SOUTH MIAMI COMPLETE STREETS POLICIES AND DESIGN MANUAL

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

What are Complete Streets, and why are they important? From a technical standpoint, Complete Streets are the inclusion of all modes of traffic, including walking, biking, transit riding, and driving. From a policy standpoint, it's about creating choices, allowing for a more complete community with enhanced neighborhood characteristics and heightened quality of life. Not all Complete Streets are the same, though they may feel like they are when we look at other examples. In adopting Complete Streets Plans, however, communities have similar goals and in when implemented with land use in mind, effect positive changes in transportation, urban design, health, aesthetics, and safety in the City.

In looking across various Complete Streets plans and how communities strive to make their urban environments complete, we find that planning for the roadways follow similar principles:

- Are designed for people of all ages and physical abilities regardless of the travel mode taken – walking, biking, transit, vehicular
- Provide opportunities for connections through interpersonal interaction
- Can encourage "Active transportation" which promote healthy lifestyles
- Are responsive to local needs in the design of the streets
- Create safe and inviting places to bicycle and walk through the implementation of pedestrian and bicycle friendly design and amenities
- Create space through the addition of landscaping, wayfinding, street furniture, and public art

Encouraging more walking and bicycling enhances the local quality of life, and create incentives for local economic development.

For South Miami, the implementation of Complete Streets is a natural evolution of existing progressive policies as it seeks to enhance local quality of life. Concepts of Complete Streets are not new to the City – in fact, it had incorporated various elements in the past, ranging from Bicycle Lanes on Red Road to Bulb-outs on Sunset Drive to create a more pedestrian and bicycle friendly community. In planning for the future, South Miami recently adopted its Intermodal Transportation Plan, which provides for the City an analysis of its needs and wants. However, the implementation of this plan requires a realignment of the roadways, and an understanding of the space required to implement the City's vision and bring it from Plan into reality. This plan, a Policy and Design Manual, is therefore structured to provide an organized, logical approach to restructuring the Streets based on the needs noted in the Intermodal Transportation Plan and existing Comprehensive Plan policies.

In implementing Complete Streets in South Miami, the policies recommended and design standards herein are designed to allow a range of options for the City to choose from, enabling the implementation of Complete Streets to be context sensitive to the surrounding land uses and urban landscape. This plan begins with the premise that the City will adopt Comprehensive Plan policies which will minimize the size of the travel lanes, and maximize the amount of space necessary to implement facilities for alternative modes of transportation. Implementation must be context sensitive to existing land use; what belongs in a dense commercial area may not be needed in a residential neighborhood with bungalows. To account for this, the City was analyzed using a Transect Model, and each portion of the City was mapped and assigned to a suburban, general urban, or urban center zone. As the City evolves, this map may be amended based on new land uses and changes in urban form, including building size. By comparing the Zones to how local, collector, and arterial streets are designed, 9 primary roadway plans were created as templates for future improvements. Within these 9 primary plans, the creation where possible of a "Flex Zone" will allow the City to choose from a menu of options, ranging from parking spaces to benches and transit shelters, to meet the needs of a diverse City.

Ultimately, when we look at all physical space, including roadway design, it is not that we made a road, or a sidewalk. It's that we programmed that particular space for a vehicle, and this particular space for a sidewalk. Understanding this concept and allowing ourselves to break free of the constraints of current planning, which have very linear, segregated modes of transportation, allows for innovative usage of space that allows for adaptability and creation of place, one that will be able to more inexpensively adapt to as the City continues to mature, grow, and define and redefine its identity and urban form. In implementing Complete Streets, South Miami is partaking in placemaking, ensuring that the City remains a desirable place to live.

Source: http://www.dec.ny.gov/docs/administration_pdf/ceponis.pdf

INTRODUCTION AND VISION

COMPLETE STREETS

South Miami streets are public spaces. Every day, thousands of people drive, bike and walk throughout the City including the downtown area, Metrorail Station, medical district and its neighborhoods. The City's streets provide transportation routes not only for its residents, but for neighbors, visitors and workers. These streets are mostly vehicle-focused, creating challenges within the transportation system such as pedestrian and bicycle connectivity issues, traffic and vehicular congestion, and limited access to transit facilities among others.

This study and the resulting manual aims to design streets that adhere to a vision of complete Streets. Complete Streets will vary based on the surrounding neighborhoods by function and design, and ultimately must be context sensitive and connected to surrounding urban design and land use. In looking across various Complete Streets plans and how communities strive to make their urban environments complete, we find that planning for the roadways follow similar principles:

COMPLETE STREETS

- Are designed for people of all ages and physical abilities regardless of the travel mode taken – walking, biking, transit, vehicular.
- Provide opportunities for connections through interpersonal interaction
- Can encourage "Active transportation" which promote healthy lifestyles
- Are responsive to local needs in the design of the streets
- Create safe and inviting places to bicycle and walk through the implementation of pedestrian and bicycle friendly design and amenities
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Encouraging more walking and bicycling enhances the local quality of life, and create incentives for local economic development. Ultimately, the goal of Complete Streets is to create a livable environment where people can interact with the built environment through a variety of means, enhancing the diversity of mobility and by extension, increasing accessibility. In the past century, the private automobile has dominated the landscape and planning, resulting in wider roads, and at times, a decrease in priorities for bicyclists and pedestrians. Today, congestion is an issue with increasing traffic. Space, then, is an issue. How much more do we dedicate to the automobile, when other modes, including bus transit, take up less space to transport the same amount of people.

South Miami has taken the lead in recognizing that we can no longer rely on the vehicle. But, to move towards a safer, healthier, and greener multimodal environment, the City has to implement the projects identified in the South Miami Intermodal Transportation Plan. The question is, what are the constraints, and how will the City be able to implement these ideas?

In South Florida, a community long reliant on the vehicle, the implementation of Complete Streets involves the long term retrofitting of the existing right of way. What fits? What does not? In planning, we come up with lofty ideas – we should make sidewalks available everywhere. In practical application of these ideals, we face constraints of space and the inherent trade-offs in providing for different transportation facilities. Ultimately, to implement plans such as the South Miami Intermodal Transportation Plan, a reconfiguration of the right of way is necessary.

To ensure that the plan was context sensitive to South Miami's streets, we first reviewed existing land use. Through this review, this study was able to distinguish the character of the neighborhood, recognizing that an urban core area as can be seen around Sunset Place will have very different transportation needs when compared to residential areas elsewhere in the City. Likewise, residential developments within the City will have different transportation needs as well based on type of residence (multifamily, single-family) and density. Through this analysis, the City was divided into transect based sectors, based on local character.

A core principle of this approach was that the transportation facilities must be tied into the land use and available right-of-way. At the same time, in looking at the diversity of the roadway network within South Miami, we realized that there were large differences in rights-of-way. To resolve this issue, the design manual took the approach of first determining the absolute needs – corridors of travel for pedestrians, bicyclists, and vehicles, including buses. The remaining space was then organized into "Flex" spaces, which could be utilized for various improvements as deemed necessary by adjacent land use or local preference.

To create this "Flex" space, there are two options. First, is to expand the Right-of-way. For South Miami, this is not an option, as they are already wide and more than adequate. The other option is to realign how space is divided on the current right-of-way. In some cases, this simply required looking at the street and narrowing the travel lanes, allowing for that space to be reassigned.

Using a modular approach, like working with Legos, allows the City certain advantages. By setting aside the appropriate space for later, it can avoid having to reconstruct the road in its entirety as conditions change. Further, it can incrementally implement based on existing and evolving need as well as available funds. Perhaps, today, the City doesn't need as many benches or bicycle racks. However, this may change in the future. Allowing this flex space to be used for parklets or green space with options for pop-up programming also lets the City create a pedestrian and bicycling environment in a more meaningful way than simply prescribing trees, set in a pattern, or a wider sidewalk when a sidewalk may already be wide enough to serve the community. It is not simply enough for Complete Streets that the minimum requirements for alternative modes are put in place. The result must be aesthetically pleasing, and allow for people to desire to walk and bike.

The best Complete Streets, the ones which people point to as examples, are far more than just looking at the mode – they create a sense of place. Within the Flex space, we can be creative. We can design an urban linear park, or a parking space. Alternatively, we can make a meandering path with trees, or utilize the extra space for a shared-use path. We can even twist the idea of a parklet by creating a seating area, perhaps with a vending machine as a library, thereby implementing tactical urbanism and allowing for the activation of space and creation of community gathering points that truly make a street Complete.

Ultimately, when we look at all physical space, including roadway design, it isn't that we made a road, or a sidewalk. It's that we programmed that particular space for a vehicle, and this particular space for a sidewalk. Understanding this concept and allowing ourselves to break free of the constraints of current planning, which have very linear, segregated modes of transportation, allows for innovative usage of space that allows for adaptability and creation of place, one that will be able to more inexpensively adapt as the City continues to mature, grow, and define and redefine its identity and urban form.

Source: Hollywood, FL CRA

Source: Completestreetsforca.ca - Complete Streets for Niagara workshop booklet

BACKGROUND AND HISTORY

BACKGROUND AND ANALYSIS

The City of South Miami is located in the middle of a major metropolitan area. The City is mostly composed of residential (single family) districts divided in ten different neighborhoods as well as multiple-family and mixed-use designated areas. The City also has a downtown area which includes several uses such as commercial, retail, offices and residential mixed-uses, as well as a transit-oriented development district intended to provide for the development of multi-story and mixed use commercial and residential projects. US1/ South Dixie Highway traverses the downtown area and is where the Metrorail station is located, making it the City's most transited corridor for vehicles, cyclists and pedestrians alike.

During the extensive public input process conducted while developing the South Miami Intermodal Transportation Plan (SMITP), significant support was expressed for expanding the range of transportation options, as well as for land development forms that are walk and bike-friendly and easily served by transit. South Miami citizens' perception and use of transportation included the support of sustainable economic development, the support of complete streets that encourage citizen safety, public health, and economic viability by promoting pedestrian safety, limiting widening of existing streets, and providing public transportation options, and the support of public-private partnerships for the implementation of complete streets. Given these responses from South Miami residents, it is obvious that providing safe and healthy alternatives to the City's current transportation system is critical.

With the increase in population, housing density and commercial demand, along with the increasing frustration with traffic and the interest in supporting green sustainable values, there is a strong movement to create multi-modal accommodations to address all of these concerns by ensuring that the streets are designed to accommodate walking, biking, transit, and vehicle access. Therefore the need for Complete Streets.

In the past, South Miami has been proactive in how it approaches Complete Streets. Examples such as wider sidewalks and curb extensions on Sunset Drive, bicycle lanes on Red Road, and other facilities exist within South Miami, and positively add to the walking and bicycling experience within the City.

COMPLETE STREETS AND LAND USE

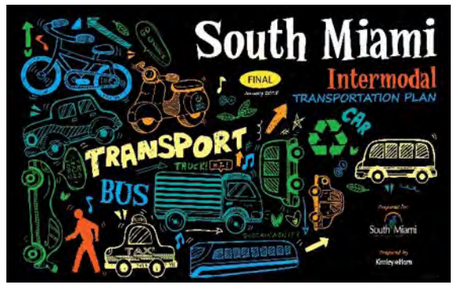
Complete Streets design considers the interaction of many different roadway users, elements of streets design and surrounding land uses. In residential/ urban communities like South Miami, a mix of well-connected residential neighborhoods and compact mixed-use developments makes walking, cycling and transit use practical travel choices. The location of a Metrorail station on US 1 and Sunset Drive and the density of housing within the downtown area provides important commercial opportunities. Although the city has the framework of a grid of streets, and a mix of land uses, there is a need to ensure that the street design is safe, that it accommodates all types of users and alternative modes of transportation, that it incorporates green design, and that it complements surrounding land uses, the environment and the community.

DATA COLLECTION, REVIEW AND ANALYSIS

Prior planning within and outside of South Miami were reviewed as part of this study to determine local needs, options, and best practices:

South Miami Intermodal Transportation Plan (SMITP) –
A review of this plan was also performed under this task. The SMITP provides an in-depth analysis of the City's existing sidewalks, trails, bicycle paths, activity nodes and roadway networks, as well as transit related studies and capital improvement projects. In addition, this plan sets goals and objectives to develop an interconnected network plan of multimodal streets that promote sustainable transportation, as well as recommendations for a future network of non-motorized transportation facilities.

Essential Complete Streets information such as its benefits and recommendations are listed in this plan. However, Complete Streets policies and design standards as well as specific goals, objectives and policies needed incorporated in the City's Comprehensive Plan have not been yet established; therefore the need of the South Miami Complete Streets Policy and Design Standards Manual.



Source: City South Miami

Downtown Miami Pedestrian Priority Zone –
Plan created by the Miami Dade County MPO for the Miami Downtown Development Authority with the purpose of enhancing pedestrian comfort and safety standards for the design of all public right-of-ways. The main goal of this plan is to promote safety, health, amenity, economic vitality and general welfare of the public, important elements of Complete Streets principles. By reviewing this plan, general design standards for complete streets were examined, as well as best practices, policies implementation, procedures and adoption.

Source: Downtown Miami DDA

In addition to the above, this study evaluated existing plans and design standards from the Los Angeles County Living Streets Manual, Miami21 guidelines, the Fort Lauderdale Complete Streets Manual, the City of Sunrise Bicycle and Pedestrian Greenways & Trails Master Plan, the CNU/ITE Designing Walkable Thoroughfares: A Context Sensitive Approach, the Boston Complete Streets Manual and the Miami-Dade MPO Complete Streets Manual, among others. These best practices were then compared with existing minimum standards based on existing design standards and regulations. This comparison is enclosed as Appendix A of this report.

South Miami's streets traffic conditions are characterized by a significant amount of through traffic on the road network including arterials, collectors and local streets. The City's road network consists of one arterial and two collectors serving north/south, and three arterials and two collectors serving east/west. The classification of the City's network are:

Principal Arterial – roadways defined as major highways serving regional activity centers. These facilities accommodate heavy volumes of traffic and channel traffic between other principal arterials and through the urban area. In South Miami they are:

- U.S. 1
- Bird Road
- Kendall Drive

Minor Arterials — roadways defined as carrying moderately heavy traffic and channel traffic to community activity centers.

- Sunset Drive
- Red Road

Collector Streets — roadways defined as carrying moderately low traffic volumes and serve to channel traffic from neighborhoods to the arterial network or to other neighborhood activity centers. These residential streets should not be re-designated to avoid potential road widenings.

- Miller Road
- David Road (S.W. 80 Street)
- Ludlam Road (S.W. 62nd Avenue)
- S.W. 48th Street

Local Streets — roadways not defined as arterials or collectors; primarily providing access to land with little or no through movement. This class of roads usually have direct property access as their primary purpose.

TRANSECT ZONES

The entire city was analyzed using a transect or context zone approach which classifies urban transect into distinct types, ranging from lower to higher density and intensity of development. Characteristics such as density, building placement, height, frontage type, public open spaces were initially examined throughout the City allowing us to identify and map all the applicable transect zones. (See Figure 01). This analysis was then refined through comparison with the Future Land Use Plan. (See Figure 02).

This method was utilized with the purpose of being context-sensitive to the City's land use. By examining and comparing the area's components of the built world such as density, buildings, lots, open space, land use patterns and streets we were able to identify and categorize different areas within the City into three transect zone categories: T-3 Suburban, T-4 General Urban and T-5 Urban Center. These zones were identified by considering both the existing conditions and the plans for the future (by reviewing the City's Comprehensive Plan). In application of a Complete Streets Plan, we recognize that thoroughfares often last longer than adjacent buildings. We also recognized that urban form changes as new developments are built, and we structured this plan in such a way so that as land is redeveloped and rezoned, an amendment to the transect map will allow South Miami to apply Complete Streets in a consistent manner, tying together urban form and roadway design.

The table below presents the full range of transect zones; however, this report focuses on urban transects T-3 through T-5. The "distinguishing characteristics" column in the table describes the overall relationship between buildings and landscape that contributes to context. In addition to the distinguishing characteristics and general character, four attributes help in identifying a context zone: (1) building placement—how buildings are oriented and set back in relation to the thoroughfare; (2) frontage type—what part of the site or building fronts onto the thoroughfare; (3) typical building height; and (4) type of public open space.

Figure 00

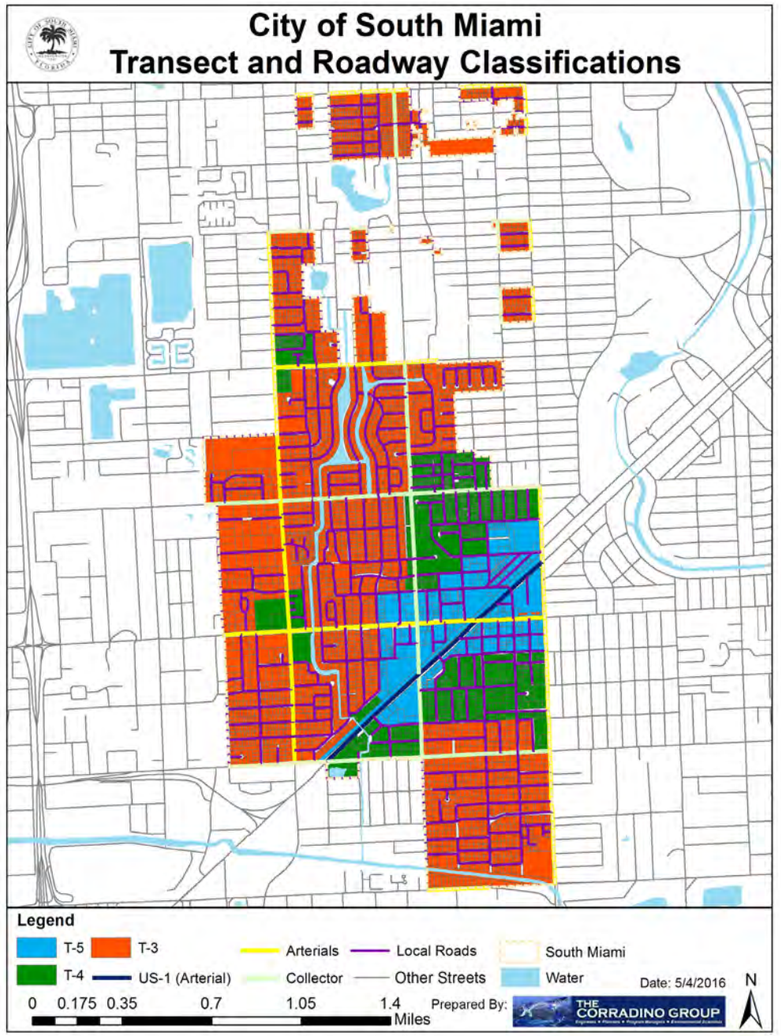


Figure 01

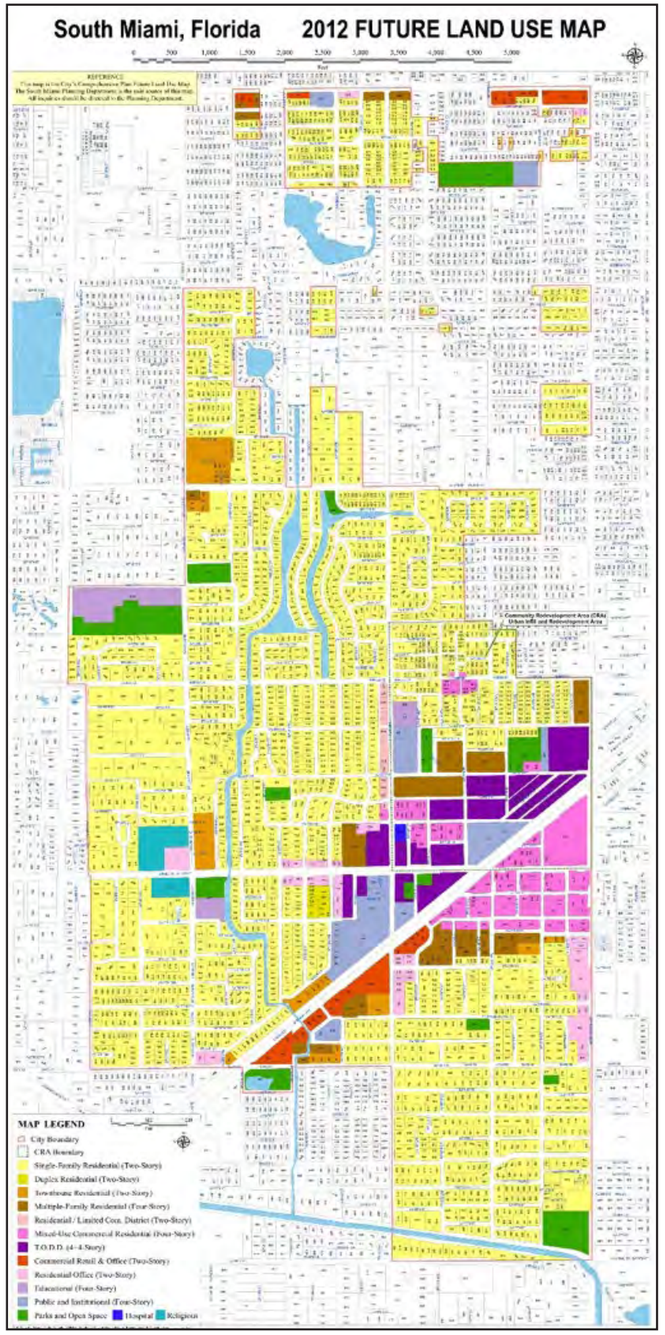


Figure 02

Transect Zone Qualities

Transect Zone	Distinguishing Characteristics	General Character	Building Placement	Frontage Types	Typical Building Height	Type Of Public Open Space	Transit (Where Provided)
T-1 Natural	Natural landscape	Natural features	Not applicable	Not applicable	Not applicable	Natural open space	None
T-2 Rural	Agricultural with scattered development	Agricultural activity and natural features	Large setbacks	Not applicable	Not applicable	Agricultural and natural	Rural
T-3 Suburban	Primarily single family residential with walkable development pattern and pedestrian facilities, dominant landscape character. Includes scattered commercial uses that support the residential uses, and connected in walkable fashion.	Detached buildings with landscaped yards, normally adjacent to C-4 zone. Commercial uses may consist of neighborhood or community shopping centers, service or office uses with side or rear parking.	Varying front and side yard setbacks	Residential uses include lawns, porches, fences and naturalistic tree planting. Commercial uses front onto thoroughfare.	1 to 2 story with some 3 story	Parks, green-belts	Local, express bus
T-4 General Urban	Mix of housing types including attached units, with a range of commercial and civic activity at the neighborhood and community scale	Predominantly detached buildings, balance between landscape and buildings, presence of pedestrians	Shallow to medium front and side yard setback	Porches, fences	2 to 3 story with some variation and few taller workplace buildings	Parks, green-belts	Local, limited stop bus rapid transit, express bus; fixed guideway
T-5 Urban Center	Attached housing types such as townhouses and apartments mixed with retail, workplace and civic activities at the community or sub-regional scale.	Predominantly attached buildings, landscaping within the public right of way, substantial pedestrian activity	Small or no setbacks, buildings oriented to street with placement and character defining a street wall	Stoops, dooryards, storefronts and arcaded walkways	3 to 5 story with some variation	Parks, plazas and squares, boulevard median landscaping	Local bus; limited stop rapid transit or bus rapid transit; fixed-guideway transit
T-6 Urban Core	Highest-intensity areas in sub-region or region, with high-density residential and workplace uses, entertainment, civic and cultural uses	Attached buildings forming sense of enclosure and continuous street wall landscaping within the public right of way, highest pedestrian and transit activity	Small or no setbacks, building oriented to street, placed at front property line	Stoops, dooryards, forecourts, storefronts and arcaded walkways	4+ story with a few shorter buildings	Parks, plazas and squares, boulevard median landscaping	Local bus; limited stop rapid transit or bus rapid transit; fixed-guideway transit
Districts	*To be designated and described locally, districts are areas that are single-use or multi-use with low-density development pattern and vehicle mobility priority thoroughfares. These may be large facilities such as airports, business parks and industrial areas.*						*As applicable*

Source: Institute of Transportation Engineers [ite.org]

Transect Zone T-3 — is primarily suburban and is characterized by single-family residential uses with walkable development patterns and dominant landscape patterns. Almost two-thirds of South Miami consist of low density residential districts with detached single-family developments connected through local streets. This type of development is usually linked to varying front and side yards, and frontage types such as lawns, porches, fences and landscaping. Transect Zone T-3 also includes scattered commercial uses that support the residential uses. In South Miami, this transect zone is the most predominant and is mainly composed of the following residential zoning districts: RS-1, RS-2, RS-3, RS-4, RS-5, Residential Office (RO), and General Retail (GR) among others.

The South Miami Intermodal Transportation Plan (SMITP) developed Complete Streets project improvement recommendations to promote safe, healthy, and sustainable bicycle and pedestrian mobility within the City. The recommendations within the T-3 transect zones are:

- Bike lanes along SW 40th Street, SW 48th Street, SW 56th Street, SW 64th Street, SW 57th Avenue, SW 62nd Avenue, SW 67th Avenue
- Shared-Use Path along SW 56th Street and Snapper Creek
- Neighborhood Greenways along
  - Manor Lane/SW 63rd Avenue – between SW 80th Street and SW 74th Street
  - SW 64th Court/SW 64th Avenue/SW 63rd Court – between Manor Lane and SW 44th Street
  - SW 59th Place – between Sunset Drive and SW 64th Street
  - SW 59th Avenue – between SW 87th Street and Sunset Drive
  - SW 58th Avenue/SW 70th Street/Commerce Lane/ SW 58th Place/ SW 58th Court/SW 58th Avenue – between SW 87th Street and SW 40th Street
  - SW 78th Street/SW 77th Terrace – between U.S. 1 and SW 57th Avenue
  - SW 68th Street – between SW 64th Avenue and SW 57th Avenue
  - SW 50th Street – between SW 64th Avenue and SW 57th Avenue
- New sidewalks along SW 62nd Avenue, SW 56th Street, SW 80th Street
- Crosswalks along SW 57th Avenue and SW 40th Street
- Green Bike Lane and/or Bike Box on SW 57th Ave at SW 40th Street, SW 48th Street and SW 56th Street
- Neighborhood Greenway Crossing Treatments along SW 58th Avenue, SW 62nd Avenue, SW 67th Avenue, SW 69th Avenue, SW 80th Street, SW 64th Street, SW 56th Street, SW 50th Street
- Neighborhood traffic circle on SW 58th Ave and SW 50th Street, SW 56th Avenue and SW 44th Street, SW 69th Ave and SW 75th Terrace, SW 62nd Ave and SW 85th Street
- Traffic circles on SW 62nd Avenue at SW 56th, 64th and 80th Street

Transect Zone T-4 — General Urban, is characterized by a mix of housing types including attached units with a range of commercial and civic activity at the neighborhood and community scale. This zone can be considered a middle point between a suburban environment with the benefit of walkability to a fairly more dense and dynamic urban setting. T-4 zones are found in South Miami in areas transitioning from residential/suburban to compact and dense uses such as Downtown South Miami. The areas and neighborhoods that show these characteristics are those with multi-family uses such as zoning districts RT-6, RT-9, RM-18 and RM-24, Residential Office (RO), Low and Medium Intensity Offices (LO, RO), Neighborhood Retail (NR) and Specialty Retail (SR). and are mainly located along local streets such as SW 66th and 68th Street, SW 57th and 58th Place, and collector streets such as SW 64th Street (Hardee Drive) and SW 80th Street (Davis Road).

Some of recommended projects for T-4, based on the SMITP, are:

- New sidewalks along SW 80th Street, SW 62nd Avenue (both sides between SW 80th Street and SW 78th Street)
- Signage and wayfinding
- Trees and green space to provide shade, buffer pedestrians from passing vehicles and provide aesthetic enhancements
- Neighborhood greenways along SW 58th and 59th Place and SW 68th Street
- Standard and buffered bicycle lanes along SW 64th Street
- Sharrows along SW 57th Avenue (Red Road)
- Green Bike Lane and/or Bike Box along SW 64th Street and SW 57th Avenue
- Neighborhood Greenway crossing treatments along SW 64th Street
- Traffic Circle on SW 57th Ave and SW 68th Street

Source: Google Streetview
SW 72nd ST, just east of 58th Ave (facing east)

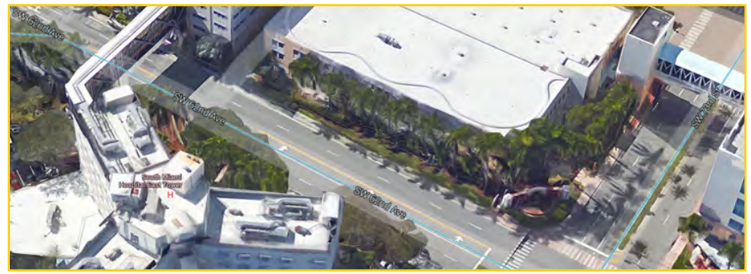
Transect Zone T-5 — Urban Center, is characterized by attached housing types such as mixed-use development with a strong retail and entertainment emphasis on the ground floors and an equal mix of residential and/or commercial office or services on the upper floors. A big presence of pedestrian activity and transit service are also common. South Miami's downtown area is a great example of a District T-5 due to its characteristics such as compact land use, closely spaced low-scale buildings (generally one to four stories), and public parking (on-street and garage). These characteristics can be seen on Sunset Drive (east of Dixie Hwy), which serves this area with streetsides that support restaurants, street cafes, social interactions, strolling and window shopping.

Transect Zone T-5 is comprised by Local Streets, such as SW 58th and SW 59th Avenues, Collector Streets such as SW 62nd Avenue, and Arterial Streets such as South Dixie Highway.

Source: Google Streetview
SW 67th Ave, just south of 62nd Ave (facing south)

Some of the recommended projects for this area, included in the SMITP, are:

- Pedestrian wayfinding sign system within downtown to identify streets, walking routes and direct pedestrians to points of interest
- Street furniture such as benches, trash receptacles, bicycle racks and shelters.
- Bus stops and bus shelters
- Buffered bicycle lane additions
- Green color pavement backing sharrows along Sunset Drive to make motorists aware of the expectation to find bicyclists sharing the travel lane
- Parklets along Sunset Drive serving as an extension of the sidewalk to provide amenities, green space and additional space for seating while maintaining pedestrian walking zones on the sidewalks
- On-street parking along Sunset Drive to provide traffic calming effects and convenience to local shops
- Mid-block curb extensions along S Dixie highway, north of South Miami Hospital exit driveway, to enhance pedestrian safety by lowering motor vehicle speeds



LEVEL OF SERVICE STANDARDS

Level of Service (LOS) refers to the speed, convenience, comfort and security of transportation facilities and services as experienced by users. Level of service ratings, typically from A (best) to F (worst), are widely used to evaluate problems and potential solutions. Such ratings systems can be used to identify problems, establish performance indicators and targets, evaluate potential solutions, compare locations, and track trends.

Typically, cities should not adopt LOS A for roadways. This is counterintuitive to what we are taught in schools – that A is the best and the standard. At this level of service, we are facing overinvestment of scarce resources into the roadway network. However, this is different for bicycling and walking level of service standards. For these, we need to be able to provide safe, adequate environments, so that Level of Service A for bicycling and walking are not only acceptable, but necessary standards.

While thousands of drivers, bicyclists and pedestrians converge on the city each day, the roadway system lacks the capacity to maintain an adequate level of service at peak periods. Since the City of South Miami has a clear goal of not adding capacity by widening roadways, a solution is to use alternative modes of transportation to add capacity into the system. By assessing transit, bicycle and pedestrian usage and linking the modes together, multimodal transportation can be addressed, greater mobility can be achieved, and the quality of life for the citizens and businesses in South Miami will be improved.

Roadway Level of Service

As stated in the City's Comprehensive Plan, a roadway level of service is defined as the ability of a maximum number of vehicles to traverse a roadway segment while maintaining a given operating condition. The standard descriptions of service levels utilized in the South Miami Comprehensive Plan are as follows:

LOS "A" describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver desires, speed limits, and physical roadway conditions. There is little or no restriction in vehicle maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.

LOS "B" describes a condition where operating speeds are beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.

LOS "C" describes an operating condition where speeds and maneuverability are more closely controlled by high volumes of traffic. Most drivers are restricted in their freedom to select their speed, lane of operation or ability to pass. A satisfactory operating speed is maintained.

LOS "D" approaches an unstable flow of traffic. Tolerable operating speeds are maintained though considerably affected by changes in operating conditions. Fluctuations in volumes and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver, comfort and convenience are low, but conditions can be tolerated for short periods of time.

LOS "E" represents operations at even lower speeds than LOS "D." Flow is unstable and there may be stoppages of momentary duration.

LOS "F" describes forced flow operation at low speeds. Speeds are reduced substantially and stoppages may occur for short or long periods of time. In the extreme, both speed and volume can drop to zero.

Except for Bird Road, all South Miami roadways are at LOS "D" or worse and Kendall Drive, Red Road and U.S. 1 are operating in the LOS "E" and "F" ranges.

