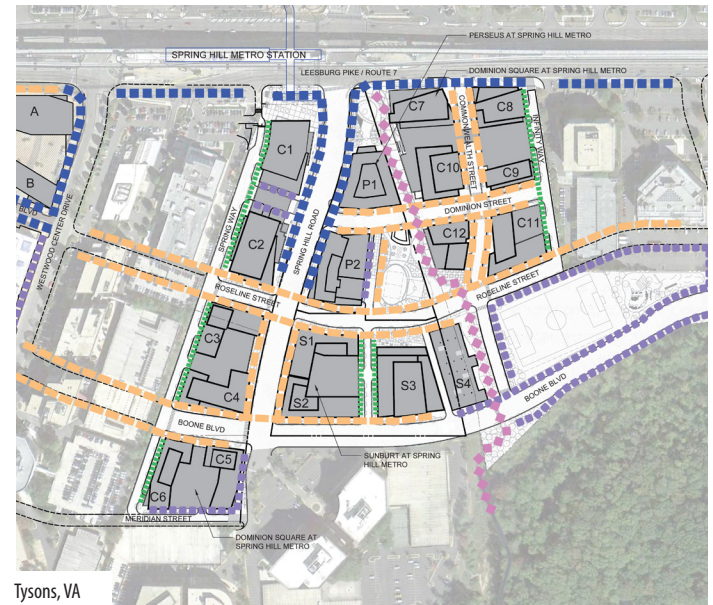
The street network of the townhome community integrates seamlessly with the rest of the Mosaic District  
Image Credit: EagleView Technology Corporation



Fairfax, VA

### RIGHT

Pedestrian plan and street hierarchy organized within new street blocks in Tysons  
Image Credit: Land Design

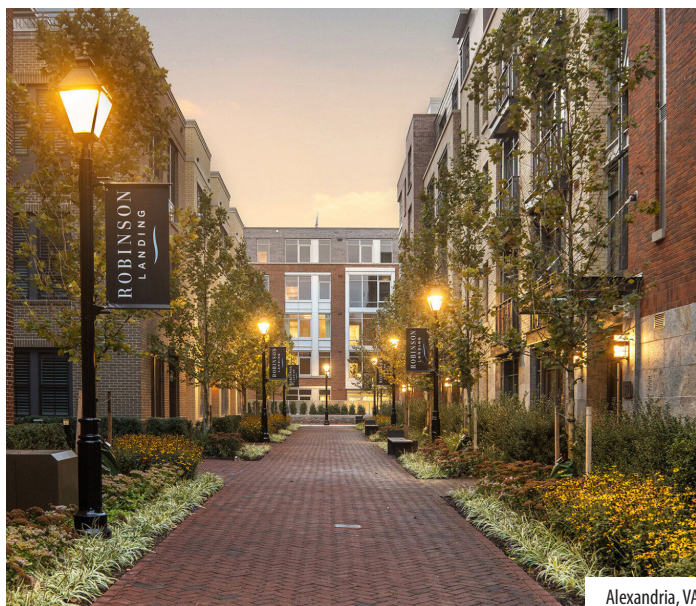


Tysons, VA



## DESIGN STRATEGIES (CONTINUED)

- ii. Connect cul-de-sacs in larger developments with a network of internal greenways or walkways.
- iii. When designing a new community, avoid excessively long dead end streets by looping the road system where possible.
- iv. Use cul-de-sac termini for pocket parks, public art installations, or enhanced landscaping. Position residential units with architectural features like porches or large windows to frame these spaces and foster a sense of enclosure and community.



Alexandria, VA

## 3 TRAFFIC AND SPEEDS

- A. Street grid associated with new developments should not encourage significant increase in non-local traffic through existing neighborhoods. If an increase in non-local traffic is anticipated as a result of new development, appropriate mitigation measures, such as those listed below, should be provided.
  - i. Strategies such as the addition of on-street parking, curb bulb-outs, and small traffic rotaries should be considered for existing neighborhood streets to manage the speed of traffic.
- B. Low speed, low volume streets can include a range of treatments that encourage the sharing of roadway space by all users. Examples include Slow Streets, Neighborhood Greenways, Pedestrian-first Streets, and Green Alleys. More information on such streets is available in the county's [Active Transportation Toolkit](#).

### LEFT

Robinson Landing, a mostly townhome community integrates its internal circulation with the street grid of Old Town Alexandria  
Image Credit: KTG

## 2B.1 PEDESTRIAN- ONLY CONNECTIONS

### BOTTOM

Projects can facilitate pedestrian movement by incorporating mid-block pedestrian pathways  
Image Credit: Foster + Partners



Washington, DC

Off-street trails can be an important aspect of the pedestrian network. They serve many functions including connecting destinations mid-block where there are large blocks that would otherwise make walking inconvenient. They may also serve a recreational purpose.

The size and design of off-street trails will vary depending on their context and function. Typical facilities will vary but will generally consist of a continuous urban trail, lighting, and seating, and may include other active and/or passive recreation components.

### DESIGN PRINCIPLES

**Off-street trails should seamlessly connect with other aspects of the public realm,** such as sidewalks and bicycle lanes, and be part of the interconnected network with visible connections to nearby destinations.

### DESIGN STRATEGIES

- A. A minimum 8-foot wide hard surface trail, 10-foot wide is preferred. The trail should have a pedestrian focus, or be designed as a shared-use facility to accommodate cyclists.
- B. Pedestrian-scaled lighting should be provided using an illumination standard of 0.5-1.0 footcandles across the facility.
- C. Wayfinding signage is encouraged.
- D. A public access easement should be recorded across the facility.



## 2C INTERSECTIONS

Intersections are a critical aspect of street design, as they are the point where vehicular, bicycle, and pedestrian movements converge. Most collisions on thoroughfares take place at intersections. Intersections may also serve an important placemaking function as gateways. Prominent land uses and architecturally-significant buildings as well as public art, signage, landscaping, and trees can

serve as focal points at intersections. As such, it is critical that intersection design serve a variety of purposes, including addressing potential conflicts between travel modes, supporting safety and mobility for all users of the street, and contributing to a vibrant and accessible public realm.



Image Credit: NAIOP

Fairfax, VA

## 2C.1 INTERSECTION DESIGN

Planning for intersections includes not only the immediate intersection, but also the approaches to it, the median (if present), street signage and striping, and active transportation facilities. Elements that need to be considered in an integrated manner in the design of an intersection include the vehicular capacity of the roadway; the number of travel ways; large-vehicle turning requirements; safety; pedestrian and bicycle convenience; accessibility, including applicable ADA regulations; and, the efficiency of transit (See *Graphic 4: Intersection Design*).

Design features described in this section assume signal-controlled intersections, although many design principles and strategies also apply to signage-controlled intersections and midblock crossings, where permissible. Final decisions for intersection design features on public roads are subject to approval by VDOT.



LEFT

A curbless street corner with bollards for pedestrian protection  
Image Credit: Arlington County Government

### DESIGN PRINCIPLES

**Design compact intersections to unify, rather than fragment, the surrounding blocks and minimize crossing distances.** The design of intersections determines, to a great degree, whether a street ties together a neighborhood or functions as a physical barrier that divides communities. When designed compactly—with smaller corner radii to slow vehicle turning speeds and shorter crossing distances—streets can function as places for people, tie together surrounding blocks, and unify communities.

**Ensure that an intersection's configuration and design promotes visibility and predictability,** such that pedestrians, bicyclists and motor vehicles can see each other and predict each other's movements through the intersection. Making intersection operations visible and predictable entails minimizing visual obstacles that obscure oncoming traffic or street crossings by pedestrians and bicyclists. It also requires clearly-marked crosswalks, pedestrian-scaled lighting, and stop lines for vehicles.



## DESIGN STRATEGIES

### 1 COMPACT DESIGN

- A. Intersections should be designed as compactly as practical to minimize pedestrian crossing distance, crossing time, and exposure to traffic, while still accommodating vehicular movements.
- B. Corner curb radii should be as minimal as possible to reduce the speed of turning vehicles and shorten the crossing distance for pedestrians. No more than 25-foot radius for streets with a design speed of 35 mph or more, and 15-foot radius for streets with a design speed of 25 mph or less.
- C. Curb extensions should be considered for streets with on-street parking. Plantings or other vertical elements inside the curb extension should not impede adequate sight distance. Curb extensions, also known as bulb-outs, entail extending the curb into the roadway at the crosswalk to shorten the crossing distance, provide additional space for pedestrians, and allow pedestrians to see and be seen by vehicles before entering the crosswalk. Curb extensions can also provide an opportunity to extend the landscape panel and include planting and bioretention areas, as well as street furnishings.

### 2 VISIBILITY

- A. The ability of drivers to see pedestrians and cyclists should be addressed by limiting signage

and parking near intersections, planting only low vegetation that does not exceed 3-feet in height, installing vehicular stop lines 8 feet behind crosswalks, using high-visibility crosswalks, and/or installing curb extensions, where applicable.

- B. Street lighting oriented for pedestrians and vehicles should be provided. For large intersections, pedestrian-scaled lighting should be provided that is independent from lighting designed to illuminate the roadway.

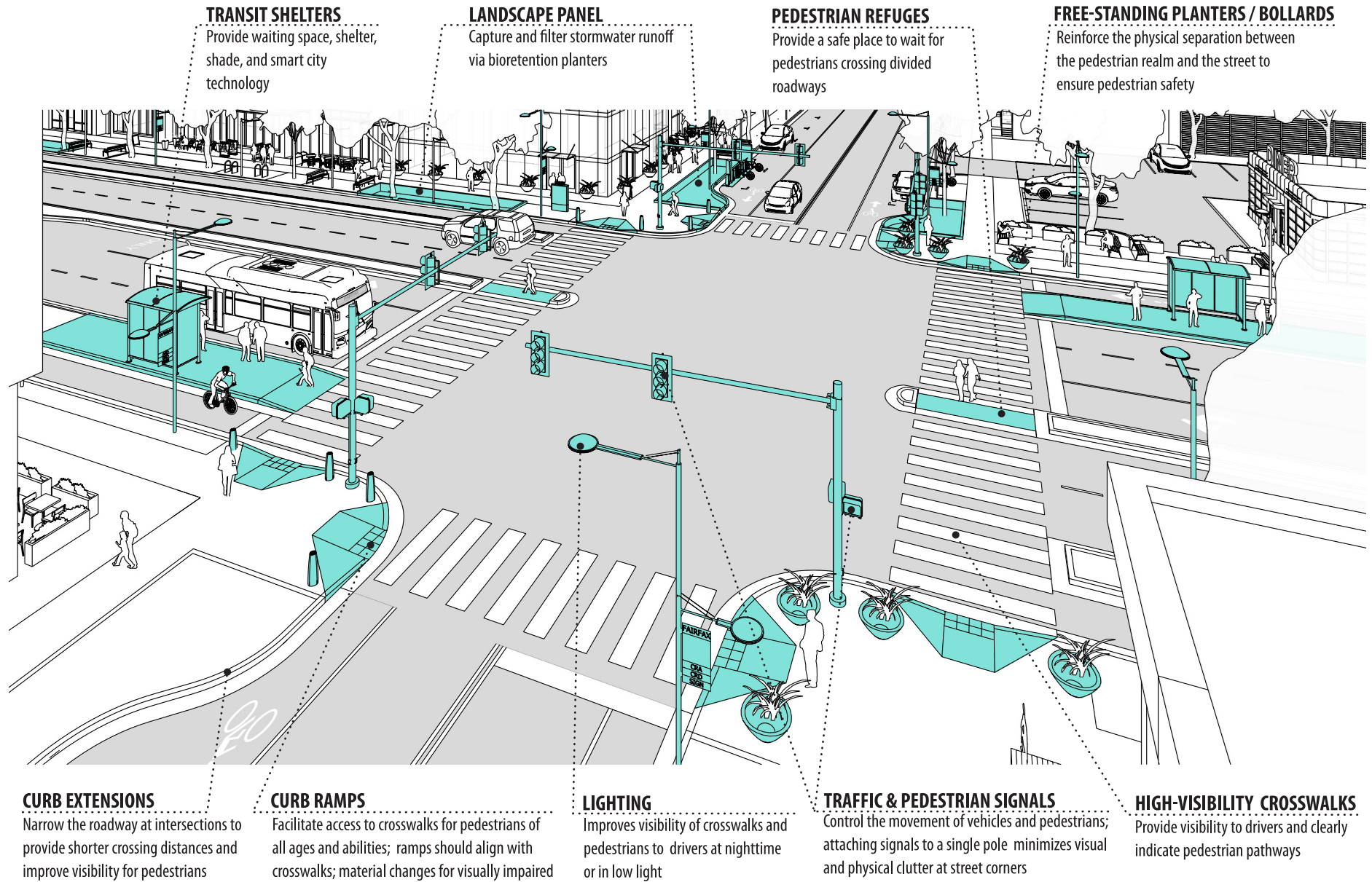
#### BELOW

A compact multi-modal intersection with tight turning radii and curb extension  
Image Credit: Anthony Crisafulli Photography



Cambridge, MA

## GRAPHIC 4: INTERSECTION DESIGN





## 2C.2 CROSSWALKS & DRIVEWAY CROSSINGS

Crosswalk markings are used to define the pedestrian path of travel across a roadway and to alert drivers to locations where pedestrian traffic will occur. Pedestrian and vehicular points of conflict should be managed through appropriate design solutions, and all crosswalks, signals and associated infrastructure should be in compliance with the [Manual on Uniform Traffic Control Devices](#) (MUTCD), the [Americans with Disabilities Act](#) (ADA) standards, and the [VDOT Road Design Manual and applicable Instructions and Informational Memoranda](#). Proposals for non-standard intersection designs, should be discussed early with FCDOT and VDOT to determine their feasibility.



