Complete Streets

Chapter 6

"Complete streets" is a term used nationally to describe the transformation of vehicle-dominated thoroughfares in urban and suburban areas into community-oriented streets that safely and conveniently accommodate all modes of travel, not just motorists. This section describes the process and components of a complete street, setting the stage for the plan's transportation and land use recommendations. The inclusion of complete streets in the Hendersonville Land Use & Transportation Plan is a response to a public interest. Local citizens, business owners, and officials recognize the importance of a shift from an automobile-dominated roadway to a balanced, multi-modal transportation system that respects all users of the roadway and the rights of adjacent land owners. Focus groups and public workshops during the public design charrette were well-attended and provided an opportunity for a majority of the participants to voice their concerns about the City's current transportation system.

Implementing Complete Streets

Transforming major arterials into complete streets is complicated, requiring a diverse range of skill sets and broad support from the community. Fortunately, other metropolitan areas have demonstrated success stories that have been translated into guiding documents. The most detailed guidance comes from a joint effort of the Institute of Transportation Engineers and Congress for the New Urbanism. With funding from the U.S. Department of Transportation and the U.S. Environmental Protection Agency, best practices have been published as "Context-Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities."

Successful complete street transformations require community support and leadership, as well as coordination between various disciplines. In particular, support must include economic revitalization, business retention and expansion, property owner involvement, urban planning, urban design, landscape architecture, roadway design, utility coordination, traffic engineering, transportation planning, transit planners, architects, graphic artists, and developers.

Guiding Principles

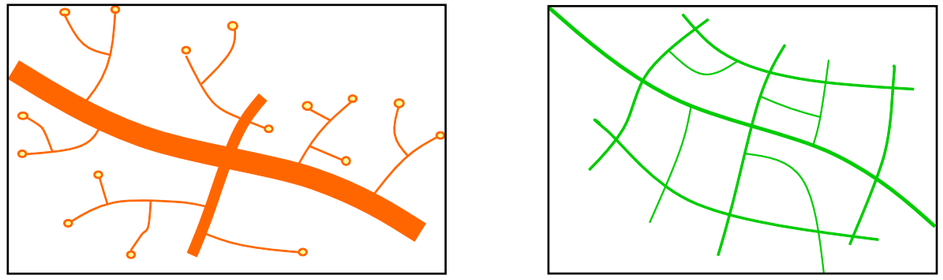
The following principles embody the most important aspects of a successful complete streets program:

- Achieve community objectives.
- Blend street design with the character of the area served.
- Capitalize on a public investment by working diligently with property owners, developers, economic development experts, and others to spur private investment in the area. A minimum return-on-investment of $3 private for every $1 of public investment should be expected. Often in more densely populated areas, the ratio is 10:1 or more.
- Design in balance so that traffic demands do not overshadow the need to walk, bicycle, and ride transit safely, efficiently, and comfortably. The design should encourage people to walk.
- Empower citizens to create their own sense of ownership in the success of the street and its myriad characters.

Caveats

Street transformations, however, require a tremendous effort by many stakeholders. Several factors contribute to the successful implementation of a complete street transformation, including:

- An interconnected network of major and minor streets with some redundancy in traffic capacity on parallel major streets. Concern over a "loss" of traffic capacity can be tempered with "surplus" capacity elsewhere.



Limited connectivity resulting in heavy reliance on arterial system (left) versus well-connected system of streets (right).

- A demonstrated and well-defined problem that can be addressed with a complete street transformation. The community should agree that the problem demands a solution and feel empowered to be advocates for change. It will never be possible to get everyone to agree with every detail of the new design, but near universal agreement on the problem definition is critical.
- A non-profit group to create an agenda for change. A non-profit group can help facilitate change and participate in design meetings to make sure that designers continue to pursue solutions and decisions that will ultimately achieve the community objective.