It is the City's vision and goal not to expand capacity or widen roadways, therefore the LOS "D" standard is not accepted as City of South Miami policy since it would require major widening's that would adversely affect the residential character of the City. It would also further congest the downtown area due to additional traffic using Sunset Drive and Red Road. Instead, this commuter traffic should use higher capacity arterials that do not pass through residential areas. The following service levels are set for both 24-hour and peak-hour periods:

- Principal Arterials LOS "F"
- Minor Arterials LOS "F"
- Collectors LOS "F"

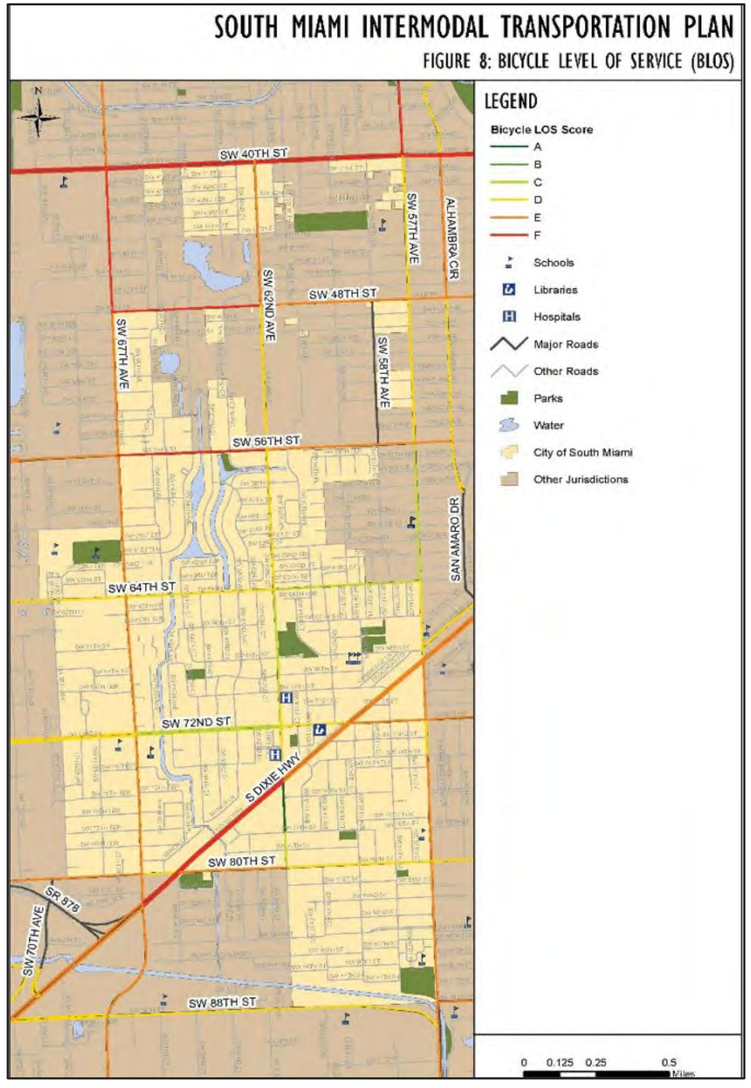
Bicycle and Pedstrian Level of Service

Through field reviews and surveys, the City's bicycle and pedestrian Level of Service were assessed as part of the South Miami Intermodal Transportation Plan (SMITP). The determination of the Bicycle and Pedestrian Level of Service for each segment of the City's Bicycle and Pedestrian Network was based on the operational level of service methodology adopted by the Florida Department of Transportation (FDOT). The Bicycle and Pedestrian Level of Service (BLOS) (PLOS) Models identify the level of service for a segment of the network on a scale of A to F based on a numerical model score. An LOS of "A" indicates good cycling or walking conditions and "F" indicates the least favorable conditions, and are a measure of the quality of the environment based on measured physical attributes including the vehicle volume and speed on the adjacent roadway, the presence or absence of striped bike lanes, sidewalks, and the presence or absence of occupied on-street parking. For each segment, a LOS score was assigned for both Pedestrian and Bicycle LOS. The segments were broken up at logical points, usually section or half section line roads, if applicable. The smaller, more residential, streets were generally taken as a single segment. This is not a level of service evaluation as is done for a road, which rates the road on how much volume it can handle. This measures the quality of service of a particular street.

Bicycle LOS is based on bicyclists' perceptions of the roadway environment and is based on the following five variables:

- Average effective width of the outside though lane
- Motorized vehicle volumes
- Motorized vehicle speeds
- Heavy vehicle (truck) volumes
- Pavement condition

Pedestrian LOS is also based on the pedestrians' perceptions of the roadway or nearby roadside environment. It is based on the following four variables:



Source: South Miami Intermodal Transportation Plan

- Existence of a sidewalk
- Lateral separation of pedestrians from motorized vehicles
- Motorized vehicle volumes
- Motorized vehicle speeds

Source: South Miami Intermodal Transportation Plan

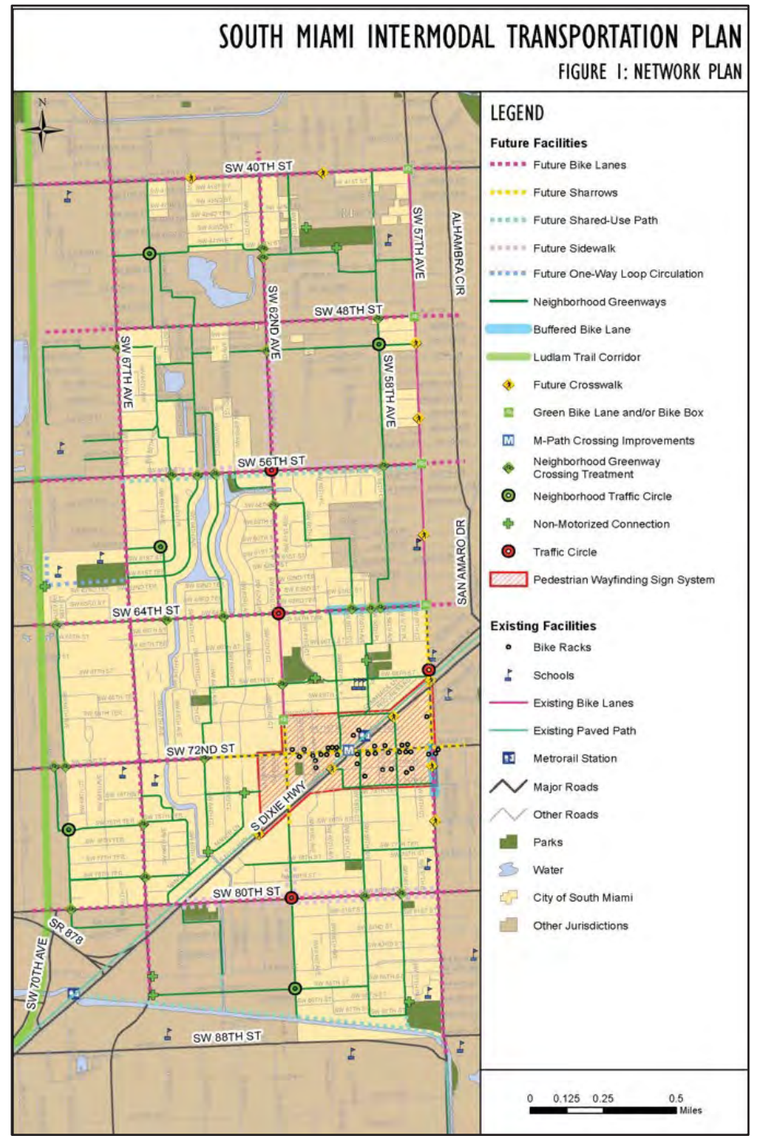
CURRENT CONDITIONS

Most of the major roadways within the City of South Miami have a Bicycle LOS of D or E and a Pedestrian LOS of D or better, indicating the result of a much greater investment over the years in pedestrian infrastructure than bicycle facilities, which is consistent with findings from Miami-Dade County as a whole. However, the aim of the Bicycle and Pedestrian LOS should be at LOS A. While some roadways have LOS A for pedestrians, there is room for improvement, especially along places like Miller Drive, where the pedestrian LOS is F. For bicycling facilities, improvements have to be made to reach a LOS A.

Existing Facilities
The City of South Miami has a few dedicated facilities for pedestrians, bicyclists and transit users, however the coverage of the network is low relative to the entire roadway network.

South Miami is unique in that a large section of the proposed 10-mile mobility corridor, “The Underline” traverses through the City along the Metrorail lines, connecting many communities while integrating transit, car, biking and walking in a safely and appealing manner. Access to this corridor is a new category of facilities considered for Bicycle Friendly Community designations. These facilities provide an opportunity for recreation and physical activity and can be a venue for community events.

Bicycle lanes exist only along SW 57th Ave from SW 40th St to SW 64th Street and on SW 62nd Ave from SW 64th Street to SW 70th Street.



Source: South Miami Intermodal Transportation Plan

LOCAL POLICY

The following provides sample language for Complete Streets Policies which may be adopted in the South Miami Comprehensive Plan.

South Miami's Complete Streets initiative aims to improve the quality of life in South Miami by creating streets that are more walkable and pedestrian-friendly throughout the City. The Complete Streets approach places pedestrians, bicyclists, and transit users on equal footing with motor vehicle users, and embraces innovative designs and technologies to expand mobility options for residents and visitors through the utilization of local multi-modal transportation systems and connectivity to regional mobility networks within Miami-Dade County.

The South Miami Complete Streets Policy and Design Standards Manual builds on and supports several major City policy and planning initiatives. Data was obtained from the Comprehensive Plan to review policies and determine any changes.

SOUTH MIAMI COMPREHENSIVE PLAN

Adopted in 1989 and amended in 2010, the South Miami Comprehensive Plan provides a consensus vision for South Miami that is based on the ideals and goals residents have for the City's future. This plan provides the overall policy framework to guide decisions over time toward achieving the City's vision. The Comprehensive Plan guides decisions made in regard to land use, transportation, housing, infrastructure, conservation, open space and capital improvements. The Future Land Use and Transportation Elements set policy for achieving more walkable and pedestrian-friendly development throughout the City. A review and analysis of the Comprehensive Plan was performed from which various goals, objectives and policies relating to Complete Streets were identified. It is crucial to review and identify all the existing policies related to complete streets policies at the initial stage of this plan in order to better accommodate and accomplish the City's set goals and objectives. The following were the Goals, Objectives and Policies identified:

Transportation Element

The Transportation Element (TRA) consists of six objectives designed to maintain an overall transportation system which does not adversely affect residential neighborhoods, discourages cut-through traffic via traffic calming techniques, and that provides for the circulation needs of all sectors of the community in a safe, efficient, cost-effective and aesthetically pleasing manner.

The Transportation Element also provides guidance for the City on land-use to transportation linkages, parking, Level of Service Standards, traffic calming, and policies aiding modal demand shift, including improvements to pedestrian and bicycle environments and enhanced transit. The following goals, objectives and policies related to Complete Streets were identified:

- **TRA Goal 1 –** To maintain an overall transportation system which does not adversely affect residential neighborhoods, discourages cut-through traffic in residential neighborhoods via traffic calming and other appropriate techniques, and that provides for the circulation needs of all sectors of the community in a safe, efficient, cost effective and aesthetically pleasing manner.
- **TRA Objective 1.1 –** Undertake only those improvements that both facilitate traffic flow and reduce adverse traffic impact on the neighborhoods, thereby making neighborhood streets safer. Measurability shall be no major street widenings. See Objective 1.5 for non-motorized transportation systems and 1.3 for convenient and efficient transportation.
- **TRA Policy 1.1.1** – The City of South Miami, in its entirety, is located within the Miami-Dade County's Urban Infill Area, which is designated as Transportation Concurrency Exception Area. The City's level-of-service standards for roadways are as follows:
  - Principal Arterials "F"
  - Minor Arterials "F"
  - Miller Drive "F"
- **TRA Policy 1.2.1** – Avoid adding any additional traffic lanes, with the exception of minor non-intrusive intersection improvements that foster improved traffic operations and management, in conformance with the Land Use Plan recommendations that call for protecting and enhancing both the neighborhoods and downtown.
- **TRA Policy 1.2.4** – The City shall investigate strategies to increase public awareness of the availability of parking facilities in the City, and the linkages between these parking facilities and destinations.
- **TRA Policy 1.2.7** – The City shall seek to reduce negative transportation impacts on neighborhoods through such strategies as traffic calming, reduced travel lanes, wider sidewalks, medians, and landscaping. In school areas, strategies to reduce adverse impacts of bus traffic through the provision of sidewalks, bicycle paths, and reconfigured bus loading areas should be considered and coordinated with Miami-Dade County Public Schools as appropriate.
- **TRA Policy 1.3.2** – The City shall undertake facility and program improvements (such as the Trolley and other transportation modes), as necessary and in coordination with other agencies, to enhance use of MetroRail and buses including adequate access to the Metrorail Transit Station to facilitate convenient and efficient "motorized" transportation.
- **TRA Policy 1.3.6** – The City shall coordinate with the Miami-Dade County MPO, MDT, FDOT and other agencies as appropriate in order to ensure the timely provision of a pedestrian overpass that will connect the Metrorail Station to the downtown area east of US-1. In addition, the City shall provide pedestrian friendly crosswalks at all intersections.
- **TRA Policy 1.4.1** – Although no collector or arterial widenings are recommended by the City at this time, use development plan reviews and other means to protect existing rights-of-way, in order to prohibit any further pavement widening.
- **TRA Policy 1.5.1** – Continue to refine and update a detailed bikeway plan including access to the Metrorail Transit Station and adequate on-site storage requirements through development code site plan requirements and as part of the Comprehensive Long Range Transportation Study.

Future Land Use Element

The Future Land Use element (FLU) consists of five goals and thirteen objectives developed to guide the use of public and private land in South Miami through the Future Land Use Map and through the goals, objectives and policies. The Transportation Element of the Comprehensive Plan is developed in coordination with the Land Use Element, as aspects of development affect transportation planning and mobility greatly. South Miami wishes to discourage street widenings and urban commercial sprawl, and will move toward the development of compact, mixed-use development where appropriate, which will help with developing densities needed to support mass transit. The following policies related to Complete Streets were identified:

- **FLU Policy 1.3.2** – The City shall seek to ensure bicycle and pedestrian connectivity in all areas within its boundaries, in accordance with neighborhood plans and the Comprehensive Long Range Transportation Plan.
- **FLU Policy 2.1.2** – Oppose street widenings that would either feed more through traffic into the downtown area or adversely impact its pedestrian amenities in downtown South Miami.
- **FLU Policy 2.1.3** – Discourage urban commercial sprawl by promoting growth in the core area surrounding the Metrorail Transit Station by creating a district for new growth which is contained and transit-oriented, thereby relieving the pressure for commercial rezonings outside of this core area.
- **FLU Policy 3.1.3** – Pursue traffic policies, parking policies and pedestrian amenity policies that enhance downtown, and thereby the tax base.

Conservation Element

South Miami's Comprehensive's Plan Conservation Element (CON) consists of four objectives and thirteen policies designed to guide the City to address the conservation and use of local resources. The policies among these objectives direct the City of South Miami to expand mobility options for residents and visitors through the utilization of local multi-modal transportation systems and connectivity to regional mobility networks within Miami-Dade County such as the Metrorail. Evaluation of this objective's success is measured by the development of bicycle paths, bus-route miles, landscaping improvements and the level of increase in mobility within the City. The following objective and policy related to Complete Streets were identified:

- **CON Objective 1.1** – In order to help achieve compliance with State Departmental Environmental Regulations on air quality, include appropriate landscaping provisions in a revised development code, and include public landscaping and bike-way improvements in the general fund.
- **CON Policy 1.1.3** – Continue to encourage the use of Metro-rail, bicycles and other alternatives to the automobile through capital improvements.

Recreation and Open Space Element

The Recreation and Open Space Element (REC) consists of three objectives and twelve policies designed to serve as a guide for public policy decisions regarding the provision of a wide variety of local recreation facilities and programs to ensure the adequacy of future recreational and leisure-time opportunities for all residents and visitors. The following policy related to Complete Streets was identified:

- **REC Policy 1.2.3** – Participate in planning for green-ways and trails, in conjunction with State, County and other local government jurisdictions.

Capital Improvement Element

The South Miami Capital Improvement Element (CIP) along with the five-year Capital Improvements Schedule and Plan provide for the basis and policies for detailing the City's public facility deficiencies and planning corrective capital improvements. The following policy related to Complete Streets was identified:

- **CIP Policy 1.1.4** – (2) Level of service or capacity problems: Next in priority would be projects needed to maintain the stated Level-of-Service Standard or that otherwise further the goals, objectives and policies of the Comprehensive Plan.

The City of South Miami is committed to a safe and sustainable transportation system for all of its residents, visitors and businesses. The City is also committed to supporting and encouraging the use of non-motorized transportation. These goals, however, exist in the context of a street system that has since been engineered to facilitate and prioritize the movement of people in and out of the city via motor vehicles, resulting in the reduction of non-motorized transportation and related land uses.

It is evident that maintaining and furthering this current transportation model is costly to the City in many different ways such as increase in air pollution, more potential crashes and injuries, increasingly sedentary lifestyle and deteriorating human health, maintenance and operations costs, sprawl and inefficient urban land use, etc.

EXISTING STANDARDS

PRINCIPLES OF PEDESTRIAN DESIGN

Within various planning for greenways, pedestrian master plans, and other aspects of pedestrian infrastructure development are principles which serve to enhance the safety of pedestrians, and which formulate the thought process behind how we should be designing pedestrian space.

Through review of standards and other documents, we find that there are principles to adhere to for crossings and to ensure adequate spaces for pedestrians. Yet, merely providing adequate space for pedestrians does not create true walkability. Accessibility to destinations, considerations of safety, and oft-forgotten lighting are key elements. Wayfinding, too, serves to enhance the walking experience. Ultimately, we find through various literature that the walking environment is best enhanced through the provision of an aesthetically pleasing, safe environment that provides opportunity for interactions with other people.

Each category also has their own principles, based on the intent of the facility.

SIDEWALKS

Well-designed sidewalks at minimum tend to have **accessibility** for all users, including the handicapped; **adequate width**, generally at least 2 people standing side-by-side in one direction and with room to pass walkers in the opposite direction; **continuous** from block to block; safety in the form of not only perception, based on predictability, but also shelter from traffic; and appropriate **drainage**, to prevent standing water and slipping. Invariably, sidewalks are noted to vary based on location. The City of Sunrise Bicycle and Pedestrian plan, for example uses the following for Sidewalk Widths:

- Local Streets: 5-6 feet
- Commercial Areas: 6-12 feet
- Arterials and Collectors: 6-8 feet

Standard thoughts on sidewalks include four distinct zones: the frontage zone, the pedestrian (aka walking) zone, the furniture zone, and the curb zone. The minimum widths of each of these zones vary based on street classifications as well as land uses. The table at the end of this chapter recommends minimum widths for each zone for different street types and land uses.

Frontage Zone

The frontage zone is the portion of the sidewalk located immediately adjacent to buildings, and provides shy distance from buildings, walls, fences, or property lines. It includes space for building-related features such as entryways and accessible ramps. It can include landscaping as well as awnings, signs, news racks, benches, and outdoor café seating. In single family residential neighborhoods, landscaping typically occupies the frontage zone.

Pedestrian Zone

The pedestrian zone, situated between the frontage zone and the furniture zone, is the area dedicated to walking and should be kept clear of all fixtures and obstructions. Within the pedestrian zone, the Pedestrian Access Route (PAR) is the path that provides continuous connections from the public right-of-way to building and property entry points, parking areas, and public transportation. This pathway is required to comply with ADA guidelines and is intended to be a seamless pathway for wheelchair and white cane users. As such, this route should be firm, stable, and slip-resistant, and should comply with maximum cross slope requirements (2 percent grade). The walkway grade shall not exceed the general grade of the adjacent street. Aesthetic textured pavement materials (e.g., brick and pavers) are best used in the frontage and furniture zones, rather than the PAR. The PAR should be a minimum of 4 feet, but preferably at least 5 feet in width to provide adequate space for two pedestrians to comfortably pass or walk side by side. All transitions (e.g., from street to ramp or ramp to landing) must be flush and free of changes in level. The engineer should determine the pedestrian zone width to accommodate the projected volume of users. In no case will this zone be less than the width of the PAR.

Non-compliant driveways often present significant obstacles to wheelchair users. The cross slope on these driveways is often much steeper than the 2 percent maximum grade. Driveway aprons that extend into the pedestrian zone can render a sidewalk impassable to users of wheelchairs, walkers, and crutches. They need a flat plane on which to rest all four supports (two in the case of crutches). To provide a continuous PAR across driveways, aprons should be confined to the furniture and curb zones.

Furniture Zone

The furniture zone is located between the curb line and the pedestrian zone. The furniture zone should contain all fixtures, such as street trees, bus stops and shelters, parking meters, utility poles and boxes, lamp posts, signs, bike racks, news racks, benches, waste receptacles, drinking fountains, and other street furniture to keep the pedestrian zone free of obstructions. In residential neighborhoods, the furniture zone is often landscaped. Resting areas with benches and space for wheelchairs should be provided in high volume pedestrian districts and along blocks with a steep grade to provide a place to rest for older adults, wheelchair users, and others who need to catch their breath.

Curb Zone

The curb zone serves primarily to prevent water and cars from encroaching on the sidewalk. It defines where the area for pedestrians begins, and the area for cars ends. It is the area people using assistive devices must traverse to get from the street to the sidewalk, so its design is critical to accessibility.

Each category also has their own principles, based on the intent of the facility.

CROSSINGS

Inevitably, pedestrian access involves crossing to get to the other side, either to reach your destination, or a transit location. Pedestrians must be able to cross safely at these points, and planning for a community implies that we must also design for more vulnerable groups. Ideas such as bulbouts which can reduce crossing lengths, can be considered a good usage of space when designing Complete Streets.

As with other forms of the pedestrian environment, accessibility guidelines such as the provision of ramps must be included, and both the real and perceived levels of safety must be considered. Each crossing, just like roadway intersection design, must be custom fit to the surrounding environment – including considerations of local vehicular speed. However, there are specific requirements, such as high emphasis crosswalks within 0.25 miles of schools, which are specified and are incorporated into this design manual by reference. Space permitting, median refuge islands can provide pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time. This is important for wider roads, where vulnerable populations may not be able to cross in a single time cycle.

Within South Miami, frequent, safe street crossings should be provided, especially around bus stops and in more commercial areas, with the exception of US-1, where crossings should be more controlled due to vehicular usage and speed. Crossings can be utilized to shorten pedestrian distances, especially with larger blocks, increasing mobility and perceived accessibility. Midblock crossings should be located as to provide safe, signalized crossings. At times, these can be emplaced to allow for more immediate crossings after alighting from a bus.

In designing crossings, it is important to make sure that the area is **clear of obstructions** and is **accessible**; is **visible** for both drivers and pedestrians to see each other, including good **lighting** as needed; with **legible** signs that offer direction for the traveler.

Wayfinding:

Inclusion of wayfinding helps to complete the pedestrian environment, and should be included in any Complete Streets plan. Wayfinding which is clear will allow both residents and visitors to find key destinations within the City. Travel times or distance can be used to inform the public.

Lighting:

Lighting can serve multiple modes of transportation. It serves to provide a better sense of safety for transit riders waiting at a stop. It provides additional visibility for bicyclists, pedestrians, and drivers, and is particularly important at intersections. Lighting, however, can have different scales. Pedestrian scale lighting can further define pedestrian areas a separate from the vehicular travel lanes, and should be utilized in areas with higher pedestrian activity.

Seating:

As the development of pedestrian infrastructure should be for those of all ages, the provision of amenities where one can rest is important, especially for the very young and the elderly. Providing benches encourages people of all ages to use the walkways. Benches should be a maximum 20” seat height in order to comfortably accommodate the elderly.

Bringing it together is Key:

Pedestrian infrastructure begins with a sidewalk, but that does not mean that people will necessarily walk. There must be a level of comfort in addition to the

need to cause a shift in behavior. We know that ideas like safety is key. In the end, all are related and must be cohesively combined.

One such example of a more cohesive look can be found with the Downtown Miami Pedestrian Priority Zone Plan, which noted the following 10 principles for development of the pedestrian realm within their zone:

1. Create a Clear Pedestrian Path
2. Align Curb Ramps with Sidewalks
3. Require Crosswalks at all Intersections
4. Provide Automatic Countdown Timers with More Crossing Time
5. Reduce Drive Lane Widths
6. Extend the Sidewalk at all Intersections
7. Enhance Mid-block Lighting
8. Provide Shade at Sidewalks
9. Designate 25 MPH Speed Limit
10. Prohibit Right Turns On Red

Source: Boston Complete Streets Guidelines

PEDESTRIAN CROSSING TOOLBOX

Despite understanding the principles, one must still then appropraitely apply tools and methods in order to ensure that the pedestrian infrastructure is appropriated improved. Engineering standards may be more stringent or loose depending on jurisdiction, but generally, overall, the available toolbox of options remains the same. The following is derived from the Los Angeles County Living Streets Manual, adapted based on Miami-Dade County and FDOT standards, and provides a detailed description of various pedestrian crossing improvements which may be employed.

Many engineering measures may be used at a pedestrian crossing, depending on site conditions and potential users. Marked crosswalks are commonly used at intersections and sometimes at mid-block locations. Marked crosswalks are often the first measure in the toolbox followed by a series of other measures that are used to enhance and improve marked crosswalks. The decision to mark a crosswalk should not be considered in isolation, but rather in conjunction with other measures to increase awareness of pedestrians. Without additional measures, marked crosswalks alone may not increase pedestrian safety, particularly on multi-lane streets.

MARKED CROSSWALKS

Crosswalks are present by law at all intersections, whether marked or unmarked, unless the pedestrian crossing is specifically prohibited. At mid-block locations, crosswalks only exist where marked. At these non-intersection locations, the crosswalk markings legally establish the crosswalk. Crosswalks should be considered at mid-block locations where there is strong evidence that pedestrians want to cross there, due to origins and destinations across from each other and an overly long walking distance to the nearest controlled crossing. Marked crosswalks alert drivers to expect crossing pedestrians and direct pedestrians to desirable crossing locations.

Typical crosswalk markings: Continental, Ladder, Staggered Continental (Credit: Michele Weisbart)

Crosswalk Markings

According to the MUTCD, the minimum crosswalk marking shall consist of solid white lines. They shall not be less than 6 inches or greater than 24 inches in width.

Placement

The best locations to install marked crosswalks are

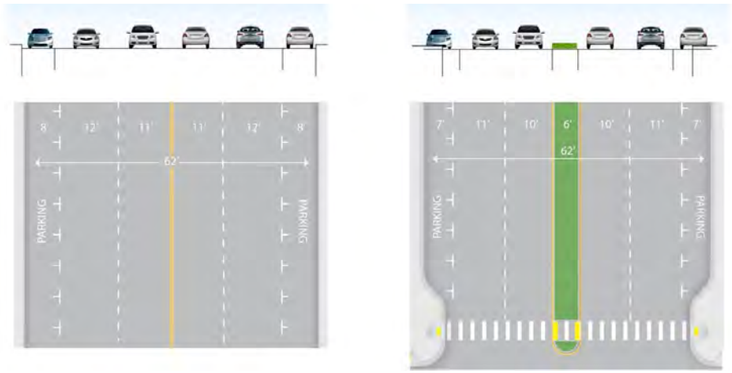
- All signalized intersections
- Crossings near transit locations
- Trail crossings
- High land use generators
- School walking routes
- When there is a preferred crossing location due to sight distance
- Where needed to enable comfortable crossings of multi-lane streets between controlled crossings spaced at convenient distances

Controlled Intersections

Intersections can be controlled by traffic signals or STOP signs. Marked crosswalks should be provided on all intersection legs controlled by traffic signals, unless the pedestrian crossing is specifically prohibited. Marked crosswalks may be considered at STOP-controlled intersections. Factors to be considered include high pedestrian volumes, high vehicle volumes, school zone location, high volume of elderly or disabled users, or other safety related criteria.

Uncontrolled Intersections and Mid-block Crosswalks

Intersections without traffic signals or STOP signs are considered uncontrolled intersections. The decision to mark a crosswalk at an uncontrolled location should be guided by an engineering study. Factors considered in the study should include vehicular volumes and speeds, roadway width and number of lanes, stopping sight distance and triangles, distance to the next controlled crossing, night time visibility, grade, origin-destination of trips, left turning conflicts, and pedestrian volumes. The engineering study should be based on the FHWA study, Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations. The following list provides some of the key recommendations from the study:



Uncontrolled crossings of four-lane streets can be difficult to cross without special treatments like medians and curb extensions.(Credit: Michele Weisbart)

It is permissible to mark crosswalks on two-lane roadways.

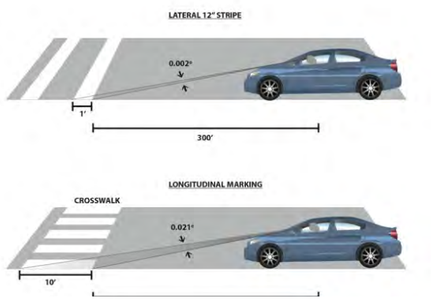
- On multi-lane roadways, marked crosswalks *alone* are not recommended under the following conditions (the other tools listed in this section can be considered to enhance the crosswalk):
  - ADT > 12,000 w/o median
  - ADT > 15,000 w/ median
  - Speeds greater than 40 mph
- Raised medians can be used to reduce risk.
- Signals or other treatments should be considered where there are many young and/or elderly pedestrians.

Frequency of Marked Crosswalks at Uncontrolled Locations

Marked crosswalks should be spaced so people can cross at preferred locations. If people are routinely crossing streets at non-preferred locations, consideration should be given to installing a new crossing. Pedestrians need crossings with

appropriate devices (islands, curb extensions, advanced yield lines, etc.) of multi-lane streets where there are strong desire lines. Along urban streets, a well-designed crossing should be provided at least every 1/8 mile.

High-Visibility Crosswalks



Longitudinal crosswalk markings are more visible than lateral crosswalk markings (Credit: Michele Weisbart)

Because of the low approach angle at which pavement markings are viewed by drivers, the use of longitudinal stripes in addition to or in place of transverse markings can significantly increase the visibility of a crosswalk to oncoming traffic. While research has not shown a direct link between increased crosswalk visibility and increased pedestrian safety, high-visibility crosswalks have been shown to increase motorist yielding and channelization of pedestrians, leading the Federal Highway Administration to conclude that high-visibility pedestrian crosswalks have a positive effect on pedestrian and driver behavior.

Colored and stamped crosswalks should only be used at controlled locations.

Staggered longitudinal markings reduce maintenance since they avoid vehicle wheel paths.

CROSSWALKS AND ACCESSIBILITY

The Pedestrian Access Route continues through the crosswalk and must conform to the surface condition, width, and slope requirements as mandated by FDOT and Miami-Dade County.

Longitudinal crosswalk markings provide the best visibility for pedestrians with limited vision.

Decorative crosswalk pavement materials should be chosen with care to ensure that smooth surface conditions and high contrast with surrounding pavement are provided. Textured materials within the crosswalk are not recommended. Without reflective materials, these treatments are not visible to drivers at night. Decorative pavement materials often deteriorate over time and become a maintenance problem while creating uneven pavement. The use of color or material to delineate the crosswalks as a replacement of retro-reflective pavement marking should not be used, except in slow speed districts where intersecting streets are designed for speeds of 20 mph or less.

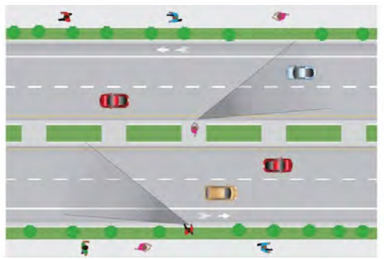
RAISED CROSSING ISLANDS/MEDIANS

Raised islands and medians are the most important, safest, and most adaptable engineering tool for improving street crossings. Note on terminology: a median is a continuous raised area separating opposite flows of traffic. A crossing island is shorter and located just where a pedestrian crossing is needed. Raised medians and crossing islands are commonly used between intersections when blocks are long (500 feet or more in downtowns) and in the following situations:

- Speeds are higher than desired
- Streets are wide
- Traffic volumes are high
- Sight distances are poor

Raised islands have nearly universal applications and should be placed where there is a need for people to cross the street. They are also used to slow traffic.

REASONS FOR EFFICACY


Medians and crossing islands allow pedestrians to complete the crossing in two stages. (Credit: Michele Weisbart)

Their use changes a complex task, crossing a wide street with traffic coming from two opposing directions all at once, into two simpler and smaller tasks. With their use, conflicts occur in only one direction at a time, and exposure time can be reduced from more than 20 seconds to just a few seconds.

On streets with traffic speeds higher than 30 mph, it may be unsafe to cross without a median island. At 30 mph, motorists travel 44 feet each second, placing them 880 feet out when a pedestrian starts crossing an 80-foot wide multi-lane road. In this situation, this pedestrian may still be in the last travel lane when the car arrives there; that car was not within view at the time he or she started crossing. With an island on multi-lane roadways, people would cross two or three lanes at a time instead of four or six. Having to wait for a gap in only one direction of travel at a time significantly reduces the wait time to cross. Medians and crossing islands have been shown to reduce crashes by 40 percent (Federal Highway Administration, Designing for Pedestrian Safety course).

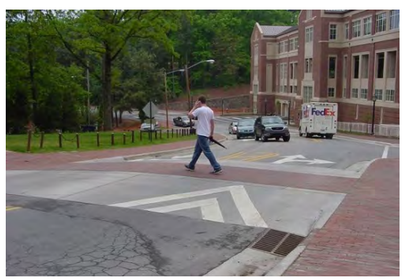
As a general rule, crossing islands are preferable to signal-controlled crossings due to their lower installation and maintenance cost, reduced waiting times, and their safety benefits. Crossing islands are also used with road diets, taking four-lane undivided, high-speed roads down to better performing three-lane roadways (two travel lanes and a center turn lane); portions of the center turn lane can be dedicated to crossing islands. Crossing islands can also be used with signals.
Angled pedestrian crossings through pedestrian refuges (as shown in the adjacent photo) force pedestrians to look for oncoming vehicles. Where to Place Crossing Islands
Crossing islands are often used for trails, high pedestrian flow zones, transit stations, schools, work centers, and shopping districts.

Design Detail

Crossing islands, like most traffic calming features, perform best with both tall trees and low ground cover. This greatly increases their visibility, reduces surprise, and lowers the need for a plethora of signs. When curves or hill crests complicate crossing locations, median islands are often extended over a crest or around a curve to where motorists have a clear (six second or longer) sight line of the downstream change in conditions. Lighting of median islands is essential. The suggested minimum width of a crossing island is 6 feet. When used on higher speed roads, and where there is space available, inserting a 45-degree bend to the right helps orient pedestrians to the risk they encounter from motorists during the second half of their crossing.

Multiple tools can be employed to improve uncontrolled crossings. (Credit: Dan Burden)

RAISED CROSSWALKS



Raised crosswalk: UNC, Chapel Hill, NC (Credit: Ryan Snyder)

Raised crosswalks slow traffic and put pedestrians in a more visible position. They are trapezoidal in shape on both sides and have a flat top where the pedestrians cross. The level crosswalk area must be paved with smooth materials; any texture or special pavements used for aesthetics should be placed on the beveled slopes, where they will be seen by approaching motorists. They are most appropriate in areas with significant pedestrian traffic and where motor vehicle traffic should move slowly, such as near schools, on college campuses, in Main Street retail environments, and in other similar

places. They are especially effective near elementary schools where they raise small children by a few inches and make them more visible.