Arlington, VA

### DESIGN PRINCIPLES

**Install high-visibility crosswalks.** High-visibility crosswalks are recommended for all intersections where permitted by VDOT.

**Install pedestrian signals wherever warranted on public and private streets.** Pedestrian signals should be installed at all intersections on public streets that meet VDOT warrants and on private streets that have either high vehicle traffic, high vehicle speeds, or transit service to increase safety and promote a walkable environment.

**For midblock crossings, incorporate special safety elements and coordinate with VDOT.**

Subject to VDOT approval, midblock crosswalks should be considered where there is a specific need based on adjacent uses and where there are no existing or planned crosswalks within 300 to 400 feet of the desired crossing. Adjacent uses that may warrant a midblock crosswalk include: midblock bus stops, parks and plazas, grocery stores, schools, trailhead, trail crossings, and other public institutions. Overhead signage and signalization of the midblock crosswalk will be determined by VDOT and are subject to MUTCD guidelines. Specific safety elements should be incorporated into midblock crosswalk designs, such as a median refuge, pedestrian-scaled street lighting, and landscaping to aid in distinguishing the crossing.

#### LEFT

A high-visibility crosswalk is preferred at intersections, where permitted by VDOT  
Image Credit: NACTO

## DESIGN STRATEGIES

### 1 CROSSWALKS

- A. Crosswalks at roadway intersections should be located to provide the shortest route possible for pedestrians (*See Graphic 5: Crosswalk Configurations*).
- B. Crosswalks, where feasible, should be included on all four legs of an intersection.
- C. High-visibility, ladder-style crosswalks are the preferred crosswalk pattern. Brick or other materials are generally not recommended for crosswalks.



#### RIGHT

A ladder style crosswalk with pedestrian refuge and pedestrian HAWK signal  
Image Credit: Michigan Complete Street Coalition

- D. Crosswalks should match the width of the entire pedestrian and cyclist travel way inclusive of any Urban Trail, cycletrack, shared facility, or sidewalk. Crosswalks with high volume of pedestrian traffic should be 12 feet wide or more.
- E. Durable inlay or thermoplastic tape should be used for all crosswalk striping rather than paint. High-visibility markings should be spaced to avoid the wheel path of cars, thereby reducing wear-and-tear on the striping.
- F. Curb ramps should be aligned directly with the crosswalk. Avoid situations when one single curb ramp serves two crosswalks at the street corner.
- G. Vehicular stop bar should be located 8 feet from the crosswalk (ADA preferred)
- H. Any block greater than 600-feet in length should have an internal mid-block pedestrian connection, where feasible. Mid-block connections may include a pedestrian walkway, a service street with a sidewalk, a trail connection, a publicly-accessible walkway through a building, or other publicly-accessible connection. A corresponding mid-block crossing of the street is encouraged to accompany mid-block connection.

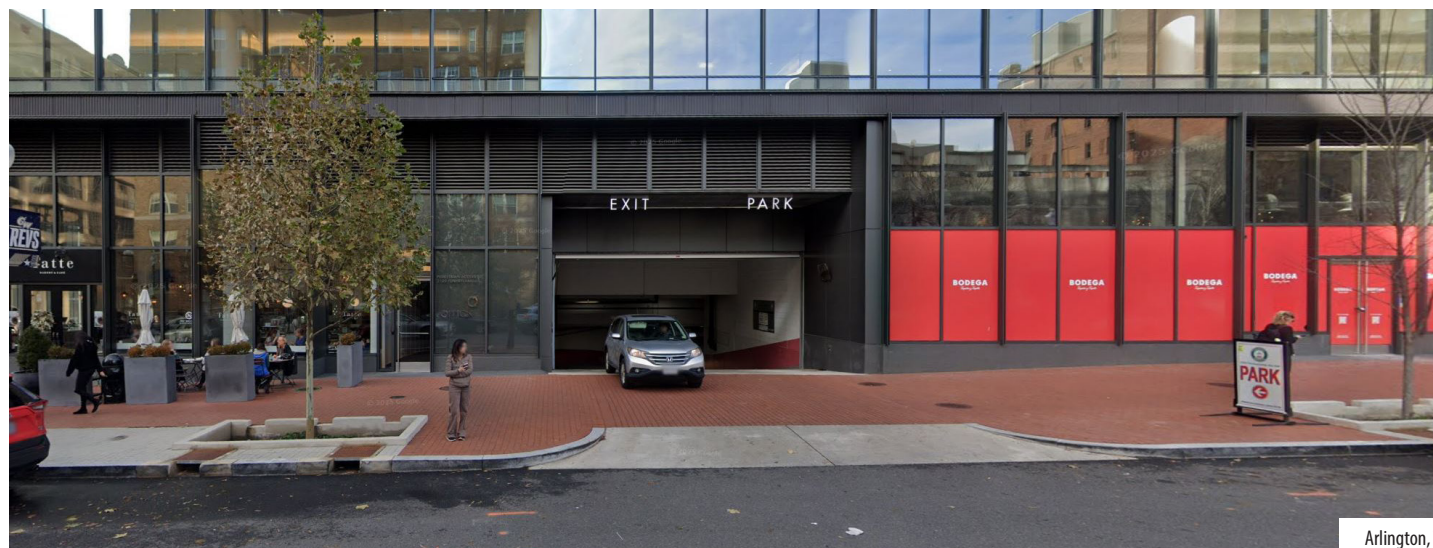


## DESIGN STRATEGIES (CONTINUED)

- I. An 8-foot wide (6 foot minimum) pedestrian refuge should be included within medians, especially those where the total crossing distance is over 60 feet curb-to-curb.
- J. Pedestrian signals should be installed at all signalized intersections, if warranted by VDOT.

### 2 DRIVEWAY CROSSINGS

- A. Driveways should be as narrow as permitted. See the VDOT Road Design Manual (RDM). Where applicable, see RDM Appendix B(2) for alternative specifications.
- B. The sidewalk or streetscape pavement material should be continuous across the curb-cut or driveway entrance. The material can be concrete or other specialty sidewalk materials planned for the area. The width of the crossing should match the width of the sidewalk.
- C. Sidewalks and off-street bicycle facilities should not ramp down to the roadway grade. Sidewalks should remain at a consistent grade across the driveway.
- D. For commercial driveways and residential driveways with greater than 20 vehicle trips/day: ADA-compliant trunked dome pavers in gray colored concrete should be provided at the edges of the driveway to warn pedestrians of cross-traffic.



Arlington, VA

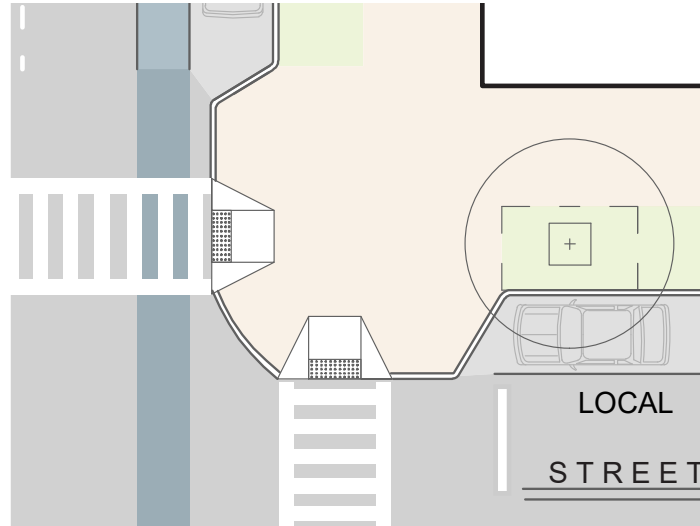
#### BOTTOM

Sidewalk paving material continues across driveway entrance  
Image Credit: Google Maps

## GRAPHIC 5: CROSSWALK CONFIGURATIONS

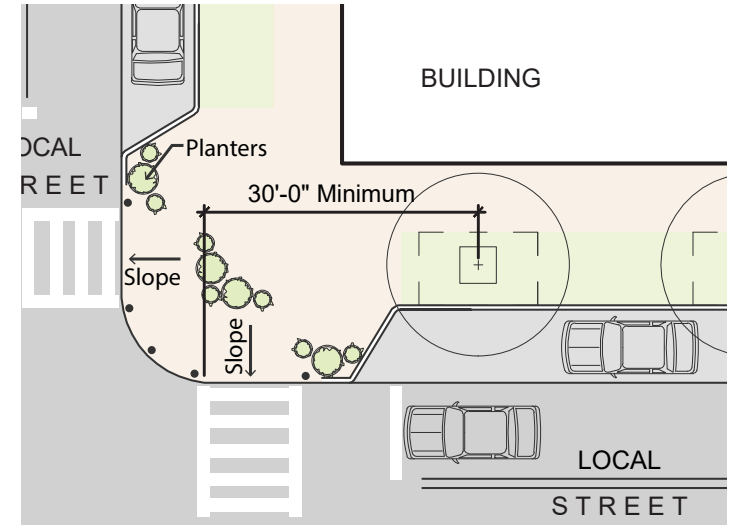
### TOP LEFT

Acceptable curb ramp alignment where ramp is directly aligned with the crosswalk



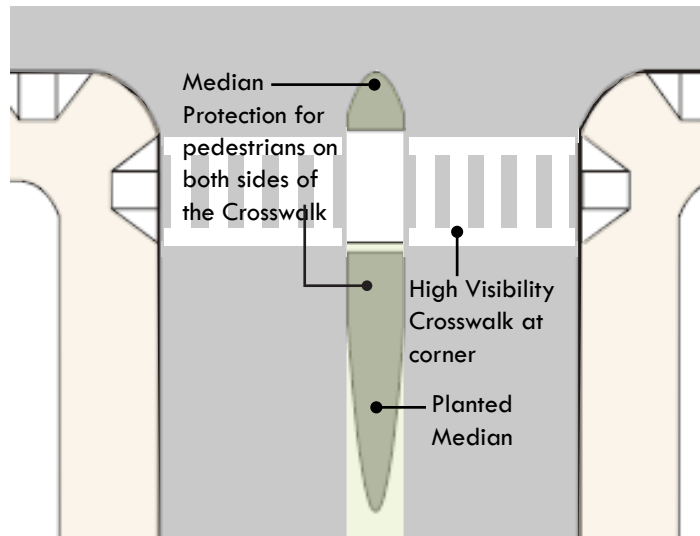
### TOP RIGHT

Curbless corner design for intersections with high volumes of pedestrian traffic



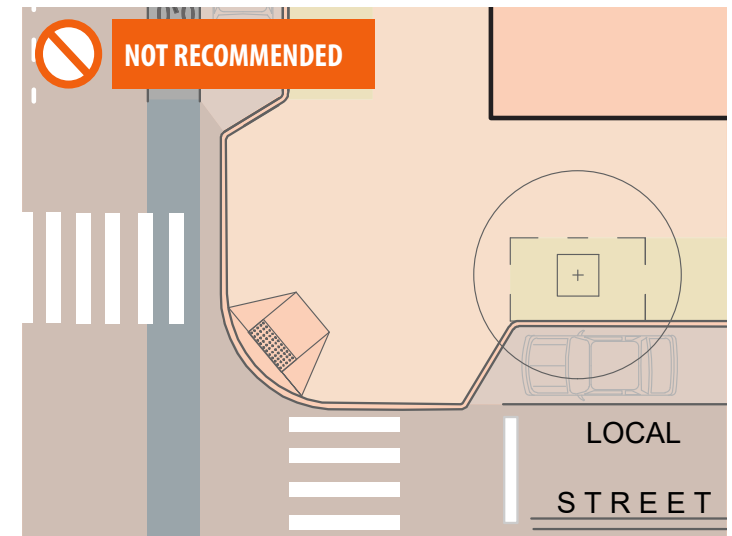
### BOTTOM LEFT

Crosswalk through a median provides a pedestrian refuge for long crossings; raised medians on both sides of the crosswalk provide buffer for pedestrians



### BOTTOM RIGHT

Unacceptable design where a single curb ramp is not aligned with crosswalks





# 2D BICYCLE FACILITIES AND URBAN TRAILS

Bicycles play an increasingly important role in the movement of people and, as such, are an essential component of a complete multimodal transportation network. In addition to the street cross-sections depicted in the Comprehensive Plan Area Plans, the following resources should be used to incorporate bicycle facilities into a proposed development plan:

- [Fairfax County Comprehensive Plan](#)
- [Fairfax County Active Transportation Network Map and Toolkit](#)
- [Fairfax County Public Facilities Manual](#)
- [Fairfax County Bicycle Parking Guidelines](#)
- [The National Association of City Transportation Officials \(NACTO\) Urban Bikeways Design Guide](#)
- [Federal Highway Administration \(FHWA\) Separated Bike Lane Planning and Design Guide](#)



New York City, NY

## Bicycle Facility Types

There are many potential configurations for bicycle facilities, depending on the available right-of-way, adjacent land uses, and the needs of cyclists on a particular roadway. Some streets that are low-speed and have low traffic volumes can be designed to accommodate cyclists within the roadway. On these streets, pavement markings and/or signage may be incorporated to alert drivers that they are expected to share the roadway with cyclists. On other streets with higher speeds and higher traffic levels, greater separation between bicycles and vehicles is necessary.

The Fairfax County Active Transportation and Trail Network Map is a comprehensive, countywide bike and trail map. The map identifies the CRDs and CRAs as 'Special Planning Areas'. For these areas, designers should consult the Comprehensive Plan Area Plan recommendations because they contain specific facility recommendations for each street. Common types of bicycle facilities planned for Special Planning Areas include:

- Bike lanes
- Buffered bike lanes
- Cycle tracks
- Urban Trails
- Shared-use Paths

**TOP**

Landscaped bioswale adjacent to the bike lane - creative addition to the infrastructure  
Image Credit: Our Greenway



Indianapolis, IN

**BOTTOM**

Buffered bike lane provides protection from vehicular travel lanes  
Image Credit: bikearlington.com



Arlington, VA

**DESIGN PRINCIPLES**

**Design for safety, comfort and all ages and abilities.** Bicycle facilities, including Urban Trails must be properly designed and implemented in order to ensure that they are safe, comfortable, useful, and attractive to the population, across the spectrum of age, ability and cycling experience.