Policy Support

Beyond the support provided with the Hendersonville Land Use & Transportation Plan, the other important policy documents that should reflect complete street policies or enabling language include:

- City or County Comprehensive Plans
- City or County Comprehensive Transportation Plans
- Area Plans (for the applicable area served by the complete street)
- Park Master Plans (if adjacent to the corridor)
- Economic Revitalization/ Development Strategies

Street Realms

As described below, complete streets can be viewed in terms of four basic zones or realms: the context realm, pedestrian realm, travelway realm, and intersection realm. Together these street designs ensure the needs of all users are accommodated.

Context Realm

The context realm of a complete street is defined by the buildings that frame the major roadway. Identifying distinct qualities of the context realm requires focusing on four areas: building form and massing, architectural elements, transit integration, and site design.

Building Form and Massing

To enhance an already high-quality street design and help create a complete street, buildings should be located close enough to the street that they are able to frame the public space enjoyed by pedestrians. In more urban areas, these buildings should be located directly behind the sidewalk. Buildings with stairs, stoops, or awnings may even encroach into the pedestrian realm to provide visual interest and access to the public space. Suburban environments that must incorporate setbacks for adjacent buildings should limit this distance to 20 feet or less and avoid off-street parking between buildings and the pedestrian realm.

Larger setbacks in these suburban areas will diminish the sense of enclosure afforded to the pedestrian and move access to the buildings farther away from the street. In both environments, building heights should measure at least 25% of the corridor width.

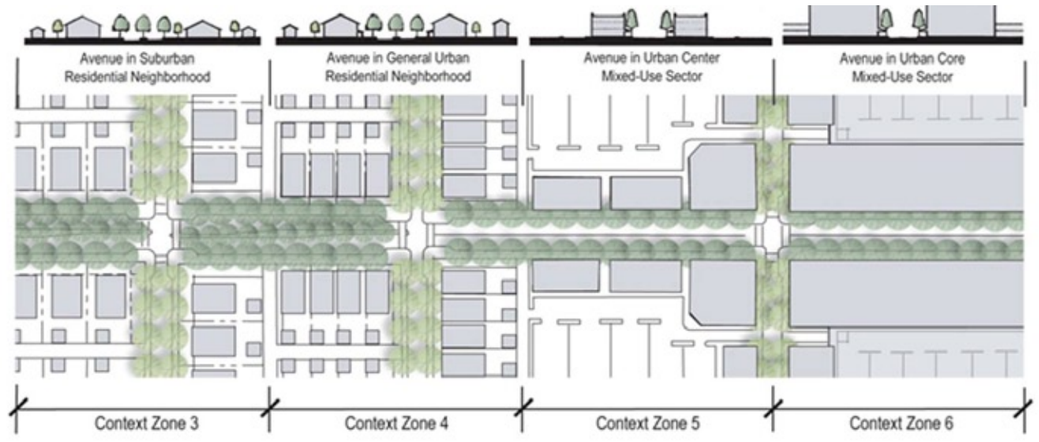
For example, a 100-foot wide roadway right-of-way should be framed by buildings that are at least 25 feet high (a typical two-story building) on both sides with facades that are at most 20 feet from the edge of right-of-way.

Architectural Elements

Careful placement and design of buildings adjacent to the major roadway offer opportunities for meaningful interaction between those traveling along the corridor and those using the corridor for other purposes. These opportunities are greatly enhanced when restaurants, small shops and boutiques, residential units, and offices are located adjacent to the street. Building scale and design details incorporated into individual buildings foster a comfortable, engaging environment focused on the pedestrian. Common building design treatments generally favored in a pedestrian environment include awnings, porches, balconies, stairs, stoops, windows, appropriate lighting, promenades, and opaque windows.

Transit Integration

Areas that are targeted for high-quality transit service must be supported through land use and zoning policies that support transit-oriented development and reflect the benefits of increased access to alternative modes of travel. Policy examples include appropriate densities and intensities for supporting transit use, parking ratios that reflect reduced reliance on the automobile, and setback and design guidelines that result in pedestrian-supportive urban design. In addition, potential transit service identified for transportation corridors within the community should take into consideration the land use, density/ intensity, and urban design characteristics of the surrounding environment before selecting proposed technologies or finalizing service plans.