CURB EXTENSIONS

Curb extensions extend the sidewalk or curb line out into the parking lane, which reduces the effective street width. Curb extensions significantly improve pedestrian crossings by reducing the pedestrian crossing distance, visually and physically narrowing the roadway, improving the ability of pedestrians and motorists to see each other, and reducing the time that pedestrians are in the street. Reducing street widths improves signal timing since pedestrians need less time to cross.

Motorists typically travel more slowly at intersections or mid-block locations with curb extensions, as the restricted street width sends a visual cue to slow down. Turning speeds are lower at intersections with curb extensions (curb radii should be as tight as is practicable). Curb extensions also prevent motorists from parking too close to the intersection.

Curb extensions also provide additional space for two curb ramps and for level sidewalks where existing space is limited, increase the pedestrian waiting space, and provide additional space for pedestrian push button poles, street furnishings, plantings, bike parking and other amenities. A benefit for drivers is that extensions allow for better placement of signs (e.g., stop signs and signals).

Curb extensions are generally only appropriate where there is an on-street parking lane. Where street width permits, a gently tapered curb extension can reduce crossing distance at an intersection along streets without on-street parking, without creating a hazard. Curb extensions must not extend into travel lanes or bicycle lanes.

Example of curb extensions (Credit: Marcel Schmaedick)

Curb extensions can impact other aspects of roadway design and operation as follows:

- May impact street drainage and require catch basin relocation
- May impact underground utilities
- May require loss of curbside parking, though careful planning often mitigates this potential loss, for example by relocating curbside fire hydrants, where no parking is allowed, to a curb extension
- May complicate delivery access and garbage removal
- May impact snow plows and street sweepers
- May affect the turning movements of larger vehicles such as school buses and large fire trucks

PEDESTRIAN 'SCRAMBLES'

Exclusive pedestrian phases (i.e. pedestrian 'scrambles') may be used where turning vehicles conflict with very high pedestrian volumes and pedestrian crossing distances are short. Although pedestrians can cross in any direction during the pedestrian phase, pedestrians typically have to wait for both vehicle phases before they get the walk signal again. This creates delay for pedestrians travelling straight, but can be mitigated by allowing pedestrians continuing along the same direction to get a WALK signal during the green signal phase and while turns are prohibited for traffic.

SIGNS

Signs can provide important information to improve road safety by letting people know what to expect, so they can react and behave appropriately. Sign use and placement should be done judiciously, as overuse breeds noncompliance and disrespect. Too many signs create visual clutter.

Regulatory signs, such as STOP, YIELD, or turn restrictions, require driver actions and can be enforced. Warning signs provide information, especially to motorists and pedestrians unfamiliar with an area.

Advance pedestrian warning signs should be used where pedestrian crossings may not be expected by motorists, especially if there are many motorists who are unfamiliar with the area. The fluorescent yellow/green color is designated specifically for pedestrian, bicycle, and school warning signs (Section 2A.10 of the 2009 MUTCD) and should be used for all new and replacement installations. This bright color attracts the attention of drivers because it is unique.

Sign R1-5 should be used in conjunction with advance yield lines, as described below. Sign R1-6 may be used on median islands, where they will be more visible to motorists than signs placed on the side of the street, especially where there is on-street parking.

All signs should be periodically checked to make sure that they are in good condition, free from graffiti, reflective at night, and continue to serve a purpose. All sign installations need to comply with the provisions of the MUTCD.

ADVANCED YIELD/STOP LINES

Stop lines are solid white lines 12 to 24 inches wide, extending across all approach lanes to indicate where vehicles must stop in compliance with a stop sign or signal. Advance stop lines reduce vehicle encroachment into the crosswalk and improve drivers' view of pedestrians. At signalized intersections a stop line is typically set back between 4 and 6 feet.

At uncontrolled crossings of multi-lane roads, advance yield lines can be an effective tool for preventing multiple threat vehicle and pedestrian collisions. Section 3B.16 of the MUTCD specifies placing advanced yield markings 20 to 50 feet in advance of crosswalks, depending upon location-specific variables such as vehicle speeds, traffic control, street width, on-street parking, potential for visual confusion, nearby land uses with vulnerable populations, and demand for queuing space. Thirty feet is the preferred setback for effectiveness at many locations. This setback allows a pedestrian to see if a car in the second (or third) lane is stopping after a driver in the first lane has stopped.

LIGHTING

Lighting is important to include at all pedestrian crossing locations for the comfort and safety of the road users. Lighting should be present at all marked crossing locations. Lighting provides cues to drivers to expect pedestrians earlier.

FHWA HT-08-053, The Information Report on Lighting Design for Mid-block Crosswalks, found that a vertical illumination of 20 lux in front of the crosswalk, measured at a height of 5 feet from the road surface, provided adequate detection distances in most circumstances. Although the research was constrained to mid-block placements of crosswalks, the report includes a brief discussion of considerations in lighting crosswalks co-located with intersections. The same principle applies at intersections. Illumination just in front of crosswalks creates optimal visibility of pedestrians.

Recommended Illumination by Street Type

Functional Classification	Average Maintained Illumination at Pavement by Pedestrian Area Classification [FC]		
	High	Medium	Low
Major / Major (boulevard)	3.4 FC	2.6 FC	1.8 FC
Major / Collector (boulevard/avenue)	**2.9 fc**	**2.2 fc**	**1.5 fc**
Major / Local (avenue)	2.6 FC	2.0 FC	1.3 FC
Collector / Collector (avenue)	**2.4 fc**	**1.8 fc**	**1.2 fc**
Collector / Local (street)	2.1 FC	1.6 FC	1.0 FC
Local / Local (street)	**1.8 fc**	**1.4 fc**	**0.8 fc**

FC stands for "foot candle" and is defined as the amount of illuminance on a 1 square foot surface of which there is uniformly distributed flux of one lumen.

Other good guidance on crosswalk lighting levels comes from the Illuminating Engineering Society of North America (IESNA) intersection guidance to illuminate pedestrians in the crosswalk to vehicles (see the adjacent image). Crosswalk lighting should provide color contrast from standard roadway lighting.

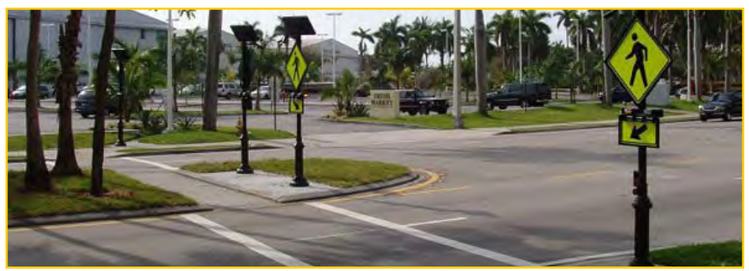
PEDESTRIAN HYBRID BEACON

A pedestrian hybrid beacon is used to warn and control traffic at an unsignalized location so as to help pedestrians cross a street or highway at a marked crosswalk.

A pedestrian hybrid beacon can be used at a location that does not meet traffic signal warrants or at a location that meets traffic signal warrants but a decision has been made to not install a traffic control signal. A minimum number of 20 pedestrians per hour is needed to warrant installation. This is substantially less than the 93 minimum needed for a signal installation.

If beacons are used, they should be placed in conjunction with signs, crosswalks, and advanced yield lines to warn and control traffic at locations where pedestrians enter or cross a street or highway. A pedestrian hybrid beacon should only be installed at a marked crosswalk.

Installations should be done according to the MUTCD Chapter 4F, "Pedestrian Hybrid Beacons." Cities should follow the formal experimental process to use these.



Rectangular rapid-flash beacon (Credit: SPOT Devices)

RECTANGULAR RAPID FLASH BEACON

The Rectangular Rapid Flash Beacon (RRFB) uses rectangular-shaped high-intensity LED-based indications, flashes rapidly in a wig-wag "flickering" flash pattern, and is mounted immediately between the crossing sign and the sign's supplemental arrow plaque.

FHWA Evaluation of Results

The Office of Transportation Operations has reviewed available data and considers the RRFB to be highly successful for the applications tested (uncontrolled crosswalks). The RRFB offers significant potential safety and cost benefits because it achieves very high rates of compliance at a very low cost compared to other more restrictive devices such as full mid-block signalization. The components of the RRFB are not proprietary and can be assembled by any jurisdiction with off-the-shelf hardware. The FHWA believes that the RRFB has a low risk of safety or operational concerns. However, because proliferation of RRFBs in the roadway environment to the point that they become ubiquitous could decrease their effectiveness, use of RRFBs should be limited to locations with the most critical safety concerns, such as pedestrian and school crosswalks at uncontrolled locations, as tested in the experimentation.

At a recent meeting of the National Committee on Uniform Traffic Control Devices, the Signals Technical Committee voted to endorse the future inclusion of the RRFB for uncontrolled crosswalks into the MUTCD and recommended that FHWA issue an Interim Approval for RRFB. This Interim Approval allows agencies to install this type of flashing beacon, pending official MUTCD rulemaking.

PRINCIPLES OF BICYCLE ENVIRONMENT DESIGN

Compared to walking, bicyclists have more mobility, and the provision of bicycling facilities in a community allows for greater accessibility over a wider area. However, to encourage bicycling as a form of transportation, it must be viewed as **safe, convenient**, and **comfortable**. The ability to secure one's bicycle at the destination, or on transit is a consideration which many bicyclists have.
Every street can accommodate bicycles, but the type of facilities utilized should be based on the roadway and potential usage. These types of facilities vary from on-road to off-road facilities. Most bicycle trips are short, allowing for a **grid of ½ mile** to be sufficient in completing a local network. As planned, South Miami's grid allows for the ½ mile network development, and the grid as noted in the SMITP would complete the system.

Often, as will be the case with some part of South Miami, the inclusion of bicycle facilities in the roadway will be contingent of securing the right-of-way from the vehicle, either through lane configuration or road diets.

Bicycles provide an alternative means of reach transit. Encouragement of bicycle usage in this regards involves safe access and secure parking. Paths should include amenities such as **lighting, signage, and fencing** (where appropriate), which enhance safety.

When possible, bicycle park should be provided free of charge, and where possible, off-street parking should be utilized.

WAYFINDING

Similarly to walkers, bicyclists can benefit from a cohesive wayfinding system as well. These signs can also include both distance to destination and expected time to destination. Generally, signs, should be placed at the convergence of two or more routes, and assist bicyclists in finding their way to key destinations. The inclusion of bicycle wayfinding should be implemented in the City as this improvement allows for motorists to be aware of bicyclists in the area. However, care must be taken to not clutter the right-of-way with signage.

Generally, Bicycle facilities should be visibly marked. Bicycle Lanes and Cycle Tracks should all therefore be marked with green lanes where possible.

BICYCLE FACILITIES DESIGN

As with pedestrian facilities, one must still then apply appropriate tools in order to ensure that bicycle infrastructure is improved. Engineering standards may be more stringent or loose depending on jurisdiction, but generally, overall, the available toolbox of options remains the same in developing for bicycle infrastructure. As different options exist, design is contingent on the availability of space. For example, two bicycle lanes and two sidewalks will at minimum take approximately 18' of right of way, but a shared-use facility and a sidewalk on the other side of the road may reasonably fit on 13' -15' of right of way.

The following bikeway design standards are derived from the MUTCD, AASHTO, and Miami-Dade and FDOT standards and are modified categorically from the Los Angeles County Living Streets Manual to fit Florida and Miami-Dade County requirements to become applicable for South Miami.

BIKEWAY TYPES

A designated bikeway network provides a system of facilities that offers enhancement or priority to bicyclists over other roadways in the network. However, it is important to remember that all streets in a city should safely and comfortably accommodate bicyclists, regardless of whether the street is designated as a bikeway. Several general types of bikeways are listed below with no implied order of preference.

Shared Roadways

A shared roadway is a street in which bicyclists ride in the same travel lanes as other traffic. There are no specific dimensions for shared roadways. On narrow travel lanes, motorists have to cross over into the adjacent travel lane to pass a cyclist. Shared roadways work well and are common on low-volume, low-speed neighborhood residential streets, rural roads, and even many low-volume highways.

Bicycle route (Credit: Marty Bruinsma)

Bicycle Boulevards

A bicycle boulevard is a street that has been modified to prioritize through bicycle traffic but discourage through motor vehicle traffic. Traffic calming devices control traffic speeds and discourage through trips by automobiles. Traffic controls limit conflicts between automobiles and bicyclists and give priority to through bicycle movement at intersections.

Shoulder Bikeways

This facility accommodates bicycle travel on rural highways and country roads by providing a suitable area for bicycling and reducing conflicts with faster moving motor vehicles.

Bike Lanes

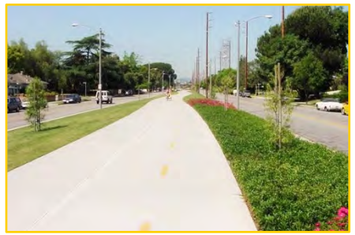
Portions of the traveled way designated with striping, stencils, and signs for preferential use by bicyclists, bike lanes are appropriate on avenues and boulevards. They may be used on other streets where bicycle travel and demand is substantial. Where on-street parking is provided, bike lanes are striped on the left side of the parking lane.

Cycle Tracks

Cycle tracks are specially designed bikeways separated from the parallel motor vehicle travelway by a line of parked cars, landscaping, or a physical buffer that motor vehicles cannot cross. Cycle tracks are effective in attracting users who are concerned about conflicts with motorized traffic.

Shared Use Paths

Shared use paths are facilities separated from motor vehicle traffic by an open space or barrier, either within the highway right-of-way or within an independent right-of-way. Bicyclists, pedestrians, joggers, and skaters often use these paths. Shared-use paths are appropriate in areas not well served by the street system, such as in long, relatively uninterrupted corridors like waterways, utility corridors, and rail lines. They are often elements of a community trail plan. Shared use paths may also be integrated into the street network with new subdivisions as described in Chapter 3, “Street Networks and Classifications.”



Example of a shared-use path: Burbank, CA (Credit: Ryan Snyder)

Bike Routes

A term used for planning purposes or to designate recommended bicycle touring routes, a bike route can be any bikeway type.

INTEGRATING WITH THE STREET SYSTEM

Most bikeways are part of the street; therefore, well-connected street systems are very conducive to bicycling, especially those with a fine-meshed network of low-volume, low-speed streets suitable for shared roadways. In less well-connected street systems, where wide streets carry the bulk of traffic, bicyclists need supplementary facilities, such as short sections of paths and bridges, to connect otherwise unconnected streets.

There are no hard and fast rules for when a specific type of bikeway should be used, but some general principles guide selection. As a general rule, as traffic volumes and speeds increase, greater separation from motor vehicle traffic is desirable. Other factors to consider are users (more children or recreational cyclists may warrant greater separation), adjacent land uses (multiple driveways may cause conflicts with shared-use paths), available right-of-way (separated facilities require greater width), and costs.

As a general rule, designated bicycle facilities (e.g., bike lanes and cycle tracks) should be provided on all major streets (avenues and boulevards), as these roads generally offer the greatest level of directness and connectivity in the network, and are typically where destinations are located. There are occasions when it is infeasible or impractical to provide bikeways on a busy street, or the street does not serve the mobility and access needs of bicyclists. The following guidelines should be used to determine if it is more appropriate to provide facilities on a parallel local street:

- Conditions exist such that it is not economically or environmentally feasible to provide adequate bicycle facilities on the street.
- The street does not provide adequate access to destination points within reasonable walking distances, or separated bikeways on the street would not be considered safe.
- The parallel route provides continuity and convenient access to destinations served by the street.
- Costs to improve the parallel route are no greater than costs to improve the street.
- If any of these factors are met, cyclists may actually prefer the parallel local street facility in that it may offer a higher level of comfort (bicycle boulevards are based on this approach).

Off-street paths can also be used to provide transportation in corridors otherwise not served by the street system, such as along rivers and canals, through parks, along utility corridors, on abandoned railroad tracks, or along active railroad rights-of-way. While paths offer the safety and scenic advantages of separation from traffic, they must also offer frequent connections to the street system and to destinations such as residential areas, employment sites, shopping, and schools. Street crossings must be well designed with measures such as signals or median refuge islands.

DESIGN OF EACH BIKEWAY TYPE

The following sections provide design guidance for each type of bikeway.

Shared Roadways

Shared roadways are the most common bikeway type. There are no specific width standards for shared roadways. Most are fairly narrow; they are simply the streets as constructed. Shared roadways are suitable on streets with low motor vehicle speeds or traffic volumes, and on low-volume rural roads and highways. The suitability of a shared roadway decreases as motor vehicle traffic speeds and volumes increase, especially on rural roads with poor sight distance.

Many local streets carry excessive traffic volumes at speeds higher than they were designed to carry. These can function better as shared roadways if traffic speeds and volumes are reduced. For a local street to function acceptably as a shared roadway, traffic volumes should not be more than 3,000 to 5,000 vehicles per day, and speeds should be 25 mph or less. If traffic speeds and volumes exceed those thresholds, separated facilities (e.g., bike lanes) should be considered or traffic calming should be applied to reduce the vehicle speeds/volumes. Many traffic-calming techniques can make these streets more amenable to bicycling.

Wide Curb Lanes

On streets where bike lanes would be more appropriate but with insufficient width for bike lanes, wide curb lanes may be provided. This may occur on

retrofit projects where there are physical constraints and all other options, such as narrowing travel lanes, have been pursued. Wide curb lanes are not particularly attractive to most cyclists; they simply allow a passenger vehicle to pass cyclists within a travel lane, if cyclists are riding far enough to the right. Wide curb lanes may also encourage higher motor vehicle speeds, which is contrary to the design principles of this manual; wide lanes should never be used on local residential streets. A 14 to 15-foot wide lane allows a passenger car to pass a cyclist in the same lane. Widths 16 feet or greater encourage the undesirable operation of two motor vehicles in one lane. In this situation, a bike lane should be striped.

Sharrows

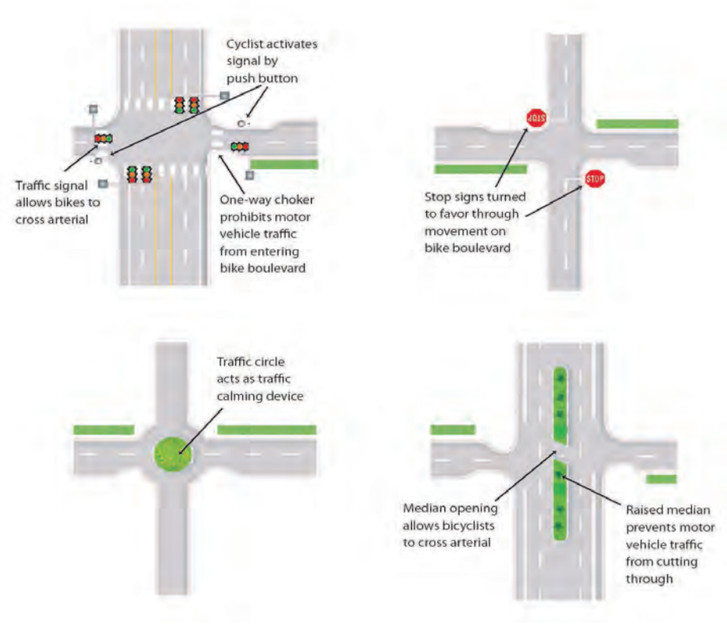
Shared-lane marking stencils ("SLMs," also commonly called "sharrows") may be used as an additional treatment for shared roadways. The stencils can serve a number of purposes: they remind bicyclists to ride further from parked cars to prevent "dooring" collisions, they make motorists aware of bicycles potentially in the travel lane, and they show bicyclists the correct direction of travel. Sharrows installed next to parallel parking should be a minimum distance of 11 feet from the curb. Installing farther than 11 feet from the curb may be desired in areas with wider parking lanes or in situations where the sharrow is best situated in the center of the shared travel lane to promote cyclists taking the lane. Placing the sharrow between vehicle tire tracks increases the life of the markings and decreases long-term maintenance costs.

Centerline Removal

On streets with one travel lane in each direction, removal of the centerline is recommended to facilitate passing of bicyclists by motor vehicles. Motorists may be unwilling to cross over a centerline to pass a cyclist, resulting in instances where motorists feel like they are stuck behind a slower moving cyclist and attempt to pass the cyclist too closely. Cyclists in these situations may feel pressured to ride to the extreme far right or in the gutter to allow motorists to pass. Removal of the centerline opens the entire traveled way for passing, and allows bicyclists to position themselves at a safe and comfortable distance from the curb. Lack of centerlines is also a traffic-calming technique, as drivers tend to drive slower without the visible separation from oncoming traffic. The MUTCD mandates centerline stripes on urban streets with ADT of 6,000 or more; most neighborhood streets suitable for sharing are well below that threshold

BICYCLE BOULEVARDS

A bicycle boulevard is an enhanced shared roadway; a local street is modified to function as a prioritized through street for bicyclists while maintaining local access for automobiles. This is done by adding traffic-calming devices to reduce motor vehicle speeds and through trips, and installing traffic controls that limit conflicts between motorists and bicyclists and give priority to through bicyclist movement.Components of bike boulevards (Credit: Michele Weisbart)



Components of bike boulevards (Credit: Michele Weisbart)

One key advantage of bicycle boulevards is that they attract cyclists who do not feel comfortable on busy streets and prefer to ride on lower traffic streets. Bicycle travel on local streets is generally compatible with local land uses (e.g., residential and some retail). Residents who want slower traffic on neighborhood streets often like measures that support bicycle boulevards. By reducing traffic and improving crossings, bicycle boulevards also improve conditions for pedestrians. Successful bicycle boulevard implementation requires careful planning with residents and businesses to ensure acceptance

Elements of a Bicycle Boulevard

A successful bike boulevard includes the following design elements:

- Selecting a direct and continuous street, rather than a circuitous route that winds through neighborhoods. Bike boulevards work best on a street grid. If any traffic diversion will likely result from the bike boulevard, selecting streets that have parallel higher-level streets can prevent unpopular diversion to other residential streets.
- Placing motor vehicle traffic diverters at key intersections to reduce through motor vehicle traffic (diverters are designed to allow through bicyclist movement)
- Turning stop signs towards intersecting streets, so bicyclists can ride with few interruptions
- Replacing stop-controlled intersections with mini-circles and mini-roundabouts to reduce the number of stops cyclists have to make
- Placing traffic-calming devices to lower motor vehicle traffic speeds
- Placing wayfinding and other signs or markings to route cyclists to key destinations, to guide cyclists through difficult situations, and to alert motorists of the presence of bicyclists
- Where the bike boulevard crosses high-speed or high-volume streets, providing crossing improvements such as
  - Signals, where a traffic study has shown that a signal will be safe and effective. To ensure that bicyclists can activate the signal, loop detection should be installed in the pavement where bicyclists ride.
  - Roundabouts where appropriate.
  - Median refuges wide enough to provide a refuge (8 feet minimum) and with an opening wide enough to allow bicyclists to pass through (6 feet). The design should allow bicyclists to see the travel lanes they must cross.

SHOULDER BIKEWAYS

Paved shoulders are provided on rural highways for a variety of safety, operational, and maintenance reasons; they also provide a place for bicyclists to ride at their own pace, out of the stream of motorized traffic.

When providing shoulders for bicycle use, a minimum width of 6 feet is recommended. This allows a cyclist to ride far enough from the edge of pavement to avoid debris and far enough from passing vehicles to avoid conflicts. On roads with prevailing speeds over 45 mph, 8 feet is preferred. If there are physical width limitations, a minimum 4 foot shoulder may be used.

BIKE LANES

Bike lanes are a portion of the traveled way designated for preferential use by bicyclists; they are most suitable on avenues and boulevards. Bike lanes may also be provided on rural roads where there is high bicycle use. Bike lanes are generally not recommended on local streets with relatively low traffic volumes and speeds, where a shared roadway is the appropriate facility. There are no

hard and fast mandates for providing bike lanes, but as a general rule, most jurisdictions consider bike lanes on roads with traffic volumes in excess of 3,000-5,000 ADT or traffic speeds of 30 mph or greater.

Bike lanes have the following advantages:

- They enable cyclists to ride at a constant speed, especially when traffic in the adjacent travel lanes speeds up or slows down (stop-and-go).
- They enable bicyclists to position themselves where they will be visible to motorists.
- They encourage cyclists to ride on the traveled way rather than the sidewalk.

Bike lanes are created with a solid stripe and stencils. Motorists are prohibited from using bike lanes for driving and parking, but may use them for emergency avoidance maneuvers or breakdowns. Bike lanes are one-way facilities that carry bicycle traffic in the same direction as adjacent motor-vehicle traffic. Bike lanes should always be provided on both sides of a two-way street. One exception is on hills where topographical constraints limit the width to a bike lane on one side only; the bike lane should be provided in the uphill direction as cyclists ride slower uphill, and they can ride in a shared lane in the downhill direction.

The minimum bike lane width is 5 feet from the face of a curb, or 4 feet on open shoulders. If on-street parking is permitted, the bike lane should be placed between parking and the travel lane with a preferred width of 6 feet so cyclists can ride outside the door zone. Streets with high volumes of traffic and/or higher speeds need wider bike lanes (6 feet to 8 feet) than those with less traffic or slow speeds. On curbed sections, a 4-foot (minimum 3 feet) wide smooth surface should be provided between the gutter pan and stripe. This minimum width enables cyclists to ride far enough from the curb to avoid debris and drainage grates and far enough from other vehicles to avoid conflicts. By riding away from the curb, cyclists are more visible to motorists than when hugging the curb. Where on-street parking is permitted, delineating the bike lane with two stripes, one on the street side and one on the parking side, is preferable to a single stripe.

Bike Lanes on Two-Way Streets

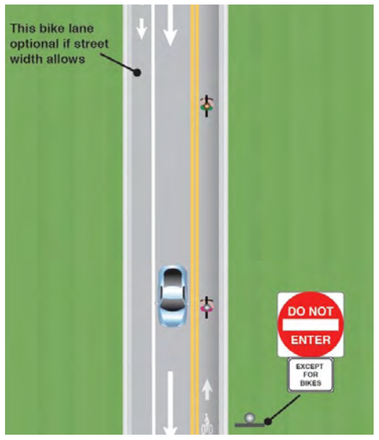
Basic bike lanes on two-way streets comprise the majority of bike lanes. They should follow the design guidelines for width with and without on-street parking.

Bike Lanes on One-Way Streets

Bike lanes on one-way streets should generally be on the right side of the traveled way and should always be provided on both legs of a one-way couplet. The bike lane may be placed on the left of a one-way street if it decreases the number of conflicts (e.g., those caused by heavy bus traffic or parking) and if cyclists can safely and conveniently transition in and out of the bike lane. If sufficient width exists, the bike lanes can be striped on both sides.

Contra-Flow Bike Lanes

Contra-flow bike lanes are provided to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street: one direction for motor vehicles and bikes and the other for bikes only. Contra-flow lanes are separated with yellow center lane striping. Combining both directions of bicycle travel on one side of the street to accommodate contra-flow movement results in a two-way cycle track.



Contra-flow bike lane design (Credit: Michele Weisbart)

Contra-flow bike lanes are useful where they provide a substantial savings in out-of-direction travel with direct access to high-use destinations, and safety is improved because of reduced conflicts compared to the longer route. The contra-flow design introduces new design challenges and may create additional conflict points as motorists may not expect on-coming bicyclists.

Bike Lanes and Bus Lanes

In most instances, bicycles and buses can share the available road space. On routes heavily traveled by both bicyclists and buses, separation can reduce conflicts (stopped buses hinder bicycle movement and slower moving bicycles hinder buses). Ideally, shared bicycle/bus lanes should be 13 feet to 15 feet wide to allow passing by both buses and bicyclists.

Separate bus lanes and bike lanes should be considered to reduce conflicts between passengers and bicyclists, with the bus lane at the curbside. Buses will be passing bicyclists on the right, but the fewer merging and turning movements reduce overall conflicts.

Buffered Bike Lanes

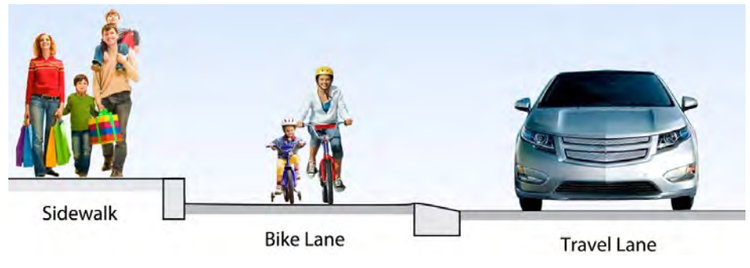
Buffered bike lanes provide a painted divider between the bike lane and the travel lanes. This additional space can improve the comfort of cyclists as they don't have to ride as close to motor vehicles. Buffered bike lanes can also be used to slow traffic as they narrow the travel lanes. An additional buffer may be used between parked cars and bike lanes to direct cyclists to ride outside of the door zone of the parked cars. Buffered bike lanes are most appropriate on wide, busy streets. They can be used on streets where physically separating the bike lanes with cycle tracks is undesirable for cost, operational, or maintenance reasons.

Raised Bike Lanes

Bike lanes are typically an integral portion of the traveled way and are delineated from motor vehicle lanes with painted stripes. Though most bicyclists ride on these facilities comfortably, others prefer more separation. Raised bike lanes incorporate the convenience of riding on the street with some physical separation. This is done by elevating the bicycle lane surface 2 to 4 inches above street level, while providing a traversable curb to separate the bikeway from the motor vehicle travelway. This treatment offers the following advantages:

- Motorists know they are straying from the travel way when they feel the slight bump created by the curb.
- The mountable curb allows motorists to make turns into and out of driveways.
- The mountable curb allows cyclists to enter or leave the bike lane (e.g., for turning left or overtaking another cyclist).
- The raised bike lane drains towards the centerline, leaving it clear of debris and puddles.
- Novice bicyclists are more likely to ride in the bike lane, leaving the sidewalk for pedestrians.

Raised bike lanes can be constructed at little additional expense for new roads. Retrofitting streets with raised bike lanes is more costly; it is best to integrate raised bike lanes into a larger project to remodel the street due to drainage replacement. Special maintenance procedures may be needed to keep raised bike lanes swept.



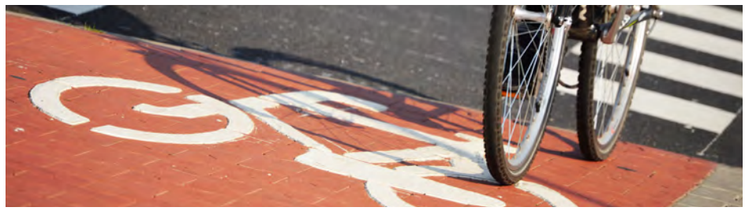
CYCLE TRACKS

Cycle tracks, also known as protected bike lanes, are bikeways located on or adjacent to streets where bicycle traffic is separated from motor vehicle traffic by physical barriers, such as on-street parking, posts/bollards, and landscaped islands. They can be well suited to downtown areas where they minimize traffic conflicts with pedestrians. Streets selected for cycle tracks should have minimal pedestrian crossings and driveways. They should also have minimal loading/unloading activity and other street activity. The cycle tracks should be

designed to minimize conflicts with these activities as well as with pedestrians and driveways.

Cycle tracks can be provided on new facilities, but they require more width than other types of bikeways. They are best suited for existing streets where surplus width is available; the combined width of the cycle track and the barrier is more or less the width of a travel lane. The area to be used by bicycles should be designed with adequate width for street sweeping to ensure that debris will not accumulate. Cycle tracks tend to work most effectively where there are few uncontrolled crossing points with unexpected traffic conflicts. Cycle track concerns include treatment at intersections, uncontrolled midblock driveways and crossings, wrong-way bicycle traffic, and difficulty accessing or exiting the facility at midblock locations. There is some controversy regarding the comparative safety of cycle tracks. Recent studies have concluded that cycle tracks are as safe as other treatments when high usage is expected and when measures such as separate signal phases for right-turning motor vehicle and through cyclists, and left-turning cyclists and through motor vehicles, are deployed to regulate crossing traffic.

Cycle tracks require at least 10' of ROW and curb and gutter requirements, and unlike Shared-use paths, still require a separate sidewalk facility.



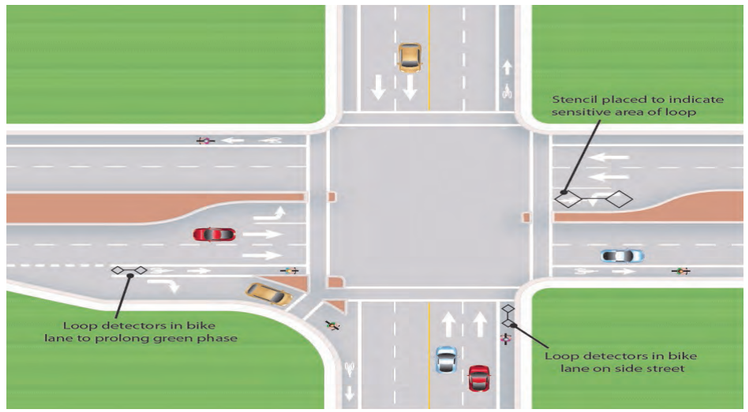
SHARED USE PATHS

Shared use paths should be a minimum of 8 feet wide with 2 feet of graded shoulder on each side. This width is suitable in rural or small-town settings. Generally, 12 feet of paved path is preferred. Wider pavement may be needed in high-use areas. Where significant numbers of pedestrians, bicyclists, skaters, and other users use the paths, either wider pavement or separate walkways help to eliminate conflicts. Most important in designing shared use paths is good design of intersections where they cross streets. These crossing should be treated as intersections with appropriate treatment.

INTERSECTIONS

Intersections are junctions at which different modes of transportation meet and facilities overlap. A well-designed intersection facilitates the interchange between bicyclists, pedestrians, motorists, and transit so traffic flows in a safe and efficient manner. Designs for intersections with bicycle facilities should reduce conflicts between bicyclists (and other vulnerable road users) and vehicles by heightening visibility, denoting a clear right of way, and ensuring that the various users are aware of each other. Intersection treatments can resolve both queuing and merging maneuvers for bicyclists, and are often coordinated with timed or specialized signals.