**Ensure a logical, comprehensive bicycle circulation system that offers seamless connections.** Associated on-site and off-site bicycle amenities should be incorporated and prioritized at the conceptual design phase for the development.

**Prioritize separated facilities wherever possible.** Several types of bicycle facilities, ranging from on-street bicycle lanes to separated bicycle facilities such as cycle tracks and shared-use paths, are proposed in the CRDs and CRAs based on the specific roadway condition. Separated bicycle facilities are preferred on streets where they are deemed necessary for safety and user comfort.

**Utilize Urban Trails in context-appropriate locations.** Urban Trails are appropriate in certain contexts within urban areas. They are a space-saving alternative that may be implemented on roadways with any volume and speed but generally for streets with four travel lanes or along high-volume roads with few signalized pedestrian crossings. Although they are designed as two-way facilities, it is recommended that they are provided on both sides of the street.



## DESIGN STRATEGIES

### 1 BICYCLE FACILITY DESIGN

- A. Refer to the Comprehensive Plan Area Plan for planned facility types within or adjacent to the proposed development. Refer to the 'Active Transportation Toolkit' for detailed design guidance for bicycle and shared-use facilities.
  - B. Intersections with bicycle facilities should be designed to reduce conflicts with vehicles by heightening the level of visibility, denoting a clear right-of-way, and facilitating eye contact and awareness between modes. Bicycle lane markings should be extended through the intersection.
  - C. When on-street parking and bicycle facilities are planned for a roadway, additional design features should be considered, including determining whether the on-street parking or the bicycle facility should be located adjacent to the vehicle travel lane; and, providing adequate space in a buffer between the parked car and the bicycle lane to prevent a cyclist from being hit by an open car door. The 'FHWA Bicycle Facility Selection Toolkit' provides specific guidance for bicycle facility design adjacent to on-street parking and buffers.
- A. Urban Trail design characteristics should be consistently applied to reinforce the continuity of the pathway and create a distinction between sidewalks and other nearby facilities. They should be visually distinctive from other bicycle and pedestrian facilities so that they are recognizable as a shared space.
  - B. Minimum of 8 feet in width, 10-12 feet preferred.
  - C. Sawcut concrete or smooth pavers preferred. Asphalt may be acceptable depending on the local communities' preference.

### 2 URBAN TRAIL DESIGN

Urban trails are shared active transportation facilities that support bi-directional bicycle and pedestrian travel similar to paved multi-use trails but with a distinctly urban aesthetic.



Alexandria, VA

#### LEFT

Bicycle lane configuration at an intersection where pavement markings help define spaces for pedestrians, vehicles, and cyclists  
Image Credit: Rhodeside & Harwell

**TOP**

Specialized buffered bicycle facility known as “Dutch Intersection” provides an enhanced, safe intersection treatment where a high-volume of cyclists is anticipated  
Image Credit: John Greenfield



Chicago, IL

**BOTTOM**

Intersection Plaza on the Indianapolis Cultural Trail  
Image Credit: ICT



Indianapolis, IN

**DESIGN STRATEGIES (CONTINUED)**

- D. Landscaping, trees, seating and furnishings, and other amenities are encouraged within the building zone.
- E. Signage explaining ‘Bikes Yield to Peds’, ‘Bike Route’, and/or bicycle wayfinding signage should be provided along the route to communicate the shared use to facility users.
- F. Enhanced treatments at intersections and driveways should be provided, including Intersection Plaza treatments and elevated driveway crossings.

## **2 INTERSECTION TREATMENT FOR CYCLE TRACKS AND URBAN TRAILS**

Where urban trails, cycletracks, or other shared-use facilities approach a roadway intersection, an appropriate intersection treatment (such as an Intersection Plaza, corner refuge, raised crossing, or other context-sensitive design) should be considered.

The type and length of treatment will depend on several factors and will be determined at the time of rezoning or site plan review. Curb ramps and crosswalks that match the width of the widest sidewalk or trail facility, meet cycling standards, and adhere to VDOT Road Design Manual shared-use path ramp requirements, should be provided at all street crossings.



## 2E PEDESTRIAN FACILITIES

The pedestrian realm includes the public and private spaces that are designed to be frequented by pedestrians. High-quality, convenient and safe pedestrian environments will promote walk-trips, attract people and contribute to the economic success of the CRDs and CRAs. In CRDs and CRAs, the parks, plazas, and sidewalks along streets comprise most of the pedestrian realm. This section sets forth general design principles and strategies for creating a high-quality pedestrian realm, followed by greater detail on many of these approaches (*See Graphic 6: Pedestrian Realm*).

### DESIGN PRINCIPLES

**Accommodate a high volume of pedestrian activity while serving the social, recreational and environmental needs of each community.**

Open spaces, land uses, building orientation, building setbacks, and a comprehensive sidewalk system should create an integrated pedestrian network that promotes walking and active living at both the neighborhood and site-specific scales. Streets and open space networks serve as connectors for pedestrians to the various parts of the area and should function as safe, accessible, convenient, direct, and comfortable connections between origin and destination points.

**Take advantage of unique, site-specific opportunities to enhance the pedestrian realm.**

Whether it is the presence of environmental features, such as an adjacent stream corridor, or a site's role as a gateway to a CRD or CRA, existing conditions on a site can create opportunities for context-sensitive solutions that are tailored to the individual site while enhancing the larger pedestrian realm.



Denver, CO

#### RIGHT

Streetscape emphasizes comfort and safety; curb extension reduces crossing distance; vertical elements between the vehicle lane and the pedestrian realm create a sense of enclosure and physical separation from vehicles  
Image Credit: Design Workshop

## DESIGN STRATEGIES

### 1 SAFE AND UNOBSTRUCTED PEDESTRIAN MOVEMENT

- A. Sidewalks and trails should create comfortable environments that are of an adequate width to accommodate and encourage pedestrian activity for a range of users. Facility widths should anticipate pedestrian needs based on adjacent land uses, types of users, and the projected volume of pedestrian traffic.
- B. Public realm environments are required to be ADA accessible and accommodate users of all ages and abilities:
  - i. Sidewalks and trails should be sufficiently wide and unobstructed, utilizing non-slip and even materials to promote access and usage by all users.
  - ii. Curbs should be designed to accommodate safe mobility for users of all ages and abilities by incorporating ramps at crossings that are aligned with crosswalks.
  - iii. Hardscape materials, landscaping and furnishings should be durable, low-maintenance and easy to repair or replace.
  - iv. Maintenance should occur on a regular basis.
- C. Pedestrian circulation should occur at the ground level. Above-grade bridges or below-grade tunnels are generally discouraged, except

potentially when crossing Multimodal Through Corridors, highways, interstates, ramps, or for major recreational trails.

- D. Clearly delineated crossings and pedestrian signals should be incorporated at intersections and midblock connections. See Section 2C.2 Cross Walk and Driveway Crossings for more details.

### 2 PEDESTRIAN-ORIENTED SPACES AND AMENITIES

- A. The pedestrian realm should incorporate interesting, safe, and properly sized spaces that include gathering areas, trees and landscaping, lighting and street furnishings, and other facilities to accommodate pedestrian-oriented programming.

#### RIGHT

Rooftop outdoor space oriented to the street animates the pedestrian realm even though it is not located at the street level  
Image Credit: downtowncharlottesville.net



Charlottesville, VA

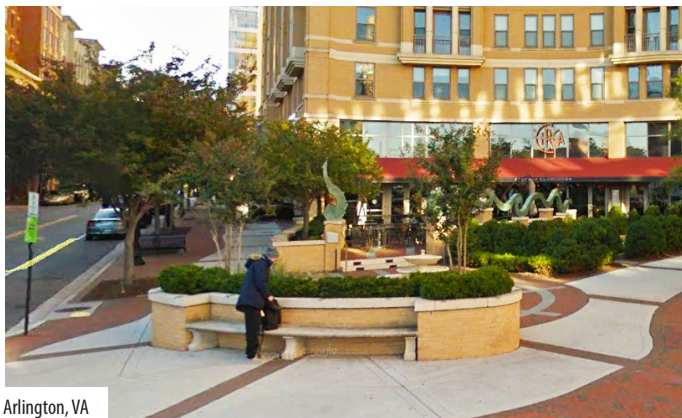


## DESIGN STRATEGIES (CONTINUED)

- B. Buildings should be designed to interact positively with the pedestrian realm by including features such as entryways, storefronts, awnings or overhangs, space for outdoor restaurant seating and merchant displays along streetscapes.
- C. Retail and other land uses that require and/or are supportive of pedestrian traffic, such as at key intersections or buildings adjacent to plazas, should be served by high-quality public spaces, streetscapes and pedestrian amenities.
- D. A mix of sunlit and shaded pathways, sidewalks and seating areas should be provided to address the impacts of weather on the pedestrian environment. Shaded areas should be provided along southern and western oriented building frontages, while sunlit facilities should be emphasized along northern and eastern oriented building frontages.
- E. Pedestrian comfort and enjoyment should be prioritized through the creative use of streetscape elements that both serve as amenities for pedestrians and guide pedestrian movement.
  - i. Repetitive, evenly spaced streetscape elements should be used, including pedestrian-scaled light fixtures, furnishings, street trees, and a mix of hardscape and landscape areas.
- ii. The repetition and continuity of these streetscape elements can establish the overall feel and comfort level of a sidewalk, and can be used to direct pedestrian movement.
- F. Locations for wayfinding signage and furnishings for pedestrians and cyclists should be considered when designing the pedestrian network.

### 3 STREET CORNERS

- A. Special streetscape design treatments may be incorporated at intersections to highlight the importance of corners in the overall streetscape and to define the pedestrian realm.
  - i. Street corners may be expanded with curb extensions, increasing the amount of pedestrian space while reducing the crossing distance between curbs.



Arlington, VA

#### RIGHT

Street corner with distinctive paving, art and seating to accentuate the corner's importance and visual prominence  
Image Credit: Google

## GRAPHIC 6: PEDESTRIAN REALM

### PEDESTRIAN-SCALED LIGHTING

Contributes to pedestrian safety and comfort at night

### BUILDING ENTRANCES

Create an active street-level pedestrian environment along key streets and at corners

### UNOBSTRUCTED SIDEWALKS

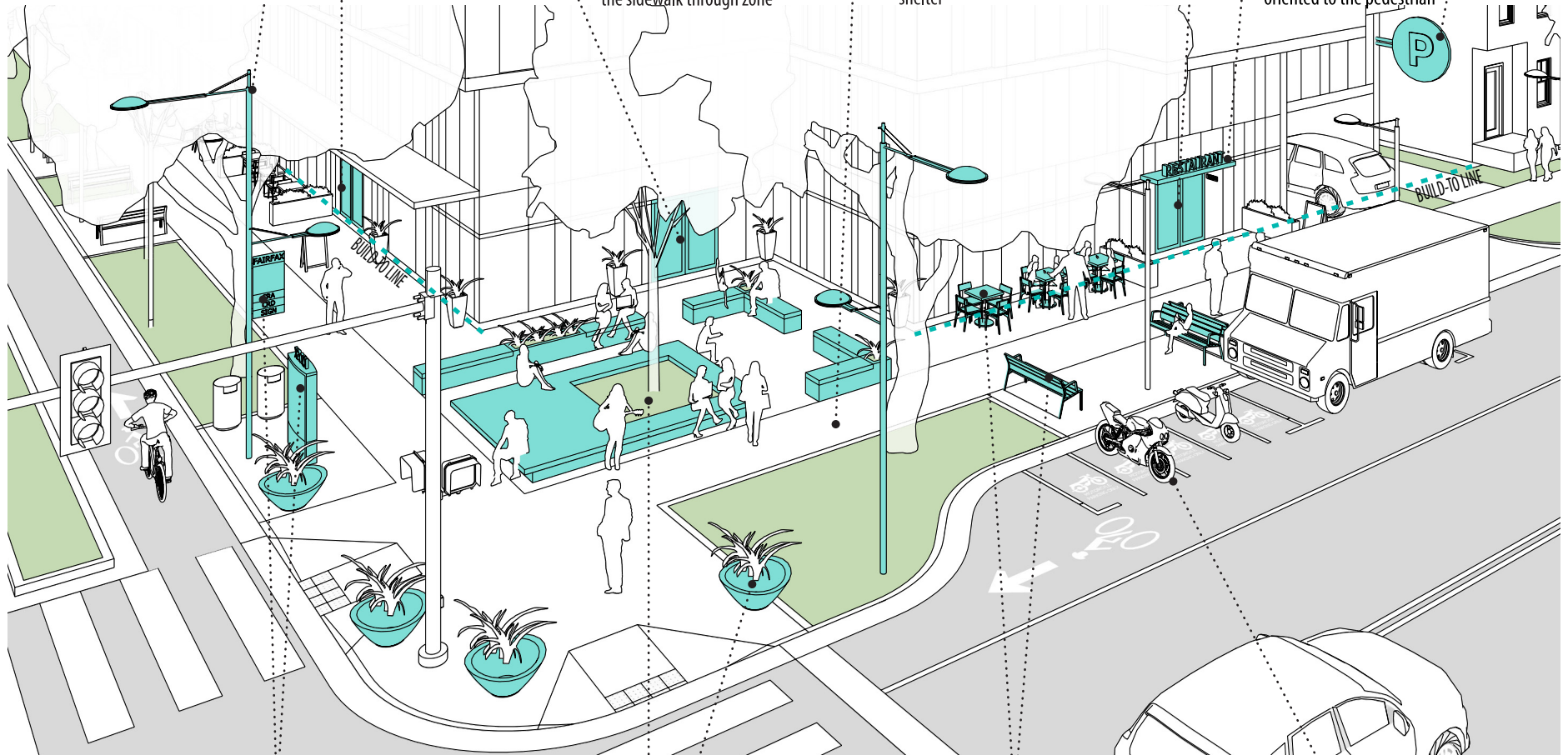
Allows continuous and unimpeded pedestrian movement when utilities and amenities are placed outside of the sidewalk through zone