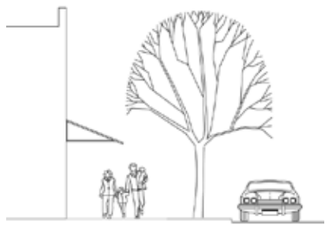


Site Design

The complete street truly is integrated into the surrounding environment when the interface between the site and the street is complementary to the pedestrian environment created along the entire corridor. Access to the site should be controlled through a comprehensive access management program to minimize excessive driveways that create undesirable conflicts for traveling pedestrians. Building orientation, further defined by landscape and architectural elements incorporated into the site should reinforce the public space protected between the buildings. Public paths through sites should be provided to shorten blocks longer than 600 feet.

Pedestrian Realm

The pedestrian realm of a complete street extends between the outside edge of sidewalk and the face-of-curb located along the street. Safety and mobility for pedestrians within this realm is predicated upon the presence of continuous sidewalks along both sides of the street built to a sufficient width for accommodating the street's needs as defined by the environment. For example, suburban settings will require different widths than downtown settings. The quality of the pedestrian realm also is greatly enhanced by the presence of high-quality buffers between pedestrians and moving traffic, safe and convenient opportunities to cross the street, and consideration for shade and lighting needs.



The pedestrian realm may consist of up to four distinct functional zones: frontage zone, throughway zone, furnishing zone, and edge zone. The frontage zone is located near the back of the sidewalk and varies in width to accommodate potential window shoppers, stairs, stoops, planters, marquees, outdoor displays, awnings, or café tables. The throughway zone provides clear space for pedestrians to move between destinations and varies between 5 and 16 feet wide, based on the anticipated demand for unimpeded walking area. The furnishing zone provides a key buffering between pedestrians and moving traffic. It generally measures at least 4 to 6 feet wide to accommodate street trees, planting strips, street furniture, utility poles, sign poles, signal and electrical cabinets, phone booths, fire hydrants, bicycle racks, or retail kiosks targeted for the pedestrian realm. The edge zone is incorporated into the pedestrian realm concurrent with the presence of on-street parking to allow sufficient room for opening car doors.

Incorporation of one or more of these function zones in the pedestrian realm of a street generally is based upon the context of the surrounding built environment. For example, a more urban, downtown environment will include all four zones in the pedestrian realm and could measure up to 24 feet wide. An equally important link to the pedestrian network that is located in a more suburban setting may omit one or more of the function zones listed above, resulting in an overall minimum width of 11 feet.
Recommended design elements for promoting a healthy pedestrian realm generally focus on one of four areas of concentration: pedestrian mobility, quality buffers, vertical elements, and public open space. Together, these best practices can be implemented in both urban and suburban environments, to varying degrees, for promoting healthy pedestrian environments.

Pedestrian Mobility

The presence of a comprehensive, continuous pedestrian network serves as the foundation for fostering a walkable community that supports active transportation and mode choice. Sidewalks generally provide clear zones of 6 to 8 feet wide to accommodate pedestrian travel. In more urban environments, amenities in the frontage zone and furniture zone will greatly increase the overall width of the corridor when compared with more suburban settings. Mid-block pedestrian crosswalks should be incorporated into the urban fabric as needed to make sure that convenient crossing opportunities are provided approximately every 300 feet for maximizing efficiency and safety within the pedestrian system. As a general rule, mid-block crossings should be considered on two-lane streets when the block length is greater than 500 feet and the posted speed limit for the travel lanes does not exceed 40 miles per hour.

Quality Buffers

Providing separation between pedestrians and moving traffic greatly enhances the character of the pedestrian realm. The amount of separation incorporated into the pedestrian realm may vary between corridors based on the context of the surrounding built environment or on streets with different travel speed and/or traffic volume characteristics. In downtown areas, parallel or angled on-street parking provides sufficient distance (8 to 18 feet) for separating pedestrian and vehicle traffic. Likewise, landscape planting areas (typically 6 feet wide) incorporated into either urban or suburban environments provide adequate lateral separation for pedestrians. In urban areas, street trees may be placed in tree wells within an overall hardscaping surface instead of using suburban-style grass areas.