Chapter 5, "Intersection Design," provides general principles of geometric design; all these recommendations will benefit cyclists. The configuration of a safe intersection for bicyclists may include additional elements such as color, signs, medians, signal detection, and pavement markings. Intersection design should take into consideration existing and anticipated bicyclist, pedestrian, and motorist movements. In all cases, the degree of mixing or separation between bicyclists and other modes is intended to reduce the risk of crashes and increase bicyclist comfort. The level of treatment required for bicyclists at an intersection will depend on the bicycle facility type used, whether bicycle facilities are intersecting, the adjacent street function, and the adjacent land use



Bikeway markings at intersections (Credit: Michele Weisbart)

BIKEWAY MARKINGS AT INTERSECTIONS

Bicycle Lanes can be marked green to better denote the facility. Continuing marked bicycle facilities at intersections (up to the crosswalk) ensures that separation, guidance on proper positioning, and awareness by motorists are maintained through these potential conflict areas. The appropriate treatment for right-turn only lanes is to place a bike lane pocket between the right-turn lane and the rightmost through lane. If a full bike lane pocket cannot be accommodated, a shared bicycle/right turn lane can be installed that places a standard-width bike lane on the left side of a dedicated right-turn lane. A dashed strip delineates the space for bicyclists and motorists within the shared lane. This treatment includes signs advising motorists and bicyclists of proper positioning within the lane. Sharrows are another option for marking a bikeway through an intersection where a bike lane pocket cannot be accommodated.

BIKE SIGNAL HEADS

Bicycle signal heads may be installed at signalized intersections to improve identified safety or operational problems for bicyclists; they provide guidance for bicyclists at intersections where bicyclists may have different needs from other road users (e.g., bicycle-only movements and leading bicycle intervals) or to indicate separate bicycle signal phases and other bicycle-specific timing strategies. A bicycle signal should only be used in combination with an existing conventional or hybrid beacon. In the United States, bicycle signal heads typically use standard three-lens signal heads in green, yellow, and red with a stencil of a bicycle.

BICYCLE SIGNAL DETECTION

Bicycle detection is used at actuated traffic signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push buttons or by automated means (e.g., in-pavement loops, video, and microwave). Inductive loop vehicle detection at many signalized intersections is calibrated to the size or metallic mass of a vehicle, meaning that bicycles may often go undetected. The result is that bicyclists must either wait for a vehicle to arrive, dismount, and push the pedestrian button (if available), or cross illegally. Loop sensitivity can be increased to detect bicycles.

Proper bicycle detection must accurately detect bicyclists (be sensitive to the mass and volume of a bicycle and its rider); and provide clear guidance to bicyclists on how to actuate detection (e.g., what button to push or where to stand).

BIKE BOXES

A bike box is a designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase. Appropriate locations include:

- At signalized intersections with high volumes of bicycles and/or motor vehicles, especially those with frequent bicyclist left-turns and/or motorist right-turns
- Where there may be right or left-turning conflicts between bicyclists and motorists

Bicycle box: Portland, OR (Credit: Ryan Snyder)

- Where there is a desire to better accommodate left-turning bicycle traffic
- Where a left turn is required to follow a designated bike route or boulevard or access a shared-use path, or when the bicycle lane moves to the left side of the street
- When the dominant motor vehicle traffic flows right and bicycle traffic continues through (such as at a Y intersection or access ramp)

BICYCLE COUNTDOWNS

Near-side bicycle signals may incorporate a “countdown to green” display to provide information about how long until the green bicycle indication is shown, enabling riders to push off as soon as the light turns green.

LEADING BICYCLE INTERVALS

Based on the Leading Pedestrian Interval, a Leading Bicycle Interval (LBI) can be implemented in conjunction with a bicycle signal head. Under an LBI, bicyclists are given a green signal while the vehicular traffic is held at all red for several seconds, providing a head start for bicyclists to advance through the intersection. This treatment is particularly effective in locations where bicyclists are required to make a challenging merge or lane change (e.g., to access a left turn pocket) shortly after the intersection, as the LBI would give them sufficient time to make the merge before being overtaken by vehicular traffic. This treatment can be used to enhance a bicycle box.

TWO-STAGE TURN QUEUE BOXES

On right side cycle tracks, bicyclists are often unable to merge into traffic to turn left due to physical separation. This makes the provision of two-stage left turns critical in ensuring these facilities are functional. The same principles for two-stage turns apply to both bike lanes and cycle tracks. While two-stage turns may increase bicyclist comfort in many locations, this configuration will typically result in higher average signal delay for bicyclists due to the need to receive two separate green signal indications (one for the through street, followed by one for the cross street) before proceeding.

COLORED PAVEMENT TREATMENTS

Pavement coloring is useful for a variety of applications in conjunction with bicycle facilities. The primary goal of colored pavements is to differentiate specific portions of the traveled way, but colored pavements can also visibly reduce the perceived width of the street.

Colored pavements are used to highlight conflict areas between bicycle lanes and turn lanes, especially where bicycle lanes merge across motor vehicle turn lanes. Colored pavements can be used in conjunction with sharrows (shared lane markings) in heavily used commercial corridors where no other provisions for bicycle facilities are evident.

While a variety of colored treatments have been used, the trend is for spring green as the preferred color for bicycle facilities of this type, especially in areas where conflicts or shared use is intended. Maintenance of color and surface condition are considerations. Traditional traffic paints and coatings can become slippery. Long life surfaces with good wet skid resistance should be considered.

WAYFINDING

The ability to navigate through a region is informed by landmarks, natural features, signs, and other visual cues. Wayfinding is a cost-effective and highly visible way to improve the bicycling environment by familiarizing users with the bicycle network, helping users identify the best routes to destinations, addressing misperceptions about time and distance, and helping overcome a barrier to entry for infrequent cyclists (e.g., “interested but concerned” cyclists).

Wayfinding signs: Seattle, WA (Credit: Ryan Snyder)

A bikeway wayfinding system is typically composed of signs indicating direction of travel, location of destinations, and travel time/distance to those destinations; pavement markings indicating to bicyclists that they are on a designated route or bike boulevard and reminding motorists to drive courteously; and maps providing users with information regarding destinations, bicycle facilities, and route options.

Legal Status *- As of the writing of this manual, a number of the designs discussed above, including cycle tracks, buffered bike lanes next to on-street parking, conflict zone colored bike lanes, bike boxes, and colored treatments of travel lanes with sharrows, have not yet been recognized by the Federal MUTCD and AASHTO and are considered experimental treatments. These devices appear to be promising improvements in bicycle access and safety as they have been widely used in Europe and experimented with in the U.S. Any jurisdiction wishing to use these treatments should follow the appropriate experimental procedures.*

BICYCLE PARKING

Secure bicycle parking at likely destinations is an integral part of a bikeway network. Bicycle thefts are common and lack of secure parking is often cited as a reason people hesitate to ride a bicycle. The same consideration should be given to bicyclists as to motorists, who expect convenient and secure parking at all destinations. Bicycle parking should be located in well-lit, secure locations close to the main entrance of a building, no further from the entrance than the closest automobile parking space. Bike parking should not interfere with pedestrian movement.

Bike racks along sidewalks should support the bicycle well, and make it easy to lock a U-shaped lock to the frame of the bike and the rack. The two samples below show an “inverted –U” rack and an art design rack: both meet these criteria. Refer to the APBP Bike Parking Guidelines for additional information.

MAINTENANCE

Maintenance is a critical part of safe and comfortable bicycle access. Two areas that are of particular importance to bicyclists are pavement quality and drainage grates. Rough surfaces, potholes, and imperfections, such as joints, can cause a rider to lose control and fall. Care must be taken to ensure that drainage grates are bicycle-safe; otherwise a bicycle wheel may fall into the slots of the grate, causing the cyclist to fall. The grate and inlet box must be flush with the adjacent surface. Inlets should be raised after a pavement overlay to the new surface. If this is not possible or practical, the new pavement should taper into drainage inlets so the inlet edge is not abrupt.

The most effective way to avoid drainage-grate problems is to eliminate them entirely with the use of inlets in the curb face. This may require more grates to handle bypass flow, but is the most bicycle-friendly design.

IMPLEMENTATION

Implementation of a bikeway network often requires an implementation plan. Some bikeways, such as paths, bicycle boulevards, and other innovative techniques described in this guide, will require a capital improvement project process, including identifying funding, a public and environmental review process, and plan preparation. Other bikeway improvements piggy-back onto planned construction, such as resurfacing, reconstruction, or utility work.
The majority of bikeway facilities are provided on streets in the form of shared roadways or bicycle lanes. Shared roadways usually require virtually no change to existing roadways, except for some directional signs, occasional markings, and minor changes in traffic control devices; removing unnecessary centerline stripes is a strategy that can be implemented after resurfacing projects. Striped bike lanes are implemented on existing roads through use of the strategies below.

RESURFACING

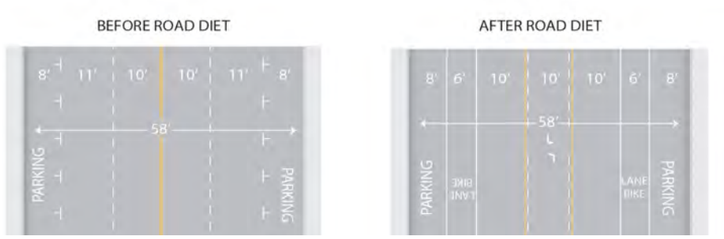
The cost of striping bicycle lanes is negligible when incorporated with resurfacing, as this avoids the high cost of stripe removal; the fresh pavement

provides a blank slate. Jurisdictions will need to anticipate opportunities and synchronize restriping plans with repaving and reconstruction plans. If new pavement is not anticipated in the near future, grinding out the old lane lines can still provide bike lanes.

There are three basic techniques for finding room for bike lanes:

- **Lane narrowing.** Where all existing or planned travel lanes must be retained, travel lanes can be narrowed to provide space for bike lanes. Recent studies have indicated that the use of 10-foot travel lanes does not result in decreased safety in comparison with wider lanes for vehicle speeds up to 35 mph. Eleven-foot lanes can be used satisfactorily at higher speeds especially where trucks and buses frequently run on these streets. However, where a choice between a 6-foot bike lane and an 11-foot travel lane must be made, it is usually preferable to have the 6-foot bike lane. Parking lanes can also be narrowed to 7 feet to create space for bike lanes.
- **Road diets.** Reducing the number of travel lanes provides space for bicycle lanes. Many streets have more space for vehicular traffic than necessary. Some streets may require a traffic and/or environmental analysis to determine whether additional needs or impacts may be anticipated. The traditional road diet changes a four-lane undivided street to two travel lanes, a continuous left-turn lane (or median), and bike lanes. In other cases, a four-lane street can be reduced to a two-lane street without a center-turn lane if there are few left turns movements. One-way couplets are good lane-reduction candidates if they have more travel lanes in one direction than necessary for the traffic volumes. For example, a four-lane one-way street can be reduced to three lanes and a bike lane. Since only one bike lane is needed on a one-way street, removing a travel lane can free enough room for other features, such as on-street parking or wider sidewalks. Both legs of a couplet must be treated equally, so there is a bike lane in each direction.
- **Parking Removal.** On-street parking is vital on certain streets (such as residential or traditional central business districts with little or no off-street parking), but other streets have allowable parking without a significant visible demand. In these cases, parking prohibition can be used to provide bike lanes with minimal public inconvenience.

For much of South Miami, a simple road diet will yield the space necessary to create bicycle and other space for Complete Streets facilities.



Fitting in bicycle lanes with road diets (Credit: Michele Weisbart)

UTILITY WORK

Utility work often requires reconstructing the street surface to complete restoration work. This provides opportunities to implement bike lanes and more complex bikeways such as bike boulevards, cycle tracks, or paths. It is necessary to provide plans for proper implementation and design of bikeway facilities prior to the utility work. It is equally necessary to ensure that existing bikeways are replaced where they exist prior to utility construction.

REDEVELOPMENT

When streets are slated for reconstruction in conjunction with redevelopment, opportunities exist to integrate bicycle lanes or other facilities into the redevelopment plans. During redevelopment, as bicycle facilities are incorporated, they should be reviewed as to ensure continuity from adjoining sections of the network.

PAVED SHOULDERS

Adding paved shoulders to existing roads can be quite expensive if done as stand-alone, capital improvement projects, especially if ditch lines have to be moved, or if open drains are changed to enclosed drains. But paved shoulders can be added at little extra cost if they are incorporated into projects that already disturb the area beyond the pavement, such as laying utility lines or drainage work.

PRINCIPLES FOR ROADWAYS IN SOUTH MIAMI

While it may seem odd to include principles for roadways in a plan which seems to be designed towards ensuring multimodal transportation, the reality is that vehicular travel remains a vital component of the transportation network. It is not the purpose of a Complete Streets program to eliminate the automobile entirely, but to have it coexist in a better balance with other modes of transportation.

In designing roads for Complete Streets, the first determination is to determine how many lanes there should be, based on local needs or wants. A community may choose to have less lanes, going on a road diet, while accepting that traffic may worsen as a result. Floridian communities with traffic concurrency, like South Miami, will have to adopt LOS F standards for all its roadways. For South Miami, this is already the case.

For South Miami, after determining the amount of travel lanes, it is important to only assign the space necessary for the roadway, allowing for additional room for the other modes. In other cities, review of plans find that travel lanes can range from 11 feet to 14 feet. Yet, on a local roadway, the minimum standard is 10 feet. For Collectors and Arterials, the standard is 11 feet. While higher speed would require more space, in some parts of South Miami, a shift in the space utilized for travel lane will allow for multimodal infrastructure to be emplaced. In many cases, the City can therefore hold to the principle of allowing adequate flow-through without compromising multi-modality.

Additionally, because roadways do interact with pedestrians and bicyclists, the design of future roadways on a Complete Street network should ensure **visibility** for both driver and pedestrian or cyclist. Achieving this may require improving safety at conflict points, such as the **implementation of safe crossings** and **improved lighting** in the community.

Speed also is important. Research shows that the higher the speed, the more likely for a pedestrian fatality with impact. While this is inherently obvious, the exponential nature of the curve shows that the likelihood of serious injury or death greatly rises when the speed goes above 20 mph. Going from 20 mph to 40 mph changes the survival rate from 85% to 15%. Control of speed through the usage of **traffic calming**, and **reduction of conflict points** are tools which can be utilized to promote safety in South Miami.

PRINCIPLES OF DESIGN FOR TRANSIT

Principles of design for transit primarily revolve around the provision of bicycling and pedestrian infrastructure from an initial standpoint. After all, transit is one of those modes where one generally may need to travel the “first” and “last” mile to and from their destination. Transit accessibility is heavily dependent on the provision of safe environments to access pick-up points. For bicycle riders, the level of safety and accessibility will dictate whether bicycling is a viable mode of transportation; further, planning for bicycle connections to transit allows for a reduction in the need for parking spaces, which are more expensive and space consuming.

Once there, amenities such as **shelter** from the elements in case of rain, places to **sit and rest**, trash cans to ensure **cleanliness** – an aspect of **comfort**; and at times, **availability of transit information** all serve to make transit a more usable mode. To emplace these shelters or benches and information spaces, space must be provided; otherwise, these amenities would end up in the sidewalk or impeding the pedestrian or bicycle path of travel. As a general rule of thumb, the provision of bus amenities should be emplaced based on the headways, as this indicates the potential wait time a person will have. Benches should be emplaced at stops with longer than 5 minute headways. Shelters should be

emplaced at stops with 10 minutes or greater headways. All of South Miami's bus stops thus should be equipped with a bus shelter, space permitting.

Transit stops should be easily **accessible**. ADA compliance, allowing for landing pads for wheelchairs and appropriate ramps, and **safe access, including appropriate places to cross** before and after bus travel, are both vital as well.

Bus stops can be located at various areas of a roadway. Three locations for bus stops are far-side, near-side, and midblock. Each has its own benefits:

- **Far-side bus stops:** Far-side bus stops are the most common type, and are generally preferred for safety reasons. These bus stops are located after the intersection, past the crosswalk. Thus, this allows pedestrians to cross behind a bus after alighting. Also, these pedestrian who do cross are not being blocked visually by the bus – this increased visibility allows for increased safety.
- **Near-side bus stops:** Near-side bus stops are generally used when far-side stops are not feasible. Located before an intersection and crosswalk, this causes pedestrians to have to cross in front of the bus. However, there are situations where the near-side stop provides better access to specific pedestrian destinations.
- **Midblock bus stops:** Midblock bus stops are located in the middle of the block segment; are generally used in areas where there are long blocks, when there are important destinations in the midblock area, and with transfer points or locations where there is a need to allow multiple buses to pull into ta stop.

Of course, there is also the vehicular aspects of bus transit to consider. Is there space for people for wait for a bus? Is there space to safely board? Generally, bus stops spaces should be designed with readership demand in mind.

How many people are being picked up at the bus stops? In a heavily urbanized area, there will be a longer queue, and thus a longer time. In a suburban area, with less density, the opposite is true. Each person also creates a needed boarding time which will not only affect the bus schedule, but also increases the need for a bus pull-in so that the stopped bus does not impeded travel flow.

Various options exist to help develop transit systems. With bus transit, the usage of vehicular lanes is a necessity. However, whether the bus system shares or does not share with the private vehicle is another consideration. With appropriate spacing, bus lanes can be included. And ultimately, as the City develops, the busiest transit lines should be considered for dedicated bus lanes. The following, from the Los Angeles County Living Street Manual, provide

BUS BULBS

Bus bulbs are curb extensions that extend the length of the transit stop on streets with on-street parking. They improve transit performance by eliminating the need for buses to merge into mixed traffic after every stop. They also facilitate passenger boarding by allowing the bus to align directly with the curb; waiting passengers can enter the bus immediately after it has stopped. They improve pedestrian conditions by providing additional space for people to wait for transit and by allowing the placement of bus shelters where they do not conflict with a sidewalk's pedestrian zone. Bus bulbs also reduce the crossing distance of a street for pedestrians if they are located at a crossing. In most situations, buses picking up passengers at bus bulbs block the curbside travel lane; but this is mitigated by the reduced dwell time, as it takes less time for the bus driver to position the bus correctly, and less time for passengers to board.

One major advantage of bus bulbs over pulling over to the curb is that they require less parking removal: typically two on-street parking spots for a bus bulb instead of four for pulling over.

The following conditions should be given priority for the placement of transit bus bulbs:

- Where transit performance is significantly slowed by the transit vehicle's merging into a mixed-flow travel lane
- Roadways served by express or Bus Rapid Transit (BRT) lines
- Stops that serve as major transfer points
- Areas with heavy transit and pedestrian activity and where narrow sidewalks do not allow for the placement of a bus shelter without conflicting with the pedestrian zone

Bus bulbs should not be considered for stops with any of the following:

- A queue-jumping lane provided for buses
- On-street parking prohibited during peak travel periods
- Near-side stops located at intersections with heavy right-turn movements, except along streets with a "transit-first" policy

Characteristics

At a minimum, bus bulbs should be long enough to accommodate all doors of a transit vehicle to allow for the boarding and alighting of all passengers, or be long enough to accommodate two or more buses (with a 5-foot clearance between buses and a 10-foot clearance behind a bus) where there is frequent service such as with BRT or other express lines. Bus bulbs located on the far side of a signalized intersection should be long enough to accommodate the complete length of a bus so that the rear of the bus does not intrude into the intersection.

Standard Transit Vehicle and Transit Bus Bulb Dimensions

Vehicle	Length (feet)	Number of Buses at Stop	Platform Length (feet)	
			Near Side	Far Side
Standard Bus	40	1	35	45
		2	55	65
Articulated Bus	60	1	80	90
		2	120	130

Federal Transit Administration, August 2004. Characteristics of Bus Rapid Transit for Decision Making Project NO: FTA-VA-26-7222-2004.1

BUS LANES

Bus lanes provide exclusive or semi-exclusive use for transit vehicles to improve the transit system's travel time and operating efficiency by separating transit from congested travel lanes. They can be located in an exclusive right-of-way or share a roadway right-of-way. They can be physically separated from other travel lanes or differentiated by lane markings and signs.

Bus lanes can be located within a roadway median or along a curb-side lane, and are identified by lane markings and signs. They should generally be at least 11 feet wide, but where bicycles share the lane with buses, 13 to 15 feet wide is preferred. When creating bus lanes, cities should consider the following:

- Exclusive transit use may be limited to peak travel periods or shared with high-occupancy vehicles.
- On-street parking may be allowed depending on roadway design, especially with bus lanes located in the center of the street.
- A mixed-flow lane or on-street parking may be displaced; this is preferable to adding a lane to an already wide roadway, which increases the crossing distance for pedestrians and creates other problems discussed in other chapters.
- Within a mixed-flow lane, the roadway can be delineated by striping and signs.
- High-occupancy vehicles and/or bicycles may be permitted to use bus lanes.

Pedestrian access to stations becomes an issue when bus lanes are located in roadway medians.

ACCOMMODATING LIGHT RAIL, STREET CARS, AND BUS RAPID TRANSIT (BRT)

A growing number of streets have light rail lines, street cars, or BRT. These need to be carefully designed into the street. The following standards are included should South Miami need to consider BRT or other facilities in the future.

The various options for accommodating light rail, street cars, and BRT within streets are as follows:

- Center-running
- Two-way split-side, with one direction of transit flow in each direction
- Two-way single-side, with both directions of transit flow on one side of the street right-of-way
- One-way single-side, with transit running one direction (either with or against the flow of vehicular traffic) and usually operating in a one-way couplet on parallel streets.

For each configuration, transit can operate in a reserved guideway or in mixed street traffic. When installing light rail or street cars within streets, the safety of pedestrians and bicyclists needs to be fully provided for. If poorly designed, these transit lines introduce hazards and serve to divide neighborhoods where crossings are highly limited and/or difficult or inconvenient (see Chapter 7, “Pedestrian Crossings” for more guidance). In general, in areas of high pedestrian activity, the speed of the transit service should be compatible with the speed of pedestrians.

The potential for each configuration is influenced by the street type. Some transit configurations will not work effectively in combination with certain street types. The table below outlines the compatibility of each configuration with the four street types.

Street Types and Transit Configurations

	Center Running		Two-Way Split Side		Two-Way Single Side		One-Way Single Side	
Street Type	**Reserved Guideway**	**In Street**	**Reserved Guideway**	**In Street**	**Reserved Guideway**	**In Street**	**Reserved Guideway**	**In Street**
Boulevard	Y	N	N	Y	Y	N	Y*	Y
Multi-way Boulevard	Y	N*	Y	Y	N	N	Y*	Y
Avenue	Y	Y	Y*	Y	Y*	N	Y	Y
Street	N	Y	Y	Y	N*	N	Y	Y

Notes
Y = Recommended street type/transit configuration combination
N = Not recommended/possible street type/transit configuration combination
**Denotes configurations that mat be possible under certain circumstances, but are not usually optimal*

Source: Integration of Transit into Urban Thoroughfare Design, DRAFT White Paper prepared by the Center for Transit-Oriented Development, updated: November 9, 2007.

DESIGN PLAN

THE DESIGN MANUAL

COMPLETE STREETS

Complete Streets, as mentioned earlier in the pan, are designed for people of all ages and physical abilities, regardless of the travel mode taken – walking, biking, transit, or driving. The implementation of Complete Streets therefore requires the organization of space based on the needs of these four spaces. The facilities which allow for each mode to be a viable choice starts with the minimum design standards, which are based on engineering to ensure safety, mobility, and accessibility. This design manual is based on exactly that – it is a set of engineering standards for the elements of the pedestrian, transit, bicycle, and roadway infrastructure, in order to effect an organized, structure approach to implementing these facilities. The standards within took into account Miami-Dade County and Florida Department of Transportation requirements, which the City of South Miami must adhere to, in order to create a plan which provides guidance for the implementation of Complete Streets when there are questions. In looking at the standards, the Florida DOT Plans Preparations Manual, Green Book, and Miami-Dade regulations were all considered along with AASHTO requirements.

The development of the Design Manual took into account not only the standard minimum, but the potential options for facilities which will encourage walking and pedestrian activities, and by extension, “Active Transportation.” In reviewing other plans, it was inherent that sufficient space which exists, but is not organized for this purpose, had to be set aside in the future for these facilities to be implemented. To create this “Flex Zone” that will allow for amenities such as bicycle racks and landscaping, which encourage bicycling and pedestrian behavior, the thought was to minimize the space in order to maximize the space for alternative modes of infrastructure.

This plan recognizes the need for vehicular travel within and through the community of South Miami. It started off by still noting the need for travel lanes, but essentially effects a road diet on existing lanes to reorganize space, so that where it can, the City can look to exceed the minimum standards for alternative modes in order to create a better facility that was great and encouraging of a shift in behavior, not one that was merely rigidly adequate. Even for alternative modes, minimum standards such as 4’ bicycle lanes exist, but if we take the principles espoused earlier in this report, comfort necessitates an effort for more than the minimum standards to exist.

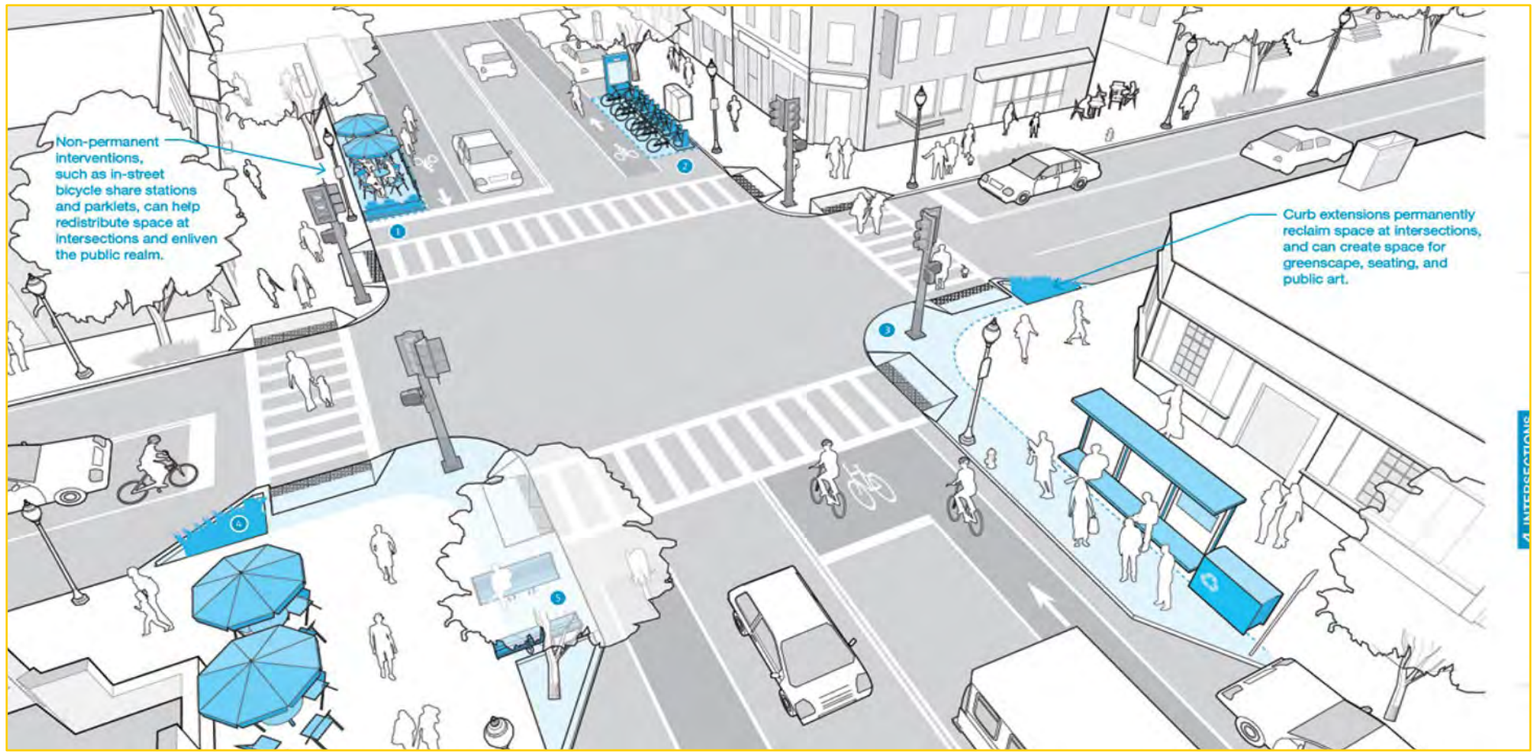
In developing this Manual, a review of the various roadways and associated urban form led to discussion on the interactions between land use, the availability of transportation right-of-way, and urban design. We have to recognize that, even by looking at the land, a single family bungalow is not going to have the same needs as an urban area with restaurants along what should be a walkable neighborhood. A local road is not going to have the same space availability or usage density as an arterial roadway. Taking these into consideration, the Design Manual split up the standards based on community qualities. The resulting plan is therefore organized by:

- Location within South Miami
- Facility Type
- Mode

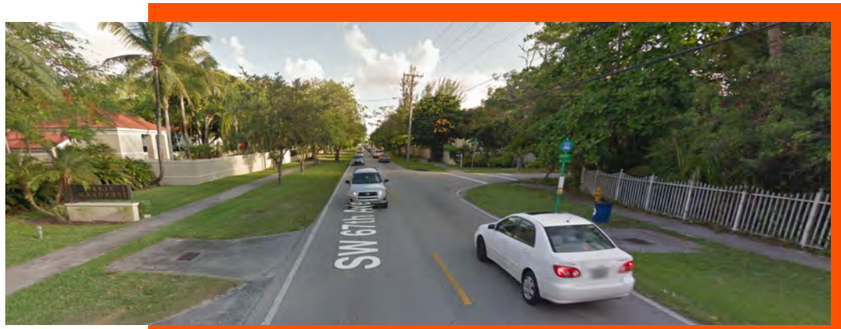
There are therefore 9 sections, 3 categories each based on urban form and land use (T-3 Suburban, T-4 General Urban, and T-5 Urban Center), with each of these categories then further divided into three types by roadway (Local, Collector, and Arterial).

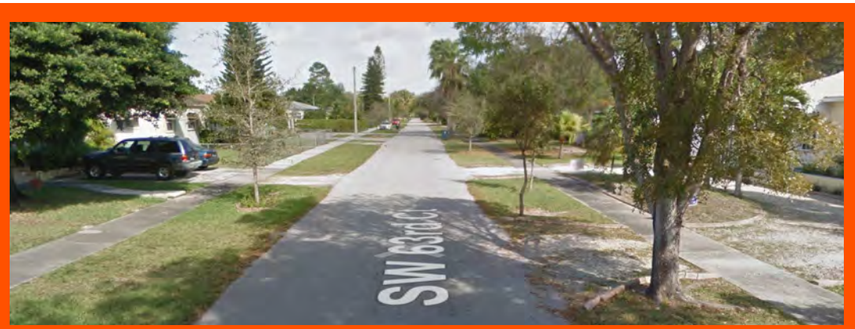
The resulting plan provides the City a look at how space can be reorganized for the smallest roadways within each functional classification (Local, Collector, and Arterial) within the City. For larger roadways, the extra right-of-way may be taken up by the number of lanes and medians, with the remainder going to the Flex Zone. This is particularly important as within every design plan, design constraints lead to tradeoffs, and there is need to recognize that street frontages are important. Creating this space thus assigns importance to the ideas behind Complete Streets. This space, in the future, will be designed and filled from a menu of options, which the City can expand upon over time. These Flex Zone items, include different options for transit, parking, seating, and others and these amenities’ associated spatial requirements, so that the City can apply them functionally and geographically as warranted by the needs of the local community.

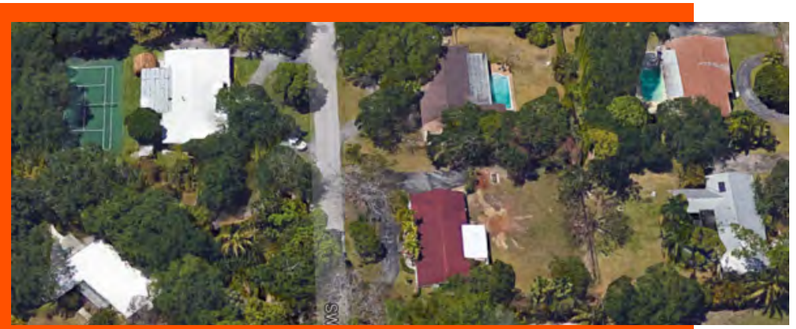
Source: Boston Complete Streets Guidelines



T-3 SUBURBAN TRANSECT







T-3 SUBURBAN TRANSECT

Generally, the T-3 Suburban district for this Plan includes the southeastern, nothern, and west portions of the City. These areas generally have single family residences of varying but generally low density. In South Miami, the nature of the existing right of way tends to vary, but generally, there are large setbacks from the property lines. Sidewalks exist in some parts of the current T-3 area, but in other areas they are absent. The map to the right notes the areas in South Miami designated as T-3 for the purposes of this Plan.

T-3 is primarily suburban and is characterized by single-family residential uses with walkable development patterns and dominant landscape patterns. Almost two-thirds of South Miami consist of low density residential districts with detached single-family developments connected through local streets. This type of development is usually linked to varying front and side yards, and frontage types such as lawns, porches, fences and landscaping.

Development within the T-3 Suburban area for South Miami generally include single family residential designations. In the future, this should remain the same. Transect 3 zones may also include institutions such as schools servicing the local neighborhood.