### STOREFRONT DOORS & WINDOWS

Provides facade transparency when facing the street; awnings highlight entrances and storefronts while providing shade and shelter

### BUILDING SIGNAGE

Highlights individual businesses and destinations; scaled and oriented to the pedestrian



### BRANDING & WAYFINDING

Provides information and area-wide identity through banners, signage, and kiosks

### OPEN SPACE

Provides opportunities for public gathering spaces, particularly at gateways or special places, such as street corners; helps create a distinct character for the area and can be activated with programmed activities

### TREES, LANDSCAPING & PLANTERS

Add shade and greenery to streetscapes to enhance pedestrian comfort; provide sense of enclosure and safety

### FURNISHINGS & AMENITIES

Make the streetscape feel comfortable and welcoming to pedestrians when provided in Amenity Zone and Building Zone

### ON-STREET PARKING

Provides convenient parking for area businesses while serving as a buffer between the sidewalk and the street



## DESIGN STRATEGIES (CONTINUED)

- ii. Bollards, trees and/or enhanced landscaping should be located between the corner and the roadway to delineate pedestrian areas and provide safety buffers.
- iii. Special paving treatments may be incorporated to highlight and differentiate prominent street corners. Prominent corners can be designed to orient people and connect physically and visually to other design elements in the public realm. For example, a similar design language of materials and furnishings can be used while also incorporating unique features to distinguish the corner.
- iv. Streetscape design features may be continued around corners and onto connecting cross streets to provide a transition between different streetscape treatments.
- v. Buildings should embrace street corners with design elements such as entrances that open directly onto the street; fenestration to provide facade transparency; and, special paving to highlight building entrances. Where sufficient space exists, outdoor seating areas may be incorporated adjacent to buildings to further enliven street corners. For additional details on building corner treatments, see section 2H (“Building Zone”) and Chapter 4 (“Building Design”).
- vi. Where excess space exists outside zones of pedestrian movement, plantings and stormwater management features may be incorporated to provide sustainable management of stormwater runoff, reductions in the amount of impervious surfaces, and aesthetic benefits such as visual variety and the definition of spaces within the streetscape. See section 2K (“Sustainable Street and Streetscape Design”) and Appendix A2 (“Sustainable Design Toolbox”) for additional information on incorporating stormwater management features into the streetscape.



Massillon, OH

### RIGHT

Street corner curb extension with street furniture and bollards for extra pedestrian protection  
Image Credit: Sérgio Oliveira@Pinterest.com

## DESIGN STRATEGIES (CONTINUED)

### BELOW

Landscape, pedestrian amenities and architecture contribute to inviting street corners

Image Credit: SantanaRow.com



San Jose, CA

B. The design of corners should facilitate, rather than impede, safer pedestrian crossings and turning movements.

- i. Parking should be prohibited within 30-feet of a street corner to ensure that oncoming

traffic, cyclists, pedestrians are visible at intersections.

- ii. Curb ramps, aligned with crosswalks, should be provided, in compliance with ADA guidelines, to facilitate safer and more comfortable crossings for pedestrians of all ages and abilities.

- iii. The path of pedestrian travel should be free of utility infrastructure and other potential obstructions, such as bicycle racks, signage, trash receptacles, or other street furnishings.

C. Where sufficient space exists, the design of street corners should foster safe, inviting and comfortable environments that encourage a variety of pedestrian activities and gatherings.

- i. In some instances, design features should be incorporated that enable the corner to feel and function like a small plaza space with landscaping and special plantings, seating, low walls with integrated seating, pergolas, shading devices, special lighting features, public art, and electronic kiosks displaying CRD/CRA-related information (businesses, transit, etc.).
- ii. In commercial areas, corner treatments should support and complement adjacent businesses (for example, incorporating seating where patrons can consume food and beverages purchased from nearby businesses).



## 2F LANDSCAPE PANEL AND AMENITY ZONE

The Landscape Panel and Amenity Zone together comprise the space between the curb and the sidewalk or active transportation facility. Landscape Panels may also be located between bicycle and sidewalk facilities. These zones serve as a buffer between different active transportation users, while housing many of the amenities that define a streetscape's character and support its many functions.

The Landscape Panel accommodates trees and other plantings that line a street. These planted elements are important to the quality of life and offer a range of benefits. Plantings provide cooling, shade, texture, color, and visual interest. Well-landscaped spaces also provide significant benefits to the urban ecology and the environment, including enhanced stormwater remediation, reduced heat island effects, improved air quality, and increased biodiversity. Streetlights and signage may also be located within the Landscape Panel.

The Landscape Panel may be largely continuous along some streets; however, particularly along streets in activity centers where pedestrian activity is greatest, the Landscape Panel frequently includes Amenity Zones, the paved areas with a variety of pedestrian and bicycle amenities—including seating, bicycle racks, transit shelters, parking meters, trash receptacles, streetlights, signage, and other street furnishings. The Amenity Zone serves a variety of important functions, including providing places to sit, socialize, rest, park a bicycle, and wait for transit; it also reinforces the physical and visual separation between the sidewalk and vehicles.

The arrangement of the Landscape Panel and the Amenity Zone may vary depending on factors such as the amount of space available, the amount of furnishings required, and the overall character of a particular street. Along some blocks, the Landscape Panel may be entirely or mostly continuous; along other streets, particularly streets with significant pedestrian activity, the Landscape Panel may be interspersed with Amenity Zones, with the two zones occupying the same linear space between the curb and sidewalk. In particularly constrained rights-of-way, the Amenity Zone may also be located within curb bump outs or in the Building Zone as space allows.

This chapter provides detailed design principles and strategies for the various elements that comprise the Landscape Panel and the Amenity Zone.



Washington, DC

### RIGHT

Streetscape with Landscape Panel and with seating in the Amenity Zone  
Image Credit: Rhodside & Harwell

## 2F.1 TREES AND LANDSCAPING

### BELOW

Continuous Landscape Panel; large canopy trees and understory plantings lining streets provide shade and buffer pedestrians from moving vehicles

Image Credit: [scotland.landscapeinstitute.org](http://scotland.landscapeinstitute.org)



Santa Monica, CA

Street trees are vital to creating vibrant streetscapes, especially in urban activity centers where walking and transit use are prevalent. They contribute to placemaking, while offering environmental, social, and economic benefits, including providing shade, buffering pedestrians from the roadway, reducing urban heat island effects, and filtering stormwater.

Chapter 12 (Tree Conservation) of the Public Facilities Manual, sets standards for minimum tree canopy within developments; importantly, trees within the streetscape now contribute to canopy credit. Urban trees are subject to harsh conditions that affect long-term health and viability, including inadequate soil volume, salt exposure, pedestrian traffic, street maintenance practices, and utility conflicts. The following design guidance balances placemaking, environmental, and engineering needs to ensure the long-term functionality of trees and landscaping.

### DESIGN PRINCIPLES

- **Street trees should be planted to form continuous green corridors.** Trees have greater impact in groupings than when alone.
- **Layer canopy trees, ornamental trees, shrubs, ground covers, and grasses to mimic natural systems.** Layered plantings can infiltrate stormwater, re-establish native plant communities, reduce heat island impacts, stabilize soil, and add seasonal interest.
- **Use a diverse palette of native species.** Supplementing with non-native, non-invasive tree species may sometimes be necessary in urban conditions.
- **Locate trees to complement ground floor building uses.** Trees should not impede building entries, restaurant seating, or other activities in the Building Zone.
- **Landscaping and planters should not be used to create barriers to public spaces.** If planters are used to solve grading challenges, pedestrian pathways should be provided at regular intervals.
- **Ensure the long-term survival of trees.** Proper tree selection, planting techniques, and ongoing care and maintenance will result in healthier trees.

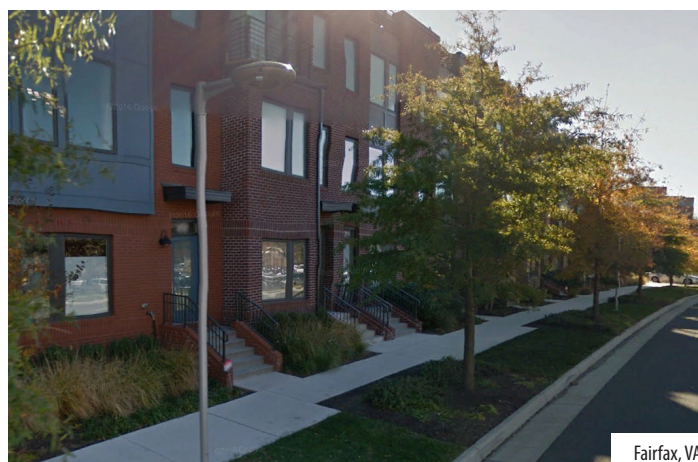


## DESIGN STRATEGIES

### The following information should be included in landscape plan sets:

Prepare landscape plans using a multi-disciplinary approach taking into account all engineering, architectural, maintenance, and legal requirements. Failing to account for all design factors typically results in fewer trees planted during construction. Landscape plans included with rezoning applications should include the following:

- Sight distance triangles at street intersections and driveways
- All recorded easements
- Utilities (existing and proposed)
- Preliminary grading
- Streetlights
- Existing vegetation to be preserved



Fairfax, VA

## 1 PLANT SELECTION AND LOCATION

### Trees

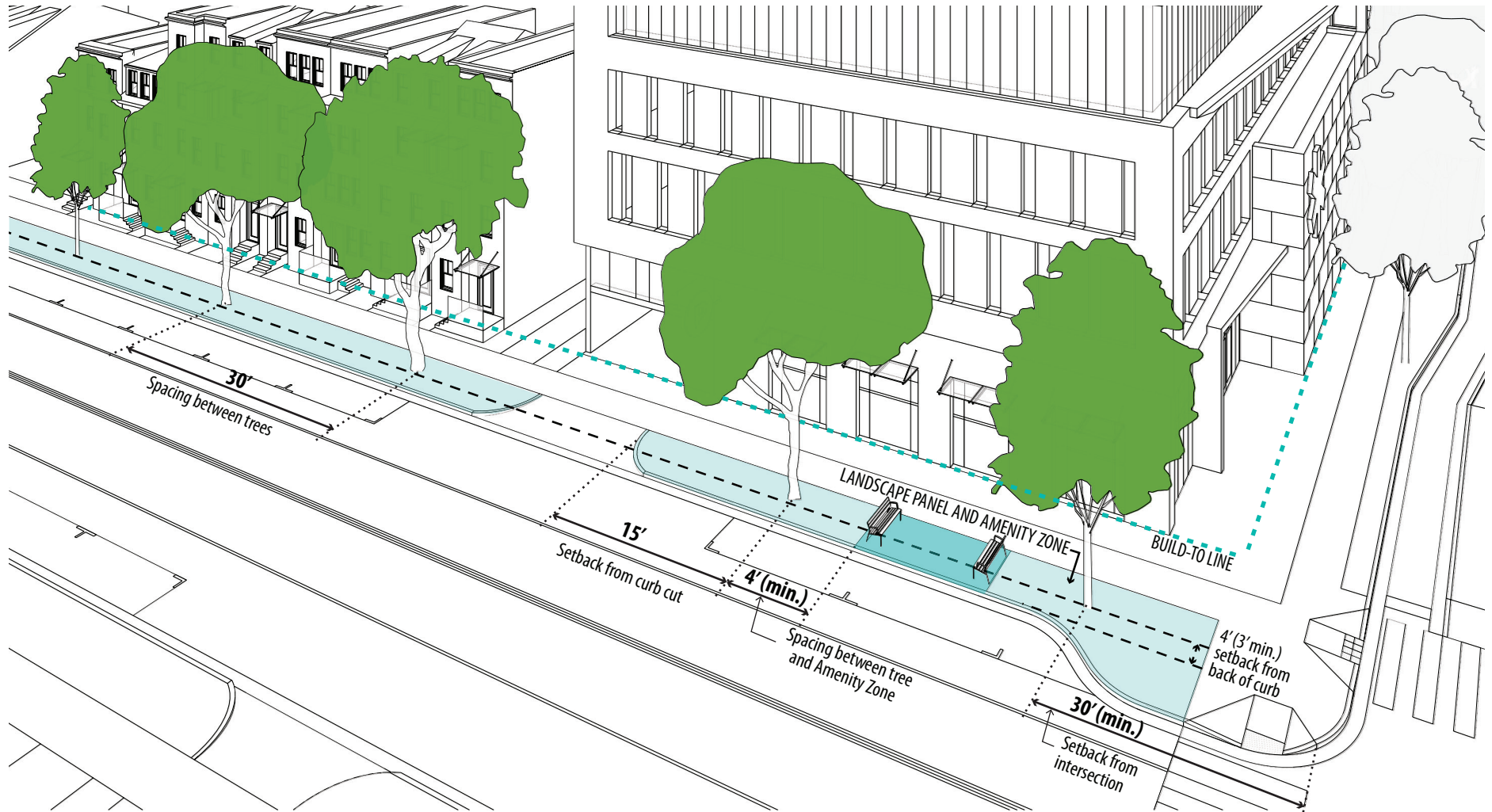
Table 12.14 in Chapter 12 of the PFM classifies trees in four categories:

- Category I are narrow columnar trees
  - Category II are understory trees with less than 20 feet height and spread
  - Category III and IV are taller, upright shade trees, with heights of up to 50 feet or more under optimal conditions.
- A. Install large canopy (Category III or IV) trees that are between 2.5- and 4-inches in caliper size at the time of planting. Use 3- to 4-inch caliper size trees on Avenues (Collectors) and Boulevards (Arterials).
  - B. Space Category III or IV trees approximately 30-feet on-center. Category I or II trees may be spaced closer together, depending on the species (See Graphic 7: Tree Locations and Spacing).
  - C. Vary tree species to decrease susceptibility to insects and disease.
  - D. Generally, trees should be planted in continuous planting areas, not tree wells. Breaks in consistently spaced street trees may occur to accommodate Amenity Zones, curb cuts, or utilities.