Vertical Elements

Vertical elements traditionally incorporated into the pedestrian realm include street trees, pedestrian-scale street lighting, and utilities. Street trees provide necessary shade to pedestrians and soften the character of the surrounding built environment. They should be spaced between 15 and 30 feet apart, be adapted to the local environment, and fit the scale and character of the surrounding area. Pedestrian-scale street lighting incorporated into the pedestrian realm should use metal halide fixtures mounted between 12 and 20 feet high. Utilities should not interfere with pedestrian circulation or block entrances to buildings, curb cuts, or interfere with sight distance triangles. In some cases, burying utilities underground avoids conflicts and clutter caused by utility poles and overhead wires. Relocation of overhead utilities to tall poles on just one side of the roadway, however, can be a cost-effective aesthetic alternative to burial of utilities in a duct bank under the road.

Public Open Space

The pedestrian realm serves a dual purpose within the built environment, acting as both a transportation corridor and a public open space accessible to the entire community. As a result, specific design elements incorporated into the pedestrian environment should reinforce this area as a public space. Properly planned, these design elements could provide opportunities for visitors to enjoy the unique character of the corridor in both formal and informal seating areas. Public art and/or specialized surfaces and materials introduced into the pedestrian realm are appreciated by slower moving pedestrians. In more urban areas, street furniture and/or outdoor cafes provide opportunities that foster community ownership in the pedestrian realm, such as "people watching." Furthermore, building encroachments in downtown areas, such as stairs and stoops, provide for interesting points of access to the pedestrian realm. Lastly, awnings and canopy trees provide shade which is helpful in the temperate climate of the region.

Travelway Realm

The travelway realm of a street is defined by the edge of pavement or curb line (in more urban areas) that traditionally accommodates the travel or parking lanes needed to provide mobility for bicycles, transit, and automobiles sharing the transportation corridor. This area also separates the pedestrian and context realms and may provide carefully-designed crossing opportunities between intersections. Recommended design elements incorporated into the travelway realm serve to achieve greater balance between travel modes sharing the corridor and favor design solutions that promote human scale for the street and minimize pedestrian crossing distance. Recommendations for the travelway realm in a complete street focus on two areas of consideration: modes of travel and medians.

Multi-modal Corridors

Balance between travel modes within the same transportation corridor fosters an environment of choice for mobility that could lead to reduced congestion on major roadways and a healthier citizenry. On a complete street, safe and convenient access to the transportation network for bicycles, transit, and automobiles is afforded within the travelway realm. Travel lanes for automobiles and transit vehicles should measure between 10 and 11 feet wide, depending on the target speed, to manage travel speeds and reinforce the intended character of the street. Parking lanes incorporated into the travelway realm should not exceed 8 feet in width (including the gutter pan) and may be protected by bulb-outs evenly spaced throughout the corridor.

Bus stops located along the corridor should be well-designed to include shelters, as well as benches that comfort patrons while waiting for transit service. On-street bicycle lanes (typically 4 to 6 feet wide) should be considered when vehicle speeds range from 30 to 40 miles per hour. Wide outside lanes may be preferred on streets with higher speeds. To avoid situations where citizens with only basic bicycle skills may be attracted to a corridor, designated bicycle routes on parallel corridors may be the best option when speeds on the major street exceed 40 mph. According to state law, bicyclists are considered vehicles and are permitted on all corridors except freeways and access-controlled highways.

Median Treatments

Medians often are incorporated into the travelway realm to provide dedicated left-turn lanes, landscaping, and pedestrian refuge at crossings. They generally vary between 7 and 18 feet wide, depending on their intended application and the limitations of the surrounding built environment. Medians also reinforce other access management solutions provided within the travelway to reduce the number of conflict points and maintain the human scale intended for the complete street.