Needs within Transect 3 identified within the South Miami Intermodal Transportation Plan include:

- Shared-Use Paths
- Neighborhood Greenways
- Neighborhood Greenway Crossing Treatments
- New sidewalks
- Crosswalks
- Green Bike Lane and/or Bike Boxes
- Neighborhood traffic circles
- Traffic circles

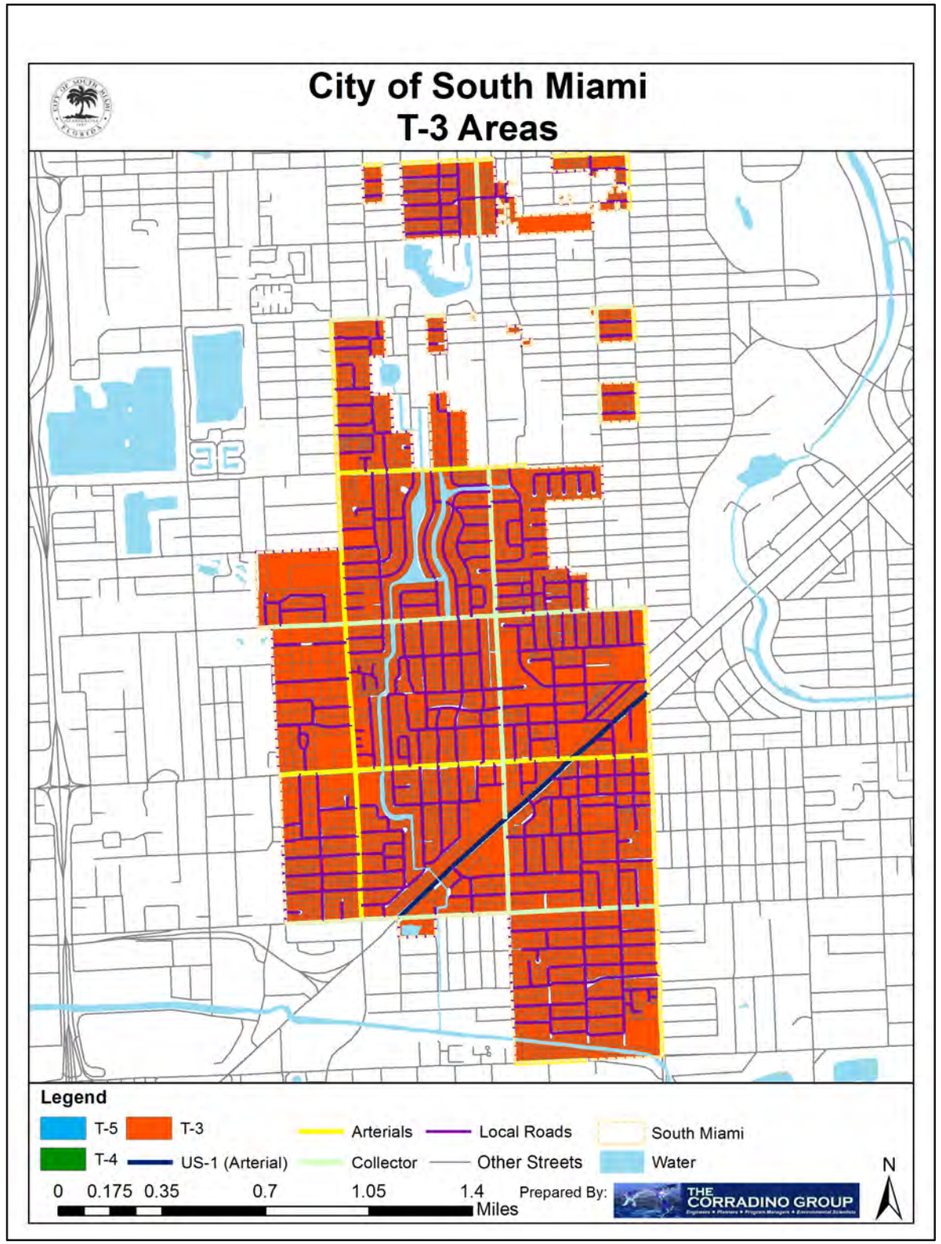
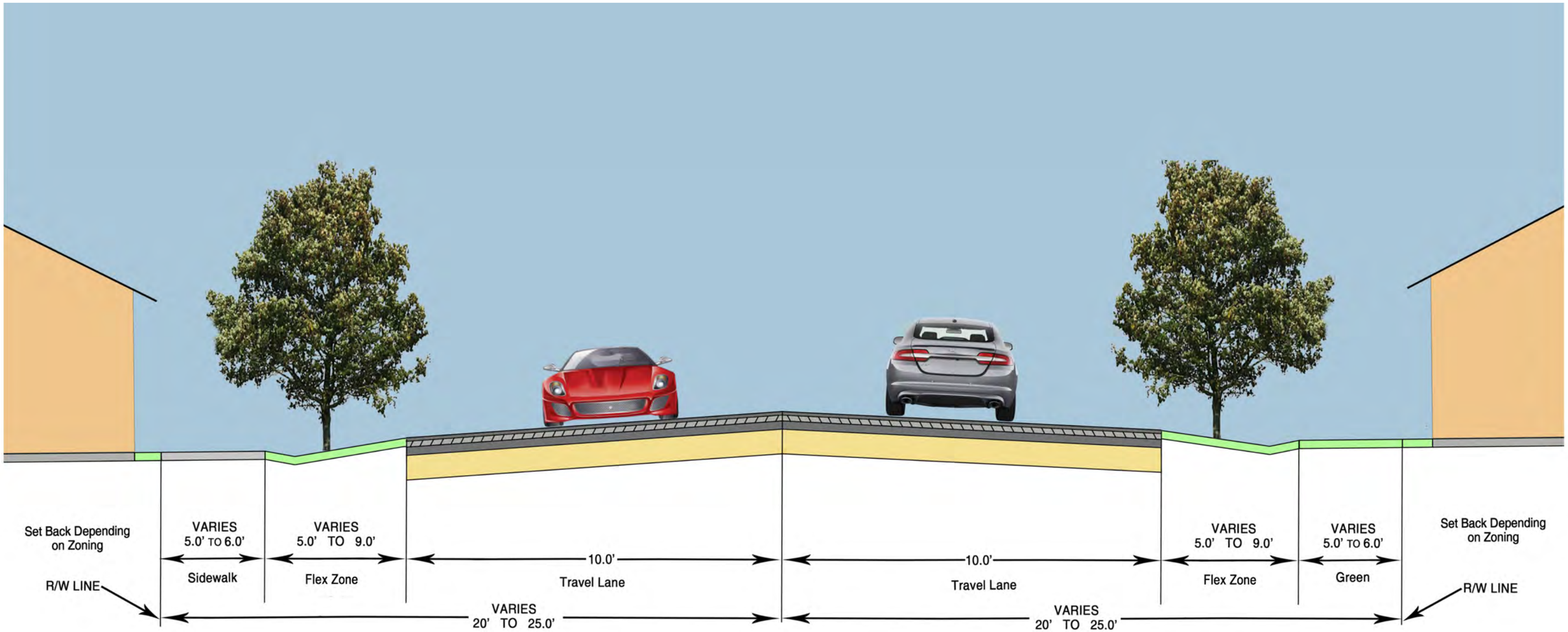
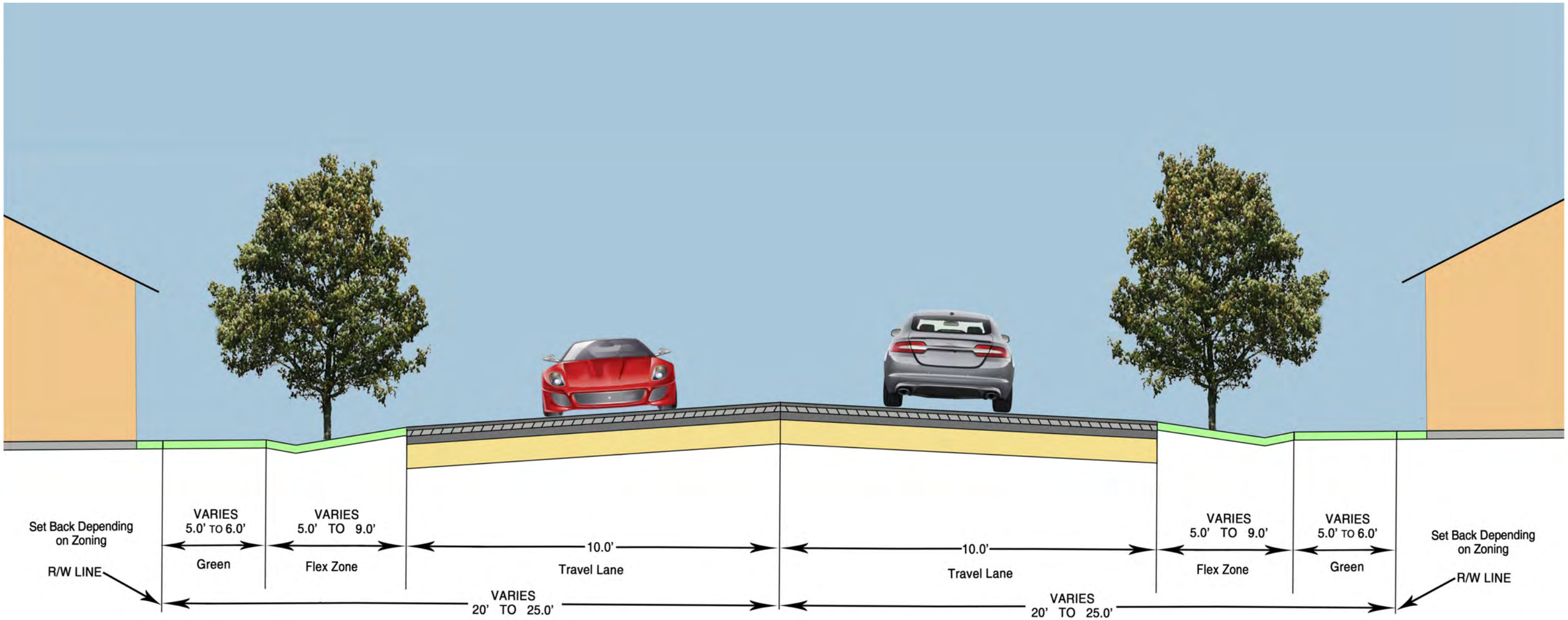


Figure 03



T-3 LOCAL

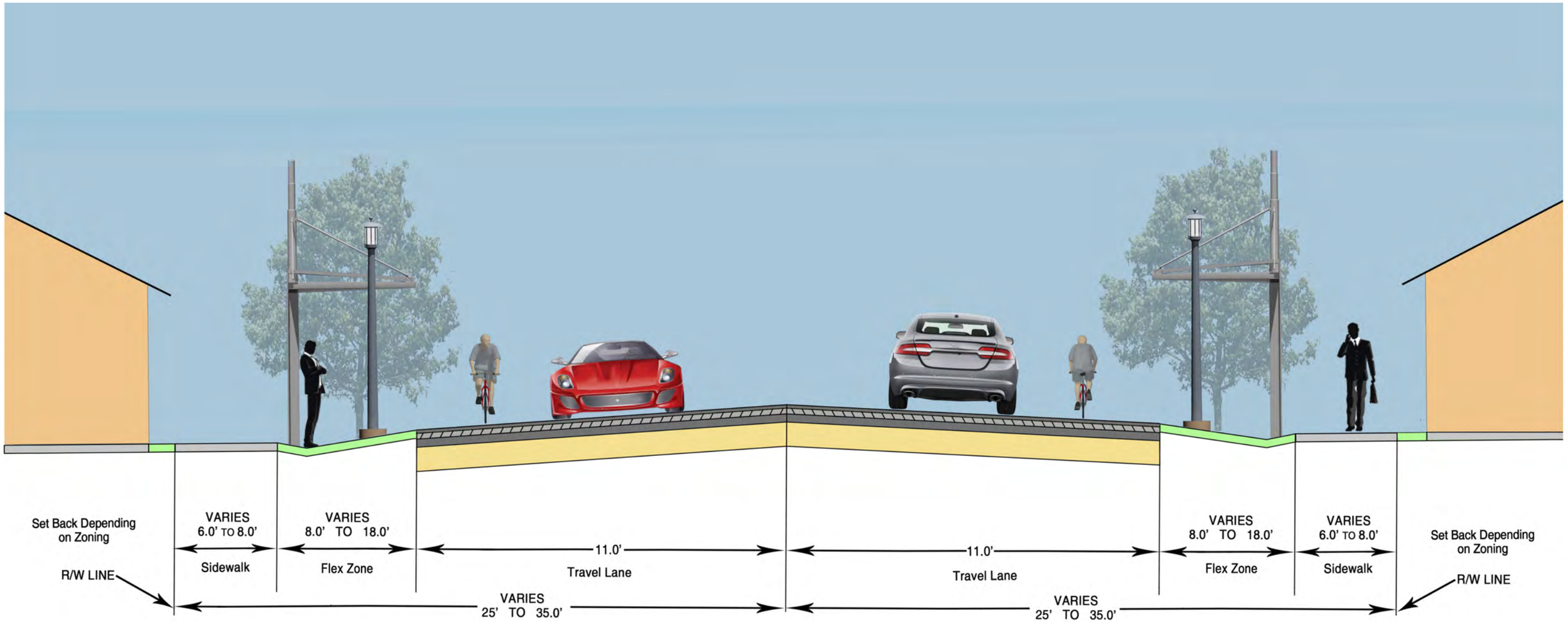
R/W Width			Minimum Criteria	Optional Criteria	Not Required
40'-50'	**Pedestrian/Sidewalk**		Clear pathway (may or may not have sidewalk)	5' sidewalk for 40' R/W; 6' sidewalk for 50' R/W Pedestrian Lighting Pedestrian Signal Crossings Curb Ramps (As needed)	
	FLEX ZONE	**Dimensions**	5' for 40' R/W / 10' for 50' R/W		
		Vehicle	See Optional		Parking Spaces
		Pedestrian		Pedestrian Lighting Landscaping or Swale Benches	
		Bicycling		Bicycle Parking Shared-use path (8' minimum, replaces sidewalk)	Bike Lanes
		Transit (Bus)		Transit wayfinding signage	
	TRAVEL LANE	**Transit (Bus)**	None required	None required	Bus Turnouts Bus shelters and Benches
		Vehicle	10' Minimum for Travel Lanes	2' curb and gutter (Flex zone area will be reduced to 3' for 40' R/W and 7' for 50' R/W) Consider on appropriate circumstances: Roundabout, curb extensions/ bump outs, parallel parking, speed humps, raised table intersections, chicanes and diverters	N/A
		Bikes	None required	Sharrow/Shared Lane	Bike Lanes
		Pedestrian	Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	In street pedestrian crossing lighting (when appropriate) Marked crosswalk at controlled intersections (10' Min. width) when appropriate	N/A



T-3 LOCAL STREET / w/o Sidewalks

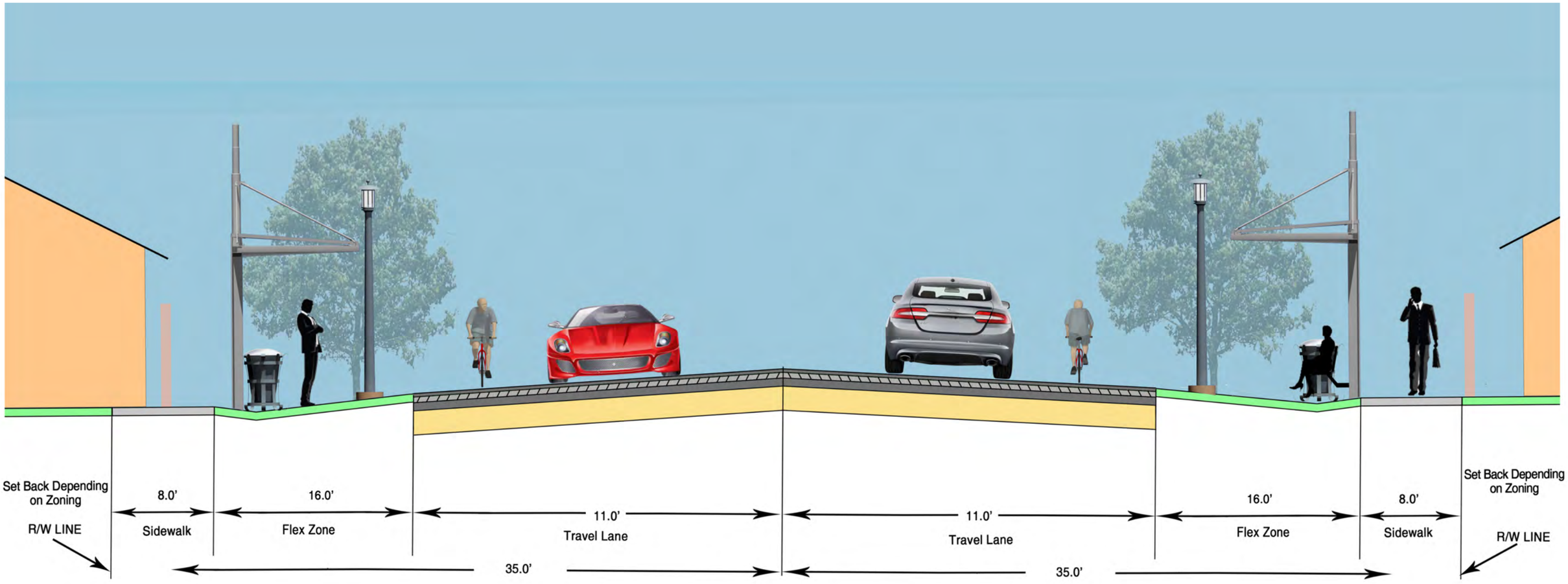
T-3 LOCAL

R/W Width			Minimum Criteria	Optional Criteria	Not Required
40'-50'	**Pedestrian/Sidewalk**		Clear pathway (may or may not have sidewalk)	5' sidewalk for 40' R/W; 6' sidewalk for 50' R/W Pedestrian Lighting Pedestrian Signal Crossings Curb Ramps (As needed)	
	FLEX ZONE	**Dimensions**	5' for 40' R/W / 10' for 50' R/W		
		Vehicle	See Optional		Parking Spaces
		Pedestrian		Pedestrian Lighting Landscaping or Swale Benches	
		Bicycling		Bicycle Parking Shared-use path (8' minimum, replaces sidewalk)	Bike Lanes
		Transit (Bus)		Transit wayfinding signage	
	TRAVEL LANE	**Transit (Bus)**	None required	None required	Bus Turnouts Bus shelters and Benches
		Vehicle	10' Minimum for Travel Lanes	2' curb and gutter (Flex zone area will be reduced to 3' for 40' R/W and 7' for 50' R/W) Consider on appropriate circumstances: Roundabout, curb extensions/ bump outs, parallel parking, speed humps, raised table intersections, chicanes and diverters	N/A
		Bikes	None required	Sharrow/Shared Lane	Bike Lanes
		Pedestrian	Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	In street pedestrian crossing lighting (when appropriate) Marked crosswalk at controlled intersections (10' Min. width) when appropriate	N/A


Set Back Depending on Zoning
R/W LINE
VARIES 6.0' TO 8.0'
Sidewalk
VARIES 8.0' TO 18.0'
Flex Zone
11.0'
Travel Lane
11.0'
Travel Lane
VARIES 8.0' TO 18.0'
Flex Zone
VARIES 6.0' TO 8.0'
Sidewalk
Set Back Depending on Zoning
R/W LINE
VARIES 25' TO 35.0'
VARIES 25' TO 35.0'

T-3 COLLECTOR

R/W Width			Minimum Criteria	Optional Criteria	Not Required
50'-70'	**Pedestrian/Sidewalk**		6' sidewalk for 50' R/W 8' sidewalk for 70' R/W	Curb Ramps (As needed)	
	FLEX ZONE	**Dimensions**	8' for 50' R/W; 16' for 70' R/W		
		Vehicle	None required	Parallel parking 7' min when next to curb and gutter	N/A
		Pedestrian	Curb ramps as necessary Pedestrian lighting	For high pedestrian areas street furniture should be provided Landscaping or Swale	N/A
		Bicycling	Optional	Bicycle Racks Shared-use (Merge with Sidewalk, min. 10' total)	N/A
		Transit (Bus)	At bus stops: A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route.	Bus Shelters Bus Benches Transit Signage Transit Signage	Bus Turnouts
	TRAVEL LANE	**Transit (Bus)**	None required	N/A	N/A
		Vehicle	11' Minimum for Travel Lanes	Consider on appropriate circumstances: Roundabout and curb extensions/ bump outs * 2' curb and gutter (Furnishing area will be reduced to 6' for 50' R/W and 14' for 70' R/W)	N/A
		Bikes	Optional	Sharrows Bike Lanes (min. 4')	N/A
		Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian sign crossings Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	Uncontrolled mid-block crosswalks (when appropriate) Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) In street pedestrian crossing lighting (when appropriate)	N/A


Set Back Depending on Zoning
R/W LINE
8.0'
Sidewalk
16.0'
Flex Zone
11.0'
Travel Lane
11.0'
Travel Lane
16.0'
Flex Zone
8.0'
Sidewalk
Set Back Depending on Zoning
R/W LINE
35.0'
35.0'

T-3 ARTERIAL

R/W Width				Minimum Criteria	Optional Criteria	Not Required
100'	SW 72nd Street	Pedestrian/Sidewalk		8' sidewalk	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	16' (Total)		
			Vehicle	None Required	Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Signals at Crossings For high pedestrian areas street furniture should be provided Pedestrian Lighting Wayfinding	Parkets Landscaping Benches	N/A
			Bikes	Wayfinding	Bicycle Parking Shared-Use Cycle Tracks	N/A
			Transit (Bus)	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit Information and Wayfinding	Bus Turnouts (10' width w/curb and gutter, 12' otherwise, requires narrowing of sidewalk at pull-in location)	N/A
		TRAVEL LANE	Transit (Bus)	None Required	Bus Lane (Same dimensions as with Vehicular Travel Lanes)	N/A
			Vehicle	11' Minimum for Travel Lanes 16' Minimum Median Width (35 mph) (Raised)	2' curb and gutter (sidewalk will be reduced to 6') Consider on appropriate circumstances: Roundabout	N/A
			Bikes	4' bike lanes (Or option - See Flex Zone, Optional Criteria) Colored Pavement in Bike Lanes (If Bike Lane) If Bike Lanes, Bicycle Boxes at Signalized Intersections	For Heavy Bike use, bike signal accomodations should be considered	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	N/A	Uncontrolled mid block crosswalks

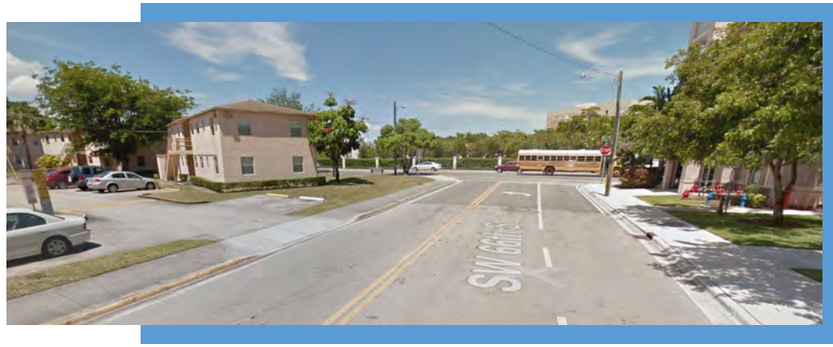
T-3 ARTERIAL

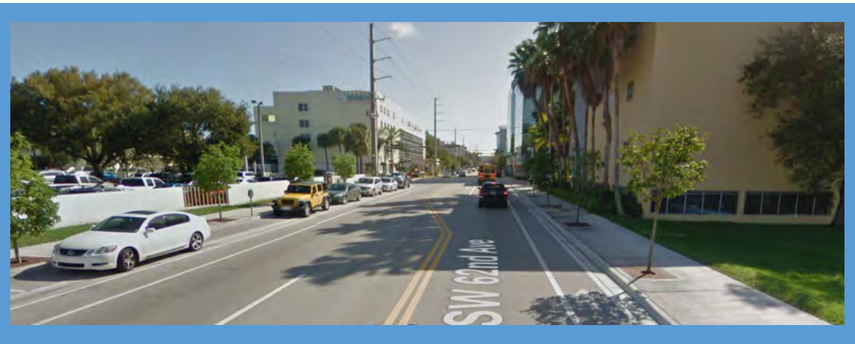
R/W Width				Minimum Criteria	Optional Criteria	Not Required
100'	SW 56th Street	Pedestrian/Sidewalk		8' sidewalk (North side of the Road) 12' Shared use path (South side of the Road)	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	12.5' - 28' (Depending On Median)		
			Vehicle	None Required	Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Lighting	Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Benches Landscaping	N/A
			Bikes	Wayfinding	For Heavy Bike use, bike signal accomodations should be considered Cycle Track (South Side - Add 7' to 12' used by shared use path (10' for two bike lanes, 5' for pedestrian path, 4' for curb and gutter and buffer) Bicycle Parking	Bike Lane (South Side)
			Transit (Bus)	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit information and Wayfinding	N/A	Bus Turnouts
		TRAVEL LANE	Transit (Bus)	None Required	Bus Lane (Same dimensions as with Vehicular Travel Lanes)	N/A
			Vehicle	11' Minimum for Travel Lanes	Median (15.5' - take from Flex Zone)	N/A
			Bikes	N/A	4' bike lanes (North Side - Take from Flex Zone) Colored Pavement in Bike Lanes (If Bike Lane) If Bike Lanes, Bicycle Boxes at Signalized Intersections	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A

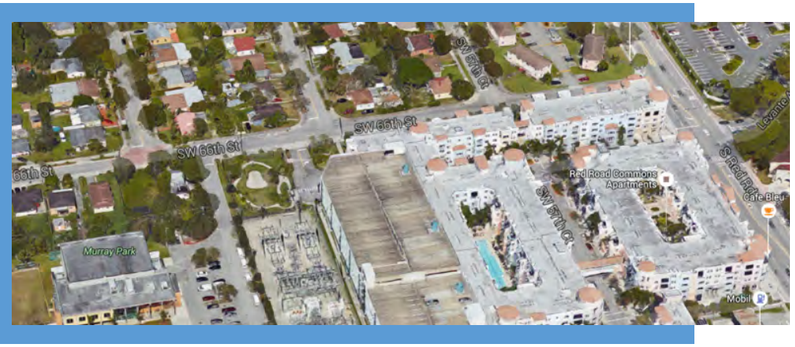
T-3 ARTERIAL

R/W Width				Minimum Criteria	Optional Criteria	Not Required
70'	SW 67th Avenue	Pedestrian/Sidewalk		8' sidewalk	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	11' Furnishing/ Planting Area		
			Vehicle	None Required	Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Lighting For high pedestrian areas street furniture should be provided	Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Benches Landscaping	N/A
			Bikes	Bike route signs	For Heavy Bike use, bike signal accomodations should be considered Bicycle Parking	N/A
			Transit (Bus)	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an Transit information and Wayfinding	Bus Turnouts (10' width w/curb and gutter, 12' otherwise, requires narrowing of sidewalk at pull-in location)	N/A
		TRAVEL LANE	Transit (Bus)	None Required	N/A	N/A
			Vehicle	11' Minimum for Travel Lanes	Consider on appropriate circumstances: Roundabout	N/A
			Bikes	4' bike lanes Colored Pavement in Bike Lanes Bicycle Boxes at Signalized Intersections	N/A	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A

T-4 GENERAL URBAN AREA







T-4 GENERAL URBAN AREA

Generally, the T-4 General Urban district for this Plan includes the parts of the eastern and southeastern portions of the City, and is adjacent to the T-5 Urban Center area, sharing many similar characteristics. In South Miami, the nature of the existing right of way tends to vary in T-4 as with T-3, but generally, there are less setbacks from the property lines. Sidewalks exist in most parts of the current T-4 area, and because of the higher intensity of land use, these areas should expect more traffic, including more pedestrian and bicycle use in the future. The map to the right notes the areas in South Miami designated as T-4 for the purposes of this Plan.

T-4 is characterized by a mix of housing types including attached units with a range of commercial and civic activity at the neighborhood and community scale. This zone can be considered a middle point between a suburban environment with the benefit of walkability to a fairly more dense and dynamic urban setting.

Development within the T-4 General Urban area for South Miami generally includes some single family residences, although in a more compact pattern than with T-3 Suburban Area, such as with duplexes and multi-story townhouses. The T-4 General Urban Area within South Miami is notable because it makes up about half of the CRA area. The T-4 General Urban Area also include areas planned for limited commercial/residential, mixed-use residential/commercial, residential office, and education buildings as noted in the Future Land Use Map.

Needs within T-4 General Urban Area identified within the South Miami Intermodal Transportation Plan include:

- New sidewalks
- Signage and wayfinding
- Trees and green space to provide shade, buffer pedestrians from passing vehicles and provide aesthetic enhancements
- Neighborhood greenways
- Neighborhood Greenway crossing treatments
- Standard and buffered bicycle lanes
- Sharrows
- Green Bike Lane and/or Bike Boxes
- Traffic Circles

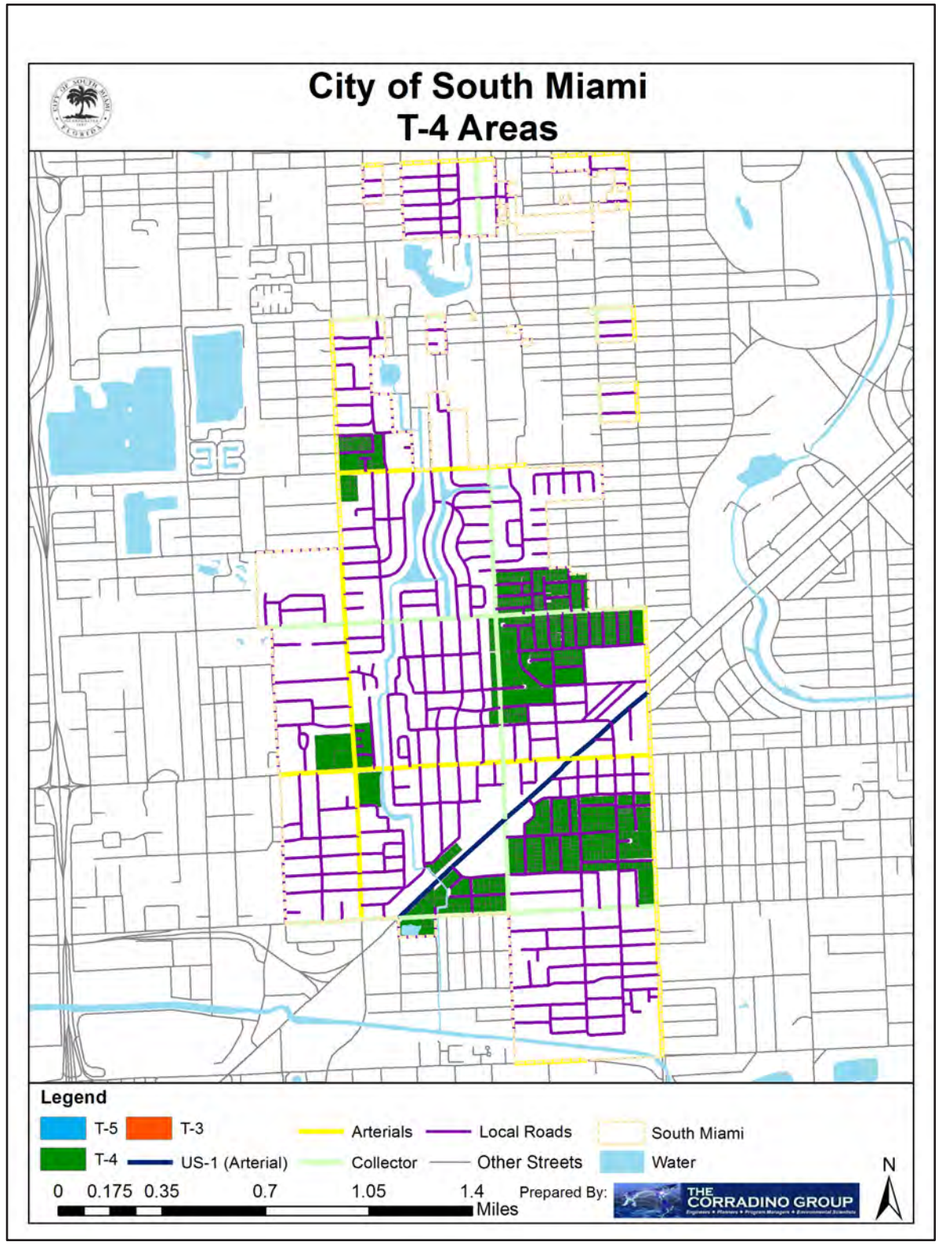
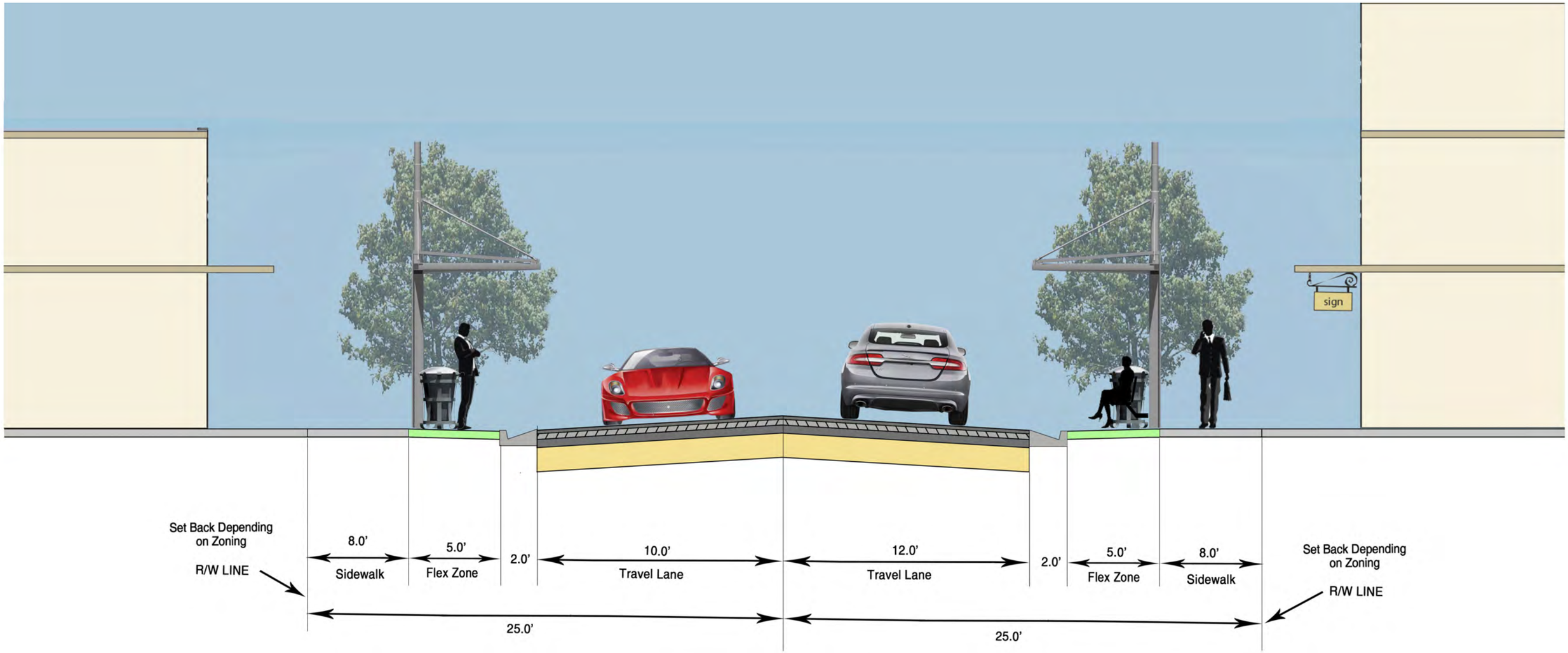
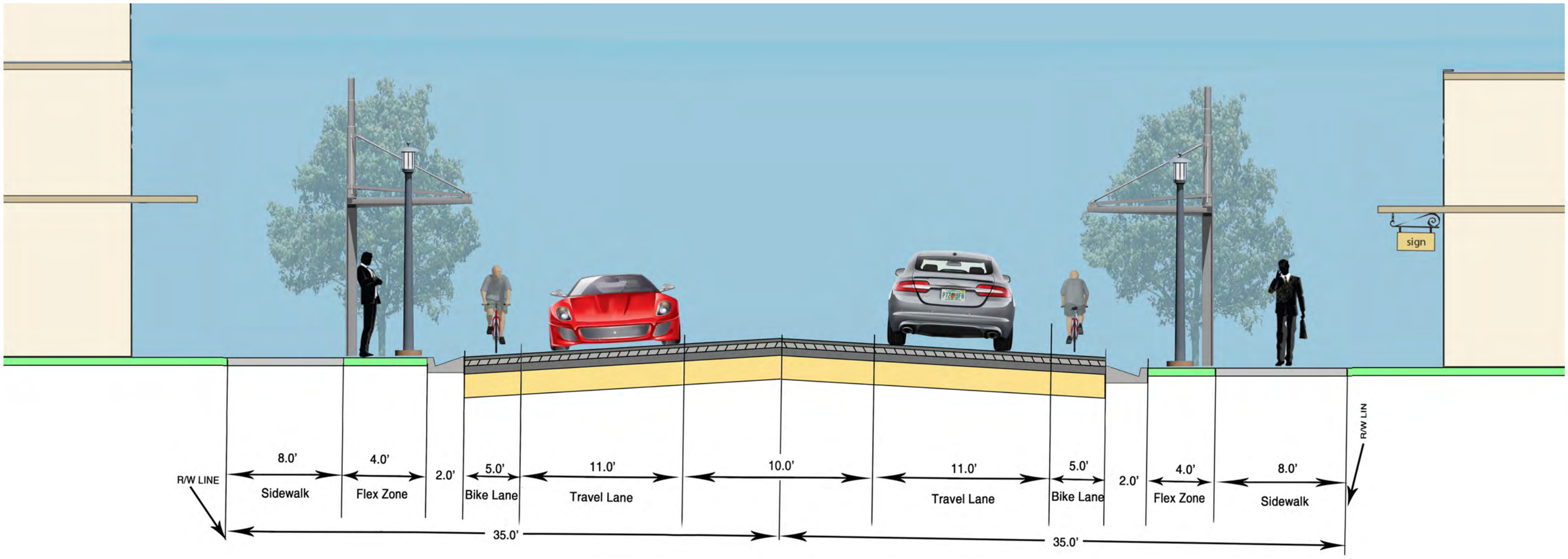