#### LEFT

Street trees spaced 30 feet apart; the sidewalk width is reduced to accommodate proper open soil area for trees  
Image Credit: Google Earth

## GRAPHIC 7: TREE LOCATIONS AND SPACING



See tree planting details in  
Appendix A1 for more information



## DESIGN STRATEGIES (CONTINUED)

- E. Select trees that are more likely to survive due to high urban environmental tolerance and climate resilience.
- F. Tree locations may need to be adjusted for fire truck access. Trees should not be planted within 30-feet of an intersection or within 15-feet of a curb cut.
- G. Plant trees in medians when adjacent to trails and bike lanes to provide shade and support year-round use.
- H. Plant trees in the Building Zone where space allows.
- I. See the Appendix for a recommended tree list, as well as the plant resources below:
  - [Plant NOVA Natives](#)
  - [Earth Sangha](#)
  - [Alliance for the Chesapeake Bay Native Plant Center](#)

### Understory Plantings

- A. Plant native ornamental shrubs, grasses and perennials in the landscape panel; turfgrass is discouraged. Plants in site distance triangles should be less than 2-feet tall at maturity. Taller species may be used in the building zone.
- B. Incorporate understory landscaping in the Landscape Panel to buffer pedestrians from

vehicles and enhance the visual character of the street.

- C. Understory landscaping should provide year-round visual interest. Select plants with multi-season interest and/or mix them with seasonal plants to ensure visual interest year-round. Avoid filling landscaped areas with plants that die back or go dormant during several months of the year. This is particularly important in landscape areas without trees, including bioretention basins.
- D. See the Appendix for a recommended plant list.



Fairfax, VA

#### RIGHT

Eight-foot-wide planting area accommodates two trees with understory landscaping  
Image Credit: Fairfax County

## Canopy Credit for Street Tree Planting

Preserving and maintaining tree canopy cover is a core value for Fairfax County. Chapter 12 of the PFM is concerned with Tree Conservation, and seeks to ensure that tree canopy is maintained with new development. New developments may receive ten-year tree canopy credit for street trees installed within VDOT right-of-way, private streets, and utility easements, where permitted. Canopy credit is awarded incrementally. Refer to PFM Table 12.14 for baseline 10-year Tree Canopy credits.

Tree size should be between 2.5 inches and 4 inches in caliper at time of planting, depending on the category of tree.

### Credit Amount

Street tree canopy credits are awarded as follows:

- A. Bonus credit (1.5):** Trees planted per the Public Facilities Manual (PFM) (PFM § 12-0310.4E) receive 1.5 times the 10-year Tree Canopy credit.
- B. Full credit (1.0):** Trees receive full (1.0) Tree Canopy credit when:
  - i. Soil volumes in PFM § 12-0310.4E(9) are met, but other provisions of PFM § 12-0310.4E are not; and,
  - ii. A contiguous soil panel meeting the minimum soil volumes is provided.
  - iii. See Appendix for tree planting diagrams.
- C. Half credit (0.50):** A multiplier of 0.50 times the 10-year Tree Canopy credit may be applied for Category III and IV trees when the Alternative Planting Standard described in the next section is used. See Appendix for tree planting diagrams.
- D. No credit:** Trees planted with less soil than the Alternative

Planting Standard receive no 10-Year Tree Canopy credit.

- E. Other multipliers found in the PFM** do not apply to trees planted in the right-of-way.

### Long Term Commitment

- A. Trees in VDOT right-of-way:** To receive 10-year Tree Canopy credit, a replacement agreement must be executed with Fairfax County and a perpetual maintenance agreement must be executed with VDOT.
- B. Trees along private streets or within easements:** To receive credit, a perpetual maintenance and replacement agreement must be executed with Fairfax County.

### Other

- A. Street trees in utility easements** may receive canopy credit under any of the above scenarios. Adequate depth may be an issue for underground utilities. For overhead utilities, the right species is important to avoid excessive trimming. Applicants should coordinate with the Forest Conservation Branch (FCO) on planting details and species selection.
- B. Street trees in bioretention facilities** may receive 10-year Tree Canopy credit if planting areas meet PFM § 12-0310.4.E standards.
- C. Trees in the Building Zone:** If significant site constraints exist that impact the landscape panel, such as existing utilities that cannot be moved, trees may be located in the Building Zone. The amount of canopy credit depends on the soil quantity and the configuration of planting space. Where space allows, trees are encouraged to be planted in both the landscape panel and building zone. Canopy credit may be received for both.



## DESIGN STRATEGIES (CONTINUED)

### 2 STREET TREE INSTALLATION

**A. Standard Dimensions.** For optimal tree health and long term viability, the Public Facilities Manual (PFM 12.0310.4E) requires the following:

- Soil volume (minimum)
  - 700 cubic feet (CF) soil/tree
  - 1200 CF soil/2 trees
  - 1500 CF soil/3 trees
  - Each additional tree in the group requires an additional 500 CF of soil
- Soil width: 8-feet minimum, with 6-feet minimum width at surface
- Distance from a curb or any restrictive barrier: 4-feet minimum

**B. Since most tree roots grow in the top 10 to 12 inches of soil, providing sufficient surface area for tree roots to spread is critical.** Where right-of-way space is limited, portions of the soil zone can be covered with paving.

**C. Structural Cells and Cantilevered Sidewalks.** These approaches allow paving over portions of the tree planting area. For these planting methods, ensure that there is 6-foot minimum surface width. See the Appendix for details.

**D. Soil Coverage.** Where right-of-way space is at a premium, an open soil area of 6 feet by 6 feet may not allow adequate space for pedestrian

movement. In this case, permeable hardscape solutions which allow water to infiltrate may be used in consultation with Forest Conservation staff. Tree grates, which restrict tree growth, cause litter to collect, and are a tripping hazard, are not recommended. They should be used only when other solutions cannot be found.

### 3 ALTERNATIVE TREE PLANTING STANDARD FOR CONSTRAINED SITES

Where constrained site conditions make tree planting unlikely to occur, the Alternative Planting Standard may be considered. It is intended for use in older urban activity centers where paved roadways and utilities occupy most of the right-of-way. It should not be used as a means of maximizing developable area on adjacent parcels.



#### RIGHT

Structured soil system in a tree well  
Image Credit: Keep Indianapolis Beautiful

## DESIGN STRATEGIES (CONTINUED)

### TOP RIGHT

Continuous tree wells provide adequate soil volumes by sharing soil among multiple trees  
Image Credit: Kim Hartley Hawkins

- A. As an alternative to the PFM standard § 12-0310.4.E and Table 12.14, tree planting space may be reduced in width and soil volume without requiring additional rooting space below pavement. All other locational provisions of PFM § 12-0310.4.E apply. The Alternative Planting Standard may be an option only when one or more of the following site conditions occur:
- There is insufficient space between the back-of-curb and the right-of-way line to fit the required widths for both the sidewalk and the landscape panel.
  - There are conflicts with existing utility easements, manholes, pull boxes, traffic cabinets, and other structures within the landscape panel.
  - The right-of-way width varies and/or has an unusual or irregular shape. Street sections allow the full planting width for most of a block, while narrowing in short stretches. In this situation, full or bonus credit may be possible for most of the street trees, with the Alternative Planting Standard used for only a few trees.
  - See the Appendix A1 for Alternative Street Tree Planting Details.

### BOTTOM RIGHT

Amenity Zone cantilevered over a tree well  
Image Credit: Fairfax County

## 4 IRRIGATION

- A. Trees and landscaping should be watered during the establishment period, using automatic drip irrigation or other methods. When automatic drip systems are used, care should be taken to adjust seasonally to ensure that trees are neither over nor underwatered.





## 2F.2 STREET FURNISHINGS

Street furnishings provide important amenities for pedestrians by adding functionality and vitality to the pedestrian environment. They can help to make pedestrians feel welcome and comfortable. These amenities provide a functional service as well as visually enhancing the sense of place.

Street furnishings encompass the following elements: benches and seating, bicycle racks, bollards, signs, lights, transit shelters, and trash and recycling receptacles. Furnishing clusters refers to seating that is grouped with other complimentary amenities such as trash receptacles and bicycle racks. Performance specifications for each furnishing element are detailed in the *Volume II: District Design Guidelines*.

### DESIGN PRINCIPLES

**Prioritize street furnishings in certain pedestrian environments.** Furnishings should be emphasized on streets with high levels of pedestrian activity; where pedestrians may linger in the public realm, such as on commercial or mixed-use streets; and on streets with an enhanced recreational component, including linear parks. Other streets should include furnishings at corners and on busier blocks, or where warranted by adjacent land use and pedestrian activity. Street furnishings should also be clustered near transit stops. On residential streets, alleys and curb extensions, less frequent clusters of street furnishings can create attractive and inviting public spaces where neighborhood residents or customers of local businesses can sit and rest, play, eat, or enjoy people-watching.

**Arrange street furnishings in coordination with street trees and street lighting.** Street tree and street lighting placement should define the major rhythm of design elements along the street; site furnishings should be coordinated with the locations of trees and lights.

#### BELOW

Street furnishings such as benches, bollards, signs, etc. add to the vitality and comfort of the pedestrian environment  
Image Credit: placestogrow.ca



Kitchener, ON, Canada

## DESIGN STRATEGIES

### 1 FURNISHING PLACEMENT

- A. Furnishings should be located in the Amenity Zones or in the Building Zone.
- B. Furnishing offsets:
  - a. Furnishings should never be placed within the sidewalk, where they could impede pedestrian flow.
  - b. Objects that are fixed to the ground must be set back from adjacent bicycle or shared-use facilities to avoid interfering with cyclists. Verify offset distances with the Fairfax County Department of Transportation.
  - c. Placement of site furnishings should consider car overhangs and door swings. When placed near the curb, furnishings should be located at the ends of the on-street parking stalls rather than at the center.
- C. Furnishing Spacing:
  - a. On typical streets, furnishing clusters should be spaced ~ 150-feet, but there should be a minimum of one seating cluster per block.
  - b. On streets heavily traveled by pedestrians, furnishing clusters generally should be spaced ~90-feet apart.
- D. Street furnishings may also be placed within curb extensions.

### 2 FURNISHING STYLE AND MATERIALS

- A. Furnishings should be considered as part of the overall family of elements within the streetscape so that there is a cohesive appearance to the public realm.
- B. Furnishing clusters in the Amenity Zone should generally be permanently fixed to the ground.
- C. Street furnishings should strive to use environmentally responsible materials, including materials with recycled content or certified wood. Bike racks should be made of tamper-proof materials.
- D. Furnishing materials should be durable to withstand long-term exposure to the elements, limit opportunities for graffiti, and be easy to keep clean.

### 3 ACCESSIBILITY REQUIREMENTS

- A. All street furnishings must meet ADA guidelines and should be ADA accessible from the adjacent sidewalk.
- B. Furnishings should not interfere with pedestrian access to the entrance of any building.
- C. Wherever possible, street furnishings should be of a contrasting color to the sidewalk to aid pedestrians with visual impairments.
- D. A minimum of 8-feet clearance should be provided between street furnishings and adjacent accessible parking and passenger loading zones.



