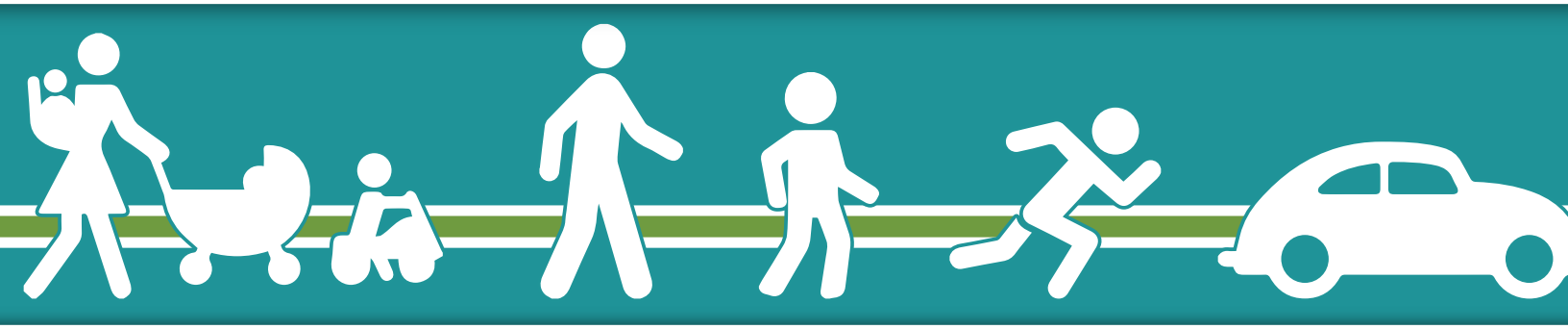


Complete Streets Design Guidelines

MAYORS' CHALLENGE

Florida HEALTH

MIAMI-DADE COUNTY

neat streets MIAMI

MAKE HEALTHY HAPPEN MIAMI

Kimley»Horn

ACKNOWLEDGMENTS

The Miami-Dade County Complete Streets Design Guidelines fulfills one of the critical action items established in the Safer People, Safer Streets Local Action Plan. Preparation of the Complete Streets Design Guidelines was made possible through funding from the Florida Department of Health (FDOH) and Miami-Dade County. To help execute this project, Miami-Dade County partnered with the engineering and planning consulting firm Kimley-Horn and Associates to prepare the Complete Streets Design Guidelines and Urban Health Solutions to conduct public engagement events. Efforts were guided with the assistance of the Local Action Team (LAT) for Safer People, Safer Streets appointed by Miami-Dade Mayor Carlos A. Gimenez and Chairman of Neat Streets Miami Miami-Dade Commissioner Dennis C. Moss, District 9.

Miami-Dade Local Action Team (LAT) for Safer People, Safer Streets

Alice Bravo	Director	Miami-Dade Transportation and Public Works
Brian Breslin	Founder	ReFresh Miami
Claudius Carnegie, Ph.D	CTAC	Florida International University
Benjamin de la Peña	Director, Strategy	Knight Foundation
Tabitha Fazino	Administrative Dir.	Miami-Dade County School Board
Cesar M. Garcia-Pons	Associate Principal	Perkins+Will
Honorable Oliver G. Gilbert III	Mayor	City of Miami Gardens
Alina Hudak	Deputy Mayor	Miami-Dade County
Ramiro Inguanzo	Assistant City Mgr	Village of Bal Harbour
George Navarrete	Director	Miami-Dade Parks, Recreation and Open Spaces
Kevin Kerwin	Director	City of Miami Parks and Recreation
Jimmy Morales	City Manager	City of Miami Beach
Nicholas Namias, M.D.	Chief, Trauma	Jackson Memorial
Jim Wolfe	Secretary	Florida Department of Transportation, District 6
Juan Perez	Director	Miami-Dade Police Department
Dr. Lillian Rivera	Administrator	Florida Department of Health in Miami-Dade
Alyce Robertson	Executive Director	Miami Downtown Development Authority (DDA)
Paul Schwiep	Chairman	Citizens' Independent Transportation Trust
Eli Stiers	Partner	Stiers Law
Honorable Philip K. Stoddard	Mayor	City of South Miami
Debbie Swain	Principal	Milian, Swain & Associates
Peter Wood	V.P. of Programs	Health Foundation of South Florida

Miami-Dade Local Action Team (LAT) Staff Resource Group

Kimberly Brown, AICP	Principal Planner	Regulatory and Economic Resources, Planning
Carlos Cruz-Casas, P.E.	Asst. Dir., Transp.	Miami-Dade Transportation and Public Works
Yanek Fernandez	Traffic Engineer III	Miami-Dade Transportation and Public Works
Patrice Gillespie Smith	Manager	Neat Streets Miami
Julian Guevara	Engineer	Miami-Dade Transportation and Public Works
Miguel Gonzalez	Asst. County Attorney	Miami-Dade County Attorney's Office

ACKNOWLEDGMENTS

David Henderson	Bike and Ped Program	Miami-Dade Metropolitan Planning Organization
Gianni Lodi	Section Supervisor	Regulatory and Economic Resources, Dev Srvcs
Gaspar Miranda, P.E.	Asst. Dir., Hwy Engin.	Miami-Dade Transportation and Public Works
Maria Nardi	Deputy Director	Miami-Dade Parks, Recreation and Open Spaces
Leandro Oña, P.E.	Chief, Rdwy Engin.	Miami-Dade Transportation and Public Works
Joshua Rodriguez	Ped. Educat. Specialist	Miami-Dade Police Department
Jill Sanchez	Lieutenant	Miami-Dade Police Department
Vinod Sandanasamy	Planner	Regulatory and Economic Resources, Planning
Mark Woerner, AICP	Asst. Dir., Planning	Regulatory and Economic Resources, Planning