Figure 04


sign
Set Back Depending on Zoning
R/W LINE
8.0'
Sidewalk
5.0'
Flex Zone
2.0'
10.0'
Travel Lane
12.0'
Travel Lane
2.0'
5.0'
Flex Zone
8.0'
Sidewalk
Set Back Depending on Zoning
R/W LINE
25.0'
25.0'

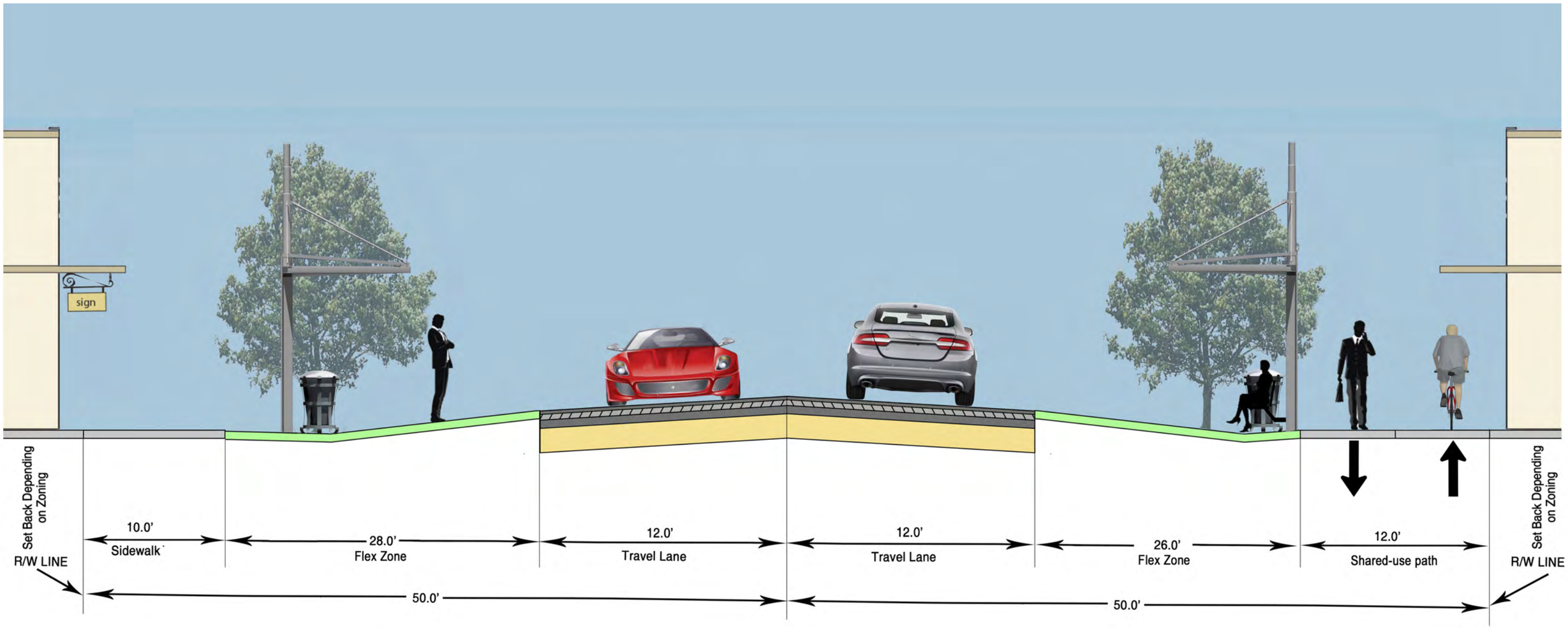
T-4 LOCAL

R/W Width			Minimum Criteria	Optional Criteria	Not Required
50'	**Pedestrian/Sidewalk**		8' sidewalk	Curb Ramps (As needed)	
	Flex Zone	**Dimensions**	10' R/W		
		Vehicle	None required	N/A	Parallel parking (7' width x 22' length)
		Pedestrian	Pedestrian Lighting	For high pedestrian areas street furniture should be provided Pedestrian Signal Crossings Landscaping or swale Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Benches	N/A
		Bicycling	None required	Bike Lanes (4' minimum each lane) Shared-Use Path Bicycle Parking Racks	N/A
		Transit (Bus)	None required	Transit Wayfinding	Bus shelters and Benches
	TRAVEL LANE	**Transit (Bus)**	None required	None	Bus Turnouts
		Vehicle	10' Minimum for Travel Lanes 2' curb and gutter	Consider on appropriate circumstances: Roundabout, curb extensions/ bump outs, parallel parking, speed humps, raised table intersections, chicanes and diverters	N/A
		Bikes	None required	Sharrows	N/A
		Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal Crossings In street pedestrian crossing lighting (when appropriate)	uncontrolled mid block crosswalks (when appropriate)	N/A


sign
R/W LINE
8.0'
Sidewalk
4.0'
Flex Zone
2.0'
5.0'
Bike Lane
11.0'
Travel Lane
10.0'
11.0'
Travel Lane
5.0'
Bike Lane
2.0'
4.0'
Flex Zone
8.0'
Sidewalk
R/W LIN
35.0'
35.0'

T-4 COLLECTOR

R/W Width			Minimum Criteria	Optional Criteria	Not Required
70'	**Pedestrian/Sidewalk**		8' sidewalk	Curb Ramps (as needed)	
	FLEX ZONE	**Dimensions**	8' (Total)		
		Vehicle	None required	Parallel parking 7' min width Wayfinding	N/A
		Pedestrian	Pedestrian Lighting For high pedestrian areas street furniture should be provided	Wayfinding Benches Landscaping or Swale Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Parklets	N/A
		Bikes	Bicycle Racks Wayfinding	Bicycle Parking For Heavy Bike use, bike signal accomodations should be considered	N/A
		Bus	A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit Wayfinding	Bus Turnouts (10' width w/curb and gutter, 12' otherwise, requires narrowing of sidewalk at pull-in location) Bus Shelter Bus Benches	N/A
	TRAVEL LANE	**Transit (Bus)**	None Required	N/A	N/A
		Vehicle	11' Minimum for Travel Lanes 10' un-raised median (As needed, if not, add to Flex Zone) 2' curb and gutter	Consider on appropriate circumstances: Roundabout and curb extensions/ bump outs	N/A
		Bikes	4' bike lanes each Lane; 5' optimal	Bicycle Boxes at controlled intersections	N/A
		Pedestrian	In street pedestrian crossing lighting (when appropriate) Marked crosswalk at controlled intersections (10' Min. width) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis Pedestrian Signal Crossings	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A



T-4 ARTERIAL

THE CORRADINO GROUP
Engineers • Planners • Program Managers • Environmental Scientists

T-4 ARTERIAL

R/W Width				Minimum Criteria	Optional Criteria	Not Required
100'	SW 72nd Street	Pedestrian/Sidewalk		10' sidewalk	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	10' (Total)		
			Vehicle	None Required	Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Signals at Crossings For high pedestrian areas street furniture should be provided Pedestrian Lighting Wayfinding	Parkets Landscaping Benches	N/A
			Bikes	Wayfinding	Bicycle Parking Shared-Use (Use 2' from Flex Zone, add to sidewalk) Cycle Tracks (Requires 9' addition to the 10' sidewalk; 10' for bicycle lanes, 5' for sidewalk, 4' for curb gutter and buffer)	N/A
			Transit (Bus)	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit Information and Wayfinding	Bus Turnouts (10' width w/curb and gutter, 12' otherwise, requires narrowing of sidewalk at pull-in location)	N/A
		TRAVEL LANE	Transit (Bus)	None Required	Bus Lane (Same dimensions as with Vehicular Travel Lanes)	N/A
			Vehicle	11' Minimum for Travel Lanes 16' Minimum Median Width (35 mph) (Raised)	2' curb and gutter (sidewalk will be reduced to 6') Consider on appropriate circumstances: Roundabout	N/A
			Bikes	5' bike lanes (Or option - See Flex Zone, Optional Criteria) (If Bike Lane) Bicycle Boxes at Signalized Intersections	For Heavy Bike use, bike signal accomodations should be considered	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	N/A	Uncontrolled mid block crosswalks

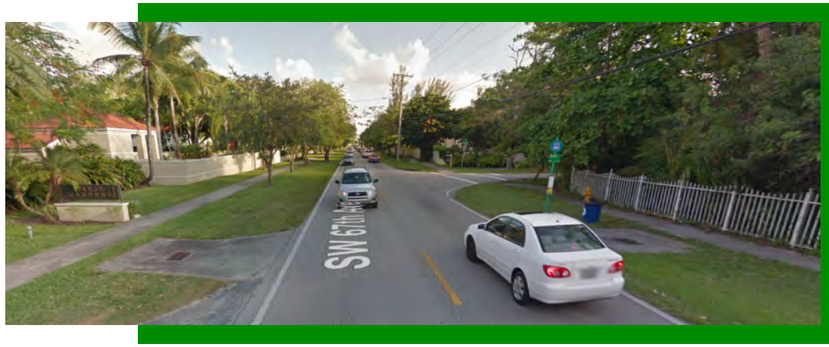
T-4 ARTERIAL

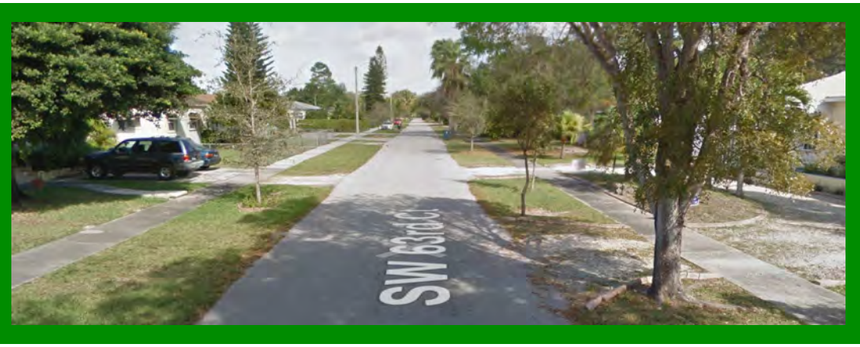
R/W Width				Minimum Criteria	Optional Criteria	Not Required
100'	SW 56th Street	Pedestrian/Sidewalk		10' sidewalk (North side of the Road) 12' Shared use path (South side of the Road)	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	10.5' - 26' (Depending On Median)		
			Vehicle		Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Lighting	Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Benches Landscaping	N/A
			Bikes	Wayfinding	For Heavy Bike use, bike signal accomodations should be considered Cycle Track (South Side - Add 7' to 12' used by shared use path (10' for two bike lanes, 5' for pedestrian path, 4' for curb and gutter and buffer) Bicycle Parking	Bike Lane (South Side)
			Transit (Bus)	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit information and Wayfinding	N/A	Bus Turnouts
		TRAVEL LANE	Transit (Bus)	None Required	Bus Lane (Same dimensions as with Vehicular Travel Lanes)	N/A
			Vehicle	11' Minimum for Travel Lanes	Median (15.5' - take from Flex Zone)	N/A
			Bikes	N/A	4' bike lanes (North Side - Take from Flex Zone) Colored Pavement in Bike Lanes (If Bike Lane) If Bike Lanes, Bicycle Boxes at Signalized Intersections	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A

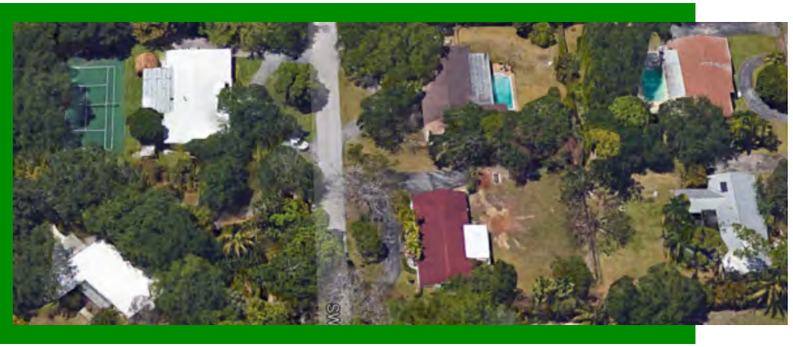
T-4 ARTERIAL

R/W Width				Minimum Criteria	Optional Criteria	Not Required
70'	SW 67th Avenue	Pedestrian/Sidewalk		10' sidewalk	Curb Ramps (As needed)	
		FLEX ZONE	Dimensions	8' Furnishing/ Planting Area		
			Vehicle	None Required	Parallel parking 8' min width (7' min when next to curb and gutter)	N/A
			Pedestrian	Pedestrian Lighting For high pedestrian areas street furniture should be provided	Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) Benches Landscaping	N/A
			Bikes	Wayfinding	For Heavy Bike use, bike signal accomodations should be considered Bicycle Parking	N/A
			Bus	Bus Shelters A boarding and alighting area of 8' (measured from the curb) by 5' (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Transit information and Wayfinding	Bus Turnouts (10' width w/curb and gutter, 12' otherwise, requires narrowing of sidewalk at pull-in location)	N/A
		TRAVEL LANE	Transit (Bus)	None Required	Bus Lane (Same dimensions as with Vehicular Travel Lanes)	N/A
			Vehicle	11' Minimum for Travel Lanes	Consider on appropriate circumstances: Roundabout	N/A
			Bikes	5' bike lanes Colored Pavement in Bike Lanes Bicycle Boxes at Signalized Intersections	N/A	N/A
			Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) Pedestrian Signal at Crossings In street pedestrian crossing lighting (when appropriate) Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A

T-5 URBAN CENTER







T-5 URBAN CENTER

Generally, the T-5 General Center district for this Plan includes the center, already more built up areas of the City, and emcompasses the area around the Hospital, City Hall, and most importantly, the MetroRail station. In South Miami, the nature of the existing right of way tends to be very constrained in the T-5 area, as it is in other cities. Setbacks in T-5 areas tend to be 0, and sidewalks are flush with the building entrances, such as can be seen with the storefronts of Sunset Place. The area is built to be the core of the City, and community activities such as festivals can be found here. Sidewalks exist throughout all parts of the current T-5 area, and because of the higher intensity of land use, these areas should expect the highest levels of traffic within the City, including more pedestrian and bicycle use in the future. The map to the right notes the areas in South Miami designated as T-5 for the purposes of this Plan.

T-5 typical development is characterized by attached housing types such as mixed-use development with a strong retail and entertainment emphasis on the ground floors and an equal mix of residential and/or commercial office or services on the upper floors. A big presence of pedestrian activity and transit service are also common.

Development within the T-5 Urban Center Area for South Miami generally include those that can be developed under future land use designations for multistory residences, such as those to be found in the Multiple Family Residential and Mixed-Use Commercial residential areas. T-5 area commercial developments are tall and have larger building footprints, such as with Sunset Place, and area includes Public and Institutional uses. The T-5 Urban Center Area within South Miami is notable because it makes up about half of the CRA area, and is located around the existing civic center, hospital, and future transit oriented development.

Needs within the T-5 Urban Center Area identified within the South Miami Intermodal Transportation Plan include:

- Pedestrian wayfinding sign system within downtown to identify streets, walking routes and direct pedestrians to points of interest
- Street furniture such as benches, trash receptacles, bicycle racks and shelters.
- Bus stops and bus shelters
- Buffered bicycle lanes
- Green color pavement backing sharrows along Sunset Drive to make motorists aware of the expectation to find bicyclists sharing the travel lane
- Parklets along Sunset Drive serving as an extension of the sidewalk to provide amenities, green space and additional space for seating while maintaining pedestrian walking zones on the sidewalks
- On-street parking along Sunset Drive to provide traffic calming effects and convenience to local shops
- Mid-block curb extensions along S Dixie highway, north of South Miami Hospital exit driveway, to enhance pedestrian safety by lowering motor vehicle speeds

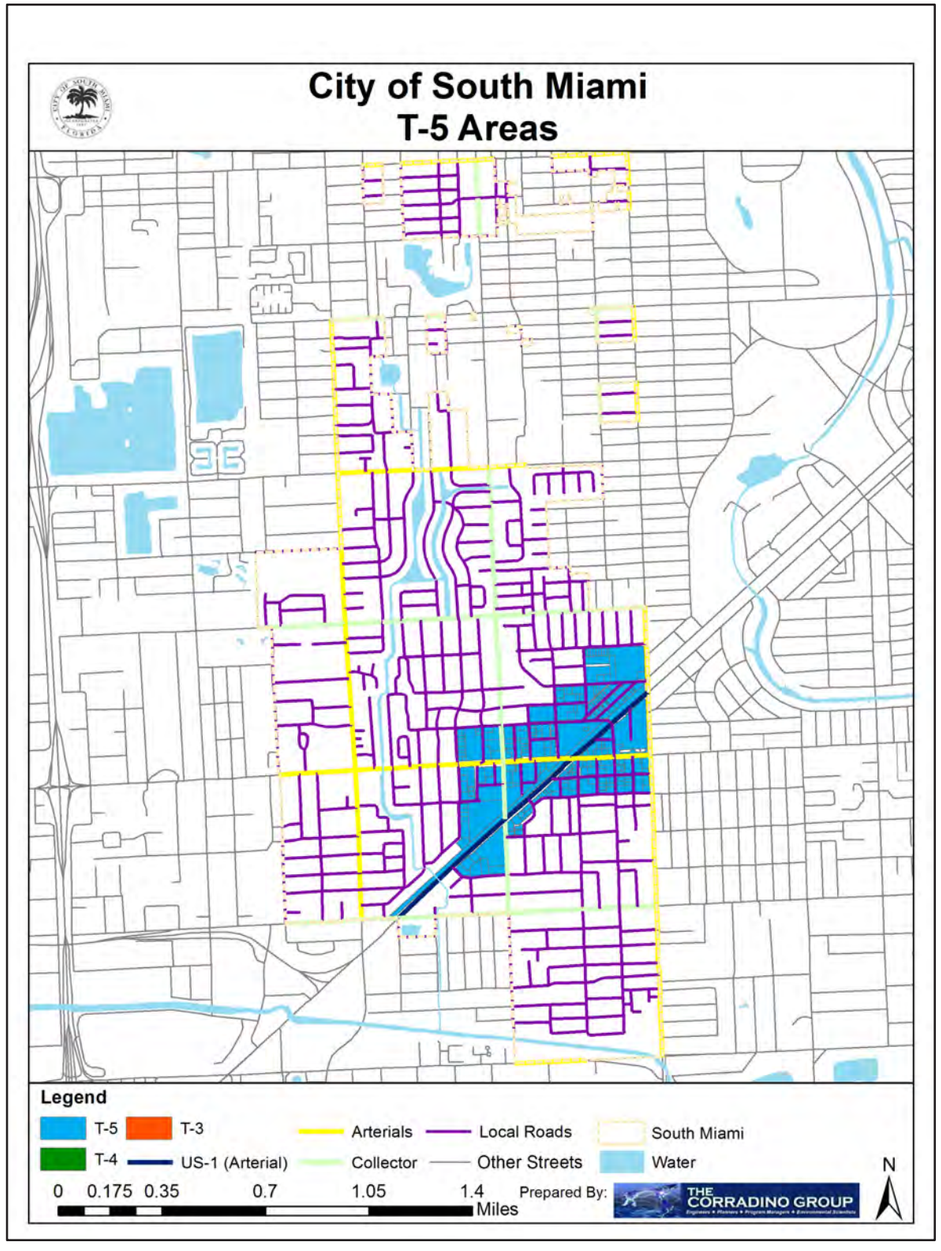
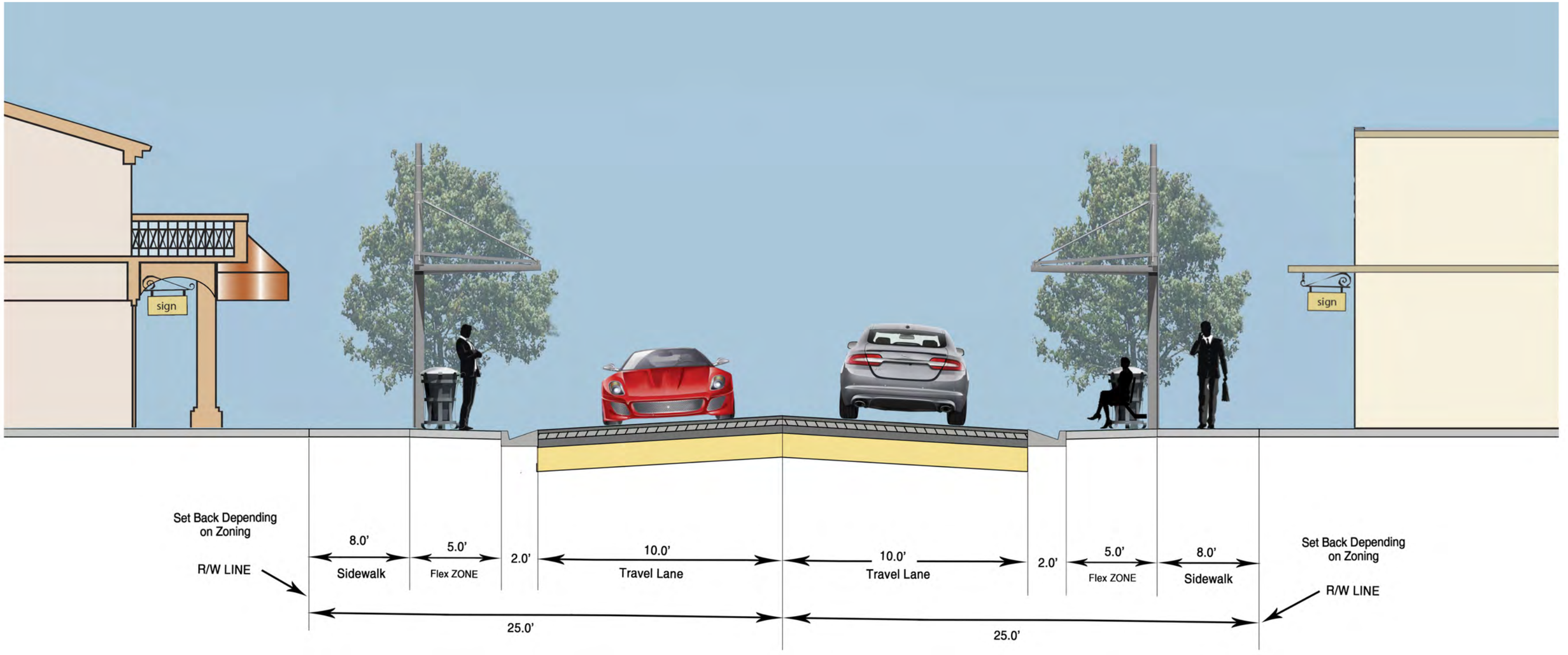
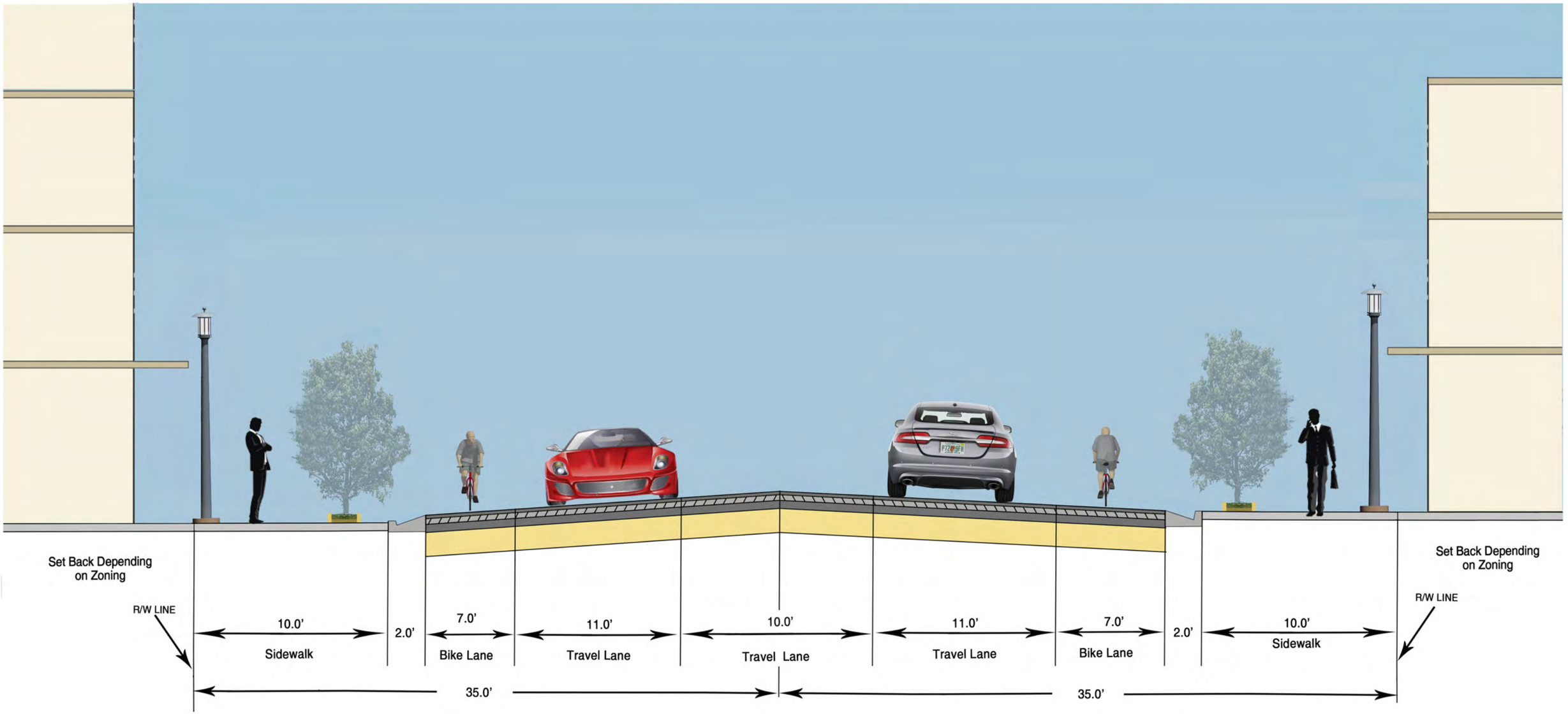


Figure 05


sign
sign
Set Back Depending on Zoning
R/W LINE
8.0'
Sidewalk
5.0'
Flex ZONE
2.0'
10.0'
Travel Lane
10.0'
Travel Lane
2.0'
5.0'
Flex ZONE
8.0'
Sidewalk
Set Back Depending on Zoning
R/W LINE
25.0'
25.0'

T - 5 LOCAL

R/W Width			Minimum Criteria	Optional Criteria	Not Required
50'	**Pedestrian/Sidewalk**		7' sidewalk; clear pathway		
	Flex Zone	**Dimensions**	10' total		
		Vehicle	None required	Parallel parking 7' min width, 22' length	N/A
		Pedestrian	Curb Ramps Pedestrian Signal Crossings Pedestrian Lighting For high pedestrian areas street furniture should be provided Marked crosswalk at controlled intersections (10' Min. width)	Bulb-outs Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate)	N/A
		Bicycling	None required	Shared-use path (8' minimum, replaces sidewalk on one side) Bicycle racks Cycle Tracks (10' minimum)	N/A
		Transit (Bus)	None required	Transit Wayfinding	Bus shelters and Benches
	TRAVEL LANE	**Transit (Bus)**	None required	N/A	Bus Turnouts
		Vehicle	10' Minimum for Travel Lanes 2' curb and gutter	Consider on appropriate circumstances: Roundabout, curb extensions/ bump outs, parallel parking, speed humps, raised table intersections, chicanes and diverters	N/A
		Bicycling	None required	Sharrows	Bike Lanes
		Pedestrian	Crosswalks at controlled intersections (per MUTCD standards, 10' min Crosswalks within 0.25 miles of a school or as identified within a Safe Routes to School Plan should be high emphasis In street pedestrian crossing lighting (when appropriate)	Uncontrolled mid block crosswalks (when appropriate)	N/A

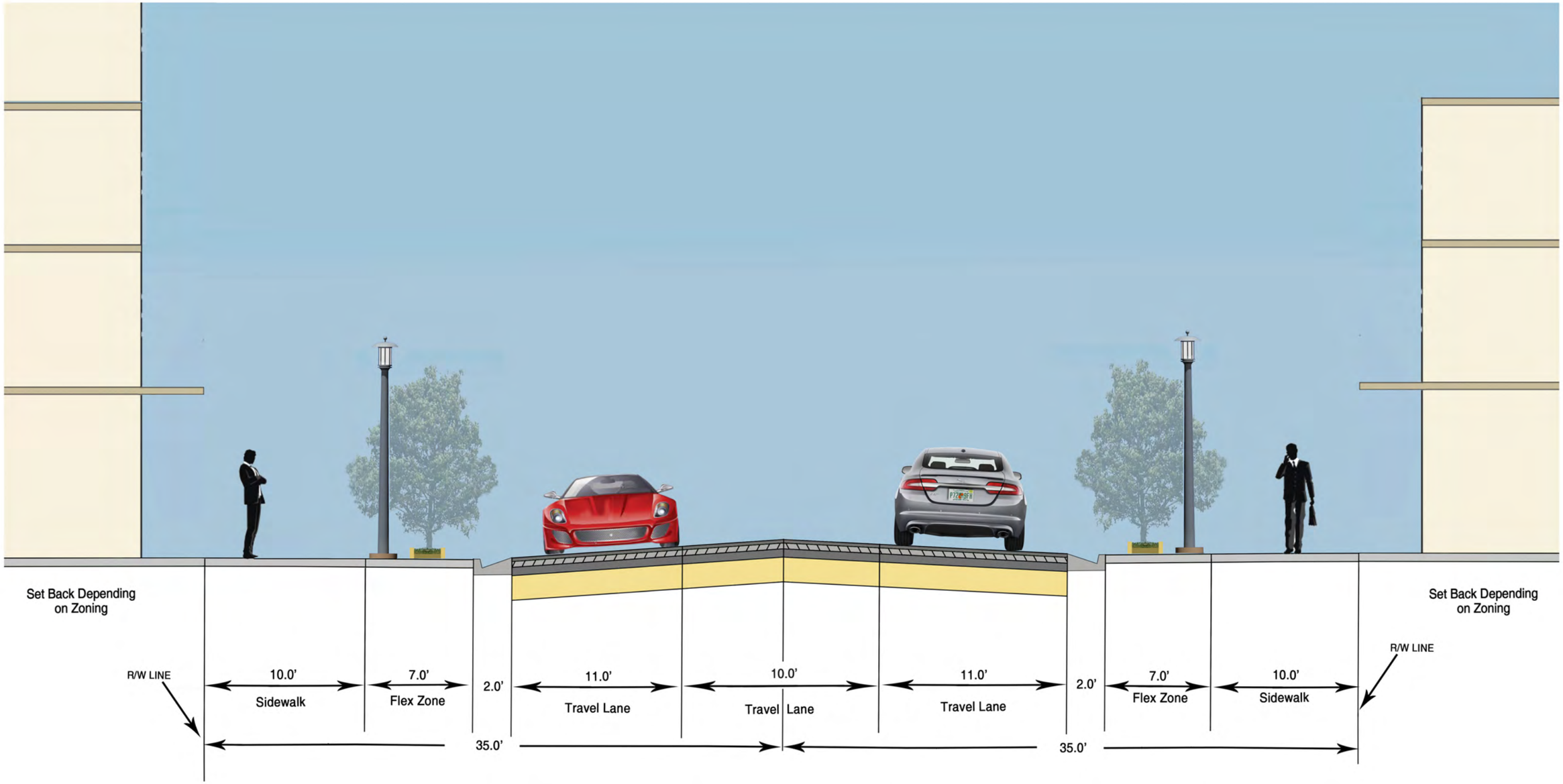


T-5 COLLECTOR

THE CORRADINO GROUP
Engineers • Planners • Program Managers • Environmental Scientists

T - 5 COLLECTOR

R/W Width			Minimum Criteria	Optional Criteria	Not Required
70'	Pedestrian/Sidewalk		10'		
	Flex Zone	Dimensions	0' - 10' (Depending on median; bike lane width)		
		Vehicle	None required	Parallel parking 7' min width, 22' length	N/A
		Pedestrian	Curb Ramps Pedestrian Signal Crossings For high pedestrian areas street furniture should be provided Pedestrian Lighting	Benches Landscaping or Swale Parklets Wayfinding Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate)	N/A
		Bikes	None required	Bicycle Parking For Heavy Bike use, bike signal accomodations should be considered Wayfinding	Bike Lanes
		Transit (Bus)	5’ x 8’ Landing Pad Transit Wayfinding	Bus Shelters	Bus Turnouts
	TRAVEL LANE	Transit (Bus)	None required	None required	N/A
		Vehicle	11' Minimum for Travel Lanes 10' un-raised median (As needed, if not, then this will become flex space) 2' curb and gutter	N/A	N/A
		Bikes	7' bike lanes (4' Minimum)	Bike Boxes at intersections	N/A
		Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) In street pedestrian crossing lighting (when appropriate)	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A


Set Back Depending on Zoning
R/W LINE
10.0'
Sidewalk
7.0'
Flex Zone
2.0'
11.0'
Travel Lane
10.0'
Travel Lane
11.0'
Travel Lane
2.0'
7.0'
Flex Zone
10.0'
Sidewalk
R/W LINE
Set Back Depending on Zoning
35.0'
35.0'

T - 5 ARTERIAL

R/W Width			Minimum Criteria	Optional Criteria	Not Required
70'	Pedestrian/Sidewalk		10'		
	Flex Zone	Dimensions	0' - 10' (Depending on median; bike lane width)		
		Vehicle	None required	Parallel parking 7' min width, 22' length	N/A
		Pedestrian	Curb Ramps Pedestrian Signal Crossings For high pedestrian areas street furniture should be provided Pedestrian Lighting	Benches Landscaping or Swale Parklets Wayfinding Pedestrian Hybrid Beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate)	N/A
		Bikes	None required	Bicycle Parking For Heavy Bike use, bike signal accomodations should be considered Wayfinding	Bike Lanes
		Transit (Bus)	5’ x 8’ Landing Pad Transit Wayfinding	Bus Shelters	Bus Turnouts
	TRAVEL LANE	Transit (Bus)	None required	None required	N/A
		Vehicle	11' Minimum for Travel Lanes 10' un-raised median (As needed, if not, then this will become flex space) 2' curb and gutter	N/A	N/A
		Bikes	7' bike lanes (4' Minimum)	Bike Boxes at intersections	N/A
		Pedestrian	Marked crosswalk at controlled intersections (10' Min. width) In street pedestrian crossing lighting (when appropriate)	Uncontrolled mid block crosswalks (when appropriate) Controlled mid block crosswalks (when appropriate)	N/A

FLEX ZONES

When we look at existing planning, we often are hinged on the idea of simply saying we need to include all the modes. But in what way can we include for each when space is limited? When we look at current planning documents, we find the same idea over and over – this space is for pedestrians. This space is for cars. That space is for bicycles. We still box things in, sometimes reducing flexibility in urban design. Can we think of this space differently? Maybe it's an urban linear park. Maybe it's a seating area after the space has been "chairbombed," or the City adds permanent benches. Maybe it's an open area where pop-up commerce can happen, or where booths can be emplaced for activities such as the South Miami Arts Festival.