## 2F.3 STREET LIGHTING

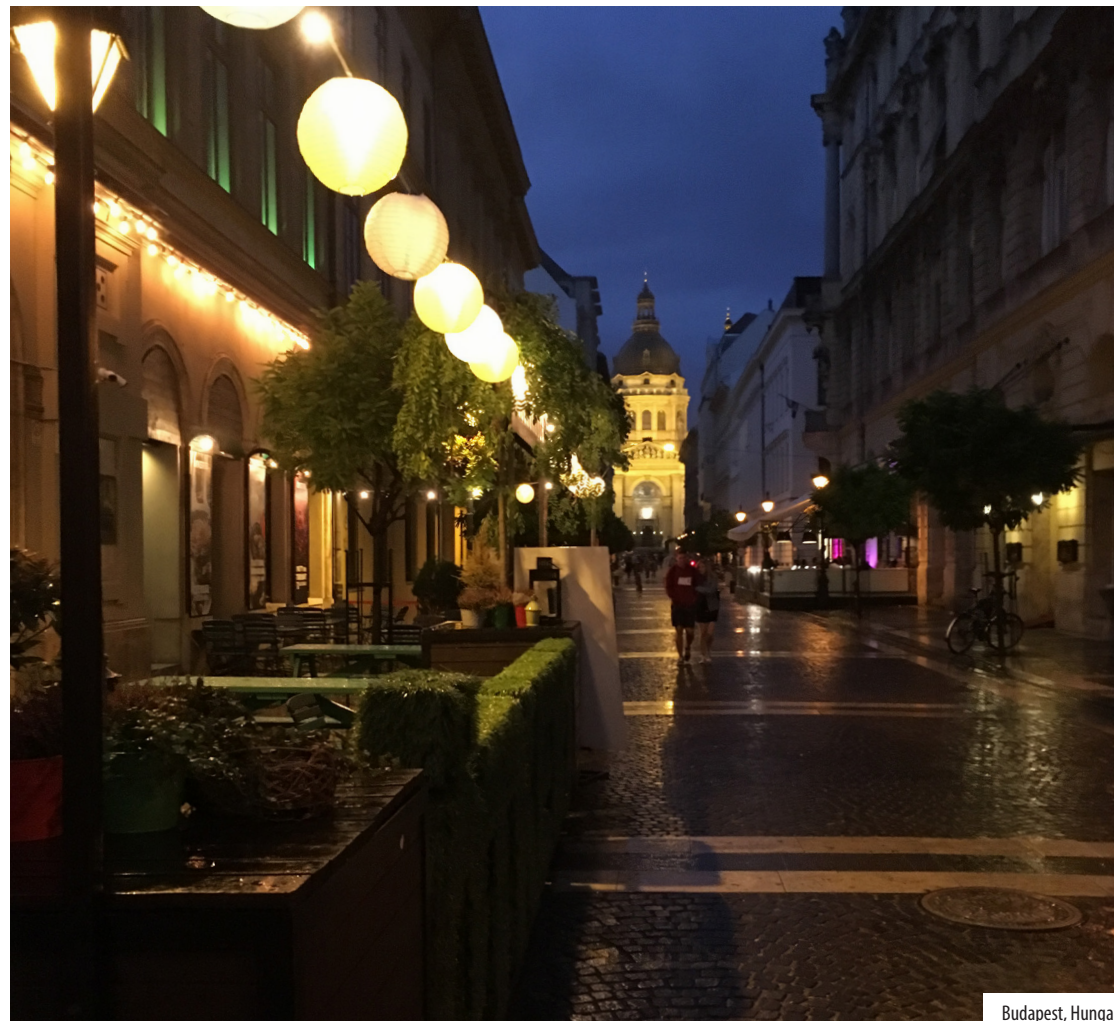
While the primary purpose of lighting is to provide nighttime visibility for the safety and security of drivers and pedestrians, it also influences how people use streets and public spaces. Well-lit areas encourage greater physical activity and contribute to placemaking in urban activity centers. Pedestrian lighting is especially crucial in vulnerable areas where residents depend on walking, public transit, and other multimodal transportation options. Before any development or redevelopment, applicants should coordinate with both the Streetlights Branch of DPWES and the Community Revitalization Section of DPD to ensure compliance with lighting requirements and fixture/pole specifications.

The LED streetlight models referenced below are listed in [Dominion Energy's Streetlight Catalog](#) or are available as Dominion approved fixtures under 'Rate Schedule 153' of the Virginia Energy Purchasing Governmental Association (VEPGA) Agreement, noted with an asterisk (\*) below. Fairfax County covers monthly maintenance and operating costs for all Dominion Energy-approved fixtures. If private streetlight fixtures are installed within the public right-of-way, their operation and maintenance become the responsibility of the private entity. Generally, private streetlights are discouraged.

### BELOW

Exterior lighting in the Building Zone can create an inviting ambiance when varied in placement and style

Image Credit: Fairfax County



Budapest, Hungary

## DESIGN PRINCIPLES

**Ensure that streetlights fit within a larger family of light fixtures and other furnishings within a CRD or CRA.** Streetlights are one component of the overall illumination of an area. Other lighting may include bollard lighting, accent lighting, and site and building-mounted lighting. When selecting the lighting for streets and streetscape areas, all fixtures should be considered as part of the family of furnishings, so that there is a cohesive appearance to the streetscape.

**Do not over-light or under-light the public realm.** In many situations, particularly when people are concerned about security, there is a tendency to over-light a space. However, too much lighting can be just as bad as too little lighting. A good lighting strategy addresses the type, placement, height, color, and wattage of lighting while minimizing up light and glare. The amount and color of light emitted from all exterior sources including streetlights should be evaluated as part of a comprehensive lighting strategy for both aesthetic and functional reasons and to avoid potentially underlit or over-lit areas.

### BOTTOM

Family of pedestrian lighting, landscape lighting, and building lighting creates a safe and vibrant environment  
Image Credit: Street-Works Studio












Rockville, MD



## DESIGN STRATEGIES

### 1 STREET LIGHT TYPE AND PLACEMENT

- A. Volume II: District Design Guidelines for a CRD/ CRA provides the selected fixture style that should be used district-wide. If no district style is recommended,
- ii. **Roadway Lighting** -Trika MAXI on narrower roads. To achieve appropriate lighting levels on wider roads, the Decorative Shoebox may be necessary.
  - iii. **Pedestrian Lighting** - Metroscope or Trika Post Top
- D. Streetlights should illuminate both the roadway and the streetscape such that all areas within the right-of-way are sufficiently lit but not overly illuminated. Roadway and pedestrian street lighting is encouraged to be co-located on the same pole.
- E. Streetlights should be sized to the scale of the roadway. Lights, generally 14-16 feet high, should be located on Local and Avenue (Collector) street types; taller lights, generally 24 to 35 feet high, should be located on Major Avenues and Boulevards (Arterials).
- F. Street lighting should be coordinated with building-mounted and accent lighting. Building and accent lighting should complement the style of streetlights recommended in the Volume II: District Design Guidelines for a CRD/ CRA.

	<b>New Development</b> Use these fixtures, as directed, for new development within CRDs and CRAs		<b>Existing/Infill Development</b> These fixtures have been historically used in Fairfax County and are generally not recommended for new developments. They may be appropriate for infill development to match adjacent development	
<b>Mast Arm</b> (Roadway)				
	Trika MAXI*	Decorative Shoebox	Shoebox	
<b>Post Top</b> (Pedestrian)				
	Metroscope*	Trika Post Top*	Carlyle Acorn	Cutoff Acorn
				
			Cutoff Round Lantern	Cutoff Colonial

**NOTE:**

Information on Schedule 153 fixtures noted with asterisk (\*) is available through these links: [Trika MAXI](#) and [Trika Post Top](#) ( Cyclone Lighting) and [Metroscope](#) (Accuity Lighting).



**LEFT**  
Street and pedestrian lighting  
co-located on the same pole  
Image Credit: Santa Cole

Bilbao, Spain

## DESIGN STRATEGIES (CONTINUED)

### 2 STREET LIGHT FEATURES

- A. Full cutoff LED fixtures are required by the Zoning Ordinance to reduce light glare from parking garages, parking lots, and buildings onto walkways, streetscapes, and streets. All lighting on both public and private property should use full cutoff fixtures or have a shield that controls the light so that it is focused only on the object that is being illuminated.
- B. Most lighting should use lower color temperature bulbs (3000K or below) for neutral white or warm white color light. The color rendition index (CRI) should be 70 or greater.
- C. Smart technologies, such as the ability to dim the lights and self-report outages, is encouraged to be incorporated into street lights.



# 2G PAVEMENT TREATMENTS

Existing pavement materials vary in the CRDs and CRAs, but primarily consist of a mix of poured concrete, brick, and concrete and stone pavers. New paving in the public realm should be designed and selected based on durability, ease of maintenance, aesthetics, environmental considerations, and the ability to meet accessibility requirements.

Specific paving materials and locations for the individual CRDs and CRAs are provided in the Volume II: District Design Guidelines.



Oklahoma City, OK

## DESIGN PRINCIPLES

**Select paving materials based on the context and character of the street.** Certain materials are better suited for specific zones and street types; as such, designs and material selections should be chosen based on the context in which the paving materials will be located and should reflect the character of the street.

**Emphasize durability and maintenance.** Durable, low-maintenance and readily available materials should be used for sidewalks.

### Environmental and Sustainability

**Considerations.** Only pave when necessary. Minimizing impervious paving surfaces can reduce the amount of storm water run-offs and be more environmentally friendly. Consider paving materials' environmental impact when choosing materials.



Des Moines, IA

**LEFT**  
Paving pattern variations relate to adjacent tree placement  
Image Credit: Fairfax County

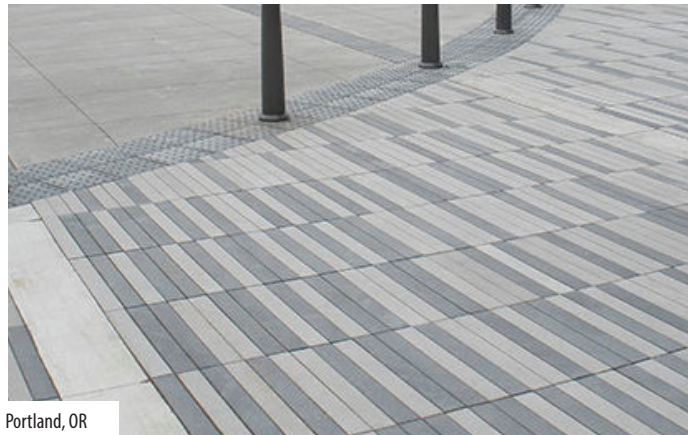
**RIGHT**  
Walkway with stabilized gravel aggregate allow rainwater to permeate back to the groundwater table  
Image Credit: Organic-Lock

## DESIGN PRINCIPLES (CONTINUED)

Choose paving materials that store less heat and have lower surface temperatures to reduce the urban heat island effect. Consider paving materials with less embodied carbon in its life cycle (production, installation and maintenance) to achieve a smaller carbon footprint.

### Highlight special features and transitions.

Sidewalks or trails may be accented with specialty materials to highlight features. Special paving patterns in the streetscape should be used to delineate the different zones and their related functions. Shifts in patterns should be employed to indicate different uses, highlight entrances, and frame seating areas. Materials can be used to define the edges of spaces and to visually enhance entire spaces, such as plazas. Creativity is encouraged, particularly in the Building Zone, where there is greater flexibility in material choices.



LEFT

Complementary paving patterns  
interchanged with poured concrete  
to create an interesting hardscape  
Image Credit: fotsos.com

Portland, OR

## DESIGN STRATEGIES

### 1 PAVING MATERIAL

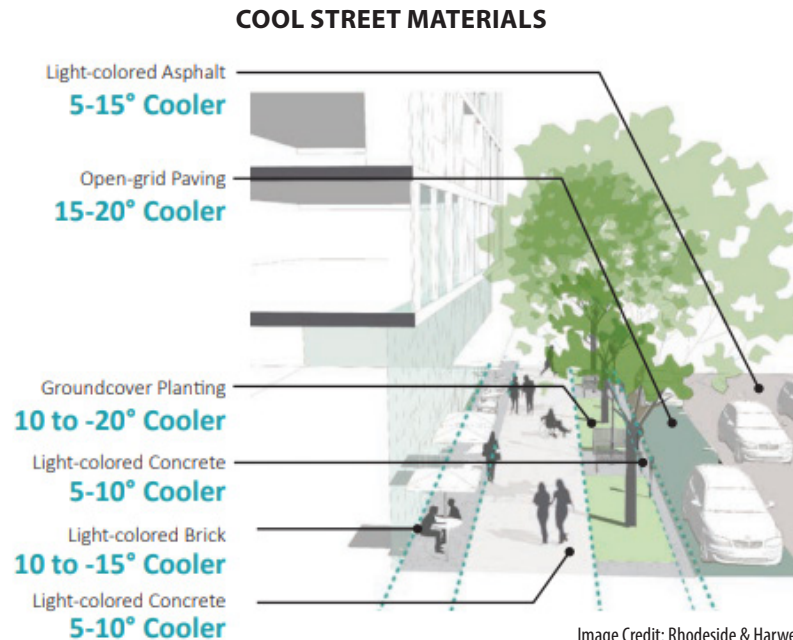
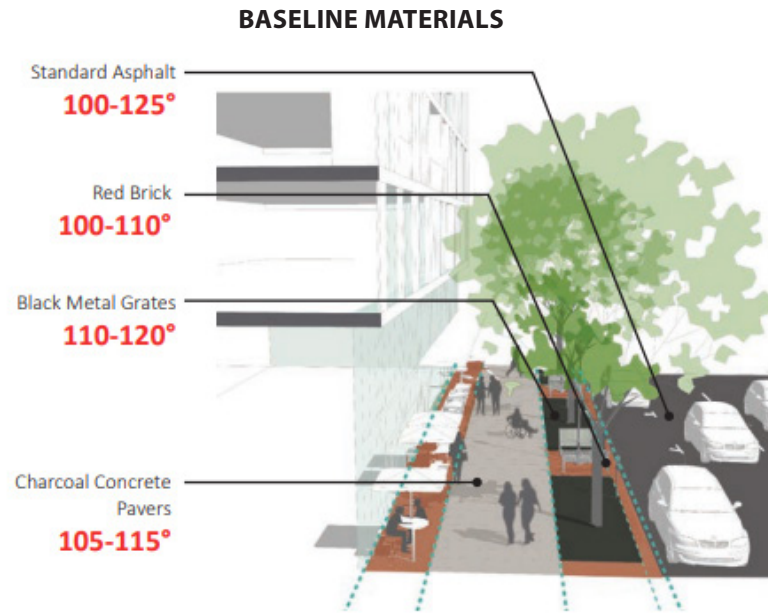
- A. Durable paving materials, such as poured-in-place concrete, should be used as the primary paving material in the sidewalks or trails, unless otherwise specified in design guidelines for the individual CRD/CRA.
- B. Stamped concrete is generally discouraged as a sidewalk and crosswalk material because it is prone to cracking and fading, and may be difficult to repair.
- C. The use of permeable paving materials (including soft paving, porous unit pavers with open joints, and permeable concrete) is encouraged in appropriate locations such as the Amenity Zone, in order to allow stormwater runoff to infiltrate through the material into the ground instead of being diverted into the storm drain system. Refer to section 2K ("Sustainable Street and Streetscape Design") and Appendix A2 ("Sustainable Design Toolbox") for more information on permeable paving applications and other sustainable design approaches.
- D. The use of paving materials that store less heat and have lower surface temperatures. This may include pavement with lighter colors. Light-colored paving materials have a high solar reflectance that aids in the reduction of surface temperatures and minimizes the amount of heat that is absorbed into the pavement. Thus, in turn



## DESIGN STRATEGIES (CONTINUED)

helps reduce heat island effect. USGBC suggests selecting paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. (LEED v 4.1: Heat Island Reduction – Non-Roof). For communities with historic characters that requires a darker paving material for sidewalks, consider supplementing with a lighter color material for adjoining areas, such as Amenity Panels or Building Zone. Also consider shading to minimize direct sun exposure to paving areas with a darker material.