ACRONYMS AND GLOSSARY

AASHTO – American Association of State Highway and Transportation Officials

ADA – Americans with Disabilities Act

ADT – Average Daily Traffic

AV – Automated Vehicle

BERT – Bus Express Rapid Transit Network, a component of the SMART Plan

DTPW – Department of Transportation and Public Works

FDOT – Florida Department of Transportation

FHWA – Federal Highway Administration, part of the U.S. Department of Transportation

Green Book (AASHTO) – Informal name of the AASHTO guide *A Policy on Geometric Design of Highways and Streets*

Green Book (Florida) – The *Manual of Uniform Standards for Design, Construction, and Maintenance for Streets and Highways* published by FDOT provides standards for use on all public streets not part of the State Highway System

ITE – Institute of Transportation Engineers published *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*

Lane Diet – Reducing the width of travel lanes to repurpose the space for other uses, typically bicycle lanes as part of resurfacing projects

MDPROS – Miami-Dade Parks, Recreation and Open Spaces Department

Mobility – A generalized term for the movement of people; includes walking, biking, transit, and driving, as well as transportation service providers such as carshare and ride-hail services

MPO – Metropolitan Planning Organization

MUTCD – *Manual on Uniform Traffic Control Devices*, published by FHWA

NACTO – National Association of City Transportation Officials

Neck Down – Mid-block curb extensions used in tandem which can narrow or create a “pinch-point” on a street

PPM – *Plans Preparation Manual*, published by FDOT includes design standards for use on the State Highway System

Public Works Manual – Design standards published by the Miami-Dade County Department of Public Works for construction within the public right-of-way

Right-of-Way – The legal right for passage along land; for purposes of the Miami-Dade Complete Streets Design Guidelines, this often refers to the publicly owned land on which streets and sidewalks are built

Road Diet – Reducing the total number of conventional travel lanes on a roadway to repurpose the space for other uses such as bicycle lanes, wider sidewalk, and/or landscaping/furnishings

Sidewalk Zones – A term referring to the four distinct zones outside of the roadway realm which provide an organizing framework for sidewalk design – frontage zone, pedestrian zone, furnishings zone, and curb zone

SMART Plan – Strategic Miami Area Rapid Transit Plan

SPC – SMART Plan Corridor

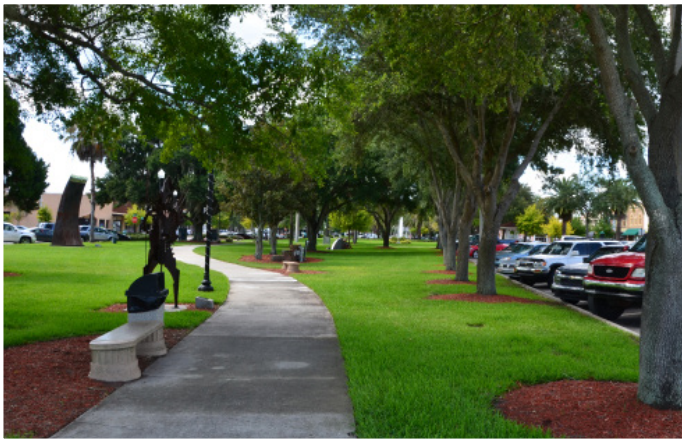
THEMES

Important themes can be found throughout the document as summarized below.

CONTENTS

TABLES

FIGURES




SCHOLARSHIPS AVAILABLE!
DOWNTOWN MIAMI
SOUTH BEACH


ALTON WEST LOOP
BUSINESSES
OPEN
Free Trolley
& Parking
Fifth & Alton
OPEN
Facturas

Introduction

PURPOSE

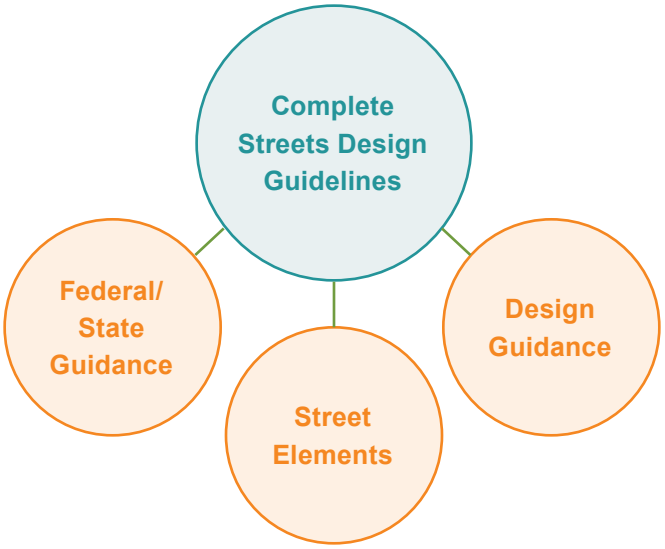
Miami-Dade County has developed the Complete Streets Design Guidelines to provide policy and design guidance to all parties involved in street design projects: governmental agencies, consultants, private developers, and community groups. It is the goal of these guidelines to support the development of streets that are safe for all users, with consistency in policy and design across all street projects in Miami-Dade County. Users of this document will be able to identify context-sensitive street elements and design features that can be applied consistent with federal and state best practices. Engineers, planners, and policy makers will find guidance and criteria to help prepare design plans based on principles of safer, more comfortable, and accessible streets so that walking and bicycling are viable transportation choices. The document also addresses some common concerns and perceived barriers regarding