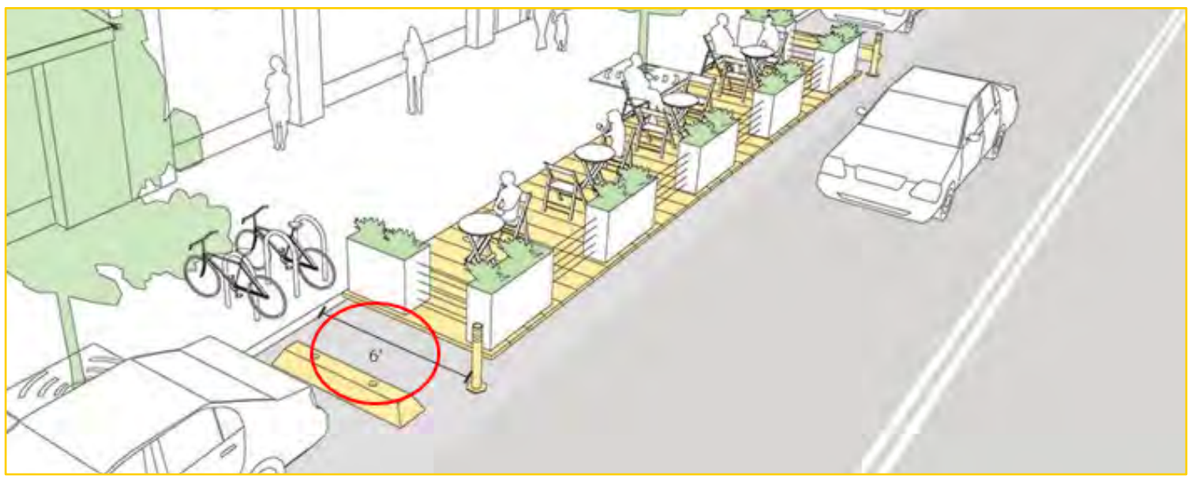
Why not look at this differently then? We know that parking spaces take up 7' x 21' at minimum for each space. If the City wanted to place a library vending machine as part of an innovative twist on your regular parklet, creating public space, it would need space for a book vending machine and a set clearance space for people using it. We know that bike racks take a specific sized space. Perhaps, this space is needed for a swale to reduce flooding. We know what can, and cannot, fit into the flex space based on dimensions. But we have to include it in the discussion and as we begin to redesign the right-of-way to allow for it, as many communities are doing as they pursue Complete Streets.

If we know the amount of If we set up a flex space in conjunction with the necessities (i.e. travel lanes for cars, etc.), and know how much space is needed for each program, each module, such as bike lanes or bike racks, etc., why can't we think about the right of way differently, and interchange them in a modular pattern, incrementally, as community needs evolve? We say that variety helps the pedestrian environment, but the space must be available for the facility to be put in place.

In the various Transects and their road segments, this plan recommends the development of a Flex Zone. This zone will vary depending on the area, but should be set-up as a form of "land bank," separate from clear pathways, that allows for options. In applying this to South Miami, this involves taking space from the vehicular right-of-way and designating it for alternative mode usage.

By thinking differently about Complete Streets, we can then evolve the idea in the implementation stage to understand trade-offs, which will not only allow us to meet community needs, but to adapt in the future and set aside appropriate funding as well. Perhaps we don't need as many bicycle parking spaces now – maybe we need more later. We reserve the appropriate flex space and module it in later, in some cases effecting a context sensitive pan with cost savings.

Ultimately, we think of Complete Streets about how we can include the various modes. It is, after all, how it's described everywhere else. Changing the thought slightly to include the need to think about spatial needs for activities, this section provides a basic menu of options which can evolve over time as new innovations occur and as new needs arise.



Flex Options Spatial Dimensions

Type of Improvement	Width	Length	Purpose
Bicycle Parking (1 bicycle)	**2’**	**6’**	**Bicycle Parking**
Bicycle Racks (10 bicycles)	6’	20’	Bicycle Parking
Bus pull-in	**12’**	**Varies (based on bus stop location, etc.)**	**Space for buses**
Parklet	5’ – 10’; varies	Varies, can be 22’	Outdoor seating, aesthetics, placemaking
Wayfinding sign (monument)	**Varies, 3’ (includes clearance space)**	**3’**	**Information for travelers/walkers**
Parallel Parking	7’	22’	Car parking
Bench	**5’ (includes clearance space)**	**74”**	**Seating for pedestrians**
Typical Bus Shelter	8’	14’	Bus stop shelter from the elements
Medium Bus Shelter	**5’**	**14’**	**Bus stop shelter from the elements**
Landscaping	Varies	Varies	Aesthetics, placemaking
Swale	**Varies**	**Varies**	**Drainage**

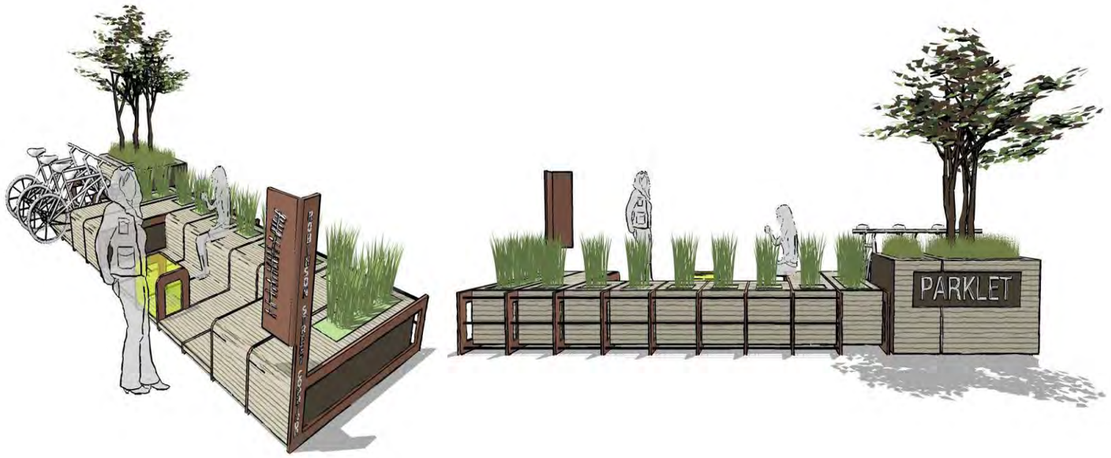
Credit: Edward Ng

Credit: Edward Ng

Source: Flavorwire

PARKLETS AND SEATING AREA/PUBLIC SPACE

Source: https://robinsonstreetrva.com/street-design/



Credit: Edward Ng

Source: Pavement to Parks

source: activetransportforcities.com

BIKE RACKS

Source: https://ladyfleur.bike

Source: http://grist.org/cities

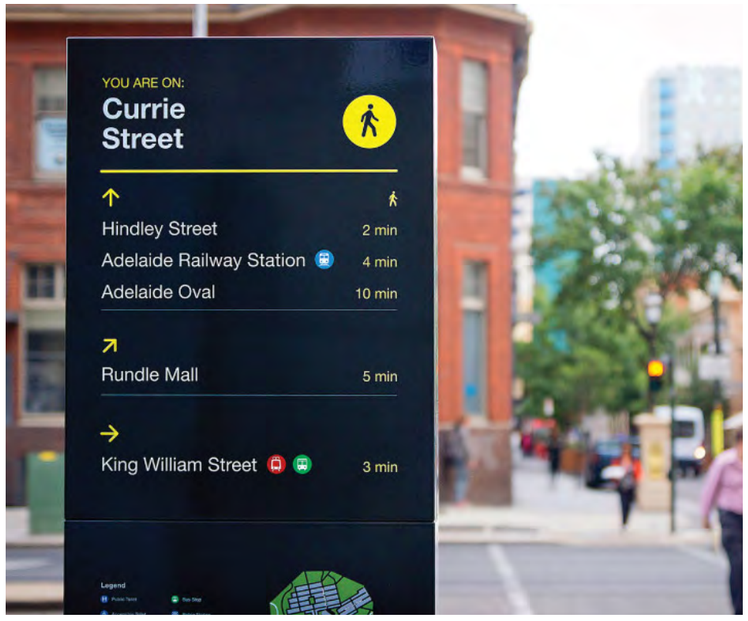
Source: http://grist.org/cities

Source: Flavorwire

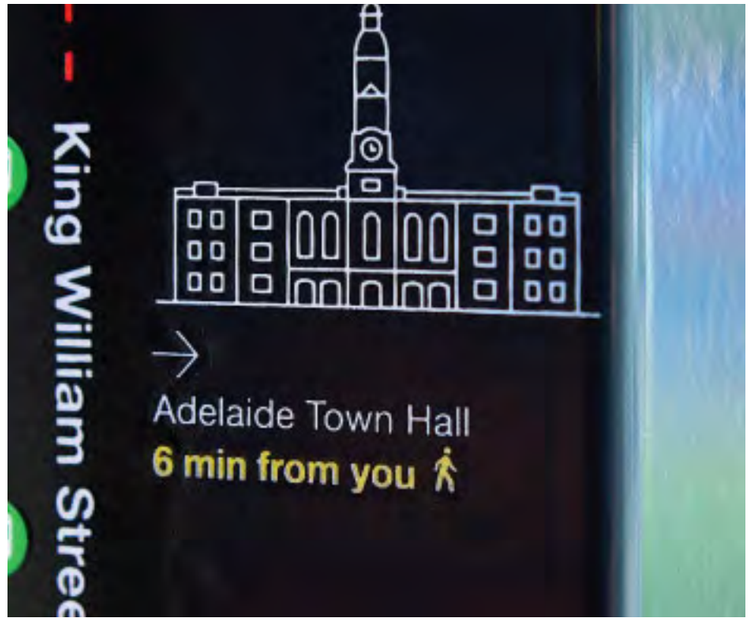
Credit: Edward Ng

WAYFINDING

source:http://www.studiobinocular.com



source:http://www.studiobinocular.com



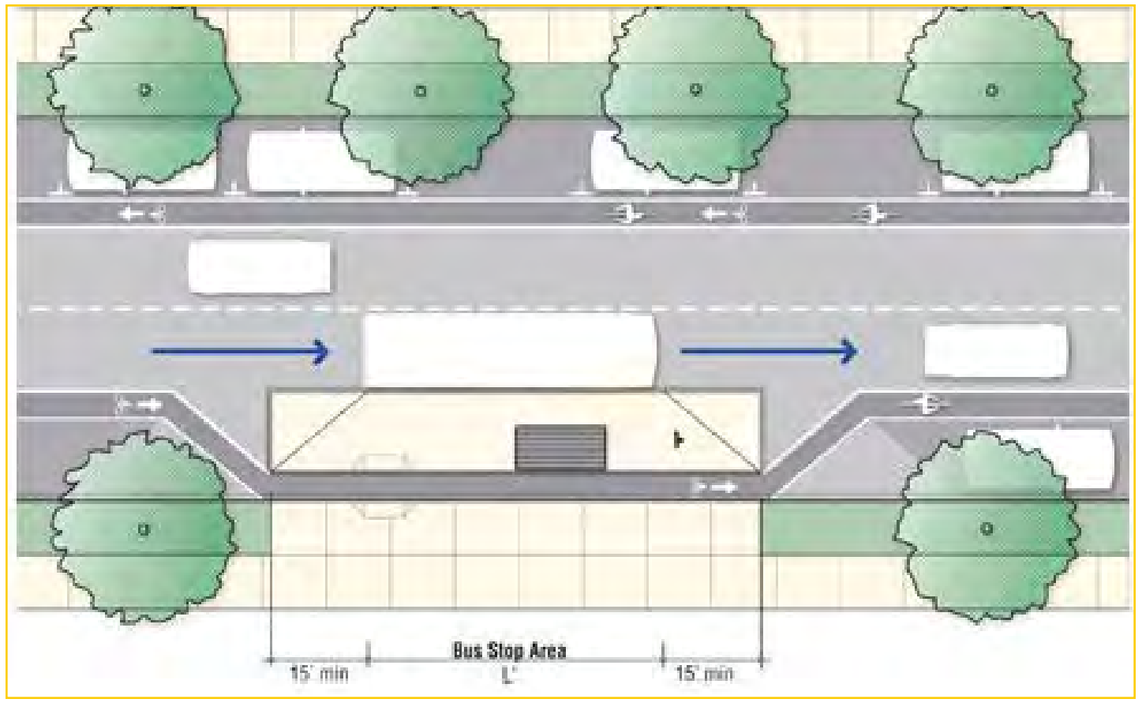
source:http://www.studiobinocular.com

Touch Screen Wayfinding - source:http://designapplause.com

Touch Screen Wayfinding - source:http://designapplause.com

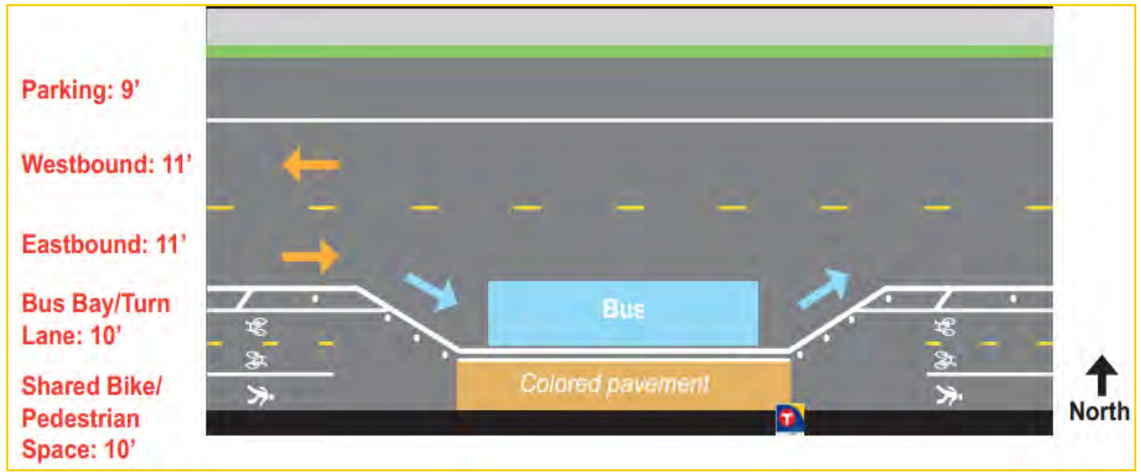
BUS PULLIN AND BUS BULBS

source: https://www.pacebus.com



source: http://streets.mn/2014/05/16/recommendations-for-minneapolis-36th-street-bikeway

source: http://streets.mn/2014/05/16/recommendations-for-minneapolis-36th-street-bikeway



IMPLEMENTATION AND FUNDING

IMPLEMENTATION

The City of South Miami aims to create and adopt a mobility system for its residents and establish long-range policies that will reduce demand for single occupancy vehicles, increase public health and safety and reduce fuel consumption through the implementation of this Complete Streets Design Manual.

By including the following Complete Streets language in the City's Comprehensive Plan, and then enforcing those provisions, the City and community will promote street design and land use policies that allow people to get around safely on foot, bicycle, or public transportation. Integrating these Complete Streets practices into planning and policy decisions will help encourage safe and active transportation, decrease pollution, reduce health risks, and bolster economic growth. However, the adoption and enforcement of policies are key.

The implementation of the Complete Street plan should involve the implementation of measures that will and policies to monitor development and adherence to adopted standards. The City is currently in the process of beginning to revise its Comprehensive Plan and Land Development Regulations. It is strongly recommended and encouraged that in this process, the City looks at and implements policies and regulations which will tie in urban form, land use, and transportation via Complete Streets. The City should also consider adopting this report by reference. However, ultimately, much of implementation will require a review of funding, as it deals with re-aligning the right-of-way. Implementation of Complete Streets in the community must also follow the design requirements imposed by Miami-Dade County and/or the Florida Department of Transportation.

The following are suggested policies recommended by review of other Complete Streets Plans, ChangeLab Solutions's "Model Comprehensive Plan Language on Complete Streets", and the South Miami Intermodal Transportation Plan.

FUTURE LAND USE ELEMENT (FLU)

FLU Objective **– Incorporate a more context-sensitive approach into design standards and encourage the use of design variations to meet context-appropriate design goals.**

- FLU Policy – The City shall review and, if necessary, amend the Transect Zones map in the Complete Streets Design Manual any time there is a rezoning, land use change, or significant new development or redevelopment project. This allows roadway design and Complete Streets decisions to be more flexible and sensitive to community values, and to better balance economic, social, and environmental objectives.
- FLU Policy – As necessary, restructure and revise the zoning and land development codes, and other plans, laws, procedures, rules, regulations, guidelines, programs, templates, and design manuals, in order to integrate, accommodate, and balance the needs of all users in all street projects on public and private streets.

TRANSPORTATION ELEMENT (TRA)

TRA Goal – Provide safe and comfortable routes for walking, bicycling, and public transportation to increase use of these modes of transportation, enable convenient and active travel as part of daily activities, reduce pollution, and meet the needs of all users of the streets, including children, families, older adults, and people with disabilities.

TRA Objective – The City will take a flexible, innovative, and balanced approach to creating context-sensitive Complete Streets that meet or exceed national best-practice design guidelines.

- TRA Policy - This includes a shift toward designing at the human scale for the needs and comfort of all people and travelers, in considering issues such as street design and width, desired operating speed, hierarchy of streets, mode balance, and connectivity. Design criteria shall not be purely prescriptive but shall be based on the thoughtful application of engineering, architectural and urban design principles in a context-sensitive approach.
- TRA Policy – The City shall select the minimum roadway width standards when possible to maximize space for sidewalks and pedestrian facilities.

TRA Objective – The City will ensure that Bicycle and Pedestrian Facilities are emplaced to allow for usage by residents and visitors to South Miami.

TRA Policy – The City shall seek to maintain a bicycle Level of Service Standard of B or better on all roadways with designated bicycle lanes in accordance with the flowing definitions:

- LOS A - On and off street facilities, low level of interaction with motor vehicles, appropriate for all riders;
- LOS B - Low level of interaction with motor vehicles, appropriate for all riders;
- LOS C - Appropriate for most riders, some supervision may be required, moderate interaction with motor vehicles;
- LOS D - Appropriate for advanced adult bicyclists, moderate to high interactions with motor vehicles;
- LOS E - Cautious use by advanced adult riders, high interactions with motor vehicles;
- LOS F - Generally not safe for bicycle use, high level of interactions with motor vehicles.

TRA Policy: The City shall seek to maintain a pedestrian Level of Service Standard of B or better on all roadways with designated pedestrian facilities in accordance with the flowing definitions:

- LOS A - Highly pedestrian oriented and attractive for pedestrian trips, with sidewalks, pedestrian friendly intersection design, low vehicular traffic volume, and ample pedestrian amenities;
- LOS B - Similar to A, but with fewer amenities and low to moderate level of interaction with motor vehicles;
- LOS C - Adequate for pedestrians, some deficiencies in intersection design, moderate interactions with motor vehicles;
- LOS D - Adequate for pedestrians but with deficiencies in intersection design and pedestrian safety and comfort features, may be some gaps in the sidewalk system, moderate to high interactions with motor vehicles;
- LOS E - Inadequate for pedestrian use, deficient pedestrian facilities, high interactions with motor vehicles;
- LOS F - Inadequate for pedestrian use, no pedestrian facilities, high interactions with motor vehicles.

TRA Objective – Integrate Complete Streets infrastructure and design features into street design and construction to create safe and inviting environments for all users to walk, bicycle, and use public transportation.

- TRA Policy – In planning, designing and constructing Complete Streets:
  - Include infrastructure that promotes a safe means of travel for all users along the right of way, such as sidewalks, shared use paths, bicycle lanes, and paved shoulders.
  - Include infrastructure that facilitates safe crossing of the right of way, such as accessible curb ramps, crosswalks, refuge islands, and pedestrian signals; such infrastructure must meet the needs of people with different types of disabilities and people of different ages.
  - Ensure that sidewalks, crosswalks, public transportation stops and facilities, and other aspects of the transportation right of way are compliant with the Americans with Disabilities Act and meet the needs of people with different types of disabilities, including mobility impairments, vision impairments, hearing impairments, and others. Ensure that the ADA Transition Plan includes a prioritization method for enhancements and revise if necessary.
  - Prioritize incorporation of street design features and techniques that promote safe and comfortable travel by pedestrians, bicyclists,

and public transportation riders, such as traffic calming circles, additional traffic calming mechanisms, narrow vehicle lanes, raised medians, dedicated transit lanes, transit priority signalization, transit bulb outs, road diets, and physical buffers and separations between vehicular traffic and other users.

- Ensure use of additional features that improve the comfort and safety of users:
  - Provide pedestrian-oriented signs, pedestrian-scale lighting, benches and other street furniture, bicycle parking facilities, and comfortable and attractive public transportation stops and facilities.
  - Encourage street trees, landscaping, and planting strips, including native plants where possible, in order to buffer traffic noise and protect and shade pedestrians and bicyclists.

- TRA Policy – In all street projects, include infrastructure that improves transportation options for pedestrians, bicyclists, and public transportation riders of all ages and abilities.
  - Ensure that this infrastructure is included in planning, design, approval, construction, operations, and maintenance phases of street projects.
  - Incorporate this infrastructure into all construction, reconstruction, retrofit, maintenance, alteration, and repair of streets, bridges, and other portions of the transportation network.
  - Incorporate multimodal improvements into pavement resurfacing, restriping, and signalization operations where the safety and convenience of users can be improved within the scope of the work.
- TRA Policy – Develop policies and tools to improve South Miami's Complete Streets practices:
  - Develop a pedestrian crossings policy to create a transparent decision-making policy, including matters such as where to place crosswalks and when to use enhanced crossing treatments.
  - Consider developing a transportation demand management/ commuter benefits ordinance to encourage residents and employees to walk, bicycle, use public transportation, or carpool.
  - Develop a checklist for South Miami's development and redevelopment projects, to ensure the inclusion of infrastructure providing for safe travel for all users and enhance project outcomes and community impact.
- TRA Policy – Encourage transit-oriented development that provides public transportation in close proximity to employment, housing, schools, retailers, and other services and amenities.
- TRA Policy – Change transportation investment criteria to ensure that existing transportation funds are available for Complete Streets infrastructure.
- TRA Policy – Identify additional funding streams and implementation strategies to retrofit existing streets to include Complete Streets infrastructure.

TRA Objective – **Make Complete Streets practices a routine part of South Miami's everyday operations.**

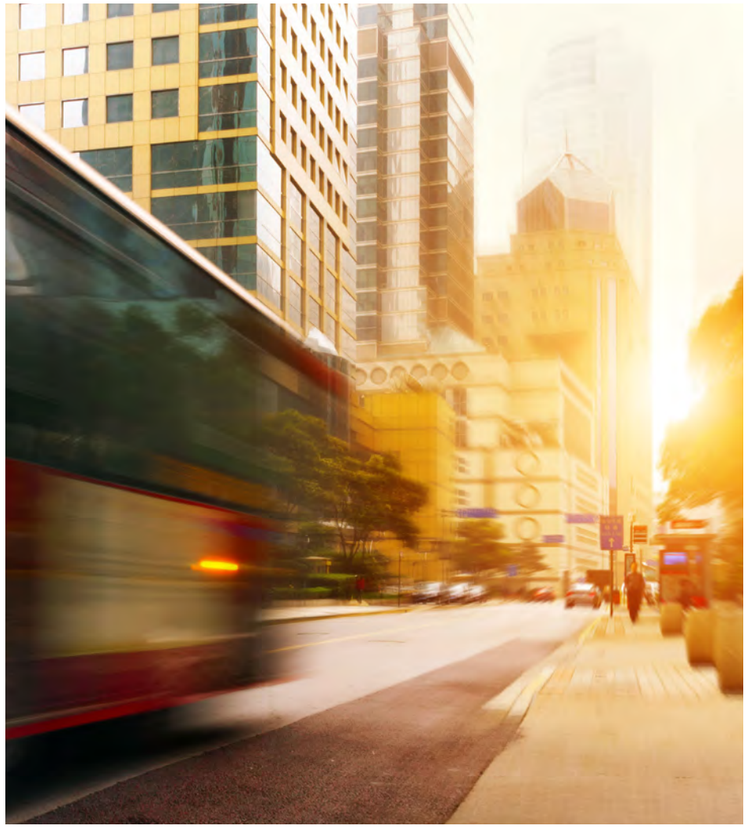
- TRA Policy – As necessary, restructure and revise the zoning and land development codes, and other plans, laws, procedures, rules, regulations, guidelines, programs, templates, and design manuals, in order to integrate, accommodate, and balance the needs of all users in all street projects on public and private streets.
- TRA Policy – Develop or revise street standards and design manuals, including cross-section templates and design treatment details, to ensure that standards support and do not impede Complete Streets.
- TRA Policy – Encourage coordination among agencies and departments to develop joint prioritization, capital planning and programming, and implementation of street improvement projects and programs.
- TRA Policy – Encourage targeted outreach and public participation in community decisions concerning street design and use.
- TRA Policy – Collect baseline data and regularly gather follow-up data in order to assess impact of policies.
  - Track public transportation ridership numbers.
  - Track performance standards and goals.
  - Track other performance measures such as number of new curb ramps and new street trees or plantings.
  - Require major employers to monitor how employees commute to work.

TRA Objective – **Plan and develop a comprehensive and convenient bicycle and pedestrian transportation network.**

- TRA Policy – Develop a long-term plan for a bicycle and pedestrian network that meets the needs of users, including pedestrians, bicyclists, public transportation riders, and people of all ages and abilities, including children, youth, families, older adults, and individuals with disabilities. (ADDRESSED IN THE SMITP)
- TRA Policy – In collaboration with the MPO, Miami-Dade County, other agencies, and surrounding jurisdictions, integrate bicycle, pedestrian, and public transportation facility planning into regional and local transportation planning programs to encourage connectivity between jurisdictions.
- TRA Policy – Develop programs to encourage bicycle use, such as enacting indoor bicycle parking policies to encourage bicycle commuting, or testing innovative bicycle facility design.

TRA Objective – **Promote bicycle, pedestrian and public transportation rider safety. (**ADDRESSED IN THE SMITP**)**

TRA OBJECTIVE – Make public transportation an interconnected part of the transportation network.



FUNDING

Funding for transportation projects comes from three primary sources: Local, State and Federal.

Each year funding is more difficult to come by. Cities and counties, face the dilemma of rising costs of transportation projects, increasing traffic volumes and limitations on their ability to generate revenue. The cost of construction and materials increased by 44 percent between 2000 and 2013, more than the 35 percent rise in the overall rate of inflation. Fast changing economic environments put pressure on local governments to keep up with growth and congestion. At the same time, most states limit counties' ability to raise revenue. In Florida in recent years, the State Legislature has capped property tax, lowered property taxes and has attempted to take away the ability for local governments to tax.

Faced with rapidly increasing construction costs and traffic volumes local governments are finding new funding and financing solutions for transportation. Often, these solutions involve partnerships with other jurisdictions, the private sector and most of all county residents. Unfortunately Florida is a donor state, giving more into the federal system than it gets back. Most monies for large projects are collected locally, provided to the Federal Government, and then reallocated to the states to be administered to agencies like FDOT. The next several pages contain a description of relevant funding opportunities at all levels.

LOCAL FUNDING

Local funding is money that is generated from within a city or county. These sources generally rely on property taxes or other funds. Many communities have concurrency fees or impact fees, which can be applied to local infrastructure projects. In high growth communities it is advised that they consider these, in the form of mobility fees, which require that developments fund their fair share of the infrastructure needed to support their development.

MIAMI-DADE MUNICIPAL GRANT PROGRAM

The Municipal Grant Program (MGP) was developed to allow municipalities within Miami-Dade County submit transportation planning proposals to the Metropolitan Planning Organization (MPO) to receive funding on a competitivebasis. Participation intheprogramrequiresaminimum 20% funding commitmentfromthemunicipality.

Selection criteria include:

- Level of Service (LOS) benefits of the proposed project
- Impact of mobility/traffic circulation gains
- Intermodal nature of proposal
- Support of the approved countywide activities of the Unified Planning Work Program
- Consistency with the applicant's local comprehensive plans

MIAMI-DADE COUNTY'S PEOPLE'S TRANSPORTATION PLAN, 1/2 PENNY SALES TAX

Miami Dade County's People Transportation Plan (PTP), half-penny transportation surtax was approved by Miami- Dade County voters in November 2002 and included $476 million for public works projects. The PTP funds to be provided were for major highway and road improvements totaling $309 million, and for neighborhood improvements totaling $167 million. Twenty percent of the total funding is provided to municipalities, based on their population. Each city must spend at least 20% of their funds on transit projects. Importantly, this source of funds can be used for a local match to federal funding. An advantage many local areas do not have.

LOCAL OPTION GAS TAXES

County governments are authorized to levy up to 12 cents of local option fuel taxes in three separate levies on fuel sold within the county. The funds are used for transportation expenditures.

- The ninth-cent fuel tax is a tax of 1 cent on every net gallon of motor and diesel fuel sold within a county.
- A tax of 1 to 6 cents on every net gallon of motor and diesel fuel sold within a county.
- A tax of 1 to 5 cents on every net gallon of motor fuel sold within a county. Diesel fuel is not subject to this tax. The funds may also be used to meet the requirements of the capital improvements element of an adopted local government comprehensive plan.

STATE FUNDING

The State of Florida has several funding sources that primarily come from FDOT.

The Governor's newly proposed FY 2016/2017 transportation budget makes the following investments:

- $3.3 billion for construction of highway projects to keep Florida's transportation infrastructure among the best in the country.
- $153.9 million in seaport infrastructure improvements to keep Florida first in the world for ocean cruise passengers and a major U.S. cargo gateway.
- $237.6 million for aviation improvements to keep Florida first in airport infrastructure investments.
- $731.9 million for scheduled repair of 48 bridges and replacement of 21 bridges to keep Florida's bridges among the best structures in the country.
- $963.4 million for maintenance and operation to keep Florida's infrastructure among the best maintained in the country.
- $574 million for public transit development grants to keep Florida's growth in transit ridership over the last five years among the best in the country.
- $159 million for safety initiatives to continue to improve the safety of families
- $46.6 million for bike and pedestrian trails to keep Florida's trail development among the best in the country.