- E. When selecting paving materials, take into consideration their embodied carbon and the life cycle impact. Explore products with less embodied carbon during the production process. Reduce and recycle materials whenever possible.
- F. Sidewalk materials should extend across driveway aprons to maintain a consistent streetscape material for the length of the sidewalk.





San Francisco, CA

## DESIGN STRATEGIES (CONTINUED)

### 2 PAVING DESIGN

- A. Paving design should create a dynamic, layered effect through the use of multiple patterns, varying paver sizes and materials, as well as through changes in color and the use of scoring patterns. Paving patterns and materials should provide visual texture and function as a backdrop for the other elements found in the public realm.
- B. Paving patterns in the Building Zone can be the same or different from those in the sidewalk and in the Amenity Zone and should be complementary to both the adjacent building and the other streetscape elements.
- C. Paving patterns should reflect the adjacent uses and provide visual cues that help define individual streetscape areas or mark transitions between different uses. For example, paving patterns can change in front of building entrances or help frame outdoor seating areas.

#### LEFT

Durable poured-in-place concrete sidewalk; paving variations between the sidewalk and Amenity Zone help define streetscape areas and provide texture  
Image Credit: asla.org



The Building Zone, located between the sidewalk and the face of the building, is the area that transitions between the public sidewalk and the space within buildings. It is a component of the streetscape that is located on private property and is designated for elements including entrances, outdoor dining, browsing, plantings, and residential porches or stoops.

## DESIGN PRINCIPLES

**Utilize street cross-sections in Volume II to determine dimensions.** Each street type has its own defined dimension for the width of the Building Zone as specified in the street cross-sections depicted in Volume II: District Design Guidelines. Widths were determined based on the adjacent land uses, the overall size of the street, and the anticipated volume of pedestrian traffic.

**Emphasize character in Building Zone design features.** Creativity is encouraged in the Building Zone, where there is greater flexibility than in the right-of-way to incorporate unique features and material choices, including distinctive paving materials and patterns, movable seating and tables, landscaping, awnings and other shading devices, to name a few. The Building Zone design should coordinate with the sidewalk and the Amenity Zones so that there is harmony within the streetscape.

## DESIGN STRATEGIES

### 1 USES AND FEATURES

- A. The Building Zone may be used for outdoor displays, café, tenant, or restaurant seating, and plantings.
- B. Architectural elements such as awnings, canopies, and marquees may also occupy this zone.
- C. Where there is insufficient width in the Landscape Panel to accommodate amenities, elements such as benches, trash cans, and bicycle parking may be located in the Building Zone to keep the sidewalk clear.

### 2 DESIGN CONSIDERATIONS

- A. On residential streets, the Building Zone should be wide enough to accommodate porches, stoops, steps, low walls, pedestrian gates, and landscaping to provide an effective transition between the public sidewalk and private residences. These features should not obstruct pedestrian movement along the sidewalk or trail.
- B. On commercial streets, particularly streets with ground-floor retail, the Building Zone should be wide enough to allow for café tables and seating, benches, plantings, merchandise displays, door swings, ramps, steps, and other building access elements, among other amenities.

# 2H BUILDING ZONE

### BELOW

Activated Building Zone with sidewalk seating and awnings. Note: the Landscape Panel does not meet the Fairfax County minimum planting requirements  
Image: Locallygrownnorthfield.com



Northfield, MN

# 21

## UTILITIES

Transformers, meters, telecommunications equipment, and other utilities can negatively impact the pedestrian experience by obstructing pedestrian circulation, reducing suitable tree planting locations, and adding visually unappealing elements within the streetscape.

Early planning of utility easements during the conceptual design phase of a development is critical to ensure that utilities are appropriately located to be less visible.

### LEFT

Utility vaults hidden by consistent paving material and integrated within the sidewalk  
Image Credit: Fairfax County



Vienna, VA

### DESIGN PRINCIPLES

**Locate utilities underground to avoid obstructing pedestrian travel and to minimize impacts on the visual character of the streetscape.** Utilities can have major impacts on the pedestrian realm. Overhead utilities are unsightly, can obstruct pedestrian movement, and can interfere with the provision of trees in the streetscape. Service lines should be placed underground. Transformers and utility equipment should be located in vaults either under the sidewalk or in the Building Zone.

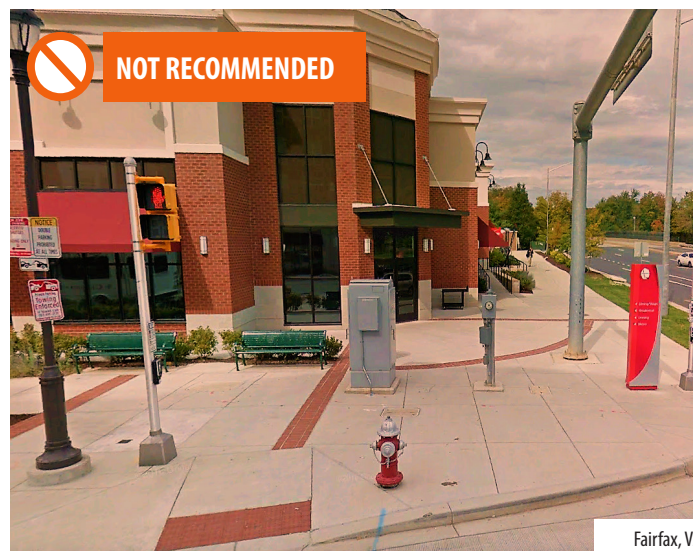
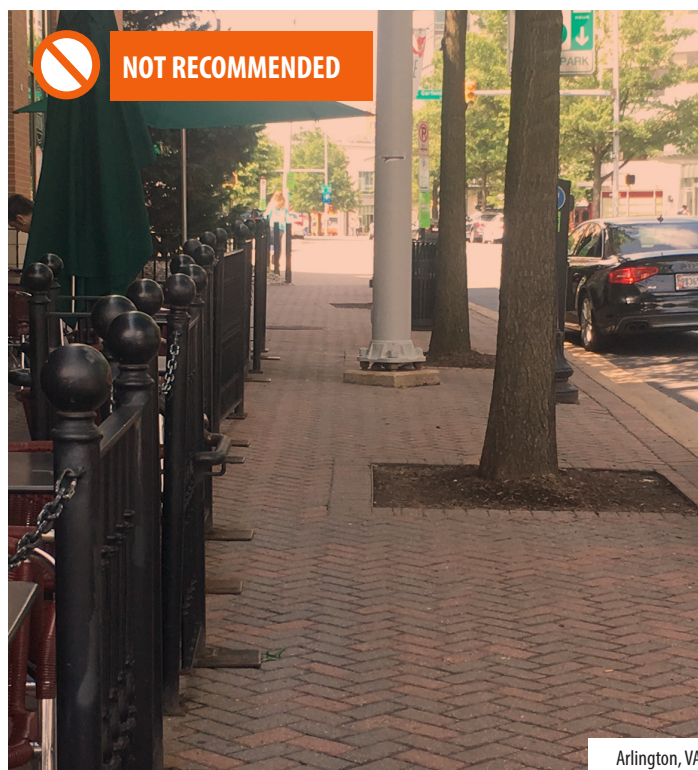
**Minimize conflicts with, or impacts on, street trees and pedestrian facilities.** Conflicts between street trees and overhead wires, as well as between street trees and underground facilities, such as trunk and service lines should be minimized. If installed in the wrong locations, underground facilities may preclude planting trees, particularly those with deep roots, or may result in the removal of, or damage to, vegetation during repairs or upgrades to underground facilities.



## DESIGN STRATEGIES

### 1 LOCATION OF UTILITIES

- A. *Graphic 8* depicts the preferred location for underground utility conduits and vaults. A conceptual utility plan should be prepared during entitlement process to designate and organize easements and utility equipment.
- B. To the extent feasible, all utility lines should be buried underground and co-located in common trenches.
- C. At grade utility equipment and vaults should be located as unobtrusively as possible. They should be located outside of the sidewalk, either within the building or in the Building Zone, so as not to obstruct pedestrian and bicycle travel. Vaults and electric transformers may be located below active transportation facilities; however, locating utility infrastructure under the these facilities will require a maintenance agreement with VDOT.
- D. In general, no building-serving utility infrastructure should be located within or below the Landscape Panel in order to avoid conflicts with street tree placement and reduce the potential for conflicts after planting.



**LEFT**  
Utility pole and trees placed in the middle of the sidewalk obstructs pedestrian flow  
Image Credit: Fairfax County

**RIGHT**  
Poor placement of utilities obstructs pedestrian flow and detracts from the visual character of the streetscape  
Image Credit: Fairfax County

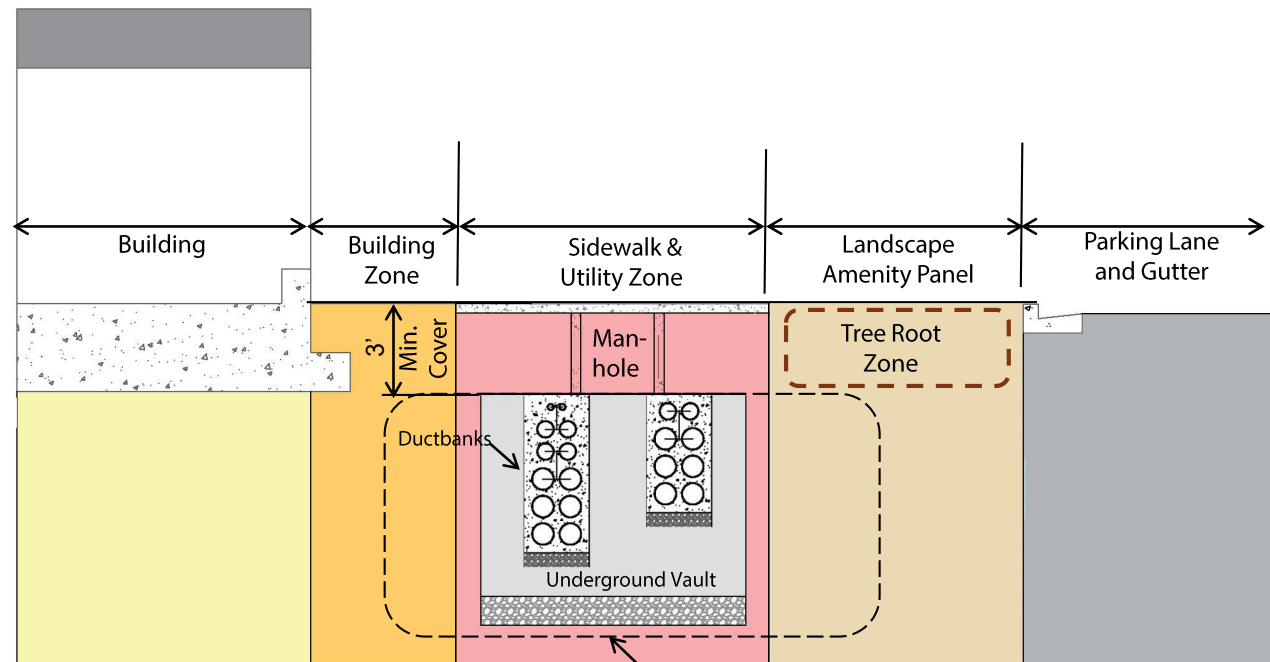
## DESIGN STRATEGIES (CONTINUED)

- E. Streetlights and pedestrian-scaled lighting should be located within the Landscape Panel and at least 10-feet from the nearest tree. The primary underground electric line for streetlights should be placed outside the Landscape Panel, either under the sidewalk or Building Zone, with only minor lateral lines extending into the Landscape Panel. [See section 2F (“Landscape Panel and Amenity Zone”) for additional guidance on street lighting].

## 2 MATERIALS

- A. If located adjacent to the sidewalk, vault covers and access points to below-grade equipment should be finished in the same material as the adjacent sidewalk surface and should have ADA accessible surfaces that are attractively incorporated into the streetscape.
- B. Equipment that is visible from the street should be screened using walls, landscaping, public art, or other materials.

**GRAPHIC 8:  
UNDERGROUND  
UTILITIES IN THE  
STREETSCAPE**



For certain constrained conditions, utilities may encroach into Building Zone or Landscape Amenity Panel below Tree Root Zone



## 2J TRANSIT SHELTERS

There are a variety of transit shelter types currently in use in the CRDs and CRAs. Some of these shelters are no longer recommended and should be phased out over time to allow for new, more visually appealing shelters that include modern technology and improved features. Ease of maintenance and graffiti-prone designs are chief concerns in the selection of shelter styles.

### DESIGN PRINCIPLES

**Incorporate FCDOT-approved shelters to achieve area-wide consistency.** New shelters should meet specifications set forth by FCDOT, and are subject to review by the state of Virginia and FCDOT. Unless otherwise indicated in the Volume II: District Design Guidelines for each CRD or CRA, developments should incorporate one of the two state- and FCDOT-approved transit shelter models to ensure that shelter styles are consistent across an area.

**Ensure that transit shelters are accessible and served by range of amenities for riders.** Paved, accessible pathways between the sidewalk and the transit shelter entrance are an essential design feature for all transit stops. In addition, amenities such as benches, signage, lighting, and real-time technology are critical to ensuring rider comfort, safety, and ease of navigation.