In addition to center medians, other access management solutions incorporated into the travelway realm should limit the number of individual driveways along the corridor and avoid the use of right-turn deceleration lanes. Together, these improvements will reduce the overall pedestrian crossing distance for the travelway and maximize the safety for pedestrians traveling inside the pedestrian realm.

Intersection Realm

Evaluating potential changes for the intersection realm of a street requires careful consideration for the concerns of multiple travel modes that could meet at major intersections within the transportation system. Recommendations for improving the multi-modal environment in and around these major intersections focus on two areas of the facility: operations and geometric design.

Geometric Design

Geometric design of an intersection should reinforce the operational characteristics of a traffic signal or roundabout. With traffic signals, this includes the introduction of curb extensions, or bulb-outs, to shorten pedestrian crossing distance and protect on-street parking near the intersection. Curb return radii designed for signalized intersections should be 15 to 30 feet to control turning speed around corners. At roundabouts, special consideration should be given to entry and exit speeds, pedestrian refuge in the splitter islands, and assigning predictability to the intersection for pedestrians, bicycles, and vehicles. Both intersection treatments may consider special pavement markings to distinguish pedestrian areas or bicycle lanes, although these surfaces need to be stable, firm, and slip resistant. Additional consideration should be given to maintaining adequate sight triangles in the intersection, addressing the treatment of bicycle lanes through the intersection, and compliance with federal requirements per the American with Disabilities Act for crosswalk and curb ramp design.

Operations

In terms of operations, traffic signals or roundabouts are the two most appropriate applications for traffic control devices that also could maintain the pedestrian scale of the street reinforced in the context, pedestrian, and travelway realms. The merits of a traffic signal rather than a roundabout for intersection control should be determined on a case-by-case basis after taking into consideration key issues such as desired traffic speed, availability of right-of-way, anticipated traffic patterns, and the context of the built environment surrounding the intersection.

Street Design Priority Matrix

As a part of this planning process a mechanism that links transportation with development character was sought. A planning tool was desired to serve as a local representation of the complete streets-context sensitive solutions philosophy. However, the tool needed to be customized for the study area. The result was a Street Design Priority Matrix (see Table 4-5). The matrix communicates the elements of each type of street and includes:

Travel Realm

- Number and width of travel lanes
- Intersection vehicular capacity
- Design for large vehicles
- Medians
- Bicycle lanes
- Multi-modal intersection design

Pedestrian Realm

- Wide sidewalks with amenities
- Standard sidewalks with verge
- Multi-use paths
- On-Street parking
- Urban design features

Additional considerations include the need for connectivity and access management. The resulting priority matrix communicates the priorities for each street element as it relates to the character areas of the community (i.e., Old Town, Mixed-Use Neighborhood, Employment Center, Regional Activity Center, Suburban Center, Suburban Lving, Rural Living, and Waterfront Living) and should indicate those high priority items that should NOT be compromised during the design process. In essence, the matrix reinforces the relationship between transportation and land use by adding design and context to each corridor within a character area.

Table 4-5- Benefits of Corridor Access Management

TRAVEL REALM	Old Town	Neighborhood Mixed Use Center	Employment Center	Regional Activity Center	Suburban Center	Suburban Neighborhood	Rural Living	Waterfront Living
Number and width of travel lanes								
Intersection vehicular capacity								
Design for large vehicles								
Medians								
Bicycle lanes								
Multimodal intersection design								
PEDESTRIAN REALM								
Wide sidewalks with amenities								
Standard sidewalks with verge								
Multi-use paths								
On-Street parking								
Urban design features								
OTHER ELEMENTS								
Interconnected street system								
Access Management								
Curb and Gutter								
Ditch Swale Section								
RELATIVE STREET SPACING (FT)	600-800	600-1500	1200-1500	800-1500	1200-1500	1500-3000	2,500-5000+	Varies

High Priority	
Medium Priority	
Low Priority	
N/A	