ECONOMIC DEVELOPMENT TRANSPORTATION FUND

The Economic Development Transportation Fund, commonly referred to as the "Road Fund," is an incentive tool designed to alleviate transportation problems that adversely impact a specific company's location or expansion decision. The award amount is based on the number of new and retained jobs and the eligible transportation project costs, up to $3 million. The award is made to the local government on behalf of a specific business for public transportation improvements.

THE TRANSPORTATION REGIONAL INCENTIVE PROGRAM (TRIP)

The TRIP fund was created as part of major Growth Management legislation enacted during the 2005 Legislative Session (SB 360). The purpose of the program is to encourage regional planning by providing state matching funds for improvements to regionally significant transportation facilities identified and prioritized by regional partners. Eligible partners are shown in the chart on the right. These partners must form a regional transportation area, pursuant to an interlocal agreement, and develop a regional transportation plan that identifies and prioritizes regionally significant facilities. To qualify for TRIP funding, partners must sign an interlocal agreement that:

- Includes development of the regional transportation plan.
- Delineates the boundaries of the regional transportation area.
- Provides the duration of the agreement and how it may be changed.
- Describes the planning process, and defines a dispute resolution process.

TRIP funds are to be used to match local or regional funds up to 50% of the total project costs for public transportation projects. In-kind matches such as right of way donations and private funds made available to the regional partners are also allowed. Federal funds attributable to urbanized areas over 200,000 in population may also be used for the local/regional match.

FDOT PROGRAMS

The Florida Department of Transportation Safety Office (FDOT) funds subgrants that address traffic safety priority areas including:

- Aging Road Users
- Community Traffic Safety
- Impaired Driving
- Motorcycle Safety
- Occupant Protection and Child Passenger Safety
- Pedestrian and Bicycle Safety
- Police Traffic Services
- Speed and Aggressive Driving
- Teen Driver Safety
- Traffic Records
- Traffic Record Coordinating Committee (TRCC)

Subgrants may be awarded for assisting in addressing traffic safety deficiencies, expansion of an ongoing activity, or development of a new program.

Grants are awarded to state and local safety-related agencies as “seed” money to assist in the development and implementation of programs that address traffic safety deficiencies or expand ongoing safety programs activities in safety priority program areas. Funding for these grants are apportioned to states annually from the National Highway Traffic Safety Administration (NHTSA) according to a formula based on population and road mileage. Funding may be available for projects in other program areas if there is documented evidence of an identified problem.

Through public rule making processes conducted in 1982, 1988, 1995 and 1998, it has been determined that certain highway safety program areas have proven to be more effective than others in reducing traffic crashes, injuries, and fatalities. These programs, designated as National Priority Program Areas are: Impaired Driving, Police Traffic Services, Speed Control, Occupant Protection/ Child Passenger Safety, Pedestrian and Bicycle Safety, Motorcycle Safety, Traffic Records, and Community Traffic Safety.

It is expected that programs funded through these grants will become self-sufficient and continue when grant funding terminates. To promote self-sufficiency, agencies are expected to provide a local funding match when personnel costs are included in second and third year projects. The local match is normally 25% of eligible costs for second year projects and 50% for third year projects.

Government agencies, political “subdivisions” of the state, local city and county government agencies, state colleges and state universities, school districts, fire departments, public emergency services providers, and certain qualified non-profit organizations are eligible to receive traffic safety grant funding.

These grants are awarded on a Federal fiscal year basis, and can be funded for a maximum of three consecutive years in a given priority area.

FEDERAL PROGRAMS

Federal programs make up the bulk of the funding for large projects. This is so because state governments contribute to the federal government, which in turn provides those funds back to the state. Florida is a donor state, which means it receives less than it contributes each year. There are competitive grant programs which often require local matches.

The US Department of Transportation helps communities fund transportation projects by issuing grants to eligible recipients for planning, vehicle purchases, facility construction, operations, and other purposes. The USDOT administers this financial assistance according to federal transportation authorization, MAP-21. There are a large number of programs and grants within the Department of Transportation that support projects that enhance or relate to livability.

Grants and Programs:

- Surface Transportation Improvement
- Accessibility to Disadvantaged Populations
- Fixed Guideway Systems
- Rail
- Surface Transportation Planning
- Bike/Pedestrian
- Marine Transport
- Air Transport
- Research & Miscellaneous

SURFACE TRANSPORTATION PROGRAM (STP)

The Surface Transportation Program (STP) is one of the main sources of flexible funding available for transit or highway purposes. STP provides the greatest flexibility in the use of funds. These funds may be used as capital funding for public transportation capital improvements, car and vanpool projects, fringe and corridor parking facilities, bicycle and pedestrian facilities, and intercity or intracity bus terminals and bus facilities. As funding for planning, these funds can be used for surface transportation planning activities, wetland mitigation, transit research and development, and environmental analysis. Other eligible projects under STP include transit safety improvements and most transportation control measures. STP funds are distributed among various population and programmatic categories within a State. Some program funds are made available to metropolitan planning areas containing urbanized areas over 200,000 population; STP funds are for areas between 200,000 and 50,000 in population. The largest portion of STP funds may be used anywhere within the State to which they are apportioned. State and local governments are eligible for these funds.

BUS AND BUS FACILITIES PROGRAM

The Buses and Bus Related Equipment and Facilities program provides capital assistance for new and replacement buses, related equipment, and facilities. Eligible capital projects include the purchasing of buses for fleet and service expansion, bus maintenance and administrative facilities, transfer facilities, bus malls, transportation centers, intermodal terminals, park-and-ride stations, acquisition of replacement vehicles, bus rebuilds, bus preventive maintenance, passenger amenities such as passenger shelters and bus stop signs, accessory and miscellaneous equipment such as mobile radio units, supervisory vehicles, fare boxes, computers and shop and garage equipment. Funds are allocated on a discretionary basis. Eligible recipients include public bodies and agencies (transit authorities and other state and local public bodies and agencies thereof) including states, municipalities, other political subdivisions of states; public agencies and instrumentalities of one or more states; and certain public corporations, boards and commissions established under state law. Private companies engaged in public transportation and private non-profit organizations are eligible sub recipients of FTA grants.

TRANSPORTATION, COMMUNITY, AND SYSTEM PRESERVATION PROGRAM

The Transportation, Community, and System Preservation (TCSP) Program is a comprehensive initiative of research and grants to integrate transportation, community, and system preservation plans and practices that improve the efficiency of the transportation system of the United States; reduce environmental impacts of transportation; reduce the need for costly future public infrastructure investments; ensure efficient access to jobs, services, and centers of trade; and examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals. States, metropolitan planning organizations, local governments, and tribal governments are eligible.

BICYCLE AND PEDESTRIAN PROGRAM

The Federal Highway Administration’s Bicycle and Pedestrian Program promotes bicycle and pedestrian transportation use, safety, and accessibility. The Program is responsible for implementing Federal transportation legislation and policy related to bicycling and walking. This is not a funding program. Pedestrian and bicycle projects and programs are eligible for almost all Federal-aid highway funding categories. Each State has a Bicycle and Pedestrian Coordinator in its

State Department of Transportation to promote and facilitate non- motorized transportation, including developing pedestrian and bicycle facilities and public educational, promotional, and safety programs. Pedestrian and bicycle projects and programs are eligible for almost all Federal-aid highway funding categories. Applicants should consult program eligibility criteria available in their State. The State Bicycle and Pedestrian Coordinators can help with questions specific to each State.

TRANSPORTATION ENHANCEMENT ACTIVITIES

Transportation Enhancement (TE) activities offer funding opportunities to expand transportation choices and enhance the transportation experience through 12 eligible TE activities related to surface transportation, including pedestrian and bicycle infrastructure and safety programs, scenic and historic highway programs, landscaping and scenic beautification, historic preservation, and environmental mitigation. TE projects must relate to surface transportation and must qualify under one or more of the 12 eligible categories. Each State develops its own procedures to solicit and select projects for funding. States may make funds available to Federal, Tribal, State, or local government agencies. A few States allow private nonprofit organizations to apply in partnership with a government agency.

TRANSPORTATION ALTERNATIVE PROGRAM

The Transportation Alternative Program was developed as a result of the Moving Ahead for Progress in the 21st Century (MAP- 21). Eligible activities for funding include: 1. Construction, planning and design of on and off road facilities for bicyclists, pedestrians, and other forms of non-motorized transportation; 2. Construction, planning and design of infrastructure related projects/systems to provide safe routes for non-drivers; 3. Conversion and use of abandoned railroad corridors for non-motorized use; 4. Construction of turnouts, overlooks, and viewing areas under community improvement activities; 5. Inventory, control or removal of outdoor advertising; 6. Historic preservation and rehabilitation of historic transportation facilities; 7. Vegetation management practices in transportation rights of way; 8. Archeological activities related to impacts from transportation projects eligible under Title 23; and 9. Environmental mitigation activities.

As a cost reimbursement program, projects must go through multiple levels of review and approval to become eligible for reimbursement. Once the Federal Highway Administration (FHWA) has authorized a project, project costs may be incurred and ultimately reimbursed. Costs incurred prior to FHWA authorization are not eligible for reimbursement.

In addition, the Safe Routes to School (SRTS) Program and Recreational Trails Program (RTP) were both consolidated within the nine (9) activities under the TAP. The planning, designing, and constructing of boulevards and other roadways largely in the right of way of former Interstate System routes or other divided highways are also eligible as well. The City has applied for funding from the TAP program before, and several projects, such as a beach pathway and elevated pedestrian plazas, may be eligible under this grant.

THE SAFE ROUTES TO SCHOOL PROGRAM

The purpose of the Safe Routes to School (SRTS) Program is to enable and encourage children, including those with disabilities, to walk and bicycle to school; to make walking and bicycling to school safe and more appealing; and to facilitate the planning, development and implementation of projects that will improve safety, and reduce traffic, fuel consumption, and air pollution in the vicinity of schools. The SRTS Program makes funding available for a wide variety of programs and projects, from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school. The Federal-aid Safe Routes to School program was created by Section 1404 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act The SRTS Program was funded at $612 million and provided Federal-aid highway funds to State highway agencies over five fiscal years (FY 2005 - 2009), in accordance with a formula specified in the legislation. Although states received these funds for FY 2005-2009, some states, such as Florida, did not utilize all of the money, which are now available. The national SRTS program is federally funded, but managed and administered by each State Department of Transportation (DOT). Funds are made available for infrastructure and non-infrastructure projects, and to administer Safe Routes to School programs that benefit elementary and middle school children in grades K-8. Each State is responsible for hiring a full-time Safe Routes to School Coordinator to implement a SRTS statewide program.

RECREATIONAL TRAILS PROGRAM

The Recreational Trails Program, (RTP) provides funds to the States to develop and maintain recreational trails and trail-related facilities for both nonnotarized and motorized recreational trail uses. Each State develops its own procedures to solicit and select projects for funding. States may make funds available to Federal, Tribal, State, or local government agencies. Some States allow private nonprofit organizations to apply directly.

APPENDIX A

COMPLETE STREETS COMP PLAN SAMPLE LANGUAGE:

COMPLETE STREETS POLICY

Goal T1: Provide safe and comfortable routes for walking, bicycling, and public transportation to increase use of these modes of transportation, enable convenient and active travel as part of daily activities, reduce pollution, and meet the needs of all users of the streets, including children, families, older adults, and people with disabilities.

Objective T1.1: Integrate Complete Streets infrastructure and design features into street design and construction to create safe and inviting environments for all users to walk, bicycle, and use public transportation.

- **T1.1.1.** In planning, designing, and constructing Complete Streets:
  - Include infrastructure that promotes a safe means of travel for all users along the right of way, such as sidewalks, shared use paths, bicycle lanes, and paved shoulders.
  - Include infrastructure that facilitates safe crossing of the right of way, such as accessible curb ramps, crosswalks, refuge islands, and pedestrian signals; such infrastructure must meet the needs of people with different types of disabilities and people of different ages.
  - Ensure that sidewalks, crosswalks, public transportation stops and facilities, and other aspects of the transportation right of way are compliant with the Americans with Disabilities Act and meet the needs of people with different types of disabilities, including mobility impairments, vision impairments, hearing impairments, and others.1 Ensure that the ADA Transition Plan includes a prioritization method for enhancements and revise if necessary.
  - Prioritize incorporation of street design features and techniques that promote safe and comfortable travel by pedestrians, bicyclists, and public transportation riders, such as traffic calming circles, additional traffic calming mechanisms, narrow vehicle lanes, raised medians, dedicated transit lanes, transit priority signalization, transit bulb outs, road diets,2 high street connectivity,3 and physical buffers and separations between vehicular traffic and other users.
  - Ensure use of additional features that improve the comfort and safety of users:
    - Provide pedestrian-oriented signs, pedestrian-scale lighting, benches and other street furniture, bicycle parking facilities, and comfortable and attractive public transportation stops and facilities.
    - Encourage street trees, landscaping, and planting strips, including native plants where possible, in order to buffer traffic noise and protect and shade pedestrians and bicyclists.
    - Reduce surface water runoff by reducing the amount of impervious surfaces on the streets.
- **T1.1.2.** In all street projects, include infrastructure that improves transportation options for pedestrians, bicyclists, and public transportation riders of all ages and abilities.

COMMENT: This provision, which requires that all street projects on new or existing streets create Complete Streets, is a fundamental component of a commitment to Complete Streets.

  - Ensure that this infrastructure is included in planning, design, approval, construction, operations, and maintenance phases of street projects.
  - Incorporate this infrastructure into all construction, reconstruction, retrofit, maintenance, alteration, and repair of streets, bridges, and other portions of the transportation network.
  - Incorporate multimodal improvements into pavement resurfacing, restriping, and signalization operations where the safety and convenience of users can be improved within the scope of the work.
  - Develop systems to implement and monitor incorporation of such infrastructure into construction and reconstruction of private streets.
  - Allow exclusion of such infrastructure from street projects only upon approval by [the City Manager or a senior manager of an appropriate agency, such as the Department of Transportation], and only where documentation and supporting data indicate one of the following bases for the exemption: (a) use by non-motorized users is prohibited by law; (b) the cost would be excessively disproportionate to the need or probable future use over the long term; (c) there is an absence of current and future need; or (d) inclusion of such infrastructure would be unreasonable or inappropriate in light of the scope of the project.

COMMENTS: This provision provides crucial accountability in the exceptions process by requiring documentation, a transparent decision-making process, and written approval by a specified official.

By including this fourth exception, exception (d), a jurisdiction gains considerable flexibility, but at the cost of potentially implementing Complete Streets practices less thoroughly. Jurisdictions should consider this trade-off in determining whether to include this exception.

Other exceptions can also be included in this list, for example: "Significant adverse environmental impacts outweigh the positive effects of the infrastructure."

In evaluating whether the conditions of (b) and (c) are met, a jurisdiction may need to conduct latent demand studies, which measure the potential level of use by bicyclists, pedestrians, and others should appropriate infrastructure be provided.

- **T1.1.3.** Develop policies and tools to improve [Jurisdiction]'s Complete Streets practices:
  - Develop a pedestrian crossings policy to create a transparent decision-making policy, including matters such as where to place crosswalks and when to use enhanced crossing treatments.
  - Develop policies to improve the safety of crossings and travel in the vicinity of schools and parks.
  - Consider developing a transportation demand management/ commuter benefits ordinance to encourage residents and employees to walk, bicycle, use public transportation, or carpool.
  - Develop a checklist for [Jurisdiction]'s development and redevelopment projects, to ensure the inclusion of infrastructure providing for safe travel for all users and enhance project outcomes and community impact.
- **T1.1.4.** Encourage transit-oriented development that provides public transportation in close proximity to employment, housing, schools, retailers, and other services and amenities.
- **T1.1.5.** Change transportation investment criteria to ensure that existing transportation funds are available for Complete Streets infrastructure.
- **T1.1.6.** Identify additional funding streams and implementation strategies to retrofit existing streets to include Complete Streets infrastructure.

Objective T1.2: Make Complete Streets practices a routine part of [Jurisdiction]'s everyday operations.

- **T1.2.1.** As necessary, restructure and revise the zoning and subdivision codes, and other plans, laws, procedures, rules, regulations, guidelines, programs, templates, and design manuals, including [insert all other key documents by name], in order to integrate, accommodate, and balance the needs of all users in all street projects on public [and private] streets.

COMMENT: By opting to apply the requirement to private streets in addition to public streets, a jurisdiction will generally expand the effectiveness of the complete streets policy. However, such a requirement may be more practical in certain jurisdictions than in others. For example, the requirement might be very important in a jurisdiction where there are many private streets in central locations.

- **T1.2.2**. Develop or revise street standards and design manuals, including cross-section templates and design treatment details, to ensure that standards support and do not impede Complete Streets; coordinate with related policy documents [such as Pedestrian/Bicycle Plans, insert other relevant documents].
- Assess current requirements with regard to road width and turning radii in order to determine the narrowest vehicle lane width and tightest corner radii that safely balance other needs; adjust design guidelines and templates to reflect ideal widths and radii.
- **T1.2.3.** Make training available to planning and public works personnel and consulting firms on the importance of Complete Streets and on implementation and integration of multimodal infrastructure and techniques.
- **T1.2.4.** Encourage coordination among agencies and departments to develop joint prioritization, capital planning and programming, and implementation of street improvement projects and programs.
- **T1.2.5.** Encourage targeted outreach and public participation in community decisions concerning street design and use.
- **T1.2.6.** Establish performance standards with measurable outcomes to assess safety, functionality, and actual use by each category of users; include goals such as:
  - By [2020], facilitate a transportation mode shift so that [20] % of trips occur by bicycling or walking.
  - By [2015], reduce the number of injuries and fatalities to bicyclists and pedestrians by [__]%.
  - Reduce per capita vehicle miles traveled by [__]% by [insert year].
  - Provide a high proportion of streets ([__]%) with sidewalks, low design speeds, tree canopy, and street furnishings.
  - Increase the miles of bicycle lanes and other bikeways by [__]% by [insert year].
  - Increase the miles of sidewalks by [__]% by [insert year]

COMMENT: Other standards could include user satisfaction, percentage reductions in greenhouse gas emissions, and reduction in gaps in the sidewalk network.

- **T1.2.7.** Replace automobile level of service as a dominant determinant with multimodal level of service assessment criteria.
- **T1.2.8.** Collect baseline data and regularly gather follow-up data in order to assess impact of policies.
  - Collect data regarding the safety, functionality, and actual use by each category of users of the neighborhoods and areas within [Jurisdiction].
  - Track public transportation ridership numbers.
  - Track performance standards and goals.
  - Track other performance measures such as number of new curb ramps and new street trees or plantings.
  - Require major employers to monitor how employees commute to work.

<u>Objective T1.3:</u> Plan and develop a comprehensive and convenient bicycle and pedestrian transportation network.

COMMENT: Jurisdictions with existing bicycle or pedestrian plans may have already addressed the policy/action items under this objective. In such jurisdictions, it is not necessary to restate these policy and action items verbatim. Such plans should be reviewed, and, if necessary, revised to complement the Complete Streets approach. If existing plans address this objective sufficiently, a jurisdiction may incorporate its bicycle and pedestrian plans with language such as: "The provisions set forth in the [Pedestrian/ Bicycle Plan] are incorporated into this plan."

For jurisdictions that have not developed a detailed bicycle or pedestrian plan, the policies and actions in this section provide a good way to begin addressing those needs in an integrated fashion.

- **T1.3.1.** Develop a long-term plan for a bicycle and pedestrian network that meets the needs of users, including pedestrians, bicyclists, public transportation riders, [insert other appropriate users if desired] and people of all ages and abilities, including children, youth, families, older adults, and individuals with disabilities.
  - Conduct a demand analysis for each category of user, mapping locations that are already oriented to each mode of travel and type of user and those for which there is latent demand.
  - For each category of user, map out a preferred transportation network with routes that will enable safe, interconnected, direct, continuous, and efficient travel from each major origination area to each major destination area.
  - Encourage public participation in community decisions concerning the demand analysis, preferred route network, and street design and use to ensure that such decisions: (a) result in streets that meet the needs of all users, and (b) are responsive to needs of individuals and groups that traditionally have not participated in public infrastructure design. Include pedestrians, bicyclists, individuals with disabilities, children and youth, families, older adults, public transportation riders, low-income communities, communities of color, and other distinct social groups, and their advocates. Establish ongoing advisory committees and public feedback mechanisms.
  - Identify and prioritize necessary changes in order to implement the preferred network; prioritize neighborhoods with the greatest need and projects that significantly alleviate economic, social, racial, or ethnic inequities.
  - Ensure that the networks provide ready access to healthy sources of nutrition.
  - Explore the use of non-standard locations and connections for bicycle, pedestrian, and public transportation facilities, such as easements, restored stream corridors, and railroad rights-of way.
- **T1.3.2.** Evaluate timeline and funding of the plan.
  - Assess the degree to which implementation of the plan can be coordinated with planned reconstruction of streets, development projects, utility projects, and other existing funding streams.
  - Develop funding strategies for addressing additional needs; actively pursue funding from state, federal, and other sources.
  - Explore imposing development impact fees and dedication requirements on new development to create paths and other Complete Streets infrastructure.
- **T1.3.3.** In collaboration with [appropriate local and regional agencies], integrate bicycle, pedestrian, and public transportation facility planning into regional and local transportation planning programs and agencies to encourage connectivity between jurisdictions.
- **T1.3.4.** Develop programs to encourage bicycle use, such as enacting

indoor bicycle parking policies to encourage bicycle commuting, or testing innovative bicycle facility design.

Objective T1.4: Promote bicycle, pedestrian, and public transportation rider safety.

Comment: As noted for the previous objective, jurisdictions with existing bicycle or pedestrian plans may also choose to omit these items if already addressed in those plans and instead reference those plans.

- **T1.4.1.** Identify physical improvements that would make bicycle and pedestrian travel safer along current major bicycling and walking routes and the proposed future network, prioritizing routes to and from schools.
- **T1.4.2.** Identify safety improvements to pedestrian and bicycle routes used to access public transportation stops; collaborate with [local transit agency] to relocate stops where advisable.
- **T1.4.3.** Identify intersections and other locations where collisions have occurred or that present safety challenges for pedestrians, bicyclists, or other users; consider gathering additional data through methods such as walkability/bikeability audits; analyze data; and develop solutions to safety issues.
- **T1.4.4.** Prioritize modifications to the identified locations and identify funding streams and implementation strategies, including which features can be constructed as part of routine street projects.
- **T1.4.5.** Collaborate with schools, senior centers, advocacy groups, and public safety departments [insert additional specific departments as appropriate] to provide community education about safe travel for pedestrians, bicyclists, public transportation riders, and others.
- **T1.4.6.** Use crime prevention through environmental design strategies4 to increase safety for pedestrians, bicyclists, and other users.
- **T1.4.7.** As necessary, public safety departments should engage in additional enforcement actions in strategic locations.

Objective T1.5: Make public transportation an interconnected part of the transportation network.

- **T1.5.1.** Partner with [local transit agency] to enhance and expand public transportation services and infrastructure throughout [Jurisdiction] and the surrounding region; encourage the development of a public transportation system that increases personal mobility and travel choices, conserves energy resources, preserves air quality, and fosters economic growth.
- **T1.5.2.** Work jointly with [local transit agency] to provide destinations and activities that can be reached by public transportation and are of interest to public transportation-dependent populations, including youth, older adults, and people with disabilities.
- **T1.5.3.** Collaborate with [local transit agency] to incorporate infrastructure to assist users in employing multiple means of transportation in a single trip in order to increase transportation access and flexibility; examples include, but are not limited to, provisions for bicycle access on public transportation, secure bicycle racks at transit stops, access via public transportation to trails and recreational locations, and so on.
- **T1.5.4.** Ensure safe and accessible pedestrian routes to public transportation stops; relocate stops if safe routes are not feasible at current location.
- **T1.5.5.** Work with [local transit agency] to ensure that public transportation facilities and vehicles are fully accessible to people with disabilities.
- **T1.5.6.** Explore working with [local transit agency] to provide travel training programs for older adults and people with disabilities, and awareness training for vehicle operators.
- **T1.5.7.** Explore creatizon of public transportation priority lanes to improve travel time.
- **T1.5.8.** Partner with [local transit agency] to collect data and establish performance standards related to these steps.

Notes:

i. *Note that many types of accommodations for people with disabilities are mandated by federal law under the Americans with Disabilities Act.*

ii. *A road diet is a transportation technique in which the number or width of lanes dedicated to motor vehicle traffic is decreased, often by combining the two central lanes into a single two-way turn lane, in order to create additional space within the right of way for features such as bicycle lanes, sidewalks, or buffer zones.*

iii. *Connectivity describes the directness of routes and density of connections in a street network. A street network with high connectivity has many short links, numerous intersections, and few dead-end streets. As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations.*

iv. *Crime prevention through environmental design (CPTED) involves designing the built environment to deter criminal behavior. CPTED aims to create environments that discourage the commission of crimes by influencing offenders to not commit a contemplated crime, usually due to increased fear of detection.*

SECTION III

Complete Streets Concepts for Inclusion within Other Chapters/Elements/ Sections of the Plan

Communities may also find it beneficial to include complete streets concepts in other chapters of their plans to increase the integration of the plan as a whole.

LAND USE CHAPTER

Goal LU1: Ensure that land use patterns and decisions encourage walking, bicycling, and public transportation use, and make these transportation options a safe and convenient choice.

Objective LU1.1: Plan, design, and create complete and well-structured neighborhoods whose physical layout and land use mix promote walking, bicycling, and public transportation use as a means of accessing services, food, retail, employment, education, childcare, recreation, and other destinations.

- **LU1.1.1.** Encourage mixed-use development to allow siting of residential, retail, office, recreational, and educational facilities within close proximity to each other to encourage walking and bicycling as a routine part of everyday life.
  - Maximize the proportion of residences within [¼] mile of uses like parks, schools, grocers, retailers, service providers, employment, public transportation, and other desirable community features.
- **LU1.1.2.** Encourage transit-oriented development by developing public transportation in downtown areas and encouraging dense infill development near public transportation facilities.
- **LU1.1.3.** Promote infill development and redevelopment; new construction should occur in a compact form in developed locations whenever feasible.
- **LU1.1.4.** Encourage the creation of high-quality community plazas, squares, greens, commons, community and neighborhood parks, and rooftop gardens; explore creation of shared streets.
- **LU1.1.5.** Require safe and convenient walking, bicycling, and public transportation features in new or renovated development.
- **LU1.1.6.** Require transportation demand management strategies in development plans.
- **LU1.1.7.** Explore imposing development impact fee, use fee, and dedication requirements on new development to fund multimodal transportation.
- **LU1.1.8.** Consider conducting health impact assessments when

designing streets or undertaking policymaking with regard to public infrastructure and development, in order to understand and address public health implications of actions in this realm.

Objective LU1.2: Require street design that creates public space that is safe and welcoming for pedestrians.

- **LU1.2.1.** Encourage street-oriented buildings; locate parking lots, if provided, in rear of retail and business centers.
- **LU1.2.2.** Provide pedestrian-scale lighting.
- **LU1.2.3.** Encourage a high proportion of streets where building façades have abundant windows and entrances facing the street and create a human-scaled wall near the lot line.
- **LU1.2.4.** Encourage ground-level business uses that support pedestrian activity, such as retail, restaurants, and services.
- **LU1.2.5.** Reduce the proportion of street frontages and rights of way lined by parking lots, blank walls, or empty lots.
- **LU1.2.6.** Where parking lots are located between commercial buildings and streets, require or encourage creation of a pedestrian path from the street to the entrance.
- **LU1.2.7.** Increase street connectivity.

PARKS/RECREATION CHAPTER

Goal P1: Increase use of parks and open space for physical activity and encourage residents to access parks by walking, bicycling, or public transportation.

Objective P1.1: Create safe routes to parks and open space.

- **P1.1.1.** Encourage the development of parks and open space with a network of safe and convenient walking and bicycle routes, including routes that access other popular destinations, such as schools.
- **P1.1.2.** Implement traffic-calming measures near parks where advisable due to vehicle speeds and volumes.
- **P1.1.3.** Improve intersections at access points to parks to create greater visibility for all users, and provide accessible curb ramps and additional time to cross the street.
- **P1.1.4.** Improve public transportation connections to trails, parks, and other recreational locations.
- **P1.1.5.** Ensure that all parks and open space can be reached through safe routes for bicycling, walking, and public transportation.
- **P1.1.6.** Ensure that trails, parks, and open spaces have secure bicycle parking facilities.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APPENDIX B: REVIEW OF COMPLETE STREETS BEST PRACTICES

Functional Classification Arterial (Major/Minor)- Curbed				
	Minimum Criteria	Best Practice		
		Fort Lauderdale	Miami-Dade MPO	ITE
Pedestrian	5 feet sidewalks when separated from the back of curb by a buffer strip (4 feet when physical constrains exist) 6 feet sidewalks when they are adjacent to the curb Sidewalks should be present on both sides of the roadway except for locations where there are physicals barriers (like canals). In such cases, sidewalk shall be provided at least for one side of the road and where the bulk of pedestrian generators exist (i.e. bus stops, shopping centers, schools, etc.)	Minimum sidewalk width Ranges from 6 feet to 8 feet 10 feet width desired between back of curb and R/W to provide a 5 feet utility-strip/driveway-approach and 5 feet sidewalk Minimum 4 feet furnishing zone Lighting Provide Landscape and or planters enhancements in dependence of existing utilities location and easements For high pedestrian areas street furniture should be provided For high pedestrian areas sidewalk surface treatments should be considered Marked crosswalk at controlled intersections Curb ramps Pedestrian Signal Crossings uncontrolled mid-block crosswalks (when appropriate) Pedestrian hybrid beacons (when appropriate) Rectangular rapid flashing Beacon (when appropriate) In street pedestrian crossing lighting (when appropriate)	Should be 5 to 6 feet minimum width with sufficient buffers street furniture and pedestrian amenities should be considered due to high speed facility planting strips of at least 8 feet wide should be considered as a buffer wayfinding signage corner island for refuge Crosswalks shall be provided and enhanced pavement crosswalks shall be installed for high pedestrian areas In pavement lighting for high pedestrian activity and vehicular conflicts Lighting	Minimum of 4 feet of tree line, utilities or furnishing zone plus 6 feet of clear pedestrian width plus 2 feet of frontage zone for a total of 12 feet. However, 19.5 feet is the total desired for crosswalks
Bike	**4 feet bike lanes and an additional 1 foot when adjacent to curb (if curb and gutter, this additional 1 foot is considered by the curb pan) or other barrier** **5 feet bike lanes when adjacent to parallel parking, if truck traffic is greater than 10% or if posted speed exceeds 50 mph** **5 feet bike lanes when adjacent to right turn, left turn lanes and bus bays** **When heavy parallel parking demand exist, an additional 1 to 2 feet of buffer space shall be provided where the R/W is adequate** **Bicycle lanes shall not be provided on a roundabout and shall be transition prior to the roundabout** **Wide Curb lanes should be 14 feet wide** **Shared lane markings should not be provided for facilities with speeds greater than 35 mph**	**5 feet bike lanes with buffer preferred** **Bike route Signs** **Colored pavement in bike lanes** **Regular and conventional bike lanes shall be provided as a minimum** **Bicycle parking shall be considered** **If space is restricted and speed is less than 35 mph, shared lane markings shall be provided** **If space is not restricted, consider shared use path** **In certain circumstances, consider raised bike lanes** **Bike signal accommodations (bike heads, loops, etc.)**	**4 feet minimum but 5 to 6 feet preferred** **Wider outside travel lanes may be considered provide bicycle box at signalized intersections for high amount of bicycle traffic**	**5 to 6 feet bike lanes or parallel routes**

Vehicles	11 feet travel lanes with cross slope of 0.02 feet per foot. Minimum 0.015 feet per foot and maximum 0.04 feet per foot Medians are required for all 4 lanes facilities with a design speed of 40 mph or greater 19.5 feet median width is required for design speed of 50 mph or greater 15.5 feet median width is required for design speed of 45 mph or less 10 feet paved median width for two way turn lanes when design speed is 40 mph or less Curbs are not to be used on facilities with design speeds greater of 45 mph	Provide refuge islands Provide raised medians 11 feet lane widths minimum Max posted speed varies from 35 mph to 40 mph (US-1) Consider on appropriate circumstances: ► Roundabout ► Parallel parking Curb extensions (bump outs) for 35 mph or less Minimum 25 feet for corner radii (35 feet desired) For high percentage of truck traffic 40 feet minimum (50 feet desired)	10 feet lanes with wide lanes 12 feet to 14 feet next to gutter All medians should be landscaped, include trees keeping proper sight distances, pedestrian refuge island can be provided at specified mid-block crossings or at intersections Wayfinding signage Corner island for pedestrian refuge	2 to 4 through lanes could be up to 6 lanes target design speed 25 to 35 mph Lane width should be 10 to 11 feet wide Medians should be required and should range between 4 to 18 feet in width Minimum parallel parking width of 8 feet Minimum combined parallel parking and bike lane width of 13 feet Minimum curb return radii of 10 to 15 feet Consider on appropriate circumstances: ► Roundabouts ► Curb extensions
Transit	If present: A boarding and alighting area of 8 feet (measured from the curb) by 5 feet (measured parallel to the roadway) shall be provided and shall be connected to streets, sidewalks, or pedestrian paths by an accessible route Shelters should be installed at locations where demand warrants installation and in accordance with clear zone criteria Benches (if provided) shall be in an accessible location outside the path of travel and shall have a surface of 2.5 feet by 4 feet deep to allow a wheelchair user to sit next to the bench. Connection between the sidewalk and bus stop boarding and alighting area shall be provided	Transit stop and transit stop signage Provide shelters and bike racks When provided, bus stop shall be located at the far side of the intersection Bus turnouts (when appropriate)	Preferred locations are generally at cross streets and high traffic generators; pedestrian enhancement which meet ADA standards should also be included Bus shelters located on amenity zone or green zone	Express and Local routes

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