Portland, OR

#### RIGHT

Accessible transit shelter located in the Amenity Zone; shelter includes rider amenities and displays real-time information  
Image Credit: asla.org

## DESIGN STRATEGIES

### 1 LOCATION AND CONTEXT

- A. ADA-accessibility requires 8-feet of space between the shelter and the curb. Adjustments to this dimension may be possible depending on the shelter's configuration.
- B. The preferred location for transit shelters is within the landscape panel. If necessary, due to space constraints, shelters may be located within the Building Zone provided there is a clear physical and visual pathway between the transit shelter and the bus entry point. This can be accomplished by installing a freestanding transit shelter in the Building Zone or by integrating the transit shelter into the design of the building itself through the use of building overhangs or recesses. Transit shelters in the Building Zone may require additional pedestrian signage to adequately identify the facility.
  - i. On certain streets where the Amenity Zone is not wide enough to accommodate the transit shelter, the sidewalk may be realigned around the transit shelter structure if the width of the sidewalk is not reduced.
  - ii. In certain limited instances, it may be appropriate to narrow the sidewalk adjacent to the transit shelter in order to accommodate it largely within the Amenity Zone, provided that the sidewalk is no less than 6-feet wide.

- C. Areas around transit shelters should be well lit to provide visibility and safety at night.
- D. Active transportation facilities should connect directly to the transit shelter.
- E. Bus stops should be co-located with pedestrian and bicycle amenities such as bicycle parking, shaded areas, wayfinding signage, and trash receptacles. Benches (in addition to the bench located within the transit shelter) should be placed near the transit shelter if the bus stop will have a high volume of transit riders.

### 2 SHELTER STRUCTURE DESIGN

- A. Transit shelters and pads should be designed in accordance with manufacturer's specifications described in the accompanying graphic. All transit shelters should provide an overhead shade structure to protect pedestrians from the elements.
- B. Transit shelter structures should incorporate innovative technology to provide up-to-date, real-time rider information and other features to enhance rider experience, whenever possible.
- C. Transit shelter structures should incorporate sustainable elements, including solar power or LED lighting, whenever possible.



## TRANSIT SHELTER SPECIFICATIONS

Unless otherwise specified in the Volume II: District Design Guidelines for an individual CRD or CRA, the following shelters should be used.



Image Credit: Fairfax County

### TRANSIT SHELTER: EURO

- Tolar Manufacturing – Euro Shelter with integrated bench
- Transit shelter dimensions: 6-feet wide by 10-feet long
- There are many available options for mounting, lighting, materials, and other technologies. Developers should work with FCDOT on the specific transit shelter features.

### SHELTER PAD

- 6-inch thick, reinforced concrete pad that is a minimum of 15-feet long by 6-feet wide and that is connected directly to the sidewalk for accessibility purposes.
- If the transit shelter is to be located on a street with an 8-foot wide Amenity Zone, the transit shelter pad should be 8-feet in width to provide a contiguous surface from the curb to the sidewalk.



Image Credit: Tolar Manufacturing

### TRANSIT SHELTER: NIAGARA

- Tolar Manufacturing – Niagara Shelter with integrated bench
- There are many options for mounting, lighting, materials, and other technologies that are available from the manufacturer. Developers should work with FCDOT on the specific shelter features.

### SHELTER PAD

- 6-inch thick, reinforced concrete pad that is a minimum of 18-feet long by 6-feet wide and that is connected directly to the sidewalk for accessibility purposes.
- If the transit shelter is to be located on a street with an 8-foot wide Landscape Panel, the transit shelter pad should be 8-feet in width to provide a contiguous surface from the curb to the sidewalk.

## 2K SUSTAINABLE STREET AND STREETSCAPE DESIGN

As urban areas in Fairfax County continue to grow, streets play an essential role in shaping the community's sustainability and quality of life. The design and construction of streetscapes present an opportunity to not only improve the functionality of these spaces but also contribute to the county's broader sustainability goals. This section highlights key considerations for creating environmentally responsible, resilient streets.

Fairfax County can create streetscapes that benefit the environment and its residents by maximizing tree canopies and vegetation, incorporating Low Impact Development (LID) approaches for stormwater management, choosing materials with lower embedded carbon, and integrating

renewable energy solutions. Each of these strategies reduces urban heat island effects, mitigates stormwater runoff, conserves energy, and lowers the carbon footprint of urban infrastructure.

Thoughtful integration of these elements can create streets that are catalysts for positive environmental change and enhanced public spaces, as well as functional.

VDOT requires most urban roadways to have a curb and gutter to be accepted into the public roadway system; therefore, designs that direct stormwater into vegetated swales or bioretention planters should be coordinated closely with VDOT. For specific guidance related to drainage design for VDOT projects, refer to the [VDOT Drainage Manual](#).

For general guidance regarding sustainable design strategies, refer to Appendix A2 and to the following sources of stormwater management best practices:

- The [Sustainable Sites Initiative \(SITES\)](#)
- [Leadership in Energy and Environmental Design \(LEED\) rating system](#) created by the US Green Building Council

For specific applications to streets and streetscapes, see the [Urban Street Stormwater Guide](#) by the National Association of City Transportation Officials.



Portland, OR

**LEFT**  
Sustainable streetscape with  
bioretention facilities and  
permeable paving materials in the  
Amenity Zone  
Image Credit: City of Portland, OR



## DESIGN PRINCIPLES

**Rethink streets as integral components of urban natural systems.** Streets are not just mobility corridors; they can function as ecological assets that help communities adapt to climate change. By integrating nature into their design, streets can regulate temperatures, manage stormwater, improve air quality, and provide habitats for wildlife. Tree canopies and reflective or porous materials reduce urban heat island effects, while permeable pavements and green stormwater infrastructure capture, filter, and slow runoff before it reaches drainage systems. Together, these strategies improve water quality, conserve resources, and strengthen urban resilience.

**Reduce impervious surfaces to promote sustainability.** One of the most effective and economical ways to reduce urban flooding is to limit pavement and allow water to infiltrate naturally. Streetscapes designed with permeable pavements, vegetated medians, and expanded tree cover lessen dependence on costly stormwater infrastructure. Replacing excess hardscape with natural surfaces not only absorbs CO<sub>2</sub> but also lowers street-level temperatures and improves overall environmental quality. Using sustainable construction materials with lower embodied carbon—such as recycled or locally sourced products—further reduces the long-term carbon footprint of street projects.

**Design for multiple ecological and community benefits.** Beyond climate adaptation, well-designed streetscapes can enhance quality of life and strengthen community identity. Incorporating Low Impact Development (LID) strategies and sustainable materials enables streets to serve environmental, social, and transportation functions simultaneously. Green infrastructure and strategic planting can buffer noise, improve pedestrian comfort and safety, and create more inviting public spaces. In this way, streetscapes that integrate nature become places that support social interaction, encourage active transportation, and build resilience against future climate challenges.



Tysons, VA

### BOTTOM

LID features help to define the streetscape and enhance the pedestrian experience while providing stormwater management benefits  
Image Credit: Fairfax County

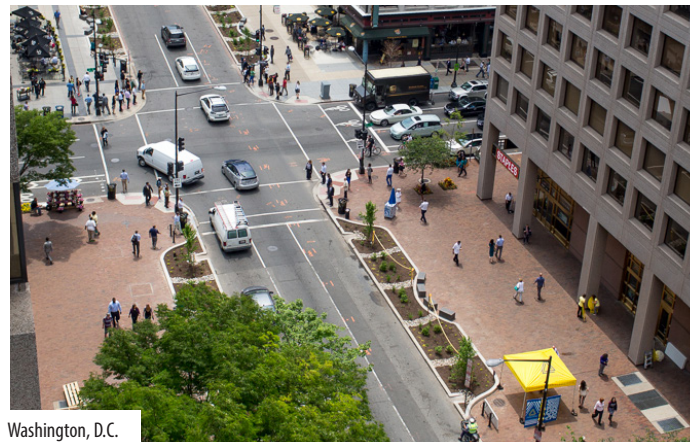
## DESIGN STRATEGIES

- A. Maximize tree canopy and vegetation within the public right of way. See Chapter 2F for strategies to maximize tree planting. Include trees within stormwater retention planters whenever possible. *Graphic 9* depicts the components and configuration of a stormwater retention planter.
- B. Stormwater management methods should be incorporated prominently as design features that provide multiple benefits, including environmental, habitat creation, species diversification, traffic calming, educational, and aesthetic benefits.
- C. LID strategies in the public right-of-way should focus on space-efficient facilities that do not impede pedestrian, cyclist or vehicle travel, and that achieve a reduction in the amount of impervious surface. Appropriate locations for bioretention facilities include street medians

and traffic islands, within the Landscape Panel, as part of curb extensions at intersections, bump outs between on street parking spaces, or within midblock crossings.

- i. Porous materials, such as porous concrete or porous structural pavers, should be used whenever feasible to reduce the amount of impervious surfaces, particularly on parking spaces, within the Amenity Zone, and in the Building Zone. The design and construction of the pavement should comply with ADA and Public Right-of-Way Accessibility Guidelines (PROWAG) regulations when applicable.
- ii. Bioretention facilities with native groundcover plantings, shrubs or trees (i.e., bioretention planters or bioretention cells) should be incorporated to filter stormwater as a first layer of treatment. The use of native vegetation within bioretention facilities provides multiple benefits including nutrient cycling, energy transfer, improved water quality, support for wildlife and insects including bees, and enhanced aesthetics. Please refer to *Appendix A1.2 - Tree and Plant List* for plant species that are appropriate for bioretention facilities.
- iii. Linear swales, wet or dry, may be installed where sufficient space exists.
- iv. Structural cell technology may be incorporated to support the sidewalks while

**LEFT**  
Landscape Panel with rain gardens for capturing stormwater, increasing landscaping, and providing space for outdoor seating  
Image Credit: Golden Triangle BID



Washington, D.C.



## DESIGN STRATEGIES (CONTINUED)

allowing more water and air to reach tree roots in the uncompacted soil below, as described in section 2.F.1 (“Trees and Landscaping”).

- D. Consider the embodied carbon and lifecycle impact when selecting materials and planning the construction process. Choose materials like wood, stone, and others

that have a lower embodied carbon footprint.

- E. Integrate renewable energy generation into public rights of way by incorporating solar and small wind power on public facilities within the streetscape, such as bus shelters, light fixtures, and traffic signals. Whenever possible, prioritize the use of low-energy consumption fixtures and equipment.

### PERMEABLE PAVING

Connect permeable pavers to bioretention to enhance stormwater management at cut thru opportunities

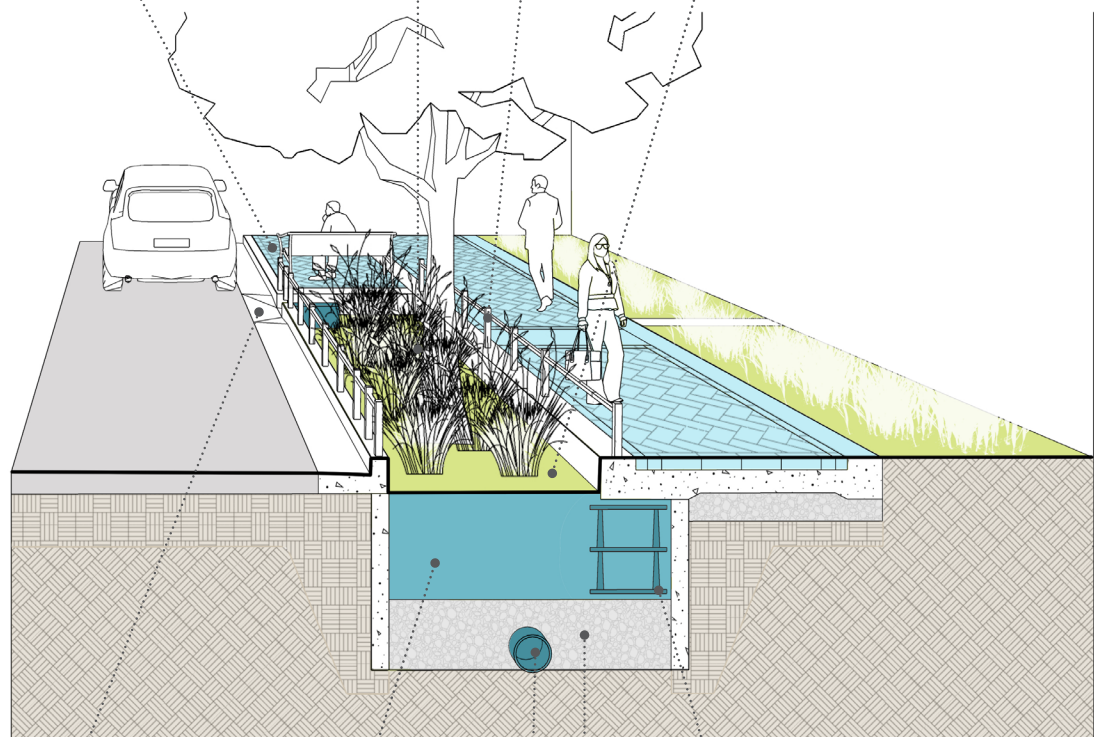
### BIORETENTION PLANTINGS

Use water-loving plants to fill bioretention areas

### FENCING

### LANDSCAPE PANEL

Landscaped buffer provided along roadways



### INLET

Use a curb cut at bioretention facilities to manage overflow

### BIORETENTION MEDIA

### UNDERDRAIN

### GRAVEL

### STRUCTURAL CELLS (OPTIONAL)

For constrained conditions, use cantilever sidewalk or structural cell support to maintain minimum required bio-retention width

## GRAPHIC 9: STORM WATER PLANTER DETAIL

### BOTTOM RIGHT

Example of a bioretention planter with a tree and decorative fencing in the McLean CBC  
Image Credit: Fairfax County



McLean, VA