

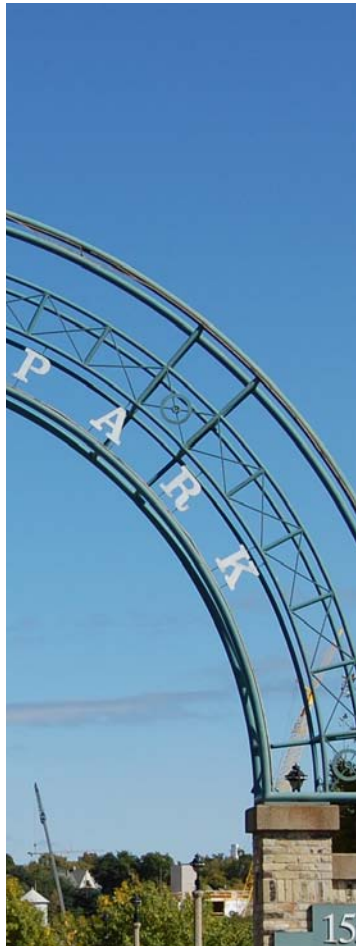


City of Milwaukee

Streetscape Guidelines

Prepared for the City of Milwaukee

Department of Public Works and Department of City Development

March 2011

Prepared by:

TERRA ENGINEERING LTD.

MARCH 2011

City of Milwaukee

Office of the City Clerk

200 E. Wells Street
Milwaukee, Wisconsin 53202

Certified Copy of Resolution

FILE NO: 090883

Title:
Resolution approving the Southwest Side Area Comprehensive Plan as an element of Milwaukee's Overall Comprehensive Plan, in the 8th, 11th, 13th and 14th Aldermanic Districts.

Body:
Whereas, One step in the City of Milwaukee's ("City") comprehensive planning process is the creation of plans for areas of the City, sometimes referred to as neighborhoods; and

Whereas, A new comprehensive plan has been prepared, titled the Southwest Si... Comprehensive Plan ("Plan"), a copy of which is attached to this Common C... and

Whereas, Pursuant to Section 66.1001, Wisconsin Statutes, the City ... ion adopted the Plan and recommended adoption to the Common Council; a...

Whereas, Approval of the Plan by the Common Council ... the Plan as a guide for the City regarding the use and development of the la... encourage common understanding and coordination among levels of ... private interests and facilitate implementation of the Plan; now, therefore, ...

Resolved, That the Common Council ... Milwaukee, approves the Southwest Side Area Comprehensive Plan, as an ... City's Overall Comprehensive Plan and as recommended by the City Pl... ; and, be it

Further Resolved, That t... est Side Area Comprehensive Plan, as approved, shall provide guidance and serve ... the basis for decision-making by the Common Council in its consideration of land use and physical development issues; and, be it

Further Resolved, That the Department of City Development, the Department of Neighborhood Services, the Department of Public Works and other appropriate City departments and agencies are directed to work toward implementation of the Plan; and, be it

Further Resolved, That the Commissioner of the Department of City Development is directed to send copies of the Plan to the parties identified in it as having responsibility for implementation of the Plan for their reference and use.

I, Ronald D. Leonhardt, City Clerk, do hereby certify that the foregoing is a true and correct copy of a(n) Resolution Passed by the COMMON COUNCIL of the City of Milwaukee, Wisconsin on December 22, 2009, published on November 12, 2009.

Ronald D. Leonhardt

Ronald D. Leonhardt

January 11, 2010

Date Certified

SAMPLE ONLY

City of Milwaukee Resolution Page

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MARCH 2011

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Streetscape Guidelines: Introduction

Milwaukee Streetscapes

Milwaukee's streets play an important role in the livability, vitality, and character of its neighborhoods and commercial areas. With a network of 1,450 miles of streets, this system forms an efficient walkable arterial grid that is an asset to the City of Milwaukee and its citizens.

These streets not only provide vehicular access to the homes, businesses and office buildings, they also provide for safe pedestrian and bicycle access throughout the city. This pedestrian access is provided on the many miles of sidewalks that line both sides of the streets.

The elements within the street right-of-way, including the roadway, trees, sidewalks, lighting and more, all combine to establish the character of an area, commonly referred to as the streetscape. A well designed streetscape improves the quality of life for residents and serves as a catalyst to strengthen the economy for area businesses.

Mission

The mission of Milwaukee's city government is to enhance the safety, prosperity and quality of life of all of our citizens working directly and through partnerships with our community stakeholders. The Department of Public Works (DPW) and the Department of City Development (DCD) work in partnership on streetscape projects to provide enhanced design and engineering, which contributes toward an improved quality of life and provides a catalyst to strengthen the economy. When the quality of life improves, more residents and visitors come to the neighborhoods. This increased pedestrian traffic can result in enhanced business opportunities and economic development.

While well-designed streetscapes can look good and enliven a neighborhood, they can also provide a positive environmental effect. Trees and plantings, key elements in the streetscape, improve air quality by producing oxygen and removing carbon dioxide and particulate matter. Trees and plantings also increase storm water retention and shade can help to mitigate the urban heat island effect.

Figure 1-1: Historic Third District

Figure 1-2: Milwaukee Medians

Tools for Streetscape Design

These Streetscape Guidelines are intended to assist the Business Improvement Districts (BIDs), elected officials, community groups, and developers in beautifying their commercial districts now and keeping them attractive well into the future. Streetscapes require consistent maintenance to remain appealing, especially considering the adverse environmental conditions and heavy usage in the City of Milwaukee. By establishing the guidelines in this booklet, the City of Milwaukee seeks to standardize a design process that will create streetscapes that are both beautiful and functional, relatively easy to repair and maintain, and in the long run, a cost-effective investment in the public realm.

Figure 1-3: Planter Detail

A Guide

This guide provides the tools necessary to plan a successful streetscape and offers helpful information about the streetscape planning process, the major building blocks and standard elements that compose a streetscape, the special circumstances that should be considered, and a variety of streetscape design examples. It also includes the City of Milwaukee palette of standard streetscape elements. These concepts and standards are guideposts for navigating the path from the initial desire for streetscape improvements to the successful realization of an actual, implemented streetscape project. In consultation with staff from various City Departments, this guide represents the best knowledge to date. This knowledge will continue to develop and change as more streetscapes are implemented and as the City's Streetscape program continues to improve and grow.

Figure 1-4: Milwaukee Sidewalks

Streetscapes and the Private Sector

Frequently, developers of new buildings and major rehabilitation projects are required to include improvements in the public way as part of the project. This typically includes the sidewalks and parkways immediately adjacent to the property being developed.

This is a good example of public-private cooperation that improves livability, amenities, and enhances Milwaukee for everyone. Maintenance is essential to the success of a streetscape project, regardless of whether the project is a result of private or public sector investment. While this guide does not attempt to outline the process developers use to obtain the various permits required for construction, many aspects of these guidelines may be helpful for developers. The chapters Organizing a Streetscape (Chapter 2), Functional Requirements (Chapter 3), and Streetscape Elements (Chapter 4) contain pertinent information about how developers should go about planning and constructing in the public way.

Although property owners are responsible for maintaining the public way adjacent to their property, after the developer is gone the City is often requested to participate in the long term repair and maintenance of the infrastructure installed in the public way.

Trees die, tree grates break, benches and sidewalks eventually require repairs or replacement. It is important to recognize that developers and property owners may install streetscape elements that are not city standard items. However, they also need to stock those custom items so that the City can repair or replace elements within these unique areas. If the custom items are not available, standard elements from City stock will be used, unless prior arrangements have been made.

Implementation Process

The successful planning and implementation of a streetscape project must follow a specific process to bring the vision into reality. Typically, an elected official, community group, private sector entity, or Business Improvement District (BID) will bring projects to the attention of DPW and DCD. In order to obtain funding, projects must typically meet certain criteria:

- Fifty percent or more of the property surrounding the right-of-way must be an existing or planned commercial area.
- The BID, elected officials, businesses, and the community must support the project.
- Public art installations or historic markers, are planned for the public way and require streetscape intervention.

If the criteria are met, the streetscape process can begin. The process can be roughly broken into two phases, the design phase and the construction phase.

Special Design Considerations

It is important to be aware of budgetary considerations at the beginning of the streetscape process. The costs for designing and installing a streetscape can vary widely depending on the width of the sidewalk zone, the length of the project, the extent of streetscape elements, and the level of customization being used for community identifiers and other special aspects of the streetscape. As a general rule of thumb, streetscapes cost approximately $350,000 per 360-foot long block. However, costs can range between $300,000-$450,000 (2010 costs) per block, depending on the scope of the streetscape and the length of the block. It is important to keep these costs in mind throughout the design of the project.

Maintenance concerns must also be addressed early in the streetscape design process. These issues often drive the type of amenities to be included since certain streetscape elements require a significant community commitment to ongoing maintenance. For example, the BID is responsible for maintaining all plant material, except trees. This includes weeding, watering (if irrigation is not provided), plant replacement, and litter pickup. It is the policy of DPW to provide these elements in the streetscape only if the BID is committed to an active and ongoing role in maintenance.

The BID's responsibility will be accepted in a maintenance agreement that must be approved by the City and passed by the BID Board.

Therefore, clarifying the BID's level of commitment is a key component of the streetscape design process. The BID must assess its ability to provide maintenance and the associated maintenance costs and assign individuals to be responsible for it. This information becomes a critical input to the design process as it will influence the amount, material, and location of all streetscape elements. Balancing costs and public amenities can be managed by setting priorities, for example, prioritizing between pedestrian area enhancements and roadway intersection enhancements.

Design Phase

The project begins with designing the streetscape, which typically takes from eight to 12 months. Usually, a landscape architect works with the BID to arrive at an affordable sustainable design solution. Streetscape projects tend to be organized by districts or corridors. The typical length of a streetscape corridor project is five 360-foot blocks. District projects can vary from as few as two or three blocks to as many as twenty blocks. If a project is much larger than this, it will be subdivided into phases to be constructed over consecutive years, as funding becomes available.

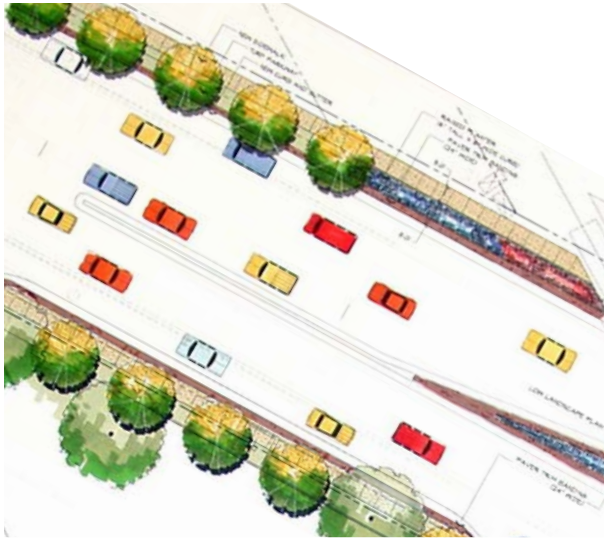


Figure 1-5: Design begins with concepts

Step One: Initial Streetscape Design

- BID submits a preliminary scope for the streetscape work (based on the Streetscape Guidelines) that DPW approves
- Establish an initial budget based on the scope of work
- Establish an initial maintenance budget and expectation
- Secure a funding source for the project design fees
- Retain the services of a design consultant and engineer
- Hire a surveyor to prepare a topographic survey of the proposed project site
- Review codes and standards, including lighting, parking, landscape, and various other considerations, that will impact the streetscape design
- Develop streetscape design concepts

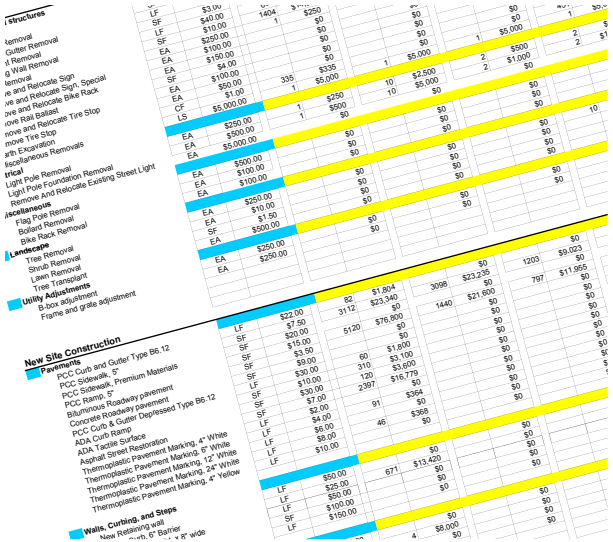


Figure 1-6: Estimates are a critical part of the process

Step Two: BID and Community Support

This step is critical in gaining consensus on the proposed streetscape improvements.

- DPW presents design concepts to the BID, the elected officials and the community for review and comment. At this point, which occurs at about the 30 percent milestone in the project, DPW and the community must determine the issues that are most important to the overall streetscape
- Refine concepts based on input from the BID, elected officials and the community.
- Generate a final concept, based on consensus that is consistent with the Streetscape Guidelines and budgetary constraints

Figure 1-7: Presentations to gain consensus

Step Three: Construction Documents

- Once a final concept is approved, develop specific details, drawings, and technical specifications in preparation for competitive bidding for the construction of the streetscape project
- If necessary, schedule another community meeting to review the streetscape's final details
- Confirm that final cost estimates are within the approved construction budget
- Complete final drawings and specifications

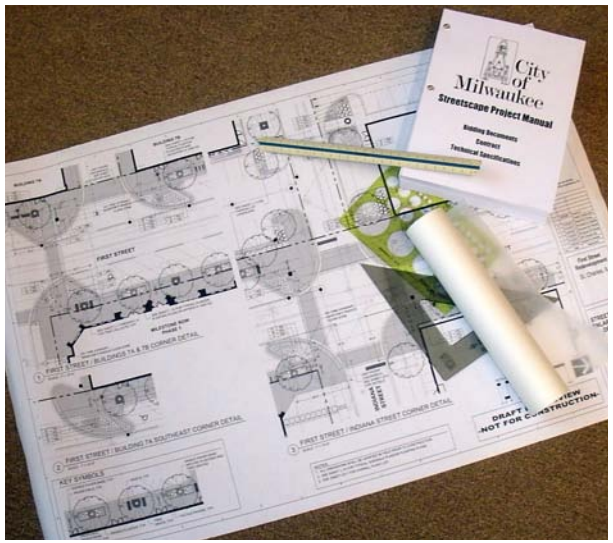


Figure 1-8: Final Plans and Specifications

Design and Construction Process

The figure below illustrates the process for establishing a streetscape project and developing a final streetscape plan. At this point, even though the construction plans are complete, the project is still only an idea on paper.

While the process appears to be linear, it can, at times, become an iterative process with numerous revisions and refinements that occur during the design development phase of the streetscape plan. Each phase adds to the amount of detail in the previous version of the plan, so that at the end of the design and engineering tasks, the project is ready to begin construction.

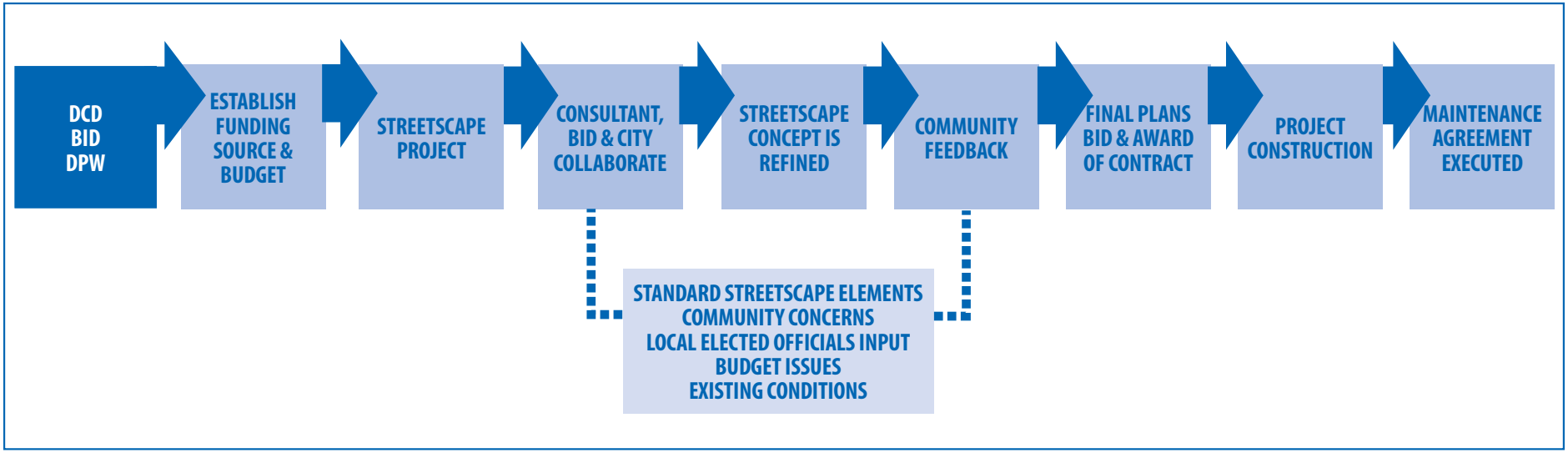


Figure 1-9: The Streetscape Implementation Process

Step Four: Bidding and Construction

In the bidding process, contractors are invited to pick up plans and specifications that were developed in Step 3 and prepare bids for construction of the streetscape improvements.

- Advertising for bids (printed legal advertisements)
- Pre-bid conferences to answer questions from bidders
- Bid opening and evaluations to determine lowest responsible bidder
- Award recommendations to City
- Award of bid by City to Contractor

The construction phase brings the project from idea into reality. Construction milestones include:

- Issue the notice to proceed to the contractor
- City holds a pre-construction meeting
- DPW and the BID distribute flyers to property owners along the streetscape notifying them of the upcoming construction
- Begin construction
- Issue final punch list of construction items
- Closeout construction

The construction of a streetscape may take from four to 12 months, depending on the size and complexity of the project. In order to ensure that projects are completed on schedule and within budget, DPW oversees day-to-day construction and makes all decisions with respect to material selection, staging, and schedule. DPW encourages BID and community input through weekly construction meetings where concerns may be aired.

Construction Phasing and Staging

Streetscape construction, like any construction activity in the public right-of-way, can be disruptive to residents and businesses. Good public information, ongoing communication, and special coordination is necessary to minimize the inconvenience.

Ideally, streetscape construction is performed in rolling phases. Work begins at one end of the job, on one side of the street, and proceeds to the opposite end of the project. It then flips to the other side of the street and moves back to the end it started from. Typically a contractor is given a three-block work zone from which construction cannot advance until the new sidewalk is installed. In this way, the job progresses in a controlled manner and keeps as much of the street intact for as long as possible.

Access to businesses and residents is maintained throughout the construction project. On projects with wide sidewalks, this is usually done by splitting the sidewalk in half. The section along the curb is removed and new curb and gutter and utilities are installed. When this is finished, the remaining half of the sidewalk is removed and the entire sidewalk is replaced within 48 hours, or less. This minimizes the impact to businesses and allows continuous access during construction. If the sidewalk is narrow, it cannot be split into two zones and a pedestrian lane is set up in the street, parallel to the curb line. This area is protected from traffic and has bridges over the work zone to the individual building addresses.

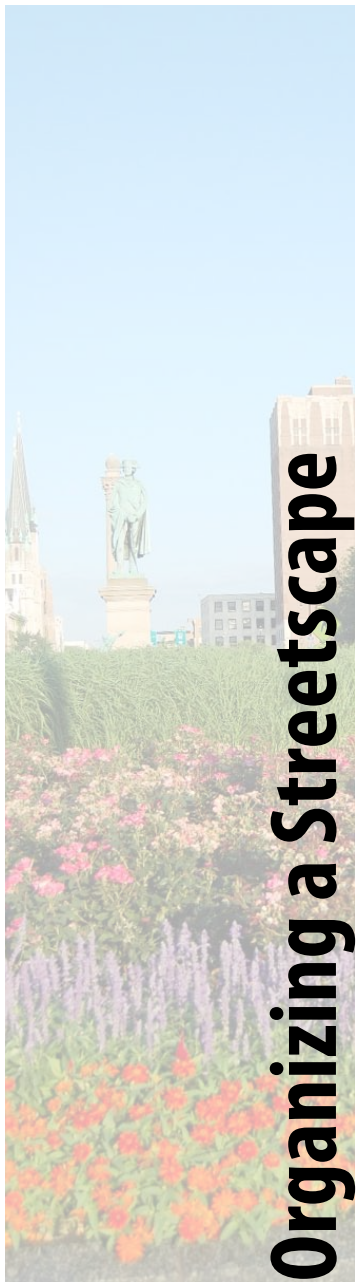
If possible, two-way traffic is maintained throughout construction. Parking may be removed from one or both sides of the street, depending on the width of the right-of-way and area needed for construction. Most projects do not require street closings, bus re-routings, or detours during construction unless extensive street work is involved.

Post-Construction and Beyond

Once construction is complete, the project goes into maintenance mode. For maintenance to be successful it must be a joint effort between the community and the City. Not only does the community play a direct role in maintaining plantings, it keeps eyes and ears on the project and is typically the source of alerting various City departments in charge of long term maintenance to problems in need of attention.

If planned and installed according to the standards described in this guide, the newly implemented streetscape should provide a functional and attractive community asset for years to come.

Figure 1-10: Construction requires special staging



Organizing a Streetscape

Organizing a Streetscape

The first step in planning a streetscape project is to understand the component parts of the streetscape including the physical space that forms the improvement zone as well as the variety of potential streetscape elements.

Each element of the street contributes to the streetscape and to the overall identity of the neighborhood. The street right-of-way is the term used to describe the publicly owned area between the two property lines on each side of the street.

Figure 2-1: Streetscape elements

Complete Streets

Wisconsin is one of the leading states in the implementation of **Complete Streets** concepts and has recently passed legislation that provides for accommodation of bicycle and pedestrian facilities in reconstruction and new road projects in Wisconsin.

Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorist and public transportation users are able to safely move through and across a complete street.

There are no prescribed designs for **Complete Streets** and each one is as different as the corridor in which it travels. Elements in a Complete Street are numerous and may include one or more of the following:

- Public art
- Sidewalk treatments
- Landscape elements
- Street furniture (public or private)
- Pedestrian amenities
- Curb bump-outs or push-outs (curb extensions)
- Median islands (including pedestrian refuge zones)
- Comfortable public transit stops
- Bicycle lanes (or widened motor vehicle lanes)
- Green spaces, circles and commons
- Public utility elements (poles, manholes, access boxes)
- Private business items (newspaper boxes, menu boards)

Street Diets

Putting a street on a diet implies reducing any unnecessary pavement width and reallocating that width to other uses. In many cases, this reallocation can result in adding:

- Bicycle lanes
- Parking lanes
- Wider pedestrian zones

The issue of street diets is beyond the scope of these Streetscape Guidelines as such diets involve traffic and transportation planning, traffic engineering and land-use planning, however the balance between providing additional transportation and pedestrian facilities should continue to be studied and addressed.

Figure 2-2: Traffic, Bicycle and Parking Lanes

Streetscape Zones

The streetscape may include a variety of elements such as vehicle travel and parking lanes, bicycle lanes, sidewalks, street trees, tree border areas, street furniture, bicycle parking, bus stops, utility lines, accent planting and signage. Since streetscapes can include so many elements, its helpful to divide them into three zones.

The **Sidewalk Zone** is the "front porch" of every business and residence. In residential areas, it is the place where people meet neighbors, interact or simply enjoy a stroll. In commercial districts, this zone is a transition zone where pedestrians alight from cars to enter businesses that front along the street. Larger sidewalk zones can also accommodate outdoor cafes, sidewalk sales, street performers and other commercial uses.

The **Parking Zone** allows convenient parking for shoppers who travel by car to patronize businesses in a commercial area. This zone also allows for short-term loading zones and transit stops.

The **Roadway Zone**, or vehicular zone, accommodates the movement of motor vehicles and bicycles through a streetscape.

While each zone is distinct, the zones often overlap and interact with each other. Pedestrians crossing the street interact with all of the zones. Street lighting located in the sidewalk zone overlaps the parking and roadway zones and intersections often contain traffic control devices located in the sidewalk zone. Bump-outs, crosswalks and curb ramps help define safe pedestrian crossing areas in the roadway and parking zones. Buses use the parking zone to pick up transit patrons from the sidewalk zone.

Understanding the relationship and interaction of the activities within the three zones is vital to the successful organization of a streetscape. Each commercial district and intersection needs to be observed and analyzed to address the activity level in each zone as well as its overall character.

There are many aspects of the public right-of-way to consider when designing a streetscape including:

- Overall right-of-way and sidewalk widths
- Presence of bus stops and shelters
- Current and projected commercial and residential uses
- Pedestrian comfort, user-friendliness
- Pedestrian traffic volume and flow
- Parking requirements and restrictions
- Vehicular traffic intensity, number of traffic and bicycle lanes
- Design for climate
- Accessibility and design for various user groups
- Safety and traffic calming measures
- Attractiveness as judged by the primary user community

These characteristics affect how a streetscape is designed and constructed as well as its ability to attract pedestrians, residents, and business patrons.

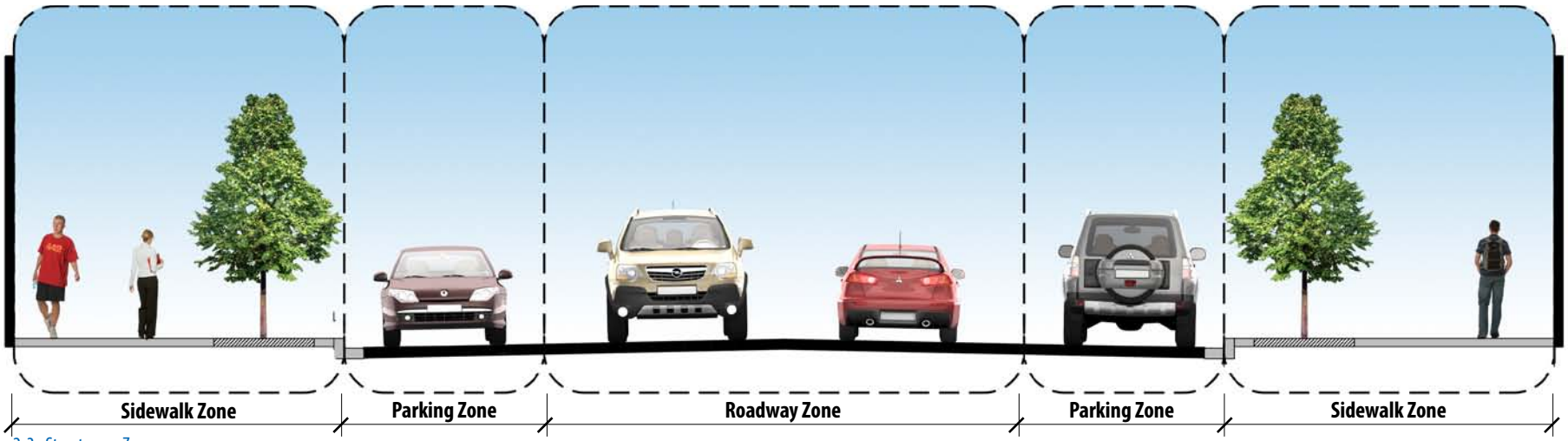


Figure 2-3: Streetscape Zones

Universal Design

When designing a streetscape, the different ability levels of all users must be considered. What some people don't even consider a problem can pose a significant barrier to others, yet with simple design changes, it can become accessible for all. This section identifies some accessibility concerns and proposes some design concepts which help to resolve the concerns. Streetscapes must still comply with all accessibility laws and regulations.

- Overall right-of-way and sidewalk widths
- Presence of bus stops
- Clear paths of travel across all areas
- Minimizing the impact of barriers such as newspaper boxes, bus shelters, parking kiosks, outdoor cafes, planters, etc. Ensure these do not impede the path of travel.
- Be aware of where parked car doors open in relation to the travel path. Parked car doors may suddenly open and impede access.
- Surfaces with no cracks, opening, or indentations more than 3/8" wide (particularly on drain covers, stamped concrete, etc).
- Ensure the grade and cross-slope of walks are designed with low slopes to minimize instability
- Snow and ice removal must be done frequently to keep all walkways, corners and crosswalks easily accessible.
- Color contrasts of elements to enhance visibility
- Be aware that some pavement surfaces are not as slip resistant as others. For example, certain exposed aggregate surfaces may be more slippery than a broom-finished concrete
- Clearly designated accessible parking signs
- Waste receptacles of sufficient size or emptied frequently to prevent trash from accumulating in travel paths
- Providing additional and clearly marked spaces for vehicles which offload wheelchair passengers with side or rear ramps, which may benefit from increased space. Clearly identify the spaces with a Handicapped Accessible sign
- High-contrast crosswalks, preferably with pedestrian islands or bump-outs to facilitate safer movement when crossing
- Be aware that some users may tap building fronts or other

Figure 2-4: Utility gratings must be accessible

Figure 2-5: Improperly installed pavers create hazards

Figure 2-6: Improperly maintained elements create hazards

surfaces with a cane to determine the path of travel. Planters or sidewalk signs may pose an unexpected barrier

- Crosswalks with audible sounds to indicate when the signal changes from walk to do not walk
- Public art or design elements which can be easily viewed or enjoyed by people of all abilities
- Uneven or broken pavement
- Tree roots near surface or when the roots heave pavement; trees must be routinely maintained to keep branches out of the sidewalk areas
- Driveways that cross sidewalks may pose a hazard considering the slopes needed for the vehicle to exit, yet for pedestrians of all abilities to safely cross the driveway. The slopes of the driveway flare may even cause some pedestrians to unexpectedly veer into the street or for wheelchair users to tip. The sidewalk should cross the drive rather than the flares when possible.

Figure 2-7: Detectable warning surface alert visually impaired pedestrians

Figure 2-8: Clearly marked crosswalks areas

Figure 2-9: Driveway with smooth transitions to sidewalks

Crime Prevention Through Environmental Design

Crime Prevention Through Environmental Design (CPTED) is an approach to design that focuses on creating spaces that reduce the risk of providing criminal opportunity. General CPTED principles address: perceived ownership of the space, design that supports the use of the space, promoting activities which increase a sense of natural surveillance or eyes on the street, and proper maintenance of the area. There are a number of methods to address CPTED in a streetscape.

- Lighting – clearly lit areas promote real and perceived safety or visibility in an area. Lighting alone will not address safety, but can be combined with other design elements to promote safety. Traditionally, lighting is designed for vehicular traffic, but there a growing emphasis on pedestrian lighting.
- Sight lines – a clearly visible travel path, with unobstructed views, provides an increased feeling of safety. Care should be taken to not provide hiding places, such as tall landscape, dark corners, or tall fences along a streetscape. This is particularly important when designing streetscapes around areas with ATMs or public transit stops.
- Natural surveillance or eyes on the street – design to maximize visibility to the street. This may include store windows that face the street and parking areas. It may include providing areas where people may congregate to watch activities or other people, like outdoor cafes or benches. Surveillance may be conducted formally through the use of cameras.
- Land use – the mix of uses in an area can promote additional natural surveillance. For example, restaurants typically provide later hours of attraction than nearby office or retail businesses, which results in longer hours of eyes on the street.

Figure 2-10: Property maintenance is a constant need

Figure 2-11: Well lighted Entry and Vestibule

Figure 2-12: Well lighted Streets

Crime Prevention Through Environmental Design

- Sense of ownership – establishing a sense of ownership demonstrates to others that an area is cared for and maintained. This relates to the broken window theory, which states that initial vandalism can escalate if the original problem is not quickly resolved. A sense of ownership sends a message to neighbors and visitors that they are welcome and to negative influences that they are being watched.
- Maintenance – much like sense of ownership, proper and prompt maintenance helps to establish a perception of safety. A well-maintained area helps pedestrians to feel comfortable and encourages them to return to the area.

Figure 2-13: Tagging must be addressed promptly

Figure 2-14: Eyes on the Street create a Safe Pedestrian Zone

Figure 2-15: People Spaces can provide "eyes-on-the-street"

Streetscape Elements

As outlined earlier, streetscapes are divided into zones based on use. Each zone will contain numerous elements and these elements will often overlap and serve multiple streetscape zones.

The arrangement of streetscape elements must be carefully considered and harmoniously integrated to help create a streetscape identity for commercial areas. When these elements take on a very strong presence, a brand can be created which creates a unique character in the area that can be expanded beyond the streetscape to advertising and marketing which are key tools in promoting economic development.

Primary Streetscape Elements

Establishing the structure and rhythm in the streetscape is the task allocated to two major sets of streetscape elements:

- **Lighting** establishes the illumination levels and night-time visual rhythm of the streetscape. The vertical elements of lighting poles and luminaires create strong visual presences in a streetscape.
- **Trees** establish the daytime rhythm with foliage and canopies.

The vertical nature of lighting and tree elements is most noticed by pedestrians and motorists. These two sets of elements are important in establishing the character of the streetscape for both day and night.

Secondary Streetscape Elements

Secondary elements add detail and texture to a streetscape. These elements include:

- Sidewalk pavements
- Roadway pavements
- Street furniture, including benches, trash receptacles and bicycle racks
- Vertical elements including banners, community identifiers and kiosks
- Public art elements
- Bus stops and patron shelters
- Traffic control devices

Chapter 4 describes each of these elements in greater detail.

Figure 2-16: Lighting can set the night-time rhythm

Figure 2-17: Street trees can set the day-time rhythm

Figure 2-18: Street furniture adds texture to the streetscape

The Element Line

When various streetscape elements are repeated over a typical block, the streetscape creates a particular rhythm depending on the use, arrangement, and emphasis of different elements. For any given typical block, there are many potential options for arranging elements.

This string of elements is loosely arranged around an **element line**, an artificial line that generally runs parallel to the street curbing. In an ideal arrangement, the centerlines of the street lighting, trees and similar vertical elements correspond to the element line and the subsequent pavement treatments and other streetscape elements respond in kind.

While ideal, the alignment of elements along an element line is not always possible. Various conditions including building and street alignments can create the need to vary the placement of elements in a streetscape. In every case, what is most important is to create a rhythm and a logic to the placement. Careful design and engineering must be used to prevent haphazard element placements.

Lighting

As one of the primary streetscape elements, lights set the stage for the nighttime look of the streetscape.

The spacing between light poles should be a function of lighting levels and rhythm with other objects in the element line such as planters, trees, and parking meters.

Shorter pedestrian lights and taller street lights will have different spacings with the taller fixtures that have a greater light "throw" spaced further apart.

The number of footcandles needed to light an area can be adjusted downward in areas where there is a high level of ambient light from individual properties, for example, house and porch lights in residential areas, and storefront lighting in commercial districts.

When these elements are linked together dimensionally, their arrangements can be logically laid out on the block.

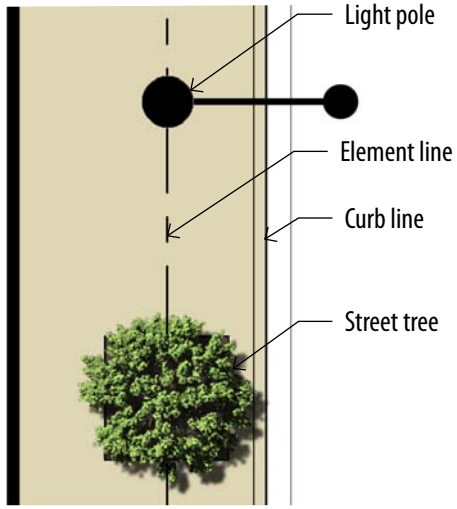


Figure 2-19: The Element Line - Plan

Trees

Where space permits, trees can be successfully planted in streetscapes. Alignment of the trees on the element line helps to reinforce the rhythm of the streetscape with logical placements of trees and lights.

Trees should be used in sufficient numbers to create a strong visual statement. The mass of tree foliage or crown of the trees will create a strong canopy effect in the streetscape. Large trees allow for visual access to businesses and signage that fronts the streetscape. Large trees may be pruned to maintain visibility at lower levels. While one of the primary streetscape elements for daytime effect, trees are increasingly being used to carry twinkle lights for seasonal and holiday night-time effect.

See Chapter Four for a more detailed discussion of planters, tree grates, and lighting.

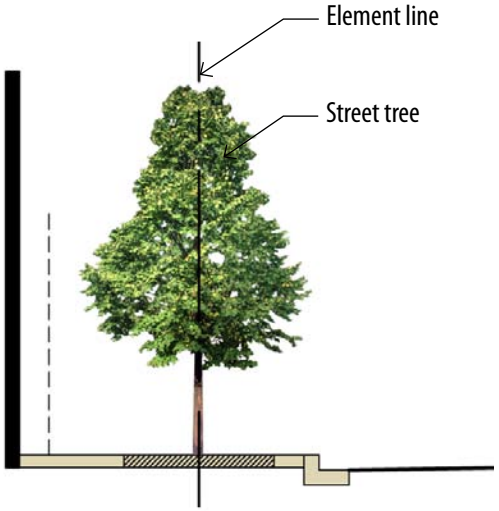


Figure 2-20: The Element Line - Elevation

Balance in the Streetscape

The Module

The combination of all the elements used in the streetscape design creates the module. This term describes the arrangement of elements in relation to each other. A good streetscape design achieves a balance between all elements, with the location of each element being adjusted in relationship to the others until a functional harmonious design is achieved.

Breaches in the Module

Once an element line is established, it must be fitted to the unique existing conditions of each block in the streetscape. Breaches in the element line can occur for many reasons, including:

- Driveways
- Hollow (vaulted) sidewalks
- Existing utilities
- Existing trees
- Intersections
- Overhanging signs and canopies
- Significant building entrances
- Bus stops
- Adjacent public spaces and existing landscape

These existing conditions disrupt the element line and can be accommodated by shifting the entire module, shifting individual elements within the module, or eliminating individual elements.

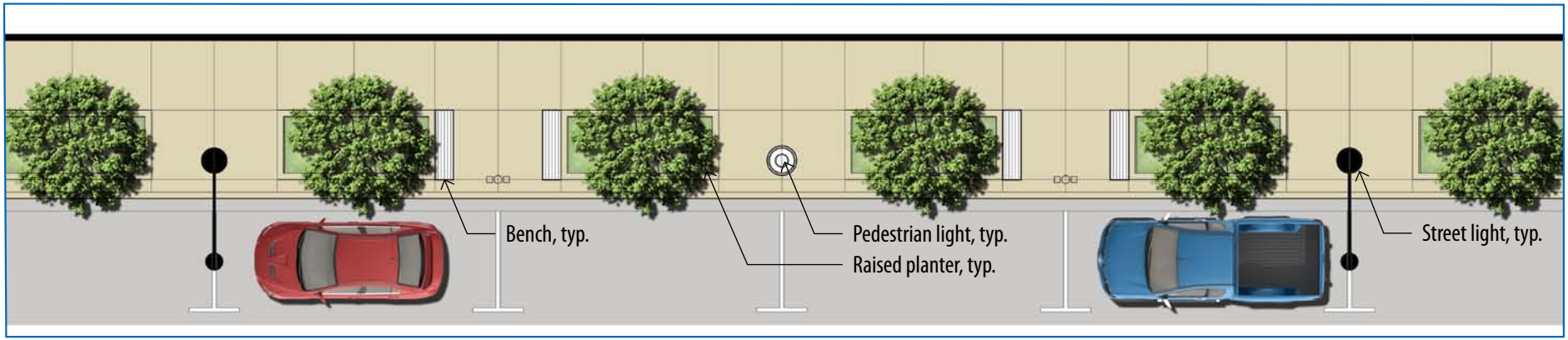


Figure 2-21: Streetscape Module

Design Psychology

A successful streetscape must accommodate another, unseen yet critical, element — the way people react to and use space. In the landmark book published in 1971, Pedestrian Planning and Design, John J. Fruin identified and quantified the body ellipse, a plan view space roughly 18" x 24" which defines the actual body space for the average individual. This measurement is useful when considering the streetscape elements a given sidewalk width can bear without sacrificing pedestrian capacity or comfort.

Much like traffic engineers work with levels of service (LOS) related to vehicular traffic, Fruin has defined similar LOS for pedestrian spaces. The LOS is a description of the intensity of use and freedom of mobility provided in a pedestrian space.

Levels of Service

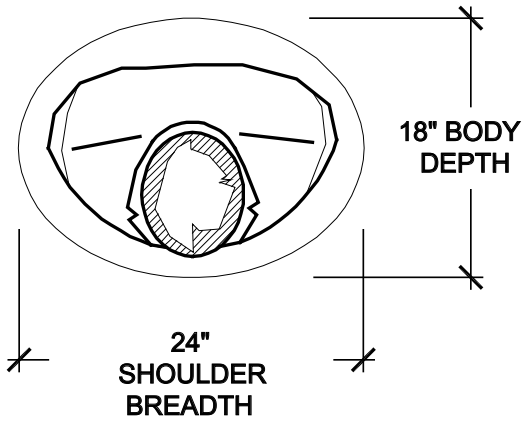


Figure 2-22: Fruin's Body Ellipse

Fruin describes LOS as intensity of use. Intensity of use is defined by the number of pedestrians using a space and their average speed of movement. Each successive LOS has an increased intensity of use. For example, LOS "A" spaces offer much more mobility and freedom than LOS "C" areas. The concept of LOS can be directly applied when planning and evaluating a streetscape design.

This concept is especially important when placing elements within the streetscape, especially at locations where potentially high numbers of pedestrians pass or congregate. These areas can include train and bus platforms, bus stops, outdoor cafes and buildings that generate high pedestrian counts.

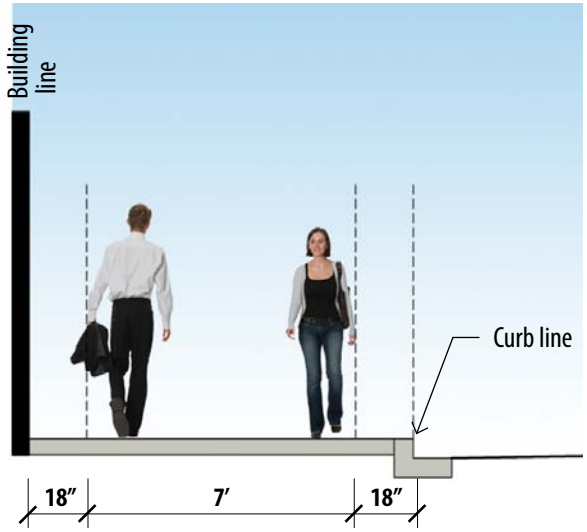


Figure 2-23: Level of Service A

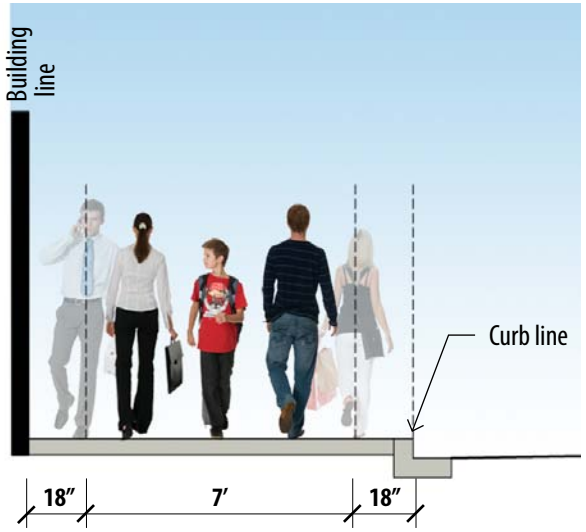


Figure 2-24: Level of Service B

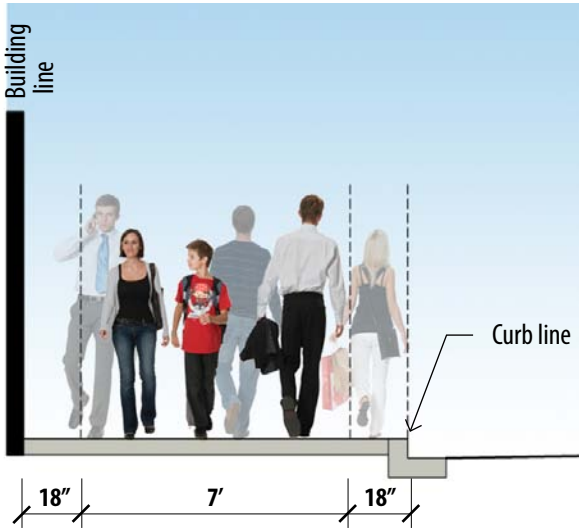


Figure 2-25: Level of Service C

Shy Zones

Another important concept developed by Fruin is the **shy zone**. When a pedestrian walks alongside a storefront, the pedestrian instinctively maintains a distance, or shy zone, from the storefront. The shy zone occurs around all objects within a streetscape. It also occurs at the curb line where pedestrians instinctively stay away from curbs unless waiting to cross into parking spaces or crosswalks. Objects placed in the streetscape actually consume more space than the actual physical dimensions due to this shy zone effect.

While a pedestrian can physically traverse the streetscape in tight conditions, attention is on safe passage rather than enjoying the streetscape or window-shopping. Since the overall goal in streetscape design is to create an environment in which pedestrians feel comfortable and to entice them to return, the shy zone effect must be carefully considered in the design process.

For example, a sidewalk that is 10' wide from curb face to building face has the shy zones indicated in Figure 2-27. The shy zone creates a net 7' wide sidewalk zone where pedestrians feel comfortable traveling. As the number of pedestrians increases, the net pedestrian space gets more crowded, impacting the personal space of individual pedestrians. To accommodate this compression, pedestrians will encroach into the shy zone areas in an effort to maneuver along the streetscape. The space available between the curb line, element line, and building face helps to determine what form the major streetscape elements can take within the streetscape. Balance of elements and breaches in the element line must also be accommodated. Therefore, narrow spaces have more limitations on the scale and size of streetscape elements that can be accommodated and this is compounded by the shy zone effect. More opportunities with a greater level of service are possible as the space widens.

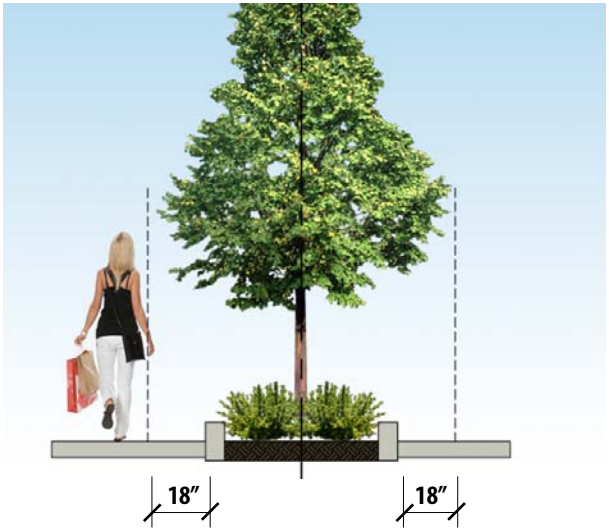


Figure 2-26: Shy Zones at Planters

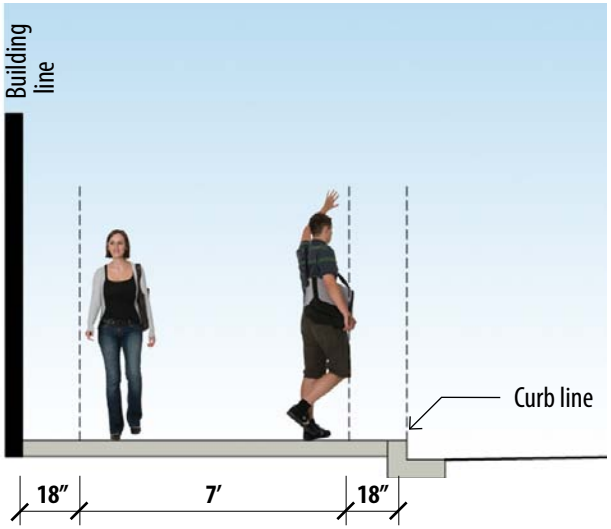


Figure 2-27: Shy Zones at Building and Street Edges

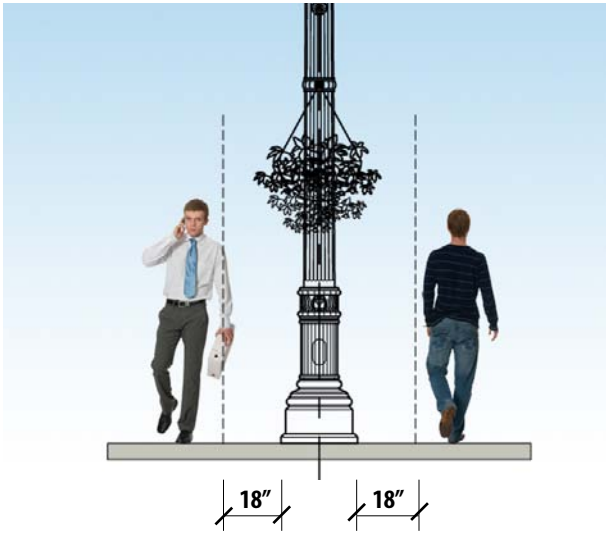


Figure 2-28: Shy Zones at Light Poles

Practical Applications of Shy Zones and Levels of Service

There are many streetscape elements that are necessary for safe vehicular and pedestrian flow. Street light poles and control cabinets, signage, trash receptacles and similar items have long been a part of common street scenes.

When properly combined, these elements would have slight effect on the movement of pedestrians in a streetscape. When these elements are not placed well in combination, pedestrian conflicts can develop. While many of these conflicts can be simply annoying, certain conflicts can contribute to an unsafe condition.

Multiple elements: The presence of multiple streetscape elements can have an additive effect on the shy zones present within the streetscape. In areas where these shy zones overlap or seem to prohibit easy pedestrian movements, pedestrians will adjust, however, this will increase the level of pedestrian discomfort. While pedestrians in urban environments have come to accept crowded conditions as the norm, there are ways to mitigate these conditions. Planters, benches, and other elements should define the pedestrian route, not create an obstacle course. It is also important not to have too many elements placed at corners, bus stops or other places where people need to wait or gather.

Al fresco Dining: The popularity of al fresco dining in urban areas has created new challenges for streetscape designers. Cordoning off of dining spaces along sidewalks creates ever narrower spaces for high volumes of pedestrian traffic. In many areas, these dining areas have taken over half the available sidewalk space. While these dining opportunities have proven very popular with the restaurant businesses and may deserve some sidewalk space, care must also be taken to preserve a safe, accessible pedestrian route.

Bollards: For years, bollards have been employed extensively in urban areas to create permeable barriers that allow access for pedestrians and prohibit access by vehicles. Bollards protect the streetscape, buildings and pedestrians from automobile intrusion.

The use of bollards and other similar streetscape elements is discussed in greater depth in Chapter 4. Bollards can create effective vehicle barriers when properly designed and their arrangement in the streetscape must be carefully determined. Streetscape corners can prove very challenging where crossing pedestrian movements and other streetscape elements can create difficult conditions. Impact resistance requirements can create bollards that can become overly large, awkward design elements in a streetscape, particularly for high traffic areas where people must maneuver around or weave through them.

Figure 2-29: Crowded street furniture leaves little room for movement

Figure 2-30: Heavily armored builidng corner creates obstacle course

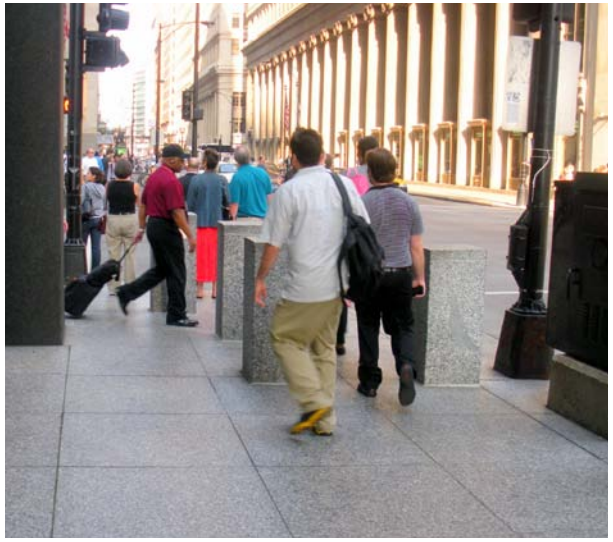


Figure 2-31: Directional conflicts combined with street furniture

Practical Applications of Shy Zones and Levels of Service

Transit: By far, the most common application of shy zones is in the design of transit facilities. Buses and bus stops create different pedestrian needs than a typical streetscape especially in heavily used transit hubs and stops. Transit patrons are specialized pedestrians with the goal of getting on and off buses and trains. The queues of transit patrons are often in physical conflict with other transit patrons or pedestrians making their way through the streetscape corridors.

Properly designed transit facilities need adequate room for queueing patrons who are waiting for the arrival of the bus or train as well as those patrons who are looking for their bus berth and those pedestrians who need to traverse the streetscape. When adequate space is not provided, transit patrons have been known to stand in unsafe positions that are too close to moving transit vehicles.

Bus stops are often placed in spaces that may be suitable for transit operations, but are not suitable for the facilities that accompany them. One-size-fits-all shelters are frequently placed at bus stops, sacrificing the quality and safety of the pedestrian spaces within the streetscape. These boxy shelters may contain seating and advertising space that can create blind spots and crowded conditions for bus patrons and pedestrians.

A solution to some of these tight conditions is to employ shelter structures with simpler supporting structures that rely on one or two supporting posts rather than the four posts commonly employed in standard transit shelters. A transit shelter with two posts located on the centerline can create a similar shelter zone as a four-post design while allowing for overlapping pedestrian zones behind the transit shelter for transit patrons and pedestrians.

Another solution is to utilize adjacent structures for the support of the shelter. While this creates a more complicated relationship between the transit agency and the building owner, it can provide heightened shelter opportunties for patrons in tighter locations.

Figure 2-32: Shy Zones at Building and Street Edges

Figure 2-33: Shy Zones at Light Poles

Maintenance and Community Commitment

Streetscape Investments

The success or failure of any streetscape project depends on continued, regular maintenance. Maintenance may come from the community, through maintenance agreements, or through budgets allocated for City departments to perform maintenance. The capital investment in a community through a streetscape should not be a short-term project, but one that will have a lasting positive impact.

Unfortunately, the natural elements and industrialized environment in which we live take a toll on infrastructure improvements. Materials, furnishings, and plantings used in streetscape projects are selected for durability as well as ease of maintenance, servicing, and replacement. Regardless of durability or installation, eventually all streetscape elements need maintenance including repair and replacement. This is especially true in the case of landscape plantings which require regular and active maintenance to appear thriving and attractive.

Given the many miles of city streets and landscaping that must be regularly cared for and maintained, a series of standard streetscape items has been established to help simplify this enormous task.

Maintenance and Community Ownership

The success or failure of any streetscape project depends on regular maintenance. This includes:

- Regular cleaning of the pavements.
- Regular painting, refinishing, refurbishment and replacement of streetscape furniture.
- Regular attention to landscape materials such as pruning, removing and replacing plants as needed.
- Regular soil enrichment program.
- Regular care and repair of irrigation system, if applicable.
- Regular repairs to pavements to eliminate tripping hazards.

This maintenance may come from the community through maintenance agreements or through budgeted allocations for city departments or BIDs to perform maintenance.

While most property owners do a good job of maintaining their own properties, few owners venture into important public areas frequented by customers. Therefore, community "ownership" and maintenance of the streetscape improvements (either through voluntary work such as weeding, watering, and general repair, or through monetary assessments for contracted work) are essential to the long-term viability of a streetscape project. While many City departments play a role in streetscape maintenance and upkeep, there are a variety of programs that help bring both economic and physical community involvement in streetscape maintenance.

Streetscape Functional Requirements

Streetscape Functional Requirements

The repetition of standard elements provides the foundation of the streetscape and defines its overall feel. However, successfully accommodating existing and special conditions is also an important part of streetscape design. Dealing with these conditions provides the challenge and opportunity to create solutions that not only harmonize with the overall fabric of the streetscape, but also increase its safety, accessibility, and overall functionality.

Sidewalk Classifications

Sidewalk width sets the stage for the streetscape, as it is the location in which most of the elements reside. Narrow spaces have greater limitations on the scale and size of elements that can be placed within the streetscape, while wider sidewalks offer more options. The City of Milwaukee would like to see creative use of the public realm as space permits. There are a variety of sidewalk widths on the streets of Milwaukee, each with unique design challenges and opportunities.

The following categories have been developed to illustrate the extent of streetscape improvements various sidewalk widths may accommodate:

- Less than 9' wide
- 9'-12' wide
- Greater than 12' wide

Once the sidewalk category has been established, the design process can begin.

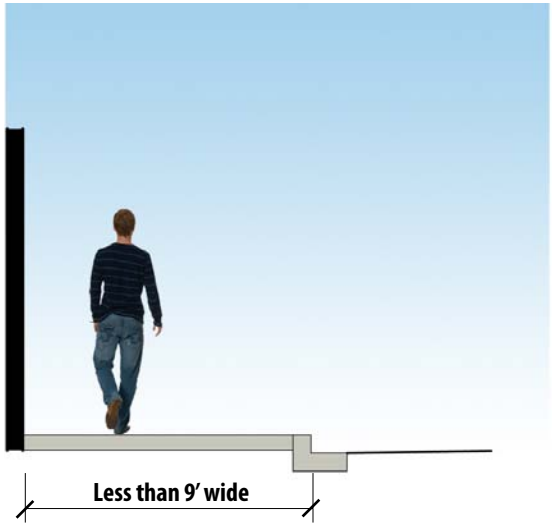


Figure 3-1: Sidewalks less than 9 feet wide

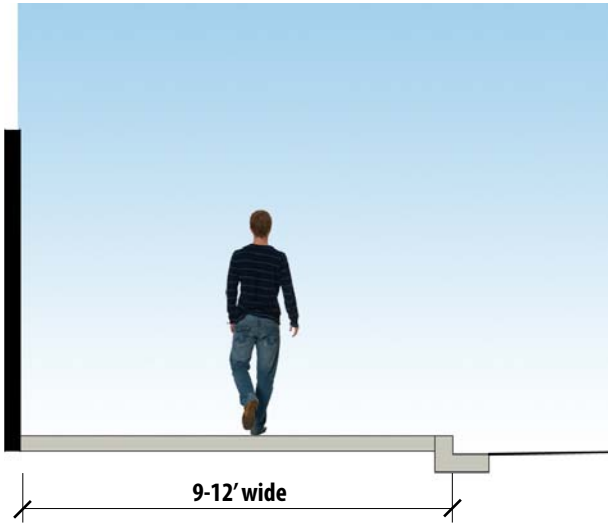


Figure 3-2: Sidewalks 9 - 12 feet wide

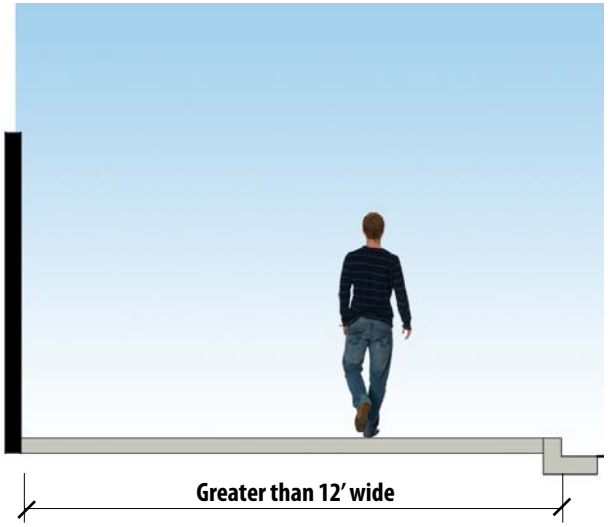


Figure 3-3: Sidewalks greater than 12 feet wide

Sidewalks Less than 9 feet Wide

Sidewalks in this category are the most challenging due to limited space available for pedestrians and the installation of streetscape elements. The shy zones at the building and curb can create net pedestrian zones of 5 feet or narrower. There is very little space for making improvements. When designing streetscapes in sidewalks this narrow, it is important to note that a minimum clear sidewalk width of 5 feet should be maintained. A minimum 3 feet clear sidewalk width is required per the Americans with Disabilities Act Accessibility Guidelines.

Streetscapes can still be very successful in this narrow condition and can include:

- Enhanced sidewalk pavement treatments
- Vertical elements such as banners

In this situation, plantings may be added to the streetscape by alternative means, such as:

- Hanging baskets on light poles
- Private planter boxes along buildings in the shy zone or hanging from adjacent buildings
- At intersections, side street curb extensions or "push-outs" with large planters
- Decorative or wayfinding street signs and kiosks

Issues of particular note for streetscape elements placed in narrow sidewalks are: the need to maintain adequate doorsweeps (space next to curb to allow car door swing); turning radii for school buses and large vehicles at corners; placement of traffic signals and large planters to maintain a clear line of sight at corners with push-outs.

Curb push-outs can mitigate the limiting effects of a narrow sidewalk by offering extra space for benches, trees or planters. The trade-off is loss of the curb parking area necessary to create the push-out and the turning radii for large vehicles on either side. Note: The vertical line of sight between 2.5' to 6' must still remain clear for streetscape elements and plantings placed on curb push-outs. Curb push-outs are typically not placed at signalized intersections because this eliminates the pull over area for bus stops and for automobiles, the right turn on red.

A cost factor in all of these solutions is the level of maintenance the community can perform. The maintenance of hanging baskets and planter pots is costly and requires a significant commitment by the community. A community commitment to maintenance is critical if such improvements are to be included in the streetscape.

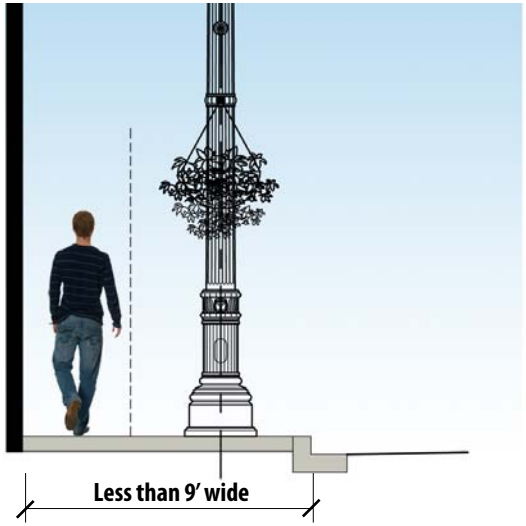


Figure 3-4: Shy Zones in sidewalks less than 9 feet wide

Figure 3-5: Planter pots in the shy zone along a storefront

Figure 3-6: Opportunities for vertical landscape elements

Sidewalks 9 to 12 feet Wide

Where adjacent land uses include parking lots or other open spaces, considerations should be given to share the landscapes that may be possible on the private side of the property line. Where possible, shade trees should be incorporated into those private property frontages so these narrow streetscapes can benefit from the shade created by the off-streetscape plantings.

Sidewalks that are 9' - 12' wide offer more flexibility. This width range allows for an ADA accessible route as well as a tree element planted in tree pits that are either open, covered with crushed gravel, mulch or tree grates. Heavily trafficked areas should use a walkable surface. Care should be taken that plantings do not obstruct a 5' - 7' clear walking path for pedestrians, wheelchairs and strollers.

For 8'-10' wide sidewalks, longer, rectangular tree pits are recommended. A tree pit of 3' x 6' aligned parallel to the curb would leave a 5' - 7' clear zone for pedestrian flow.

For sidewalks in the 10'-12' wide range, even wider tree pits are recommended. 4' x 6' or 5' x 5' tree pits are recommended.

Sidewalks in this category can also accommodate short benches (depending on the orientation), small kiosks, and small community identifiers. Placement must be carefully considered to not interfere with pedestrian movements.

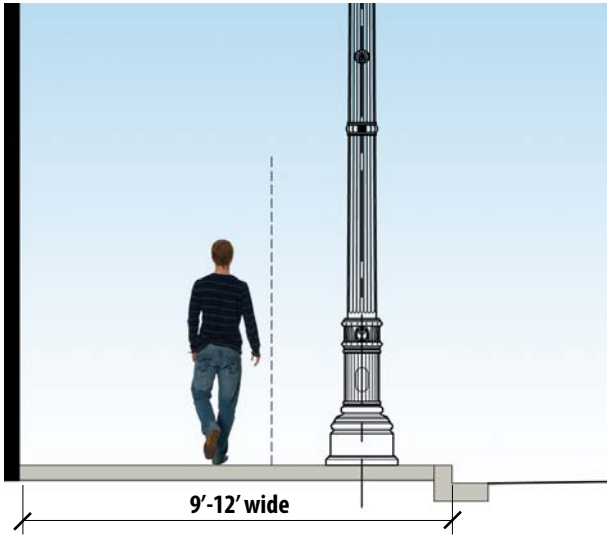


Figure 3-7: Shy zones in sidewalks 9' - 12' wide

Figure 3-8: Tree pit with salt lip and tree grate

Figure 3-9: Tree pit with mulch and benches in mid-range width

Sidewalks Greater than 12 feet Wide

This sidewalk width range offers the most flexibility. However, even with extra space, care must be taken to preserve pedestrian flow and accommodate various levels of service.

Larger greenspace areas are possible because of the available width. Planters should be as long and continuous as possible while still providing sufficient business and pedestrian access from the parking zone. These planters can be raised, curbed planters which offer a better way to protect landscape plantings from salt intrusion and damage due to pedestrian traffic.

Pedestrians and delivery persons must have access from parking spaces and loading zones. Utilities and other elements in the streetscape will also determine the location and frequency of breaks between planters. It is also important to maintain clear sight lines when installing planters, especially at intersections.

Once again, the level of maintenance the BID or community group is willing to perform should be considered when determining the quantity and size of the planters and the landscape treatments to be installed in each planter.

In addition to more green space, wide sidewalks can usually accommodate more street furniture and amenity elements, including benches, bicycle racks, vertical elements, bus patron shelters, and public art. The City also encourages uses such as outdoor cafes, sidewalk artists, and street vendors.

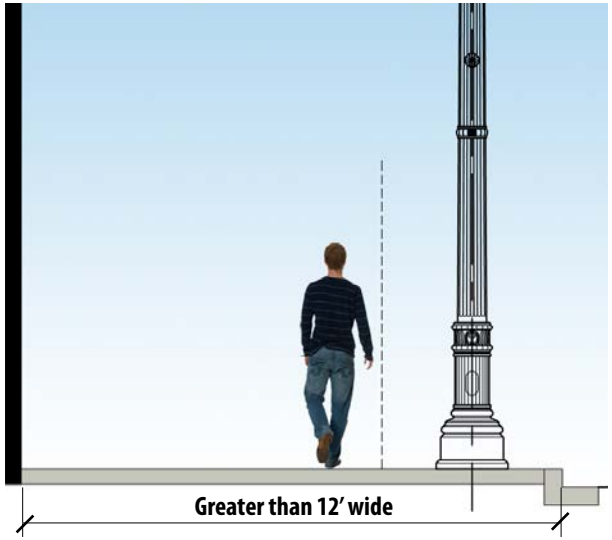


Figure 3-10: Shy zones in sidewalks greater than 12 feet wide

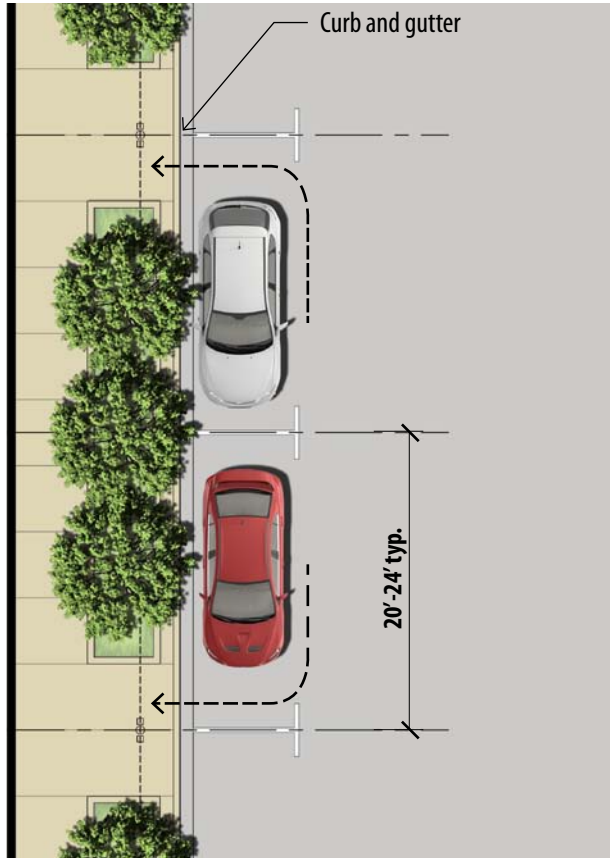


Figure 3-11: Limiting planter lengths to allow for access to vehicles and businesses

Figure 3-12: Raised, curbed planters

Parking

One of the key objectives of the City streetscape program is to promote neighborhood commercial, economic, and social development. To successfully promote commercial districts, parking is an essential component. Most city streets have parking on at least one side of the street, although there are several cases where on-street parking is partially or completely restricted. These include:

- High traffic streets
- Snow routes, on snow days
- Fire hydrants
- Public transportation stops and stations
- Loading zones
- Rush hour restrictions

The City's commercial areas typically have parallel parking. A limited amount of angled parking occurs, and may be appropriate on side streets adjacent to commercial areas. Angled stalls present a significant safety challenge by requiring the driver to back out into oncoming traffic. Larger vehicles may obstruct the view of adjacent vehicles, making a backing maneuver even more difficult. They may also project into the adjacent travel lane, creating a traffic hazard.

Specific guidelines have been developed to determine the feasibility of angled parking. These requirements are different for one-way and two-way streets. In addition, the existence of mature trees, driveways, loading zones, and low-height residential windows must also be examined.

In many areas of the city, parallel parking spaces are not striped into separate stalls but combined into a parallel parking zone and drivers are free to use the parallel parking lane as needed. Because the length of spaces is not delineated, car spaces will vary. This can create challenges for streetscape design given the interrelationship between parking and sidewalk zone elements like trees and lights.

The dimensions of metered parking stalls is an important design consideration. Metered parallel parking stalls are a delineated space that corresponds to a payment area. Dimensions may vary, but only slightly: an 8' wide by 24' long parking space provides good room for maneuvering. Parking stalls that are at the ends of the block can be down-sized to 8' wide by 17'-20' long. Parking stalls at the end of the block are also useful for rear or side-lift van accessible parking, where additional space is often beneficial.

Figure 3-13: Parking restriction signs

Figure 3-14: Angled parking on quiet side street

Figure 3-15: Parallel parking using kiosk and numbered spaces

Parking Meters and Kiosks

Metered parking stall dimensions can be used to help create the streetscape module that integrates the locations of trees, planters, lights, parking and other elements.

Currently, the City uses both single-head and double-head parking meters. Double-head meters have an advantage in the streetscape as they reduce the number of elements, which may be helpful aesthetically and functionally.

Figure 3-16: Patrons at Parking Kiosk

Parking Space Posts

In recent years, the City has been implementing parking kiosks which allow consumers to use cash or credit cards in areas where parking rates are relatively high, e.g., downtown. The kiosks eliminate the need to carry change. For example, two hours of downtown parking would require twelve quarters or thirty dimes at the old meters. The kiosk allows a $3.00 charge on a credit card for the two hours of street parking.

The parking spaces are numbered by a new small sign head attached to the top of the post that indicates the parking space number. Both the parking kiosks and parking stall number posts are streetscape elements that need to be accommodated in the overall design of the element line.

Figure 3-17: Parking Space Post

Door Sweeps

Parking stalls also affect the overall streetscape due to the influence of passenger doors opening into the sidewalk and roadway zones. Passenger doors of legally parked vehicles open outward over the curb and into the adjacent sidewalk zone. Door sweeps (minimum 24") need to be accommodated in the placement and arrangement of streetscape elements along the pedestrian zone. Placing elements within sweep zones can prohibit or limit opening passenger doors, causing damage to both the doors and to the streetscape elements and can severely restrict accessibility.

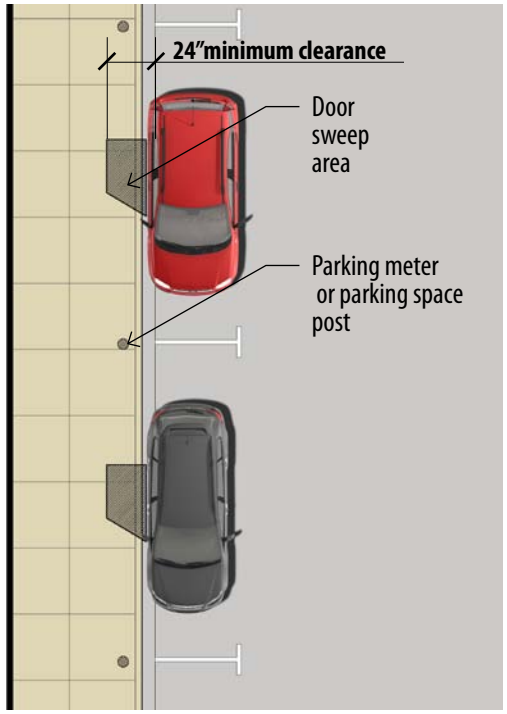


Figure 3-18: Door Sweeps

Corner Treatments

More streetscape elements are concentrated at corners than anywhere else in the streetscape. Corner treatments are a design challenge or opportunity for streetscape elements to overlap:

- Light poles and control boxes
- Traffic signal poles, lights and control boxes
- Pedestrian signal poles
- Regulatory signage
- Wayfinding
- Curb ramps
- Newspaper vending racks
- Trash receptacles
- Bus shelters / transit stops

In the middle of this potential clutter, pedestrians gather to make decisions on direction. Pedestrians waiting to cross in one direction must make way for pedestrians entering the corner from the other direction. In high pedestrian volume areas, this can be a challenging space to navigate.

To highlight the importance of these areas, streetscape treatments may be upgraded at corners, including the use of special pavements, seating, lighting, and other street furniture elements. These elements need to be carefully integrated with the other elements–lighting, traffic control devices, and regulatory signage–in order to not add to the visual and physical clutter.

During the design process, the streetscape designer should consider how to wrap the corners of the streetscape and to what point the streetscape extends down side streets.

In many cases, City of Milwaukee streetscape projects include a half block "return" on cross streets, or a continuation of basic infrastructure upgrades from the main street to the alley on the cross street (where alleys are present) or approximately half a block where alleys are not present.

Streetscape treatments can extend to building corners, window corners, other logical building breaks, or alleys. The goal is to end the streetscape in a way that blends within the context of the neighborhood and immediate surroundings.

Figure 3-19: Corner treatment

Figure 3-20: Corner treatment

Figure 3-21: Corner treatment

Curb Push-Outs or Bump-Outs

As a variation on standard corner treatments, bump-outs create additional pedestrian space in place of vehicular surfaces.

When allowed, bump-outs can be used at intersections on side streets or at the middle of the block. A typical bump-out is 7' wide by 20'-30' long. A bump-out can provide the following advantages:

- It shortens the distance that a pedestrian must travel to cross a street. Pedestrians will feel safer in these expanded pedestrian zones.
- It increases the sight distance between motorist and pedestrians crossing the street.
- It creates additional pedestrian space that can be used for amenities, bus shelters, and landscape treatments.

Careful traffic and parking analyses must be performed to determine the location of bump-outs and whether or not they are appropriate for a specific streetscape.

In addition, bump-outs need to be carefully coordinated with the various City departments especially those departments responsible for maintenance and snow removal. A few slight design changes can make maintenance, such as street sweeping or snow-removal, easier and more effective.

Note: As with all streetscape plantings and most larger opaque elements, a clear sightline from 2.5' to 6' should be maintained so pedestrians and storefront windows are visible from the street.

Curb push-outs or bump-outs are generally not used at bus stops. The push-out forces the bus to stop in a travel lane next to the curb push-out, which causes a traffic hazard. Curb push-outs are also generally not used at signalized intersections because they prevent right-on-red turns from the parking lane.

Bump-outs should have green spaces included where possible. These greenspaces should be enclosed with curbing and possibly low metal railings that protect the plantings from pedestrian damage and increase a snow plow driver's awareness of the location of bump-outs. These raised planting curbs should be set back from the street curb to allow for snow storage.

Figure 3-22: Bump-out with room for street furniture

Figure 3-23: Bump-outs can accomodate many different elements

Figure 3-24: Bump-out with raised planting area

Crosswalks

Crosswalks are where pedestrians are legally allowed to cross city streets. The Manual on Uniform Traffic Control Devices provides guidelines for marked crosswalks, as well as standards and guidelines for crossing improvements. This document should be used in combination with professional judgment and specific traffic engineering analysis on a case-by-case basis when designing crosswalks. Pedestrians have the right to cross the street in the safest way possible, and crosswalks should be designed accordingly (Source: "Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO Draft August 17, 2001).

At intersections, crosswalks are defined as the extension of a designated walkway or pedestrian pathway across an intersection, whether marked or not. (Source: "Guide for the Planning, Design and Operation of Pedestrian Facilities", AADAG, 2001). Wisconsin Statutes, Chapter 340, defines a "marked crosswalk" as any portion of the roadway indicated for pedestrian crossing by signs, lines or other markings on the surface.

Marked crosswalks generally consist of two white parallel lines perpendicular to the direction of traffic. Crosswalks vary in width and should align with the edge of the right-of-way (usually the property line) and a line extended from 2' back of the curb face. Typically they are 6'-10' wide and should merge at the corners of the intersection, where there is a double or single curb cut that aligns with the crosswalk. In special situations where it is common to have crowds, the crosswalk sizes can be increased to accommodate large numbers of pedestrians.

Crosswalks can become an important element in the streetscape environment by physically and visually linking opposite sides of the street. This continuation of the pedestrian zone through the parking and vehicular zones can be accomplished not only by striping, but by using various materials and patterns that may already occur in the streetscape.

A number of materials have been used to create special crosswalk surfaces in the city including pavers, standard asphalt and concrete, and stamped concrete and asphalt. These materials have been used with varying degrees of success. Unit pavers are rarely used due to both aesthetic and maintenance issues, such as chipping and heaving of pavers that result in uneven surfaces.

Maintenance must be considered when making material selections for crosswalks. The City's preference, from high to low, is:

- Concrete (may be colored) with a scored pattern
- Specialty treatment asphalt such as Duratherm
- Unit pavers (sandset or traffic resilient setting)

Regardless of material used, it is typical to outline the crosswalk with parallel white demarcation lines on either side.

Figure 3-25: Colored Concrete Crosswalk

Figure 3-26: Asphalt with Painted "Ladder" Crosswalk

Figure 3-27: Standard Concrete Crosswalk

Mid-Block Crossings

In rare cases it may be acceptable to install a crosswalk at the middle of the block where this is a logical crossing point. Since vehicles may not expect a crossing in an area where they generally are not required to stop, these areas must be carefully studied and well marked with high visibility pavement markings.

International crosswalks, a series of ladder-style parallel bars running in the direction of traffic, are typically used in combination with traffic calming devices, such as warning signs, increased lighting, crossing islands, and curb push-outs.

Typically, a minimum amount of parking (100') must be removed in advance of the crosswalk for visibility of pedestrians by motorists. The presence of curb push-outs will improve visibility, thereby reducing the amount of parking that must be removed in advance of the crosswalk.

Driveways and Alleyways

Driveways into parking lots, garages, and other properties often create a challenge for the streetscape designer. Driveways may create a breach in the fabric of the streetscape where the module elements may need to be adjusted or deleted to accommodate the driveway function.

Driveways and alley aprons need to be treated as a pedestrian surface; the pedestrian surface should appear to be unbroken (driveways are flared with no curb returns or grade separations) as the pedestrian travels through the streetscape and across the driveway. This includes continuation of the sidewalk pattern and treatments across the width of the driveway or alley. Driveways and alley aprons must be constructed according to City design standards and using heavy-duty pavement to withstand heavy wheel loads created by refuse trucks, fire trucks, and similar vehicles.

Figure 3-30: Alley crossing pedestrian zone

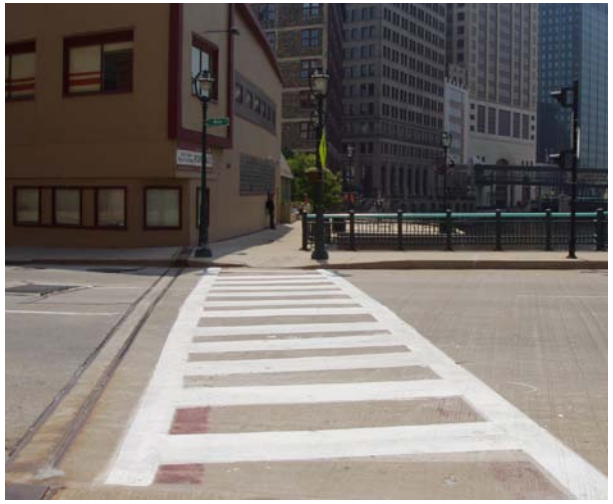


Figure 3-28: Mid-block crossing connecting two segments of riverwalk

Figure 3-29: Driveway treatments should put pedestrians first

Figure 3-31: Mid-block driveway with minimal curb returns and grade separation

Hollow (Vaulted) Sidewalks

Hollow, or vaulted, sidewalks are a building remnant from the past that creates special challenges in the development of streetscape projects in the city. According to City of Milwaukee ordinance, hollow walks are the responsibility of the property owner.

Some of the city's vaulted sidewalks date from the middle of the 19th Century and were used for a number of purposes; mostly coal storage and utility connections to buildings. Over the years, some have been abandoned and filled in. However, many are extensions of building basements and still in use for storage or other purposes.

As with any building system, hollow sidewalks need maintenance, repair and eventual replacement or removal. In the interest of long term savings on maintenance, the City has sought to fill and seal these vaults as a safety measure for both pedestrians and building owners alike.

When a hollow sidewalk is noted within a streetscape project, special, more expensive, procedures are used for sidewalk reconstruction. First, a wall is built at the property line. Existing private utilities are moved, at the owner's expense, to the interior of the new wall. Hollow sidewalks require a socket or base for street lighting and ductwork for electrical connections as needed (street light foundation by the private utility at owner's expense).

The hollow area between the property line wall and the curb line wall is then filled with granular material, compacted, and sealed with a concrete sidewalk. The sidewalk and vaulted sidewalk roof are removed and a new vault roof is constructed. Waterproofing is applied to the vault roof prior to a new sidewalk surface being installed. The new sidewalk can be any of the surfaces the City uses now including concrete sidewalk pavements and unit pavements.

Figure 3-32: Bridges used during hollow sidewalk reconstruction

Figure 3-33: Waterproofing reconstructed hollow sidewalk

Figure 3-34: Waterproofing reconstructed hollow sidewalk

Bus Stops

The Milwaukee County Transit System (MCTS) provides public transit services for the City of Milwaukee. Bus stops are treated as utilitarian not streetscape elements, with markers that simply note the stop and the route number. Bus stops in commercial areas may or may not have a shelter and may be no more than a posted sign.

As described earlier, bus stops can create challenges for the overall design of the streetscape if not properly configured. Bus stop locations must accomodate the berthing of the bus, patron queuing and the minimum 5' - 7' passage of non-transit oriented pedestrians along the streetscape.

The streetscape designer must be knowledgeable in transit operations to accomodate the front and rear patron doors in the MCTS buses so streetscape elements are not placed where interference is caused.

Bus Patron Amenities

Clear Channel Outdoors, a media company that currently provides outdoor advertising, may select and purchase enhanced shelters, seating and trash receptacles for bus patron use.

When selecting bus patron amenities, special consideration must be given to their heavy use, durability, maintence and resistance to vandalism.

A clear walking path in front of or behind a bus shelter is critical to pedestrian safety and comfort.

Bus Pads

The City has been installing a thick, concrete pad in the right lane at the most heavily used bus stop locations because of the heavy wheel loads and braking action of the buses used by the MCTS. This is to discourage premature deformation of the asphalt pavement at locations where buses make repeated stops on a daily basis.

Figure 3-35: Standard Bus Shelter with Advertising

Figure 3-36: Designer Bus Shelter with Patron Amenities

Figure 3-37: Bus Pad

Medians

The City of Milwaukee takes great pride in the median and award winning boulevards it has created over the course of a century. The City's long history of boulevards began in the 1920's with the first landscaped and irrigated boulevard. Currently, Milwaukee has over 120 miles of boulevards.

Recently, care and planting of the boulevards has taken a shift toward design and construction techniques that will reduce the amount of maintenance needed to keep the boulevards in good condition.

As part of the Milwaukee Strategic Boulevard Plan, a number of guidelines were developed to guide construction and future maintenance of the boulevards.

- A combination of annuals and perennials (but no evergreens) will be planted in the signature beds
- All beds will contain combinations of ornamental trees, shrubs, perennials and annuals
- All annual bed areas will be located at the borders or at the most highly visible focal point of the bed
- All bed grades will be raised for visual aesthetics
- All beds will contain some raised natural stone visual elements (primarily borders)
- All bed sizes will be dictated by the site location and follow the shape of the median where possible
- All beds will be a minimum of 800 SF, maximum of 2,000 SF
- All beds will be mass planted with closely spaced plantings
- All plant species will be selected for high salt tolerance, ease of maintenance, four-season color, flowering and texture characteristics
- Bulb plantings will be included in the shrub and perennial areas to add drama and color
- Species of annuals, perennials, grasses and shrubs to be limited to two species of each per bed
- All bed installations will be coordinated with irrigation contractors for proper head layout for cost savings and maintenance efficiencies
- Visual clear zones (between 2.5' and 6' above street grade) will be maintained near corners and median openings

Figure 3-38: Median planting can be highly varied

Figure 3-39: Median tree plantings add color and interest to streetscapes

Figure 3-40: Dramatic median through the Marquette campus

Bicycle Lanes

Figure 3-41: Bike lanes should be well marked and wide enough for safe riding

In an effort to promote transportation alternatives, recreation, better air quality, and environmental awareness, the City of Milwaukee is in the process of implementing a Citywide Bicycle Plan. This plan includes provisions for adding bike lanes on arterial streets in order to promote greater bicycle ridership among citizens and ultimately decrease auto dependency.

The following are some of the minimum desirable dimensions and requirements for bike lanes:

- Typical bike lane width is 5′. Placement of the bike lane is directly adjacent to the parking lane. For a standard 66′ right-of-way, this allows for a 48′ pavement width, giving a 11′ travel lane width in two directions, and a parking lane width of 8′.
- At approaches to channelized intersections, bike lanes are not distinguished. Delineation striping stops 125′ prior to the intersection. Bicycles share the road with cars in the right turn lanes and through lanes.

Bike lanes achieve a shared streetscape experience between the sidewalk, parking lane, and travel lanes. The impact of a bike lane on a neighborhood may be to encourage further bike-oriented travel, which helps reduce traffic congestion and pollution. This is especially true for short trips of five miles or less.

DPW typically determines locations for, and installs, bike lanes. When existing bike lanes are present in an area slated for streetscape improvements, they must be carefully incorporated into the design of the streetscape.

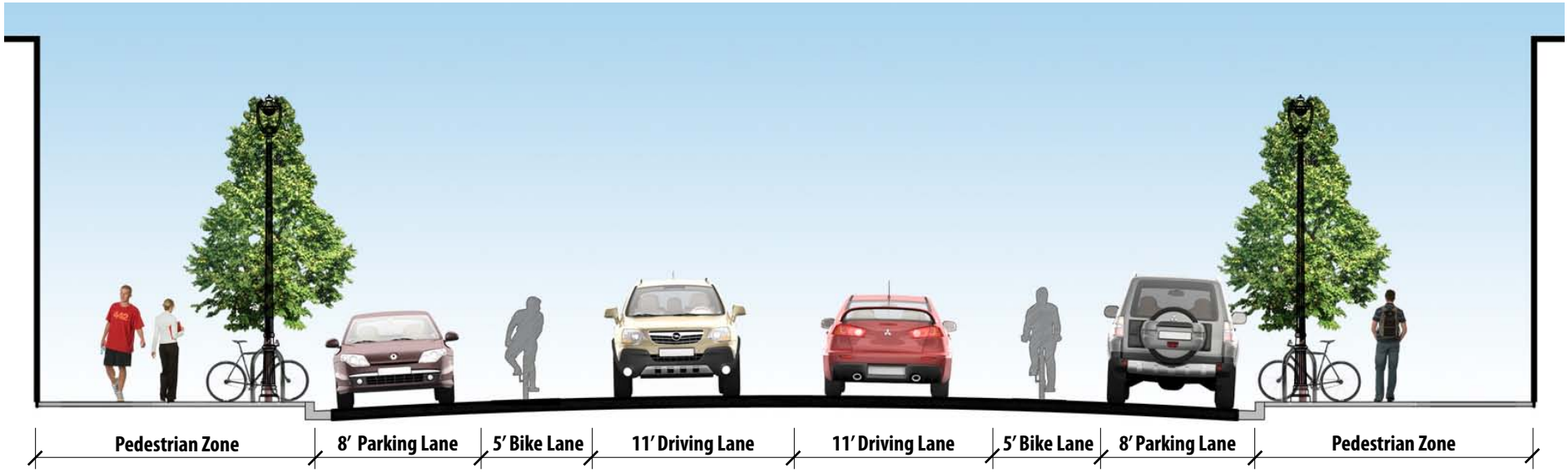


Figure 3-42: Parking/Bicycle/Travel lane example

Special Security Issues

As a result of increasing homeland security concerns, the need for specially designed security barriers in the public way at selected sensitive buildings has become a new streetscape design issue. In these situations, it is important to retain a pedestrian-friendly environment. This includes maintaining a clear pedestrian path throughout and incorporating plantings and street trees whenever possible.

The General Services Administration (GSA) has developed a set of guidelines for developing secure perimeters around federal buildings under its jurisdiction. GSA guidelines need to be consulted during the development of streetscapes around federal facilities.

While some of the techniques for hardening the perimeter of these sensitive buildings can seem harsh, with proper planning these elements can provide multiple functions in the streetscape. Many perimeter security installations are combining bollards with hardened raised planters that create visual and pedestrian amenities while functioning as barriers. The presence of security cameras may also impact tree placement and/or pruning, but not eliminate trees from the streetscape.

Figure 3-45: Combination of bollards and hardened planters

Figure 3-43: Cast iron bollards and hardened planters

Figure 3-44: Continuous raised and hardened planters can provide color

Figure 3-46: Continuous raised and hardened planters can provide amenities

Sustainable Streetscape Design

Streetscapes have long been participating in sustainable design with the need to recycle concrete and bituminous pavements to keep those materials out of landfills. Recently, new techniques and technologies have evolved to bring a higher level of sustainability to the design and engineering of streetscapes.

Lighting: As solar powered lighting elements continue to improve in appearance and function, there is the possibility that their use could help decrease the City's total power consumption in the future. Currently, there are functional problems with snow cover and aesthetic issues with the industrial look of solar lights. However, the City's DPW will continue to monitor improvements.

Light pollution: Light pollution can have negative effects on human health, disrupt ecosystems and be disorienting to the migratory patterns of birds. There is also the energy waste and cost of misdirected light, but not always enough to warrant retrofitting older light fixtures with cutoffs to reduce glare or light trespass. Dark sky design is gaining popularity in many cities as residents express a preference for a dark night sky over the ambient haze or glare (light pollution) given off by older model light fixtures. However, residents of Milwaukee have not expressed a strong preference for dark sky design or an opposition to light pollution. Therefore, it is unlikely that the city will undertake an expensive retrofit to reduce light pollution at any point in the near future.

Permeable Pavements: Decreasing the flow of surface water into the storm sewer system has become a high priority in the City of Milwaukee. Permeable pavements are an effective method for putting surface water into the subgrade where it can naturally percolate into groundwater. This can have several benefits as the water can be cleaned during this process of percolation. Solids are often left behind in the percolation process through a permeable pavement system and some biologic cleaning can also occur.

Permeable pavements can be created in concrete, asphalt or unit pavers. While research is still on-going, permeable pavement systems appear to be the most long-lasting and easiest to install and maintain.

Bioswales: As with permeable pavements, bioswales are useful for getting the water back into the ground rather than directing it to storm sewer systems. Bioswales consist of water-tolerant plantings that are planted in a free draining media that helps to filter the water as the water percolates through the system. To be effective, bioswales must be properly sized to create effective infiltration areas. Medians and boulevards are ideal locations as are larger bump-out areas in streetscapes.

Bioswales require regular maintenance as the water flow will tend to bring debris into the area. The fluctuating and irregular water levels require careful considerations to choose planting materials that can tolerate these conditions. Designers must also be aware of foundations for street lights, cable, and traffic control elements. Bioswales should not be located in areas near utility cabinets and light fixtures.

Figure 3-47: Solar powered street lighting

Figure 3-48: Permeable pavements can help to reduce runoff

Figure 3-49: Bioswales can help filter runoff water

The Future

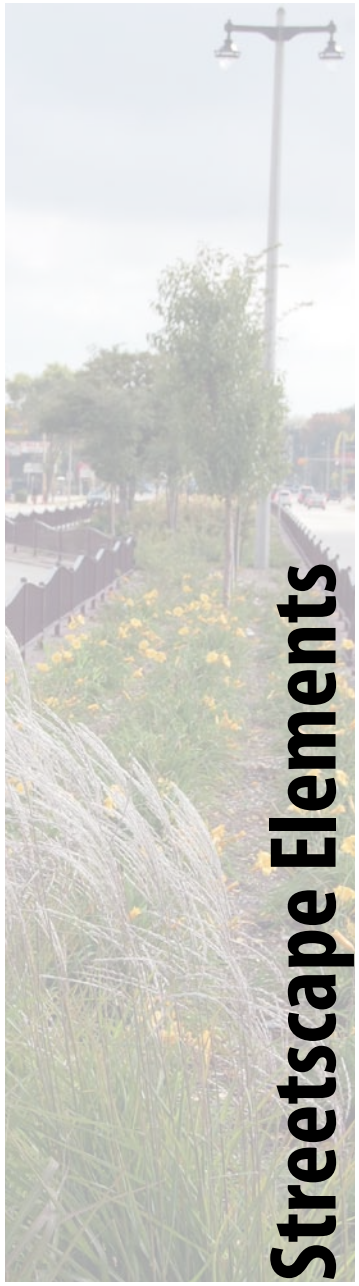
As modes of transportation change, streetscapes will need to evolve to meet the needs of transit patrons, pedestrians, motorists, and bicyclists. The City of Milwaukee is considering a street car system to augment its mass transit system. As this streetcar system is being developed, special attention will need to be taken to accomodate those new transit vehicles in both existing and new streetscapes, and most likely, in a shared right of way.

These transit technologies will continue to evolve in the future and will not only affect the transit vehicles, but the shelters, vehicle boarding areas, street lights and support elements (catenaries, rails, etc.). Future designers and engineers will need to incorporate these new transit-oriented features into Milwaukee's streetscape.

Figure 3-50: Milwaukee Street Car Concept Showing Shared Right-of-Way

Figure 3-51: Milwaukee Street Car Concept

Figure 3-52: Milwaukee Street Car Concept Detail



Streetscape Elements

Lighting

The City of Milwaukee owns and operates a unique electrical system that is divided into roughly two equal halves. Each half is defined by the voltage of the system. The first half is a fairly conventional system consisting of 240V roadway and pedestrian luminaires and poles commonly found in cities across the country The other half of the system is a much older, unique electrial system that uses an extensive arrangement of 2200V cabling and transformers to power a special set of light fixtures.

There are transclosures that contain the electrical equipment necessary to supply energy to the lighting systems. Because they are above and not below ground in Milwaukee, they create significant elements in the streetscape. There are also cabinets which house the electrical components needed for the outlet circuitry.

Milwaukee's Electrical System

There must be a clear area around these transclosures, which must meet all National Electrical Code (NEC) and National Electrical Safety Code (NECS) standards. This is an OSHA requirement and cannot be modified.

Because these large, highly visible transclosures and cabinets do create significant elements in the streetscape, they should be given a graphic design, a community-oriented image or civic logos, so they can become more attractive landscape features.

In either system, circuitry is accomplished with the installation of cable, conduit, junction boxes, box outs and other methods which allow for maintenance of the systems after installation. Typically, the conduits extend from pole-to-pole and are installed within the first two feet back from the curb.

Lighting Styles

Special care is needed when working in this zone. Streetscape designers must accommodate this zone when designing streetscape improvements.

To accomodate holiday lighting elements, a separate circuit can be provided to supply power to 120 volt outlets mounted on the poles. The power available at each outlet is generally limited to 120 watts (one amp/two amp maximum load per outlet per circuit). The BID will be responsible for the energy consumed, electric company charges, and maintenance (done by the City at BID expense).

Only City of Milwaukee electricians are allowed to install electrical equipment which will be connected to the City's system.

Figure 4-1: Transclosure and davit pole installation in median

Figure 4-2: Transclosure installation improved with community-oriented art

Figure 4-3: Milwaukee Harp Luminaire

Lighting Styles

In the early part of the 20th century, the City of Milwaukee designed and used as standard lighting, luminaires known as the Milwaukee Harp and the Milwaukee Lantern. Fabricated in various cast metals over the years (aluminum, iron, and steel), the teardrop fixture has been used in single and double combinations and on metal or concrete poles depending on the application in the city.

The Milwaukee Harp is generally used for pedestrian level lighting and can be mounted on steel poles (dark green or black poles and mountings for Harps and Lanterns) or pre-stressed concrete poles (standard gray or black finish for concrete). Due to the added cost, the Double Harp mounting is currently available for use only on Wisconsin Avenue.

Figure 4-4: Double Harp luminaire detail

Harp Luminaire

Figure 4-5: Harp luminaire on metal pole

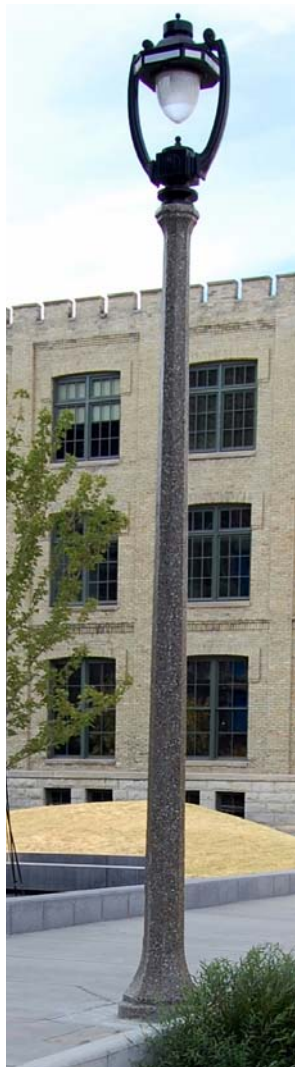


Figure 4-6: Harp luminaire on concrete pole

Harp Luminaire Variations

Figure 4-7: Double Harp Installation with banners

Milwaukee Lantern

Figure 4-8: Harp luminaire - single davit arm configuration

Figure 4-9: Harp luminaire - double davit configuration

The Milwaukee Lantern is essentially a harp with a yoke removed with the luminaire installed in a pendant configuration at the end of a decorative arm. The lanterns have been designed for use on tall poles (either 13′ or 15′), usually concrete, but metal poles have also been used (steel is acceptable, aluminum is no longer used).

The Harp and Lantern luminaires all utilize a high pressure sodium light source in a number of wattages depending on the fixture height and the intended use.

The City designs lighting to meet the current standards established by the Illuminating Engineering Society of North America (IESNA). Spacing criteria is a minimum of 25′ between trees and lights, and a minimum of 40′ between street light pole and traffic signal face. However, there is no set lighting level or pole spacing because of the wide diversity of streets, layouts, traffic levels, and pedestrian traffic levels.

Each project presents a unique set of design parameters. The City's Lighting Department (within the Department of Public Works), makes the final decision regarding lighting levels and pole spacing.

Exact placement will vary with conditions and streetscape design. For example, Milwaukee Harps (octaflute poles) are typically set back 36″ from the face of the curb, except on Highland Avenue they are set back 30″, and on Wisconsin Avenue, where the streetscape is more elaborate, they are set back 48″.

In order to maintain a consistent "Milwaukee" identification throughout the city, only Harp Luminaires and Milwaukee Lanterns will be allowed for lighting in all future streetscape projects. Harps are typically placed 25′ on center, and set back 3′ from front of curb.

Historic Third Ward Fixture

Figure 4-10: Historic Third Ward Luminaire and Pole

Milwaukee's Historic Third Ward has a special fixture reserved for its exclusive use as part of its overall palette of streetscape elements.

This nautical-inspired element is a drop pendant luminaire with an exterior cage over an opalescent glass or plastic dome that covers the light source. This fixture is used primarily in double-luminaire configurations, however, at special locations quad units have been installed. The color of the metal pole and other components matches the other metal streetscape elements in this Business Improvement District and contributes to the area's unique identity.

The City has made special arrangements with the Historic Third Ward BID to stock and maintain these special fixtures. While the City will repair and replace these units, the BID provides the poles and parts to the City directly.

Figure 4-11: Historic Third Ward - Quad Fixture

Figure 4-12: Historic Third Ward Streetscape Lighting

Standard Poles and Luminaires

Figure 4-13: Davit "cobra" luminaire on concrete pole

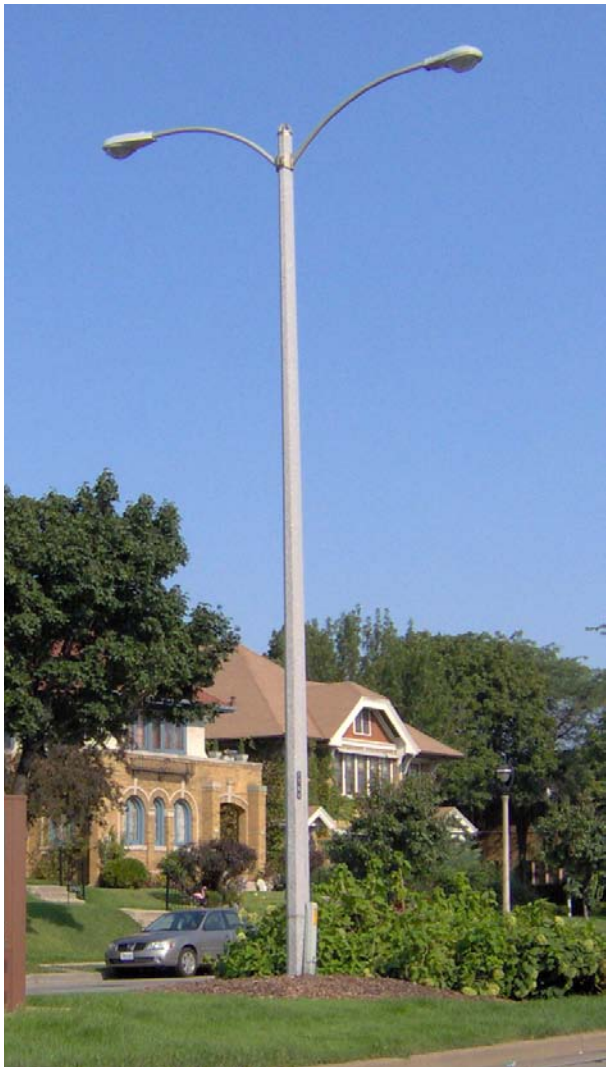


Figure 4-14: Double-armed davit "cobra" luminaires on concrete pole

The city also employs a set of standard davit arm fixtures for use in the residential areas of the city. These fixtures are standard "cobra" style luminaires mounted on steel arms on concrete poles.

Tree and Plant Materials

Tree and plant materials add four-season color, interest, and texture to a streetscape. The goal is to efficiently manage the urban landscape to provide a better quality of life for our citizens and visitors. It is important to consider a number of items to ensure a successful landscape.

Use and Effect

The intended use of the landscape should be at the forefront of the design process. What is this landscape intended to do? Whether the intent is to control traffic, screen or enhance views, provide a background for an adjacent use, or just to soften the existing streetscape, the intended use and its desired effect must be considered in the choice of plant materials.

Plant heights must also be considered to ensure safety and security in the streetscape. Hybrid varieties, including dwarf and columnar plants, have been developed over the years to create a wide range of choices for the streetscape designer.

Plant Color

Color is probably the most striking design feature of the landscape. It can attract attention to a single plant or a mass of plants. It can create an atmosphere of warmth or a cooling effect. Two color techniques are generally used in landscape design: background color and accent color.

Background color establishes the basic theme of the landscape, providing a backdrop on which to present a harmonious composition. Accent color serves to emphasize certain features in the landscape.

Color must be used carefully in the composition of the landscape. Light and cool colors (blues and greens) represent a calm, thoughtful landscape. These colors also appear farther away, or recede from the viewer. Bright and warm colors (reds, yellows, oranges) excite people and may guide the viewer through a landscape. These colors appear nearer to, or to advance toward, the viewer.

Figure 4-15: Median plantings with varying textures

Figure 4-16: Mixes of perennial and annual plantings add seasonal color

Figure 4-17: Fall tree color

Sight Triangles

Sight triangles are a method of quantifying the requirements for determining plant heights in certain conditions. Sight distance triangles are generally based on the design speed of the roadway and may be covered by AASHTO and WisDOT requirements. At intersections where plantings are included, the sight triangles help to determine where plantings of certain heights can be included.

Milwaukee sight triangle requirements vary by zoning classification and intersection type. Within sight triangles, mature plant heights (excluding trees) should not exceed 12-18" in height. In other applications, trees and shrubs should not block a 2.5' - 6' clear vision zone, above the plantings and below the crown of the trees, so that drivers can see pedestrians and on-coming vehicles. Other opaque elements should not obstruct this clear vision zone.

Curbed planters are often used, and the curb height should be included in any mature plant material height calculations. Median plantings have a special set of sight triangles based on design speeds of the roadway and the various positions of the driver.

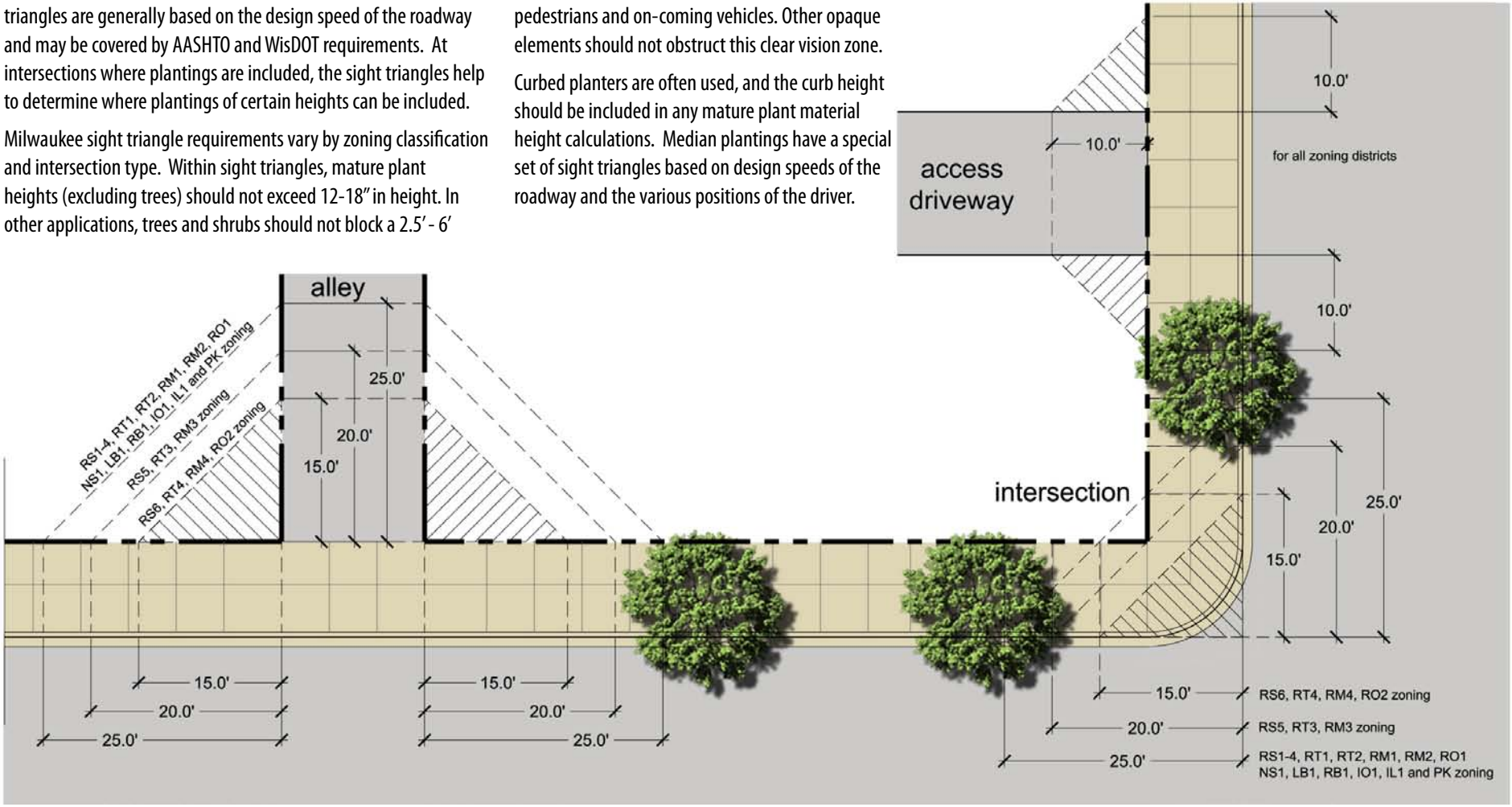


Figure 4-18: Sight triangle

Plant Maintenance

Maintenance must also be considered in the choice of plant materials. A maintenance free landscape does not exist; all landscapes, even those labeled as low maintenance require some degree of attention to tend to the needs of live plant materials including:

- spring cleanup of prior season's growth
- removal of refuse blown into planting beds
- replacement of damaged or dead plant materials
- periodic tending to plant installations including weeding, pruning and similar activities

Salt Tolerance

Streetscapes can be some of the harshest environments in which to expect plant materials to survive and given the need to keep streets clear of snow and ice in winter, plant material with a high salt tolerance must be used. The City maintains a list of plant materials that have been successfully used in DPW projects.Adding to this knowledge base is regional research in Milwaukee and other cities on new plants that can be used in these environments.

The availability of water and the presence of underdrainage in medians can help in ensuring the long-term survivability of plantings. Water - manually applied or via an irrigation system - is often used in the early spring to help flush out any salts that may accumulate over the winter snow events. The drainage systems carry this water away to keep the salts from accumulating in the lower soil layers.

Although it is still recommended that salt tolerant plants be used in this environment, other design features can be incorporated into the streetscape to help ensure the survivability of plants in the streetscape. For example, raised salt lips around tree pits, raised planter beds, and "carriage walk" or door swing separations between planter beds and parked cars (approximately two feet), can be used to increase the distance of the plants from the road. Specially designed salt fencing can be installed during the winter to further protect this investment.

Figure 4-19: Trimming landscape areas

Figure 4-20: Salt tolerant plantings can include a wide variety of plants:

Figure 4-21: Ornamental grasses and daylilies

Planting Soils

Providing the proper planting soils in streetscape projects is very important. Standard topsoil should not be used alone; it must be augmented with materials to increase the drainage characteristics of the soils. A recommended soil mix could include the following:

- 50% topsoil (by volume)
- 30-40% sand (by volume)
- 10-20% organic mulch (by volume)

Nutrient-rich organic material needs to be carefully considered; while providing essential nutrients to the plant materials these nutrient-rich materials can add to salt residue buildup in the soils.

Mulches should also be used after plant installations; hardwood bark mulch for trees and shrubs and a finer material for perennials helps maintain soil moisture content.

Drainage

In combination with proper planting soils, proper drainage can help ensure good plant growth. In areas of the city where soils drain freely, providing extra drainage systems is not necessary. Where subsoils do not drain freely and water will accumulate in planters or tree pits, removing the water with underdrains is critical to plant survival.

Underdrains can be constructed of either perforated polyethylene or PVC pipe and connected to the storm sewer system.

One of the most important aspects of landscape maintenance is the availability of water to supplement natural precipitation. In the spring, using irrigation to flush out accumulated salts can greatly help plant materials survive.

Irrigation

Irrigation can be either by automatic irrigation or hand watering. Automatic irrigation consists of underground piping connected to pop-up sprinklers or drip lines located in the planters. These systems are maintained by the City and perform automatically, usually at night. The hand watering method uses quick-couplers with hose bibs. A standard garden hose can be attached to these for manual watering of the planters. The hose bib is a separate piece that is easily installed and removed to prevent undesired use. Although the City maintains the piping, the hose bib may be kept with the Business Improvement District or members of the community who have agreed to take responsibility for maintenance.

Figure 4-22: Installing planting soils

Figure 4-23: Underdrain pipe

Figure 4-24: Median irrigation being tested

Planters

Streetscape planters come in a wide range of styles and sizes. When placing planters, it is important to consider accessibility. Federally established accessibility guidelines allow a 32″ minimum pinch point for a 2′ maximum travel distance. Downtown areas with high pedestrian traffic require more accessible passage space than the 32″ minimum required by law. In addition to freestanding planters, light standards and other street amenities must comply with this passage requirement.

Flush Planters

Flush planters have no curb and are placed at the same elevation as the surrounding sidewalk. Flush planters can be installed with or without railings, with turf, or with more intense plantings including groundcover, annuals, perennials, ornamental grasses, and shrubs, or simply mulched. When more intense plantings are used, a railing is recommended to protect the plantings. The best example of a flush planter is a typical turf parkway.

Pedestrian traffic levels must be taken into account when designing flush planters, as they may be used for additional walking space if adequate space is not allocated. In this scenario, railings may be warranted.

Curbed Planters

Curbed planters can be poured in place or constructed of precast concrete, granite, or other natural stone. These planters, varying in length, are generally 6″-8″ in height and may have a variety of profiles, depending on the design intent of the project. The minimum size for planters, as measured from the inside of the planter curbs, is 4′ in width and 8-1/2′ in length. Planters can be installed with or without railings.

Sidewalk drainage is a key consideration when designing the placement of curbed planters. Sidewalks should be graded so that water on the sidewalk, behind the planter, drains in between the planters to the street.

Figure 4-25: Overly large planters can constrict pedestrian movements

Figure 4-26: Flush or salt lip planters can provide access to parked cars

Figure 4-27: Curbed planters can provide protection to plants

Free-Standing Planters

Free-standing planters come in a variety of sizes and shapes and can be precast concrete or a synthetic material, such as glass fiber reinforced concrete (GFRC). The planters are placed above ground and rest on the sidewalk, adding color and texture in tight areas or where underground conditions, such as utilities and vaults, prevent in-ground planters from being installed. Planters are allowed on hollow sidewalks, provided owners prove the sidewalk is structurally sound.

Caution must be taken to maintain the accessible route when placing free-standing planters. Care should be taken during installation to keep planters level. Planters may be decorated for interest in all seasons, such as pine boughs for winter and forced bulbs for spring.

Figure 4-28: Planters provide seasonal interest.

Hanging Baskets

Hanging baskets are specially designed hanging flowerpots often constructed of open metal bands and filled with a lightweight planting soil. Hanging baskets add interest and color to a streetscape and are a way to introduce plant materials when there is no room for trees or planters. Hanging baskets are desirable in retail districts, main streets, and neighborhood shopping districts with an intimate scale.

Although hanging baskets are purchased and installed by the City, the sponsoring organization has the ultimate ongoing maintenance responsibility. Both free-standing planters and hanging baskets require constant maintenance and frequent watering. The ability of the community stakeholders or BID to maintain these elements is a critical factor in the decision to include them in the streetscape design.

Figure 4-29: Hanging basket maintenance

Landscaping and Utilities

Before deciding to install planters and trees, a careful check of underground utilities and above ground utilities or encroachments, such as balconies, awnings, skywalks, etc., must be made. Large-size utilities, such as a large water main or gas line, must be relocated if trees or in-ground planters are to be installed in the same location. This can add significantly to the cost of a project. If the utilities cannot be moved, landscape designs must be changed to accommodate.

Figure 4-30: Utility boxes and vaults in the landscape

Railings

Low, ornamental railings add interest and identity to a streetscape, as well as protection from pedestrians and animals, when placed in combination with flush or curbed landscape planters. These railings vary in height from 12″-18″. Due to their height and location within the streetscape, railings should not be constructed with pickets extending above the top rail in order to prevent snags or injuries.

The panels of pickets between the posts are secured in place with tamper proof bolts. This allows panels to be removed for access to the planter area for tree stump removal and/or tree planting equipment. In areas where there are existing trees, it is often advisable to install a railing without a curb. Unlike a curb, which has a continuous footing, the railing posts have narrow foundations that do not require tree roots to be removed or cut to accommodate railing installation.

Figure 4-31: Wisconsin Avenue Planter Railings

Tree Grates

In the past, the City has used cast iron tree grates in the streetscape. However, for cost reasons, the City is moving away from using tree grates unless width restrictions require their use.

Tree grate openings must comply with ADA accessibility guidelines. This means that the slots of the tree grate must not be more than 3/8″ wide. This allows tree grates to become part of the ADA's accessible route that must be present in all streetscapes.

Cast or ductile iron tree grates have been used throughout the city for many years. In addition to protecting trees, cast iron tree grates have the benefits of strength, durability, stability, low maintenance, non-flammability, and the ability to be cast in varying thicknesses and patterns. Manufacturers have standard off-the-shelf patterns that can be purchased by contractors and still satisfy DPW requirements. Iron tree grates must have breakout rings or removable bolted tree rings cast into the grate. This allows the center of the tree grate to literally be broken out or removed to accommodate the growing tree trunk.

Tree grates should also be installed with frames as part of a raised salt lip or edge that frames the tree grate. This slightly raised position of the tree grate helps to keep salt out of the tree planting pit. These salt lips are typically part of the concrete support that surrounds the tree grate. In certain areas of the city, this salt lip has been fabricated in granite.

Figure 4-32: Tree grate with granite salt lip

Figure 4-33: Tree grate with concrete salt lip

Sidewalk Pavement

Pavements, especially in urban areas, form the floor of the outdoor environment in which people live, work, and play every day. The design of walking surfaces is one of the most important elements for setting the initial mood of the space. A space covered in grass will feel much different than the same space covered in concrete.

Even if the outdoor area is accented with trees, lights, benches, people, and other urban space elements, the ground plane sets the tone for how the space is to be used and how it feels to the user. For the most part, the sidewalks in the City of Milwaukee are constructed with concrete, although a number of areas have concrete walks accented with the addition of other materials, such as pavers or colored concrete.

Monolithic Sidewalks

Most sidewalks are monolithic, which means that the pavement is constructed with one material, most typically Portland Cement Concrete (P.C.C.). The typical P.C.C. sidewalk constructed in the city has the following characteristics:

- Thickness: 5"
- Strength: minimum 3,500 pounds per square inch
- Not reinforced with wire mesh or rebars
- Broom finished top surface

This type of sidewalk is easy to install and long lasting when installed correctly. Repair of the sidewalk is easily accomplished when properly done.

There are a number of finish variations to P.C.C. sidewalks: scored concrete; stamped pattern concrete, and window pane concrete.

Scored Concrete

Typically, concrete surfaces are scored into squares or rectangles in order to control cracking in the concrete slabs. Additional scoring can be added to further break up the concrete surface and to add visual interest. This additional scoring can be either hand tooled during initial installation or saw cut after curing of the concrete.

Special attention should be paid to the design of concrete scoring at certain streetscape elements, especially tree grates, planters, and light poles.

Figure 4-34: Sidewalk pavements

Figure 4-35: Sidewalk pavements

Figure 4-36: Scored concrete sidewalk pavements

Window Pane Finish

Scoring can be combined with wide tooling of the surface to create a window pane effect. This must be done during the final finishing of the concrete. After the concrete surface has been broom finished, the scoring is created using a wide concrete tool that creates a smooth surface on both sides of the score joint. This smooth surface can vary from 2"-3" wide and the resulting surface has a higher level of visual interest.

Colored Concrete

Colored concrete sidewalks are constructed with Portland Cement Concrete (P.C.C.). The typical colored P.C.C. sidewalk in the city has the following characteristics:

- Thickness: 5"
- Strength: minimum 3,500 pounds per square inch
- Not reinforced with wire mesh or rebars
- Broom finished top surface
- Color can be added integral to the concrete or during the curing process (it is the City's practice to use integral color)

It is important to consider the problem of color matching when future maintenance is required. The new patches may not completely match the original colors.

Stamped Concrete Finish

Stamped concrete was developed to impress a design resembling masonry or a modular material, into a monolithic concrete surface. There are numerous patterns available: brick, cobbles, flagstone, and boardwalks. These are achieved by pressing a metal or rubber master pattern into the freshly poured concrete or during the curing process.

Color may also be added, either integral to the concrete or during the curing process. It is important to consider the challenge of color matching when future maintenance is rquired. New patches in a stamped or colored concrete surface are very difficult to match to the original surface.

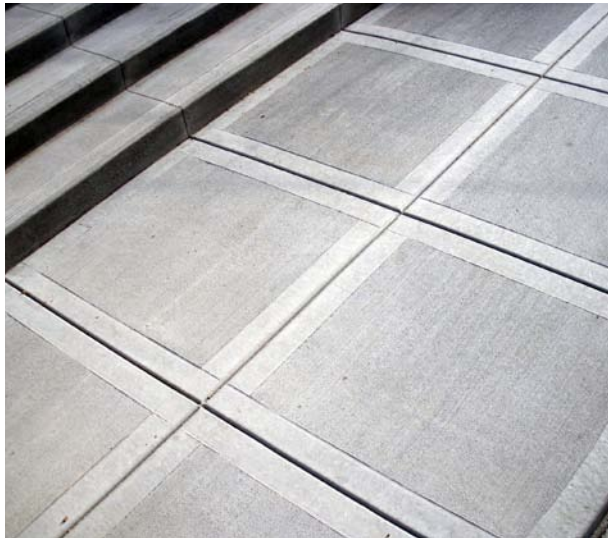


Figure 4-37: Window pane concrete finish

Figure 4-38: Colored concrete finish

Figure 4-39: Stamped concrete finish

Detailing and Streetscape Elements

To avoid cracking and increase the longevity of concrete walks, it is important to pay close attention to joint detailing. Each streetscape element poses a different circumstance that must be addressed. Curbed concrete planters should have an expansion joint between the planter curb and the surrounding concrete walk. Similarly, light poles should have an expansion joint between the light pole footing and the surrounding concrete walk.

Figure 4-40: Proper detailing is important in streetscape elements

Unit Paver Sidewalks

In contrast to monolithic sidewalks, unit paver sidewalks are created using small paving units that form the surface of the sidewalk. Unit pavers have been in use in Milwaukee since the city was constructed. The old, original brick streets that often underlay newer asphalt surfaces were constructed with unit pavers.

Unit pavers are made from a number of materials, including concrete, clay, and stone, and are highly variable in color, finish, and texture. Both maintenance and budgetary constraints must be considered when determining the appropriateness of unit pavers in a streetscape project. The walkability of unit pavers must be considered.

Figure 4-41: Unit paver sidewalks

Concrete Unit Pavers

Unit pavers must be used as an accent feature and not as the main pavement surface.

These pavers are fabricated from highly compressed, specialized concrete mixes. High quality concrete unit pavers have the following characteristics:

- Very high strength (generally 8,000 pounds per square inch)
- Absorption rates are low (generally four to five percent range) to help prevent spalling
- Smooth finish for walkability
- UV resistant, integral color throughout the paver, however concrete unit pavers tend to fade after three to five years of exposure to sun (depending on quality and color of pavers)

The City of Milwaukee has used Holland Stone paver (4″ x 8″ x 2-3/8″) or Double Holland paver (8″ x 8″ x 2-3/8″) manufactured by Unilock, or an approved equal. The standard color is either a buff/brown blend or a charcoal/natural blend.

Figure 4-42: Concrete unit pavers

Clay Unit Pavers

Concrete pavers are typically used as an accent feature in streetscape design, not a principal walking or driving surface.

These unit pavers are fabricated from clay that is fired at extremely high temperatures. However, unlike typical building bricks, clay unit pavers are solid and must meet much higher strength requirements due to their exposure to weathering , water, and salt. High quality clay unit pavers have the following characteristics:

- Extremely high strength, often in the range of 10,000-12,000 pounds per square inch
- Low absorption rates (generally in the four to five percent range) to help prevent spalling
- Color will not change because the paver is a fired product

The City of Milwaukee does not have a standardized clay unit paver and new projects must provide samples for approval by DPW for approval. These are typically used as an accent paver.

Figure 4-43: Stamped pattern concrete gives "unit paver" accent in streetscape

Granite Pavers

Milwaukee has utilized recycled granite pavers in a number of its projects, most notably in the intersections of major streets in the downtown area. These pavers have been salvaged from street reconstruction projects, cleaned, palletted, and stored for re-use in City projects.

These pavers are quarried from actual granite blocks and have a highly variable size and surface characteristic. The cleft finish of a granite paver surface can be relatively rough and may not be appropriate for pedestrian use unless the pavers were sawn to create a consistent walking surface.

It is strongly recommended to limit the use of granite pavers to an accent paver or in conjunction with landscaping in terraces or medians because the high cost of the material.

Figure 4-44: Clay unit paver accent with granite paver edging

Special Finish Pavers

There are a number of manufacturers of high quality, special finish pavers. These pavers generally are fabricated in a variety of sizes - from 4" squares up to 36" squares- and have highly variable and customizable surface textures and colors. The larger size makes these pavers appropriate for larger sidewalk sections, especially plazas and special interest areas. Special finish pavers can also represent natural stone products such as marble, granite, or other natural local or imported stones. The City of Milwaukee has not selected any particular paver for a standard in its streetscape work.

Depending on the size, special finish pavers may require specialized installation detailing for long term durability.

Figure 4-45: Special finish pavers during installation

Unit Pavement Construction

For long-term durability, unit pavers must be installed properly and on a base that is appropriate for the intended use of the surface. The City of Milwaukee has installed unit pavers in a wide variety of methods with varying degrees of success. Pavers which have been installed with mortared joints have suffered significant failure, not of the pavers themselves, but of the mortar and setting bed due to the harsh winter climates and application of salts. This system is not recommended for future streetscape installations.

Today, unit pavements are constructed in one of three ways:

- flexible base system
- rigid base system
- hybrid system

Flexible Base System

In this system, unit pavers are placed on a sand setting bed that is installed on a compacted stone base course. The pavers are vibrated into place which causes the sand to migrate and interlock with the pavers. This system has the following characteristics.

- Initial installation is comparatively easy and inexpensive
- Repairs to subsurface utility systems are easier to access, however repair of the unit paver surface is difficult to achieve to the original grade. Careful attention must be made to meet original compaction levels to prevent uneven settling
- Finished surface of pavement is subject to settling as the subgrade settles. Settlement may occur adjacent to fixed objects (lights, etc.) and adjacent monolithic pavements (sidewalks) and curbing
- This system will require future maintenance to correct settled pavements

This system is commonly used for residential driveways and patios and has been used for streetscapes in the past. However, because of the possibility for settlement, the use of this system should be very limited and used in areas where pedestrians are not expected to be present.

The initial savings created by this system over other systems more often are offset by future costs of resetting pavers that have settled. While it may appear that this system would be easy to make repairs to underground utilities, the new surfaces can fail as the subgrades are frequently more difficult to compact to original densities and will settle over time, which causes uneven settlement in the repaired unit paver surface.

Figure 4-46: Unit paver crew in action

Figure 4-47: Flexible system with pavers, sand and aggregate base

Figure 4-48: Settled unit pavers

Rigid Base System

In this system, the unit pavers are placed on a bituminous setting bed that is installed on a concrete slab base course. The purpose of using bituminous material in the sand setting bed is to provide a barrier to prevent sand from moving into any cracks that may have developed in the concrete underlayment slab. The concrete slab is installed similar to any sidewalk or driveway slab with a stone base course over a compacted subgrade. This system is typically used in sidewalks, crosswalks and driveways where vehicular traffic is present. The characteristics of this system are as follows:

- This is a comparatively more difficult system to initially install and typically more costly.
- This system is much more resistant to settlement since the bituminous setting bed and concrete underlayment bridges over areas of subgrade that are not fully compacted.
- This system is outstanding for areas subject to vehicular traffic.
- This system will not require as much future maintenance work to correct settled pavements.
- Repairs to the pavement are often more costly, however, those repairs can last longer.

While the concrete underlayments may appear to create challenges in this system when access to utilities below grade is needed, the replacement concrete is tied into the adjacent concrete slabs and will bridge the excavation. This bridging effect will keep the repaired unit paver surface flush with the original.

The installation of the bituminous setting bed and the pavers is a precision installation which requires specialized knowledge and expertise. Repairs can often be more costly.

Figure 4-49: Preparing subgrade for underlayment installation

Figure 4-50: Concrete underlayment prepared for new pavers

Figure 4-51: Installing pavers on bituminous setting bed with neoprene tack coat

Hybrid Base System

Recently, a hybrid system has emerged that combines the advantages of the sand setting bed in the flexible base system with the concrete underlayment in the rigid base system. This hybrid system uses a sand setting bed with a filter fabric over a concrete underlayment slab and has a number of characteristics:

- This installation of the pavers is nearly identical to the flexible base system, which increases the pool of available installers.
- The costs are in the mid-range between flexible and rigid systems because of the concrete underlayment.
- The filter fabric keeps the sand from flowing out of the setting bed and into the cracks that develop in the concrete underlayments.
- System is tolerant of occasional vehicular traffic.
- Repairs to a finished paver system will still require replacing concrete underlayments to help preserve surface integrity.

The hybrid base system can provide a high performance unit pavement system with the ease of installation of the flexible base and the settlement resistance of the rigid base unit paver pavement systems.

Balance of Systems

Each unit paver system must be evaluated on the application and function that is intended.

- In areas where vehicular traffic is anticipated - crosswalks, alleys, driveways, etc. - a rigid base (bituminous setting bed) system is recommended.
- In areas where pedestrian traffic dominates, such as sidewalk areas, a hybrid base system is recommended.
- The flexible base system is not recommended except in very limited areas where pedestrians and vehicles are not anticipated.

Figure 4-52: Hybrid Base System - installing pavers on sand over concrete (filter fabric is obscured)

Figure 4-53: Installing large slab pavers over sand over concrete with filter fabric

Figure 4-54: Unit pavers can be used for intricate patterning

Roadway Pavements

The City of Milwaukee surfaces all of its roads with bituminous asphalt. Concrete roadway pavement is preferred for new construction and reconstruction projects. Refer the DPW Infrastructure for more information.

Striping

The City of Milwaukee has standards for striping driving lanes, angle parking spaces, crosswalks, stop bars, and bicycle lanes; generally these follow the requirements of the Manual of Uniform Traffic Control Devices (MUTCD).

While a project is under construction, temporary spray-painted markings may be used. However, the final thermoplastic markings that are applied to bituminous surfaces will be more permanent and long lasting.

Curb and Gutter

Curbs define the edge of the sidewalk area where it meets the street and act as a barrier to prevent vehicular traffic from riding up onto the sidewalk. The gutter is located in the street, adjacent to the curb, and forms the edge of the roadway pavement. The gutter collects water run-off from the street and channels it into the appropriate drainage structures, which are located along its length. The City of Milwaukee installs cast-in-place curb and gutter. The typical curb is 15" deep by 7" wide and tapers into an integral 12" wide gutter.

Figure 4-55: Roadway pavement

Figure 4-56: Standard striping

Figure 4-57: Standard curb & gutter

Crosswalks - Standard

As discussed in Chapter Three, crosswalks are the legal pedestrian crossings for city streets. DPW uses 4" wide white stripes to delineate crosswalks in standard crosswalk applications. These stripes are periodically renewed when the pavement is resurfaced. Typically, crosswalk stripes are applied using thermoplastic materials.

The city has used various materials in the construction of crosswalks with enhanced surface features and has decided to limit enhanced pavement choices for crosswalks to concrete with the option of using unit pavers as an accent material. The city has had experience with stamped bituminous asphalt texturing, however, the stamped surface does not wear well and the surface coating requires nearly constant renewal due to vehicular traffic.

Figure 4-58: Standard crosswalk

Crosswalks - Concrete

The first enhancement option for crosswalks is to use concrete with a scored (not stamped) finish. This concrete will be the standard gray color of Portland Cement Concrete (P.C.C.) or be integrally colored concrete with a buff colored finish and scored into a simple grid and banding pattern . The concrete will be as deep as the adjacent pavement system and tied into the adjacent pavements to prevent differential settlement.

This technique provides a good contrast between the driving surface and the crosswalk area. A border stripe should also be applied on each side of the crosswalk in keeping with the Manual of Uniform Traffic Control Devices (MUTCD).

Figure 4-59: Scored concrete crosswalk

Crosswalks - Unit Pavers

The second enhancement option for crosswalks is to use unit pavers not as the primary walking surface, but as a header or accent material. The City has used pavers in certain intersections with good success. The pavers should be installed on a bituminous setting bed over a heavy duty concrete underlayment. To contain and protect the pavers and to provide a visual band, a concrete header band should be installed on each side of the paver field. All of the concrete elements should be tied into the adjacent concrete pavement underlayments to prevent differential settlement and to prolong the pavement life.

This technique provides a smooth-to-rough contrast between the driving surface and the crosswalk. The "rumble strip" causes drivers to slow down and contributes to pedestrian safety. Given the cost of this enhancement, this technique should be reserved for areas where unit pavers are used on the sidewalks.

Figure 4-60: Stamped pattern concrete crosswalk (unit paver treatment)

Crosswalks - Historic Third Ward

In parts of the Historic Third Ward close to the Public Market, the crosswalks are constructed using stamped concrete with a boardwalk surface texture and appropriate color. This special finish is currently reserved for those areas inside the boundaries of the Historic Third Ward.

Curb Ramps

Curb ramps provide a connection from the sidewalk to the street for all pedestrians and especially those with mobility challenges such as people in wheelchairs, people pushing strollers, children on bicycles, and delivery services.

Curb ramps are required at all intersections and crosswalks, including mid-block crossings, and should align with the center of the crosswalks. A typical curb ramp consists of the ramp, side flares, approach and a landing. The slope of the ramp must not exceed 8.33 percent, or 1" rise per 1' length. The flares must not exceed 10 percent, although 8.33 percent is preferred whenever possible. The cross slope must not be greater than 2 percent. The preferred width of a curb ramp is 6' and the minimum width is 4' not including the width of the flared sides.

While there are a number of potential curb ramp design configurations, the City prefers two curb ramps per corner that run parallel to the crosswalk and direct pedestrians into the crosswalks.

Care must be taken in the design and construction of curb ramps. Per the Federal requirements, there should be a flat landing at the top of the curb ramp. This can create a challenging grading situation for retrofit situations and most likely would require replacement of the entire sidewalk corner.

In addition, it is often necessary to correct the street pavement grades immediately adjacent to the curb ramps. This is done by milling the surfaces of the street and repaving to create the proper gradients at the curb ramps.

Figure 4-61: Historic Third Ward stamped crosswalk (boardwalk treatment)

Figure 4-62: Series of curb cuts and curb ramps with detectable warning surfaces

Figure 4-63: Typical curb ramp

Curb Ramps - Detectable Warning Surfaces

Per Federal ADA requirements, detectable warning surfaces must be applied to all ramps to indicate the interface with the street. This pattern of slightly raised truncated domes is determined by the Federal requirements. The finished detectable surface must be in contrast to the surrounding surface colors.

There are a number of methods to create this pattern, however, an embedded unpainted metal panel is the preferred method. This panel is pressed into the moist concrete and is permanently affixed to the concrete panel. This panel is resistant to freeze/thaw cycles and damage from snow plowing and street cleaning.

In areas where unit pavers are used for the surface of the sidewalk, detectable warning surfaces are created using special unit pavers that create the required pattern. Using unit pavers to create this pattern preserves the integrity of the unit paver design and the construction system by not introducing another paving system into the design.

Figure 4-64: Street milling is sometimes required to fix curb ramps

Figure 4-65: Cast iron detectable warning plate

Figure 4-66: Detectable warning unit pavers

Street Furniture

Street furniture includes those elements that pedestrians, motorists and bicyclists need in the streetscape including benches, trash receptacles, bicycle racks and other accessory elements. Long term durability and ease of maintenance is of primary concern by the City. Using the criteria of long term maintenance, a limited number of special streetscape furniture elements may be considered. In some cases, DPW may require BIDs to assume maintenance of streetscape elements it deems are beyond its capacity to properly maintain with its limited resources.

It is possible to deviate from the standard palette, at the owner's expense, to help reinforce a particular motif or brand in a BID or historic area of the city. However, unless the BID has made special provision to stock those items, the City will repair or replace items with standard streetscape furniture elements.

Benches

The public realm is like an "outdoor room" in many ways. Benches and other street furniture need to be carefully selected for comfort of the user and still stand up to extreme weather and everyday use. A number of considerations are used in the selection of benches:

- Style: timeless style that can span many periods and architectural styles
- Materials: all steel with a durable powdercoated finish
- Backs and armrests for comfort; intermediate armrests on long benches
- Slatted construction to provide for water drainage and to discourage skateboard grinding

For new streetscape projects the City has chosen a standard bench with several variations for use in the public way: the Landscape Forms Plainwell Bench in wood or cast aluminum, or approved equal.

Either variation of the bench is timeless and works well in nearly every situation. The Plainwell Bench is well-designed for comfort and reflects a historical heritage without an overt look.

These benches were selected for their exceptional strength and durability under the most extreme environmental conditions and their vandal-proof protection against destruction and defacing.

For existing streetscapes, or continuation of previously developed streetscapes, the Victor Stanley RB-28 may continue to be used to maintain continuity in the furnishings.

Figure 4-67: Coordinated Street Furniture

Figure 4-68: Landscape Forms Plainwell Bench (black)

Figure 4-69: Voctor Stanley RB-28

Trash Receptacles

Like benches, trash receptacles need to be considered carefully for two different users: pedestrians and maintenance personnel. The City standard trash receptacle has the following characteristics:

- 20 gauge cold rolled steel with 4 drainage holes in bottom
- 24 gauge galvanized steel liner measuring 20-3/8 inches square by 33-1/2 inches high
- 55 gallon capacity
- 48 inches high, 21 inch square base
- 2 self closing doors on the hood

Trash receptacle capacity is critical in Milwaukee because most trash receptacles are only serviced once per week. The downtown area trash receptacles are serviced twice per week during the summer to address increased waste from high pedestrian traffic, festivals, and special events. Waste receptacles are usually placed two per block, on opposite corners at intersections.

In special areas of the city, some trash receptacles deviate from the standard. The Historic Third Ward uses a decorative teal green trash receptacle manufactured by Victor Stanley. This trash receptacle only has a 36 gallon capacity with an interior pull out liner. It is fabricated from vertical steel bars with a powdercoated finish.

Ash Urns

With the gradual elimination of indoor smoking, smokers are using the streets more often for smoking breaks and ash urns are now returning as optional site furniture accessories. If they are used, urns are usually placed near building entrances and pedestrian congregation areas like bus stops.

In the past, the City has used the Victor-Stanley Ironsites (S-20) ash urn, or approved equal, in the color black as the standard ash urn.

Due to its limited demand and use, this is no longer considered a standard streetscape element by the City.

Figure 4-70: Milwaukee Standard Trash Receptacle

Figure 4-71: Historic 3rd Ward Trash Receptacle

Figure 4-72: Victor Stanley S-20 Ash Urn

Bicycle Racks

Encouraging bicycle traffic begins with providing safe corridors to bicycle riders and proper places where bicycles can be secured against theft.

The basic bicycle rack is a simple inverted U-shape rack that is either direct embedded or bolted to the sidewalk pavement. These racks should be ganged together in groups of three or more, parallel to each other about 24-30 inches apart.

No particular manufacturer is named because of the simple nature of this design. The bicycle racks are fabricated from tubular steel; approximately 2 inches diameter and formed into the U-shape that is approximately 24 inches across and 36 inches high after mounting. Finish should be a black powdercoating.

Figure 4-73: Basic bicycle rack

Bollards

Bollards are simple streetscape elements that have two primary functions:

- to separate areas without creating full barriers like fencing
- to protect high-value elements from deliberate or accidental vehicle collision damage

For most applications, the City has chosen a simple pipe bollard filled with concrete and set in the ground with 24-36" exposed. The exposed portion is covered with a black polyethylene sleeve and cap to eliminate painting and to absorb minor dings.

Heavier duty cast iron sleeves are also available and are often used in hardened perimeter security projects where the sleeve is installed over a heavily reinforced steel pipe core.

At times a decorative bollard is desirable in a streetscape and many light pole manufacturers offer bollards as companion pieces to the light pole, or standard elements in a complementary "kit of parts."

In the Historic Third Ward, a precast bollard element has been employed in the streetcape. This bollard design is reserved for this particular district.

The City is currently experimenting with bollards of solar lighting on a small project. If these prove to be durable and low maintenance, they could become a standard element.

Figure 4-74: Standard bollards sleeve examples

Figure 4-75: Decorative bollard

Parking Meters

The City has been maintaining its stock of standard parking meters as it introduces parking kiosks in certain areas of the city.

The standard parking meter is mounted on a post fabricated from steel pipe and core drilled into the pavement. The post is unpainted. The post is set approximately 12 inches back from the face of curb and centered on parking stall lines.

Figure 4-76: Parking meters

Parking Kiosks

In recent years, the City has been implementing a parking kiosk system ("Lukes") that drivers use to pay for parking. The kiosks accept cash and credit cards and can be used for any numbered space in the system. Drivers may also get a parking receipt at the kiosk. The City can check to see if parking spaces are paid for at the kiosk rather than having to check individual parking meters. All kiosks accept payment for any parking space. (A driver can add time to the numbered space where his car is parked using a kiosk located blocks away.)

Figure 4-77: Parking Kiosk

Parking Space Number Posts

In conjunction with the parking kiosks are the posts that delineate which parking space is assigned to the parking receipt. These posts with a top finial and number plate attached are the same material and size as the standard parking meter post and the entire assembly is painted black with applied number graphics on the post plate.

Figure 4-78: Parking Space Number Post

Community Identifiers and Branding

Community identifiers are sculptural elements within a streetscape that seek to bring a unique identity to a neighborhood commercial district.

This character can be drawn from many different sources: cultural ethnicity, architectural styles or elements, special cultural or historic institutions, or the general historical background of a neighborhood. Since these elements can initially be expensive, have unique maintenance considerations, and are unique to each BID or community area, separate funding must be identified in order for community identifiers to be included in a streetscape project.

A symbol or idea may be developed via community meetings and design charrette to be used repeatedly in a variety of forms throughout a commercial area, such as:

- Large, single-use elements placed over the street, such as a monumental arch, gateway or portal
- Two flanking elements, columns or markers placed on either side of the street, typically located on the sidewalk
- Smaller, repetitive elements such as fabric banners or permanent pole identifiers
- Pavement medallions
- Pavement treatments along the streetscape
- Custom streetscape elements or modifications to standard streetscape elements to include identity elements, such as medallions placed on railings or unique finishes and colors.

Identifier Elements

The following represent some of the elements that may be used as community identifiers.

"Gateways" and Area Markers: An area marker or gateway is generally a large sculptural element placed either at the end of a streetscape or along a streetscape. These elements serve the purpose of marking the entrance ways and throughways into the commercial/retail district. A variety of structures have been used for existing gateways in the City of Milwaukee, including an interior lit "lighthouse" with bronze community name plaques, large steel vertical elements with the name of the area laser cut into the steel, and large sculptural archways with and without community labels identifying the community area.

Figure 4-79: Historic Third Ward Entry

Figure 4-80: Riverworks Entry Feature

Identifiers Elements

Kiosks: The purpose of a kiosk is to present information about both the commercial/ retail area, as well as map points of interest and highlight local events taking place within the area. The kiosk may present permanent information or include a Plexiglas case that allows change-out of information. The Plexiglas case is only installed when a BID or community group has identified a group to maintain it and oversee the information to be displayed in the case.

Banners and Pole Identifiers: Banners are rectangular metal, vinyl, or treated fabric signs that are mounted in flag fashion on one or two sides of the light standards along a streetscape. Although banners can be changed seasonally or for special events, both pole identifiers and banners can represent the unique character of a community group, its individual identities, or commercial members. When mounted on steel light poles, banners are subject to various criteria, including size limitations and minimum vertical clearance.

Sidewalk Medallions: Pavement markers, or sidewalk medallions, are ornamental emblems that are set or stamped into sidewalks along a streetscape, usually at intersection corners. These medallions are typically bronze, tile, or precast concrete and can be logos or other representations of community identity. In some areas, such as the Historic Third Ward, pavement markers indicate street names.

Public Art: Public art is another way that districts can distinguish themselves in the streetscape. Care should be taken when designing a streetscape, to create opportunities for both temporary and permanent public art. Public art may complement the history or culture of an area, or create a new experience or interest for the people in the district.

Funding for public art can be most effective when used to design or select infrastructure, including but not limited to:

- Benches and other forms of seating
- Walls or borders (murals, ghost signs, lettering, insets)
- "Kit of parts" streetscape elements such as tree grates
- Planters and other methods of "greening"
- Landscape enhancements, both natural and hardscape
- Walking surfaces
- Lighting (including the City's Landmark Lighting Program)

Figure 4-81: Decorative Kiosk

Figure 4-82: Washington Park Banner

Figure 4 -83: Freedom Quilt Pavement Medallion

- Transit Shelters
- Signage and signage holders
- Establish an endowment for public art that can fund art for an area over an extended period of time and respond to neighborhood changes

Prior to installing any public art, administrators should consider the following:

- Will the art hold the attention of viewers over many years?
- Will a portion of the funding be set aside for long-term maintenance?
- Will there be funding to hire a public art administrator to facilitate an RFP and/or RFQ?

Construction and Maintenance: The constructability of a design as well as maintenance concerns must be at the forefront of the design process for identifier elements, whether large or small. As ideas for identifiers grow in size and complexity, there is often a direct correlation to increased costs for manufacturing, installing, and maintaining these items.

Although identifiers are often dramatic statements, if they are not designed, located, and constructed properly they can become more of a liability than an asset to the community. Whenever feasible, gateway identifiers should be protected with bollards. Often a community desires to have lighting incorporated into the design of their community identifier. This requires careful design and consideration of maintenance.

All publicly funded designs must be approved by DPW and must either use standard components for ease of maintenance and replacement, or assume the responsibility of providing and maintaining custom or non-standard components.

Design Standards: The City of Milwaukee has a review process through the Milwaukee Arts Board (or Public Art Subcommittee) to determine the appropriateness of symbols or identifiers in the public realm because the vast differences in types of identifiers. An identifier can range from a small medallion in the sidewalk pavement to a large gateway structure that spans an entire roadway. Designs will also be reviewed for safety and long term maintenance cost.

Depending on the type of identifier element, proper design standards must be maintained to ensure proper use, maintenance, and safety. For example, placement must not impede the accessible route or headroom heights. When space is tight, communities may decide to place identifier elements on private property. Although the City will help with these efforts, the City's streetscape program will not pay for or install them.

Figure 4-84: "Engine Co. 10"

Figure 4-85: Sculptural walll mural

Private Streetscape Elements

As outdoor dining continues to become more popular, many restaurateurs are bringing their dining areas into the streetscape. In many cities, al fresco dining is allowed in the public right-of-way with certain stipulations and permits (Milwaukee code s.115-32.6). The use of privately-owned corrals that surround the outdoor dining areas has been in response to the requirements of liquor laws in many cities.

The challenge in these private streetscape elements is to balance the needs of the public traversing the streetscape with the desire to stimulate and encourage outdoor activities that bring in business. There have been many instances where the extent of sidewalk cafes have forced pedestrians off the sidewalk and into the street to traverse the streetscape area.

Finding the balance can be a difficult task. Each location is unique and may have different pedestrian movements and volumes as well as physical constraints and limitations.

Providing a clear, unobstructed pathway is a critical component of any sidewalk cafe. In areas with high pedestrian counts, this minimum width could be approximately 6 feet. This would allow two approaching pedestrians to pass each other. In areas where there is lighter pedestrian counts, that minimum width may be able to be reduced to 4 to 5 feet. Where sidewalk cafes are long, a wider width would be more comfortable.

The structures that create the corrals should be carefully examined for safe construction and materials. Steel and wood elements are very common; care must be taken to keep sharp edges and splinters from injuring passing pedestrians or snagging clothing. Overhead structures and lighting elements may rquire special permit reviews and insurance requirements.

Figure 4-86: Outdoor cafe corral - metal and fabric enclosure

Figure 4-87: Outdoor cafe corral - wood planters and enclosure

Figure 4-88: Outdoor cafe corral - wood and planter enclosure

Combining Streetscape Elements

Combining Streetscape Elements

There are nearly endless potential combinations of streetscape elements that are possible. Each streetscape combination needs to address a number of considerations including, but certainly not limited to:

- the available budget
- the available maintenance budget
- the width of the sidewalk area
- the vehicular traffic on the street
- the pedestrian volumes along the sidewalk
- the presence of parking along the sidewalk line
- the presence of bus routes and stops
- the presence of hollow sidewalks
- the presence of underground utilities
- the presence of above ground conflicts such as canopies and other building elements.
- the BID or Main Street's marketing and retail strategy
- traffic calming, parking and safety strategies
- installation and maintenance of public art

It is the streetscape designer's challenge to create concept alternatives that blend these considerations with the overall desire of the City of Milwaukee and the BIDs. Other groups are involved in the design process including Main Street Programs, merchants associations, and CDCs.

Budgets and Maintenance

One of the most important considerations is the issue of budget and maintenance. Initial construction budgets may allow for certain streetscape elements, however, the downstream maintenance requirements may become cost prohibitive. This analysis of the maintenance costs is a crucial step in determining the initial streetscape elements that can be initially constructed.

During the evaluation of the streetscape elements, it is important to consider the installation techniques that are used. Paving materials, for example, can be installed in a number of methods. A high quality paver can be installed with a less expensive paving system and the resulting installation can create higher long term maintenance issues for the City and the BIDs in the future. A lesser quality, but still acceptable, paver that is installed using a higher performance paving system can create less long term maintenance.

Another example is the use of plant materials. Creating extensive greenspaces in streetscapes can provide substantial visual improvements, the long term costs of maintaining extensive plantings needs to be considered.

There are certain elements where it would be tempting to use custome items rather than stock items. Stock items are much easier to replace when necessary. The City only provides stock items as replacements unless the BID or funding entity provides replacement stock.

This analysis effort is a critical step in balancing the needs for a good looking and performing streetscape with the initial construction budget and long term maintenance budget.

Figure 5-1: intricate landscapes will require higher levels of maintenance

Figure 5-2: Custom elements require high quality materials to last

Tree Clearance Zones at Intersections

Beginning the process of combining the streetscape elements includes looking at a number of condtions that may preclude the inclusion of certain elements. As defined earlier in this document, trees and lights are the primary streetscape elements. Given the need for illumination of the roadways and sidewalks at night, the lighting elements will generally take precedence over trees in the establishment of the initial framework for the streetscape. The City has established a number of clearance requirements for trees in streetscapes.

At corners, there are a several clearance requirements depending on the traffic drection:

- Near-side clearance - 40 feet from property line
- Far-side clearance - 20 feet from property line.

This helps ensure that trees are not planted where views to traffic signs and signals are blocked.

Intersections are where pedestrian conflicts most often occur. Pedestrians use this small space - the eddy zone - at the street corners to make decisions on crossing the street, changing direction of travel, avoiding traffic and other related activities. Because of the congested nature of this eddy zone, the placement of streetscape furniture and related elements near intersections must be carefully considered.

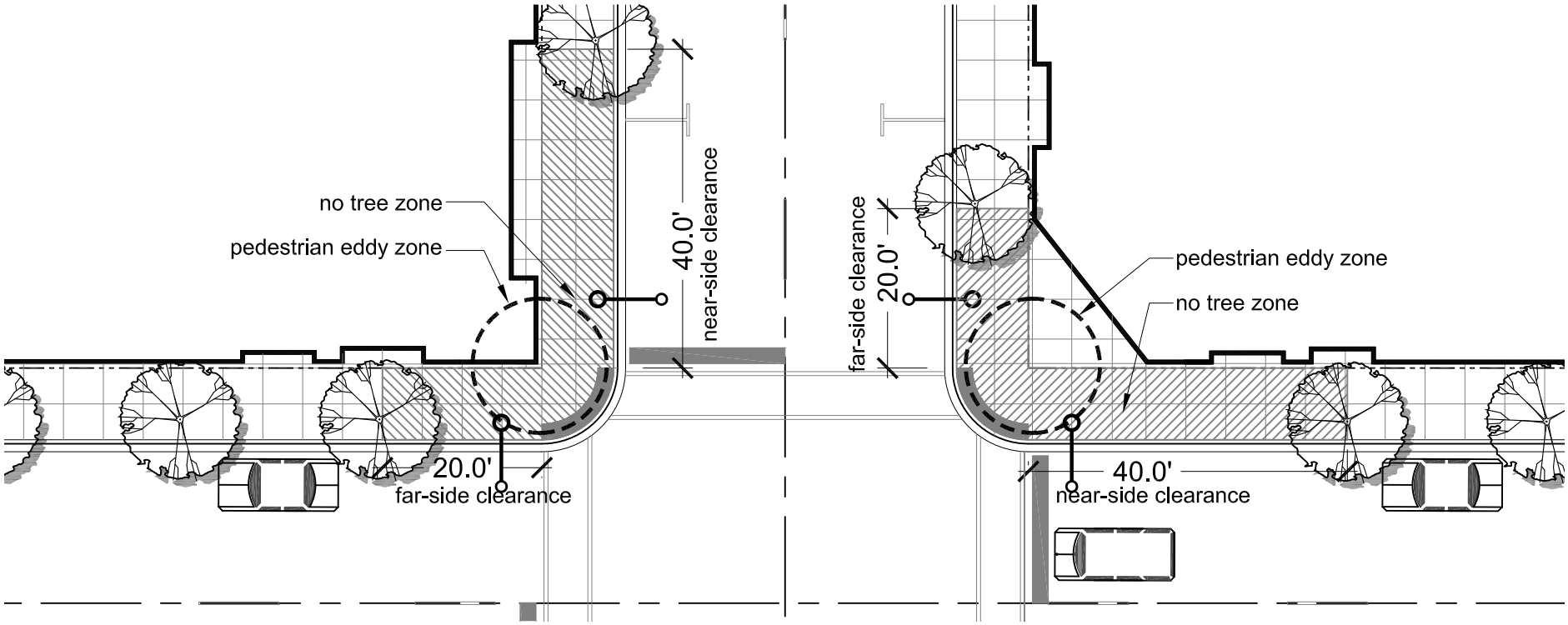


Figure 5-3: Tree clearances and pedestrian eddy zones at intersections

Intersection Clearance Zones

When these clearances are applied to an entire intersection, the clearance zones are as shown below.

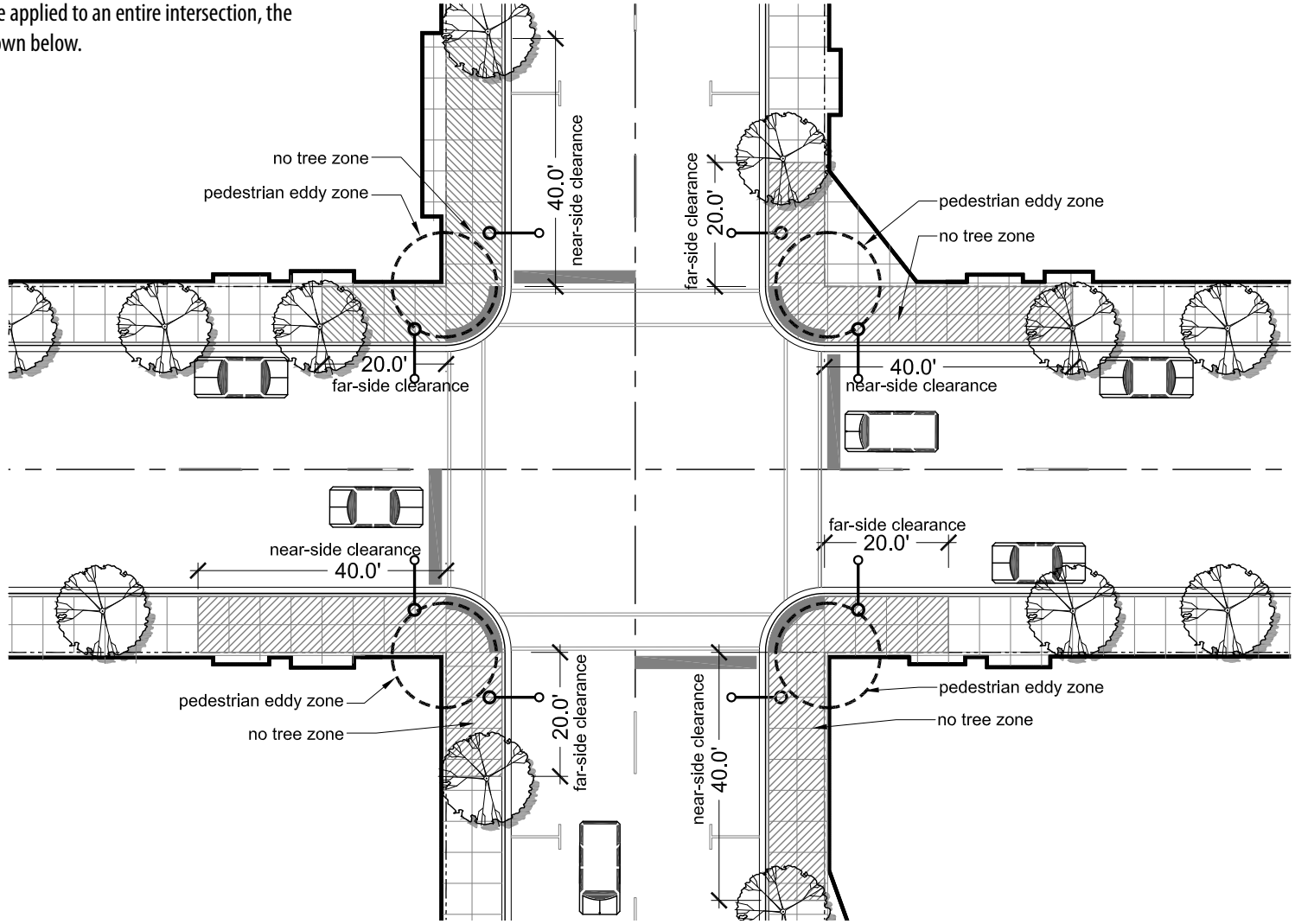


Figure 5-4: Intersection Clearance Zones

Tree Clearance Zones at Light Poles

At light pole locations, the City has a 20-foot clearance from street light poles. This is to help ensure that trees do not interfere with light distribution patterns.

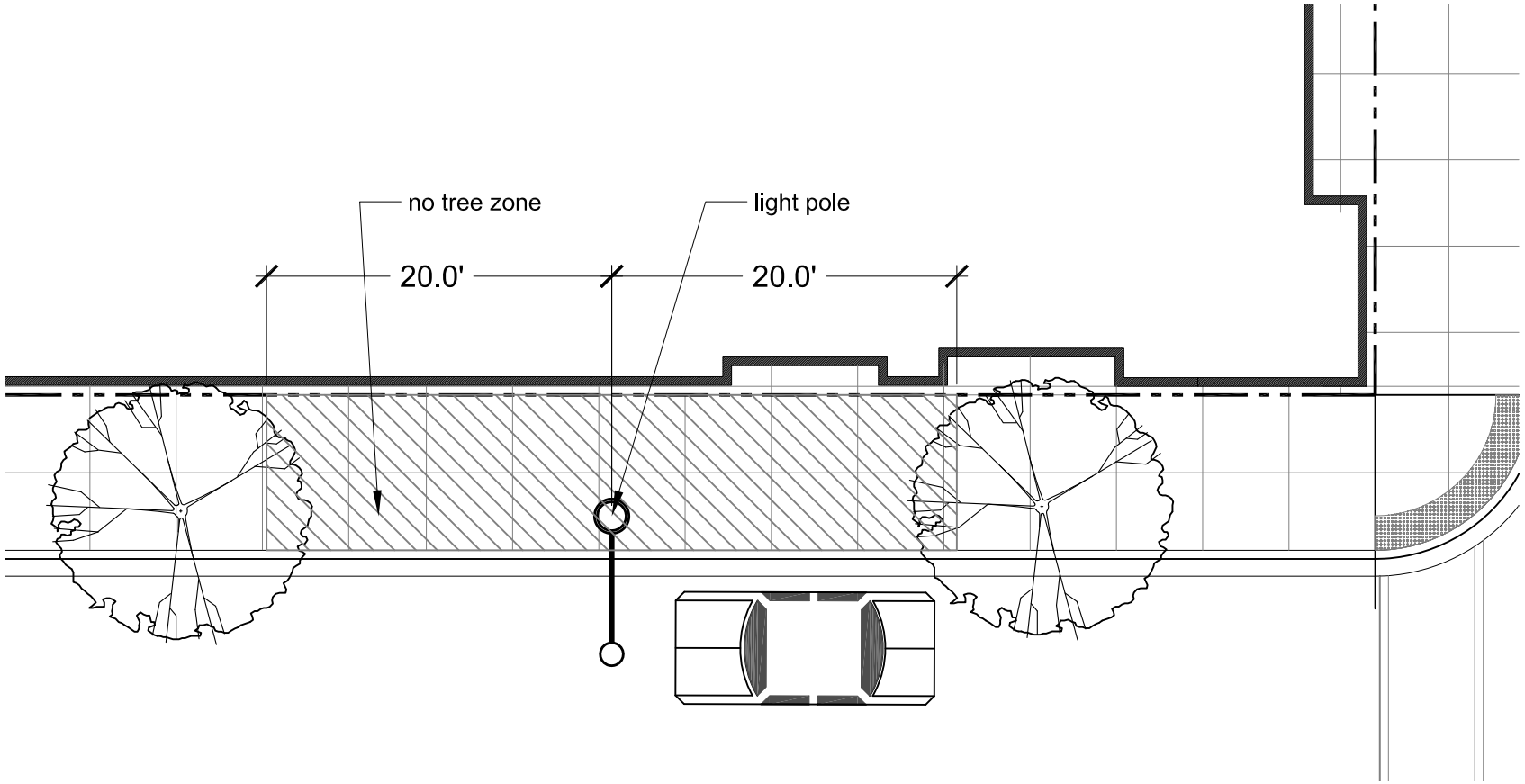


Figure 5-5: Tree clearance zones at light poles

Opposite Light Pole and Tree Layout

The streetscape design process begins with the establishment of a module using tree and light pole spacings. In this example, a 25-foot module is established which corresponds with a typical parking module. The module lines establish where either a tree or light pole is located. In this example, the light poles are located directly opposite to each other. This can create a layout of light poles that march with a regular pattern down the streetscape. The trees would be planted opposite each other as well.

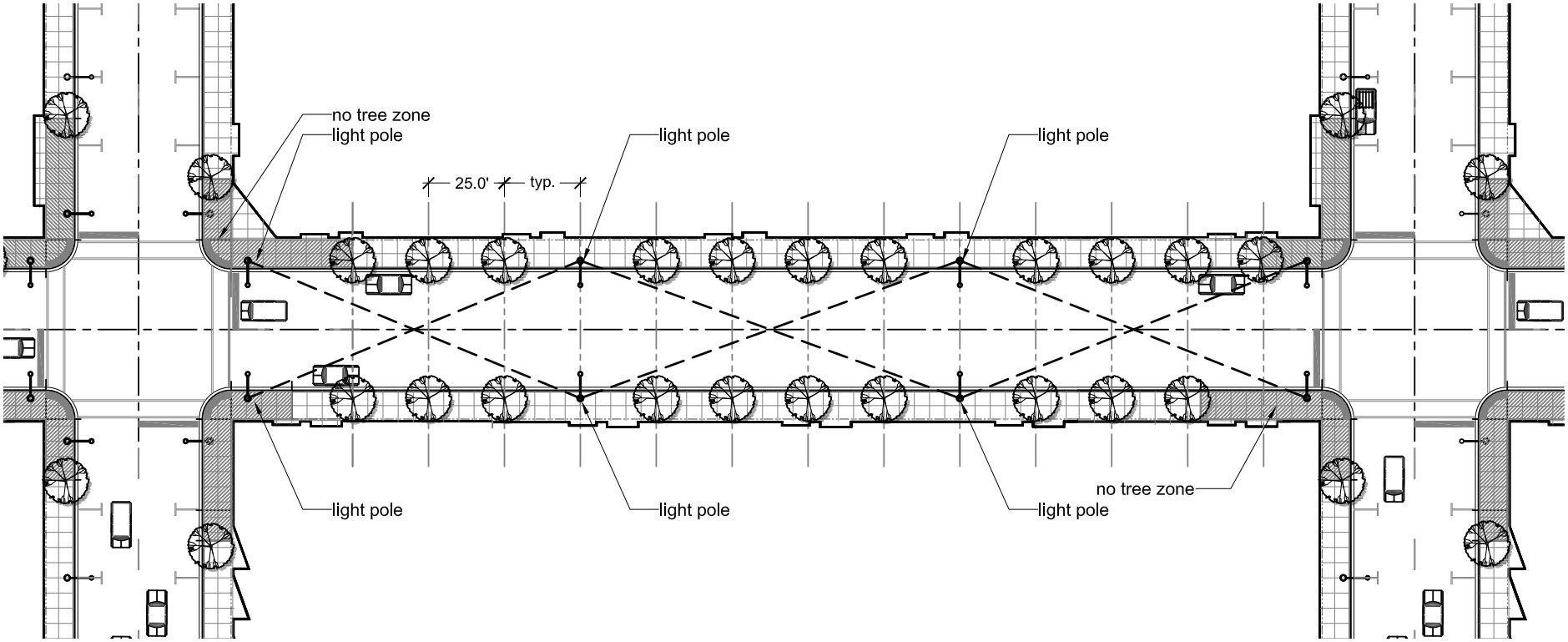


Figure 5-6: Opposite light pole layout

Alternating Light Pole and Tree Layout

In a variation of the prior layout, an alternating light pole layout can create the following tree and light pole spacing arrangement. In this layout, the light pole locations switch sides of the street and the space between the poles is infilled with trees and other elements.

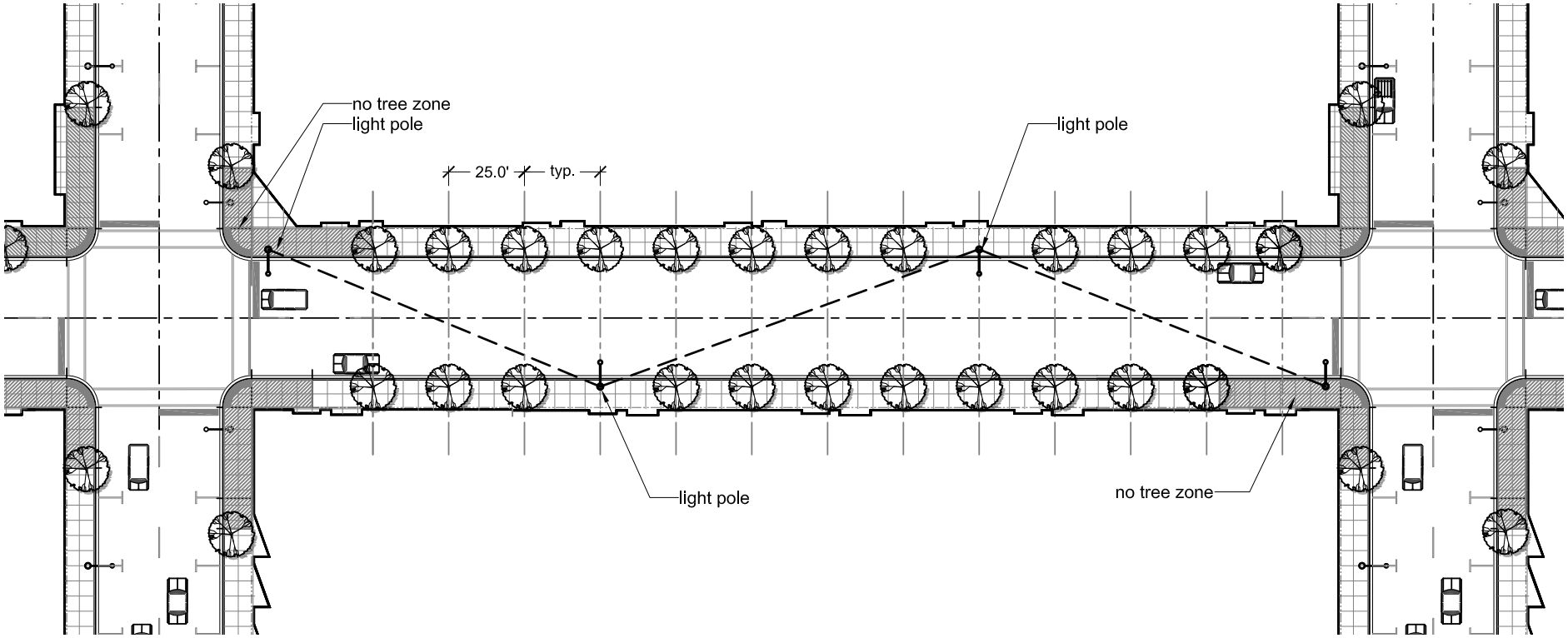


Figure 5-7: Alternating light polelayout

Combining Streetscape Elements - The Examples

The following pages are examples of how some of the major streetcape elements can be combined. The examples are divided into the three major sidewalk width categories:

- Sidewalks less than 9 feet wide
- Sidewalks between 9 and 12 feet wide
- Sidewalks greater than 12 feet wide

Given the potential number of possible combinations, the following examples are a very small sampling of the potential streetscape design possibilities. These examples were developed using a set of hypothetical sidewalk widths with no constraints related to underground utilities, driveways, hollow sidewalks or adjacent conflicts. When developing new concepts for actual streetscapes, designers and engineers must consider all of the existing conditions and characteristics when developing concepts for a specific project. A thorough inventory and analysis of the existing conditions is a critical task at the beginning of any streetscape design project.

Another critical step is to fully define the desired programming goals for the streetscape early in the design process. Understanding these goals for the specific streetscape project will aid in determining the potential range of design elements that could be considered.

Gaining concurrence and agreement on these elements from the constituency that represents the streetscape users is also important in the process. Divergent views are very common at the beginning; successful streetscape projects most often have merged the needs and desires from a diverse set of users into a singular vision for the streetscape.

Figure 5-8: Streetscape master plan example

Concept A-1

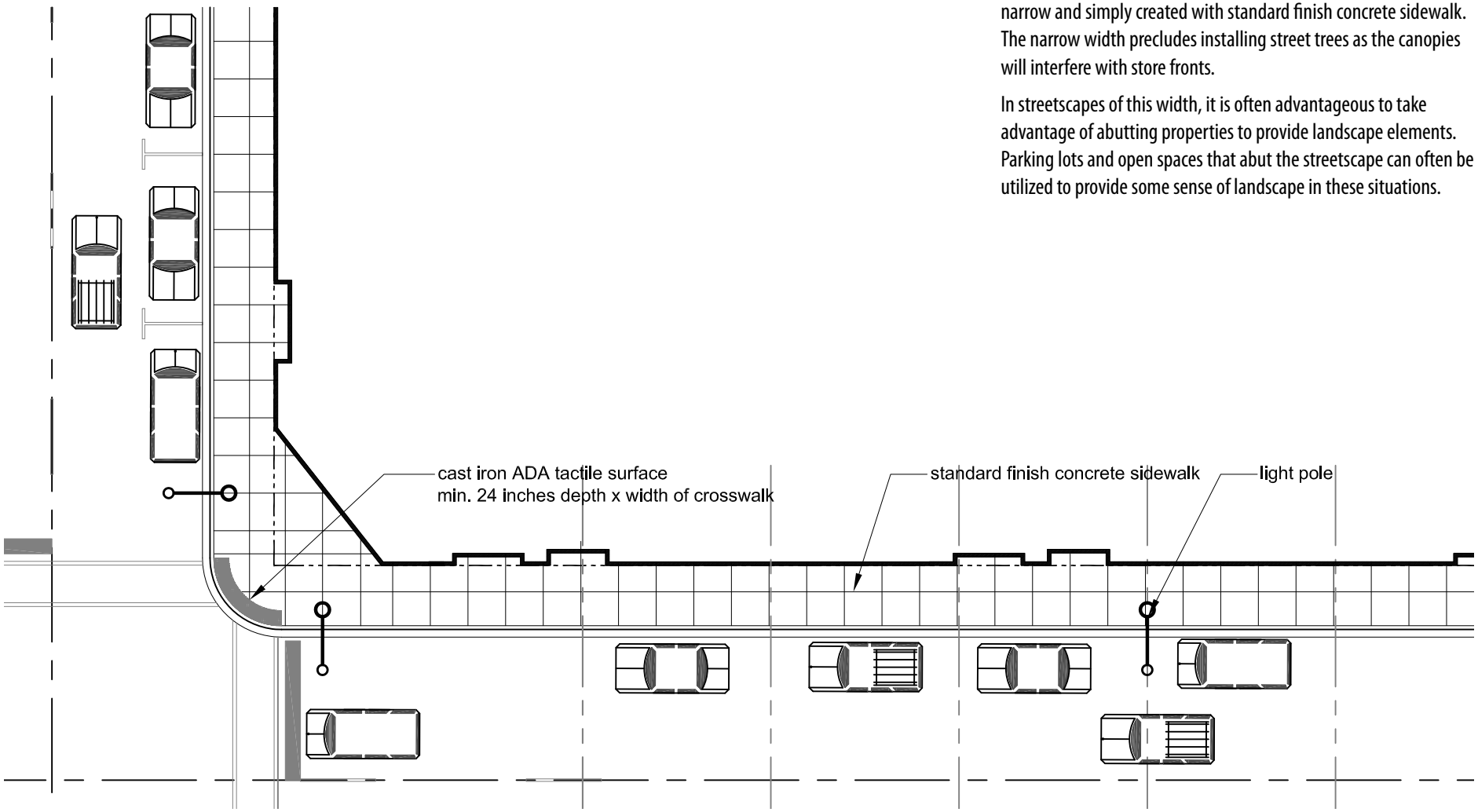


Figure 5-9: Concept A-1

Sidewalk Width less than 9-feet Wide

In the most basic of all of the concepts, the streetscape is very narrow and simply created with standard finish concrete sidewalk. The narrow width precludes installing street trees as the canopies will interfere with store fronts.

In streetscapes of this width, it is often advantageous to take advantage of abutting properties to provide landscape elements. Parking lots and open spaces that abut the streetscape can often be utilized to provide some sense of landscape in these situations.

Concept A-2

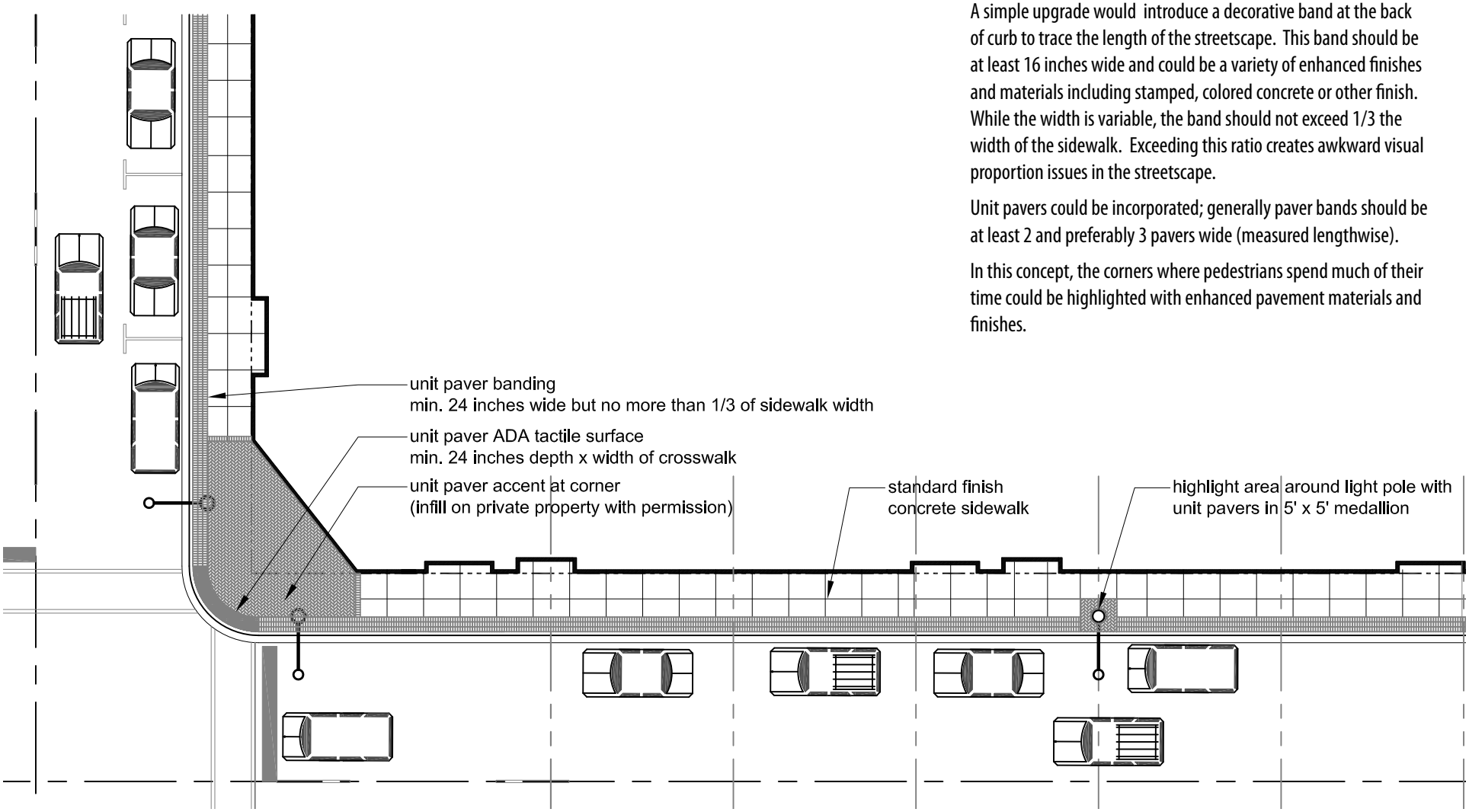


Figure 5-10: Concept A-2

Sidewalk Width less than 9-feet Wide

A simple upgrade would introduce a decorative band at the back of curb to trace the length of the streetscape. This band should be at least 16 inches wide and could be a variety of enhanced finishes and materials including stamped, colored concrete or other finish. While the width is variable, the band should not exceed 1/3 the width of the sidewalk. Exceeding this ratio creates awkward visual proportion issues in the streetscape.

Unit pavers could be incorporated; generally paver bands should be at least 2 and preferably 3 pavers wide (measured lengthwise).

In this concept, the corners where pedestrians spend much of their time could be highlighted with enhanced pavement materials and finishes.

Concept A-3

Sidewalk Width less than 9-feet Wide

In a variation of Concept A-1, a bump-out is introduced at the corner to provide a space for landscape elements.

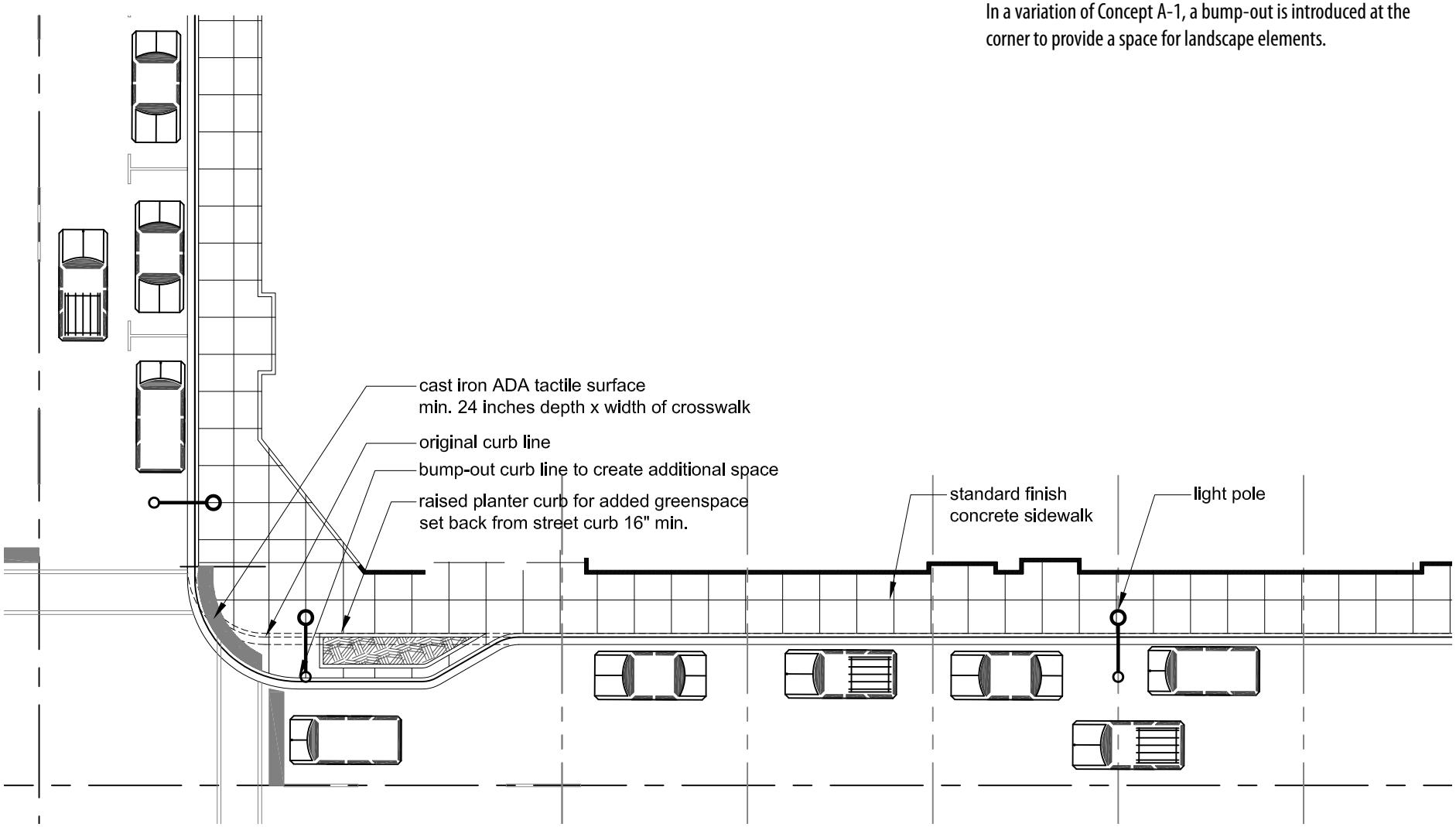


Figure 5-11: Concept A-3

Concept A-4

Sidewalk Width less than 9-feet Wide

Concept A-4 enhances the prior concept by including enhanced pavements at the corner as well as landscape elements in the bumpout. The required tree/corner clearances preclude tree plantings in this bumpout.

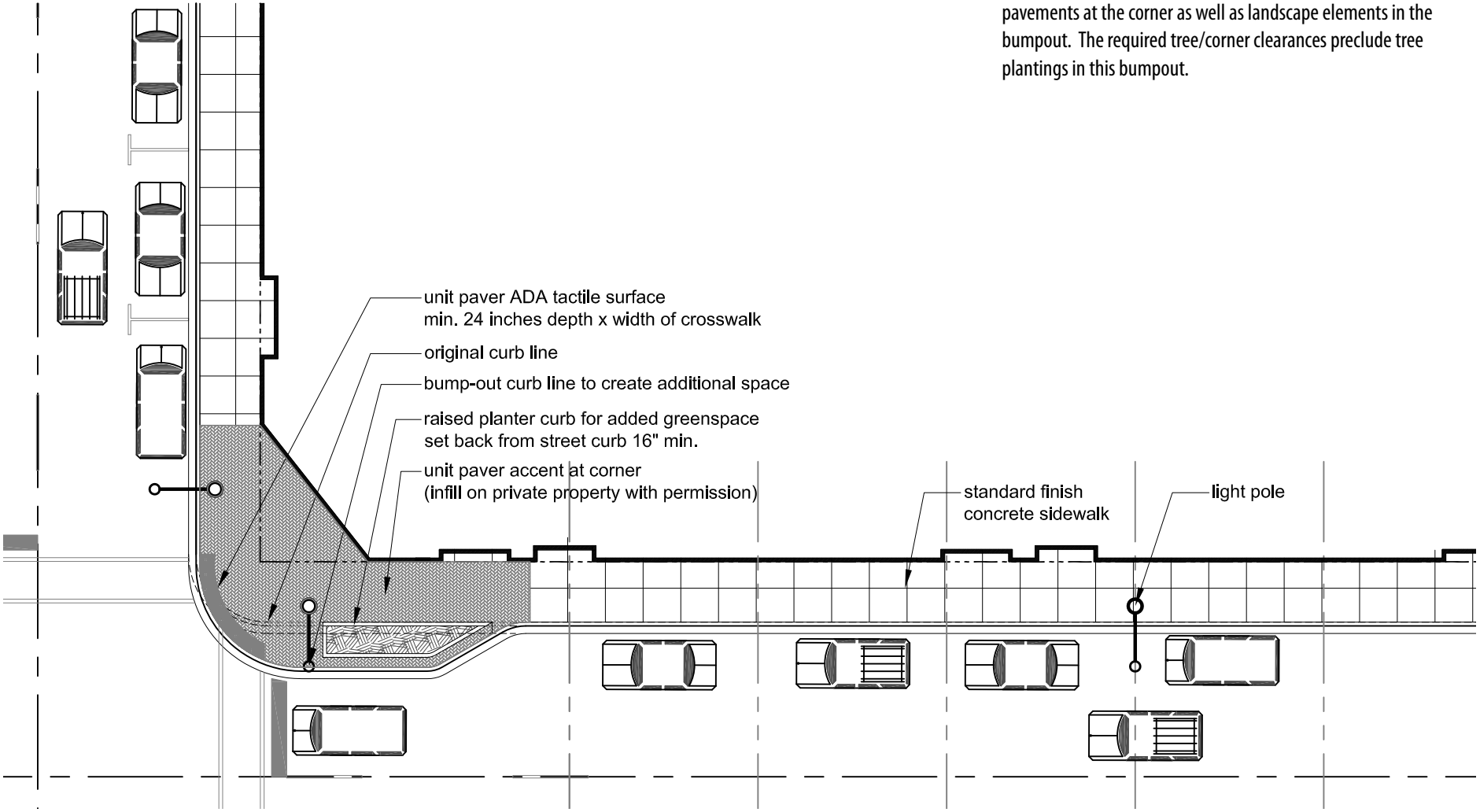


Figure 5-12: Concept A-4

Concept B-1

Sidewalk Width between 9 and 12-feet wide

In this intial mid-range width concept, street trees are introduced. These trees are planted in cast iron tree grates with salt lips that provide a banding element.

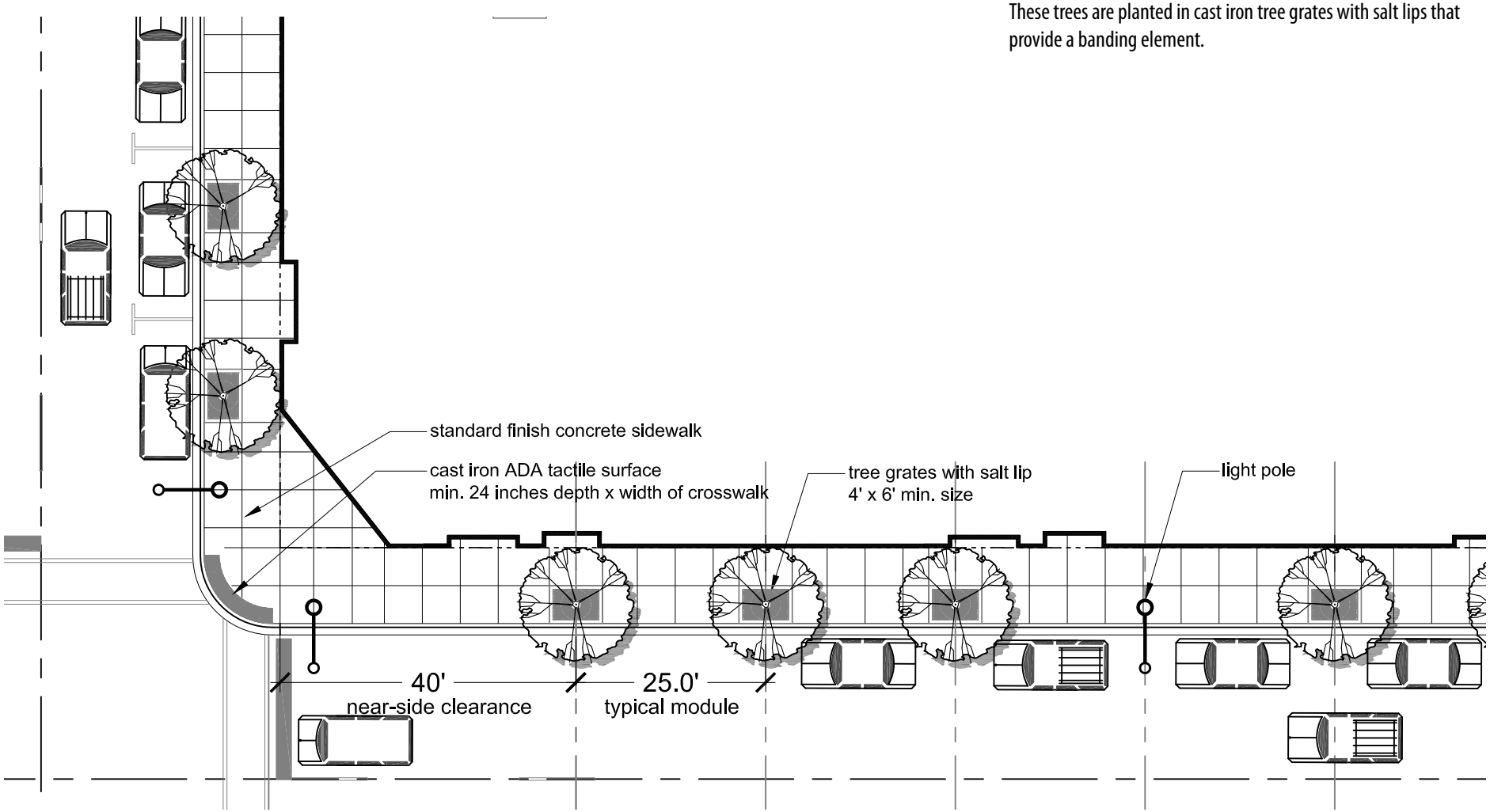


Figure 5-13: Concept B-1

Concept B-2

Sidewalk Width between 9 and 12-feet wide

In a slight variation, the tree grates are replaced with landscape plantings in the tree pits. These tree pits could be expanded somewhat lengthwise depending on the amount of greenspace needed.

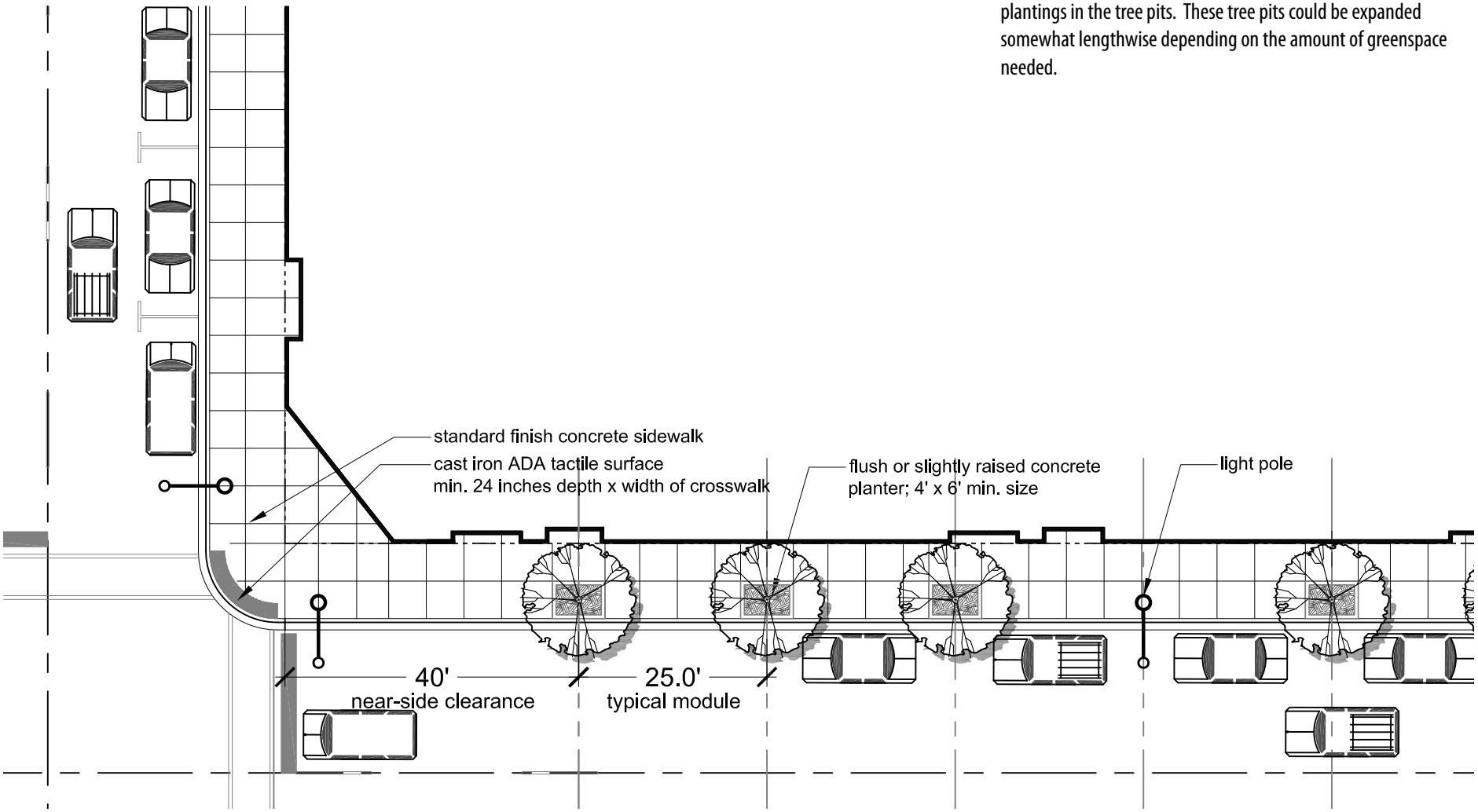


Figure 5-14: Concept B-2

Concept B-3

Sidewalk Width between 9 and 12-feet wide

In this concept, a banding element is introduced and would follow the same design recommendations as listed in in the prior concepts. In select locations, benches could be introduced depending on the orientation.

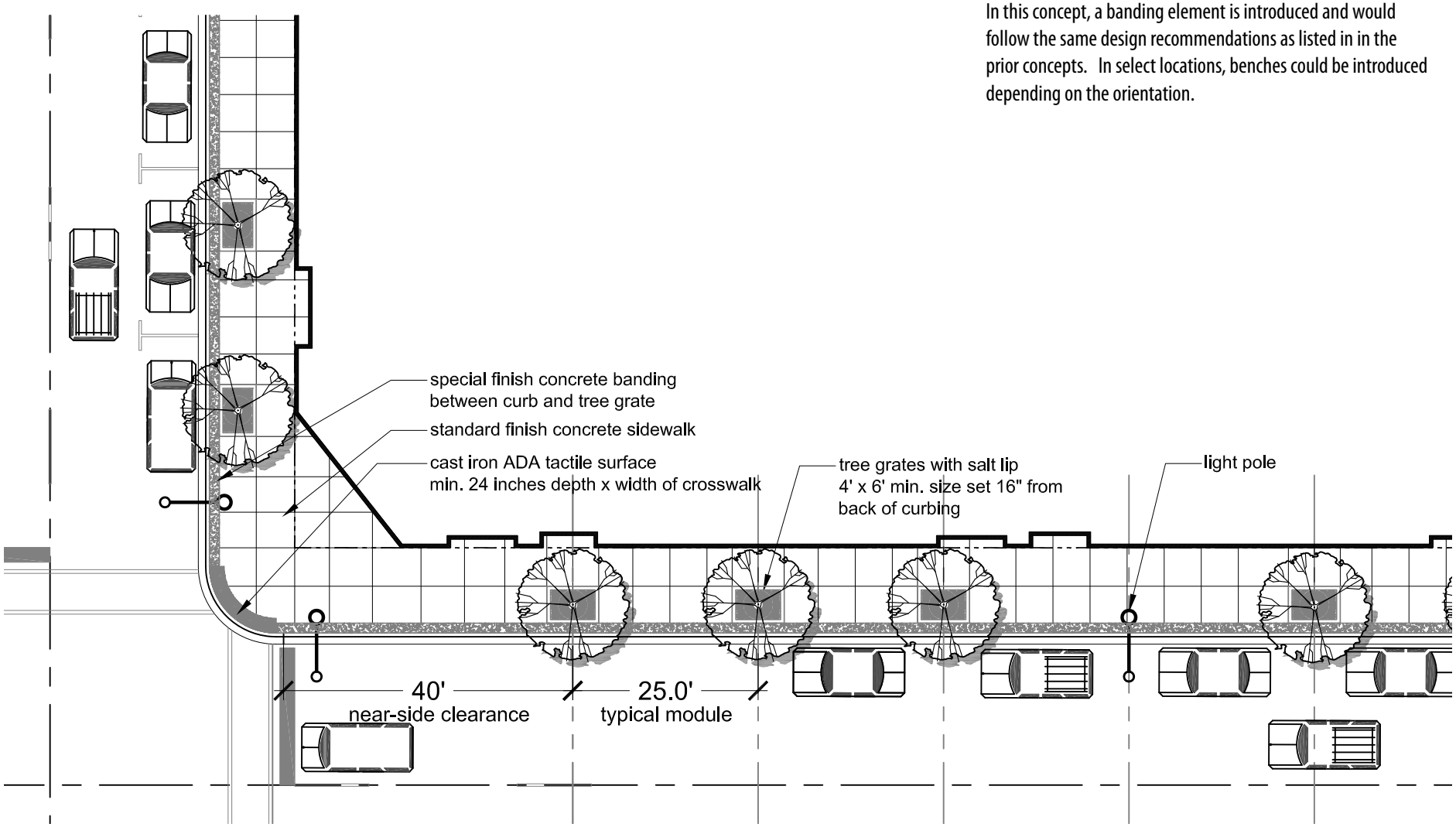


Figure 5-15: Concept B-3

Concept B-4

Sidewalk Width between 9 and 12-feet wide

In this concept, the banding element is expanded to a three paver width band and the pavement is enhanced is enhanced at the corners. the rhythm of the streetscape is reinforced with the banding and tree grates by enhancing the pavement around the light pole bases. Benches could be included depending on the orientation.

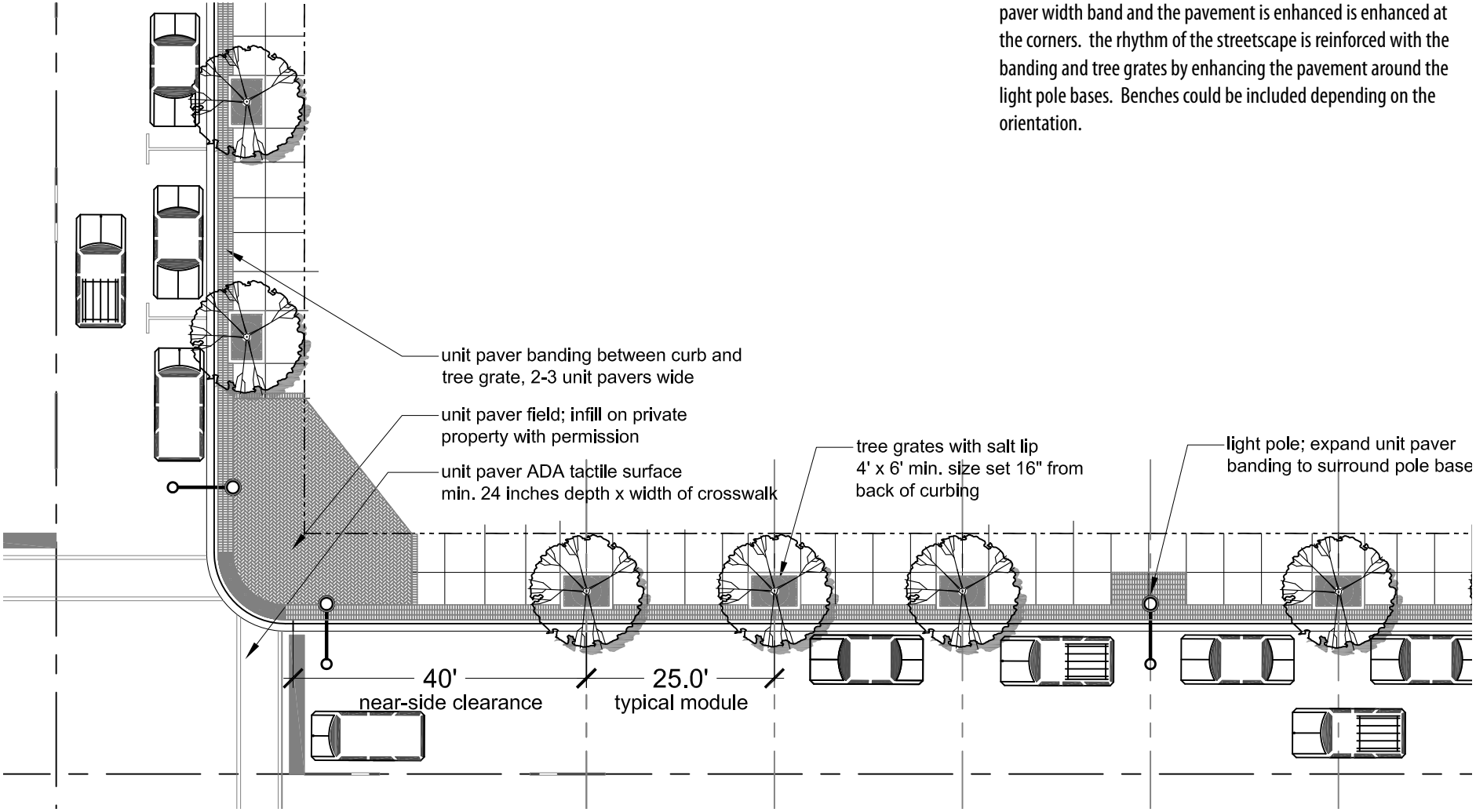


Figure 5-16: Concept B-4

Concept C-1

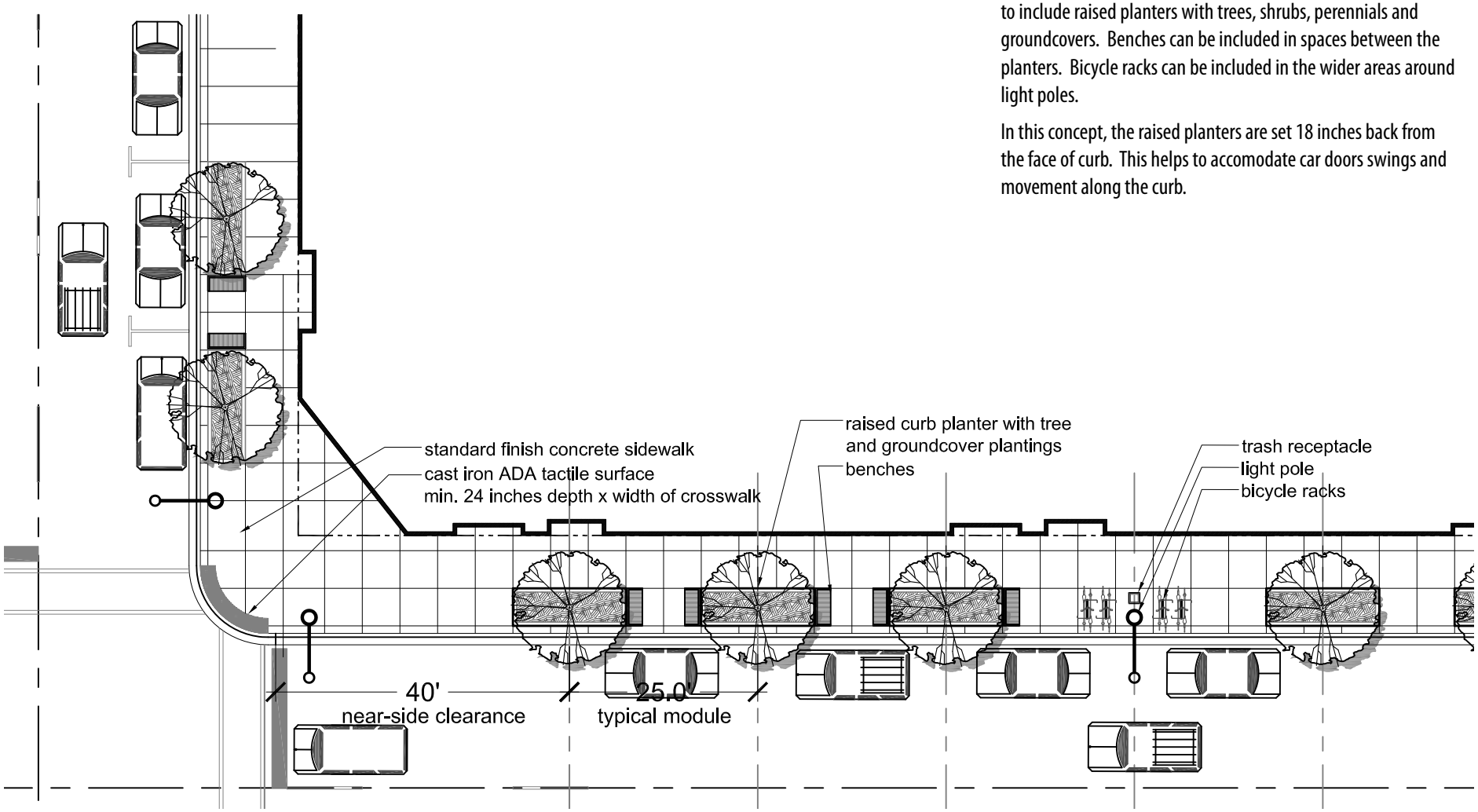


Figure 5-17: Concept C-1

Sidewalk Greater than 12-feet wide

In the wider sidewalks, the landscape areas can be expanded to include raised planters with trees, shrubs, perennials and groundcovers. Benches can be included in spaces between the planters. Bicycle racks can be included in the wider areas around light poles.

In this concept, the raised planters are set 18 inches back from the face of curb. This helps to accomodate car doors swings and movement along the curb.

Concept C-2

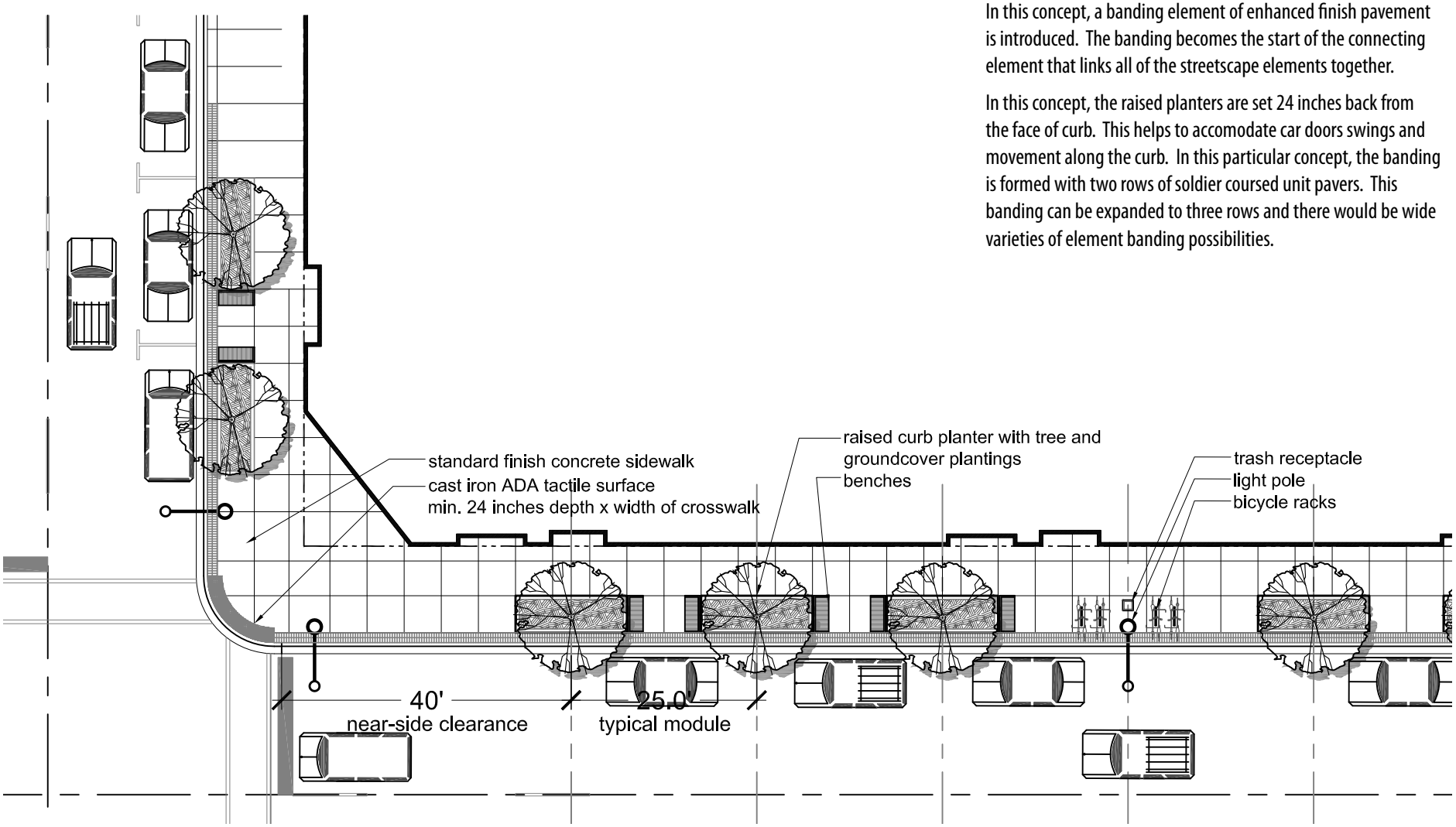


Figure 5-18: Concept C-2

Sidewalk Greater than 12-feet wide

In this concept, a banding element of enhanced finish pavement is introduced. The banding becomes the start of the connecting element that links all of the streetscape elements together.

In this concept, the raised planters are set 24 inches back from the face of curb. This helps to accomodate car doors swings and movement along the curb. In this particular concept, the banding is formed with two rows of soldier coursed unit pavers. This banding can be expanded to three rows and there would be wide varieties of element banding possibilities.

Concept C-3

Sidewalk Greater than 12-feet wide

In this concept, a sidewalk cafe is illustrated. One of the large planters is replaced with a tree grate to maintain the tree canopy and to provide more walkable space under the tree. Space for tables and chairs would be available as well as other benches and bicycle racks.

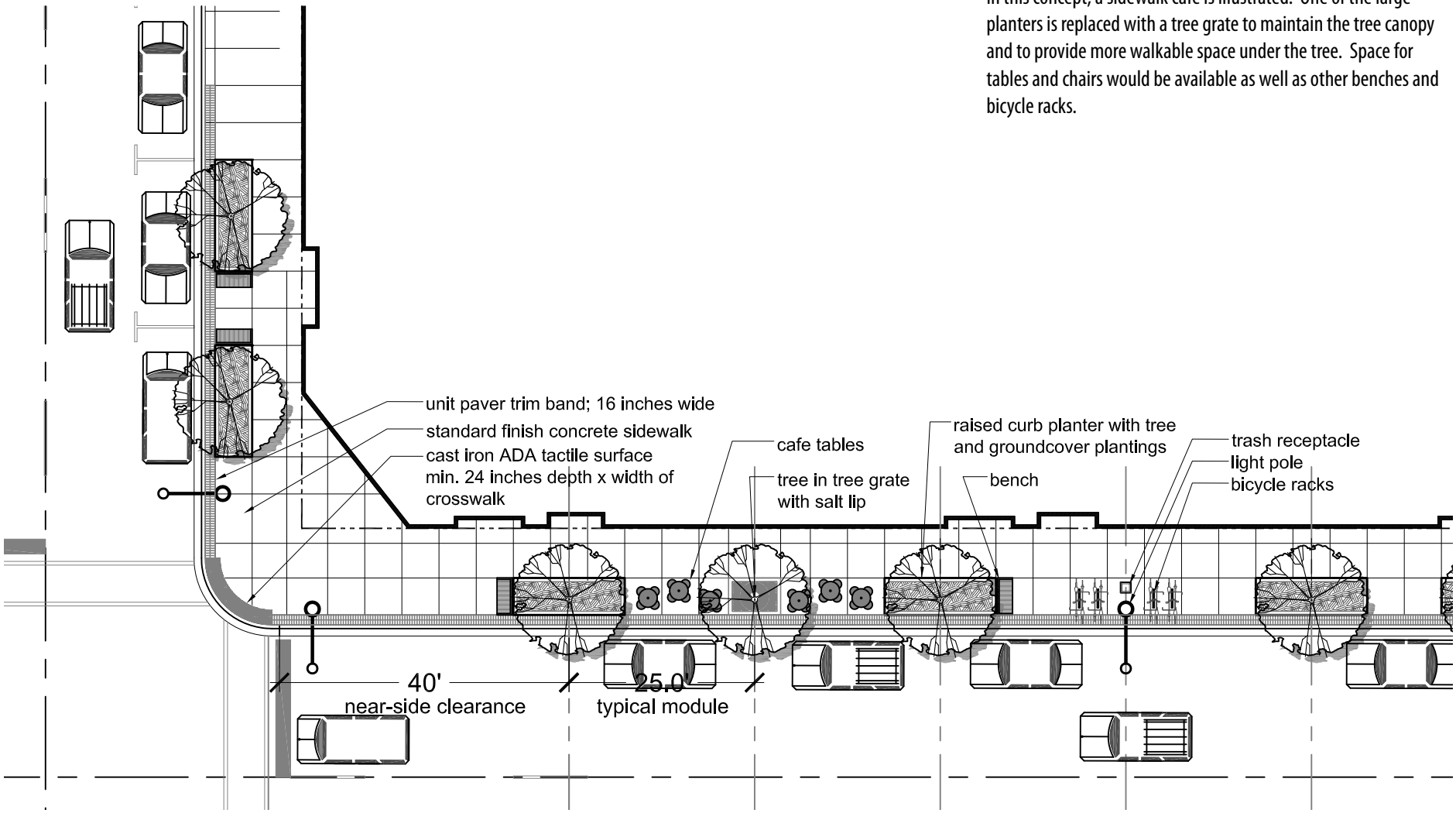


Figure 5-19: Concept C-3

Concept C-4

Sidewalk Greater than 12-feet wide

In this concept, a bumpout with expanded landscaped areas is introduced. The enhanced pavement banding becomes the continuous link for all the streetscape elements.

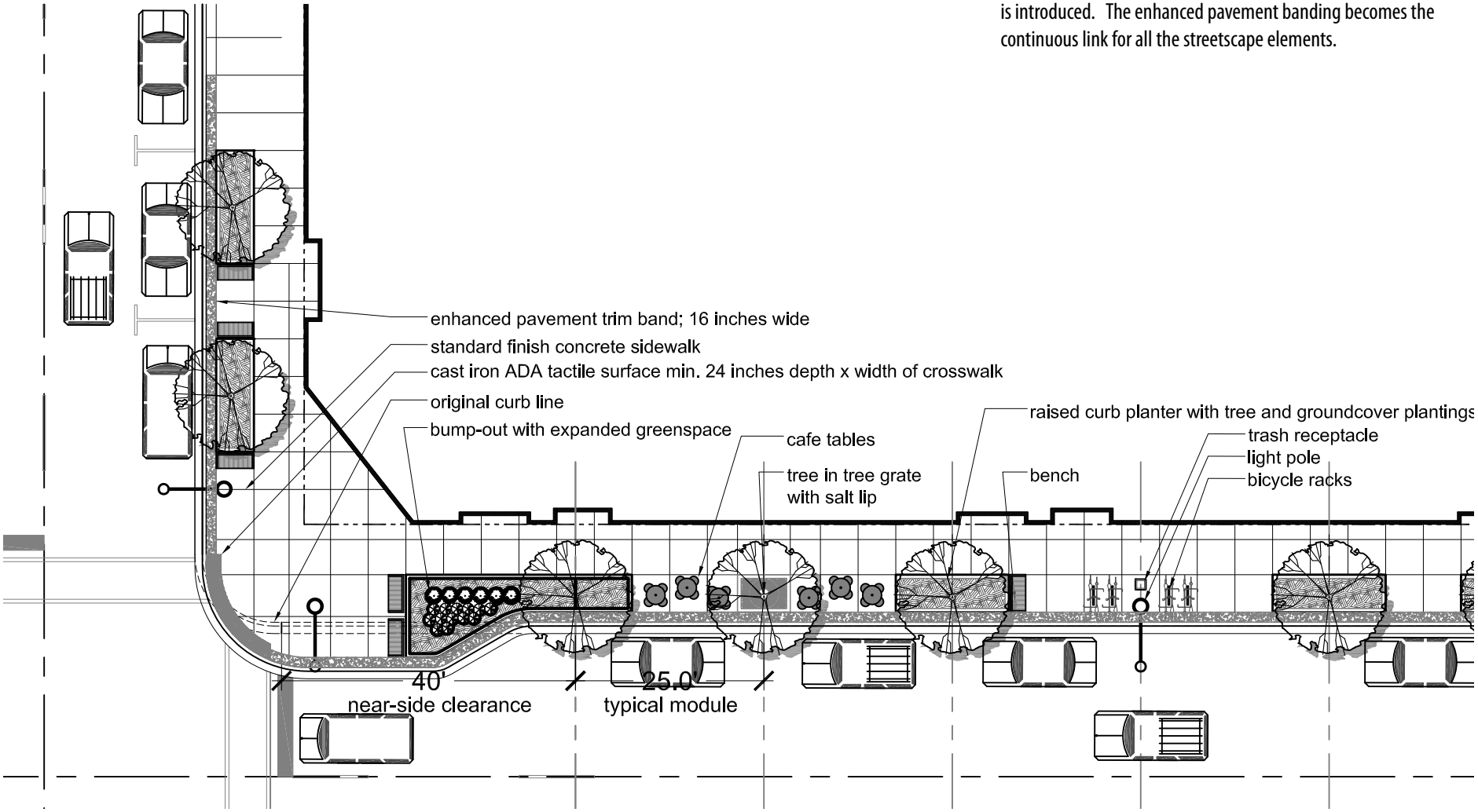


Figure 5-20: Concept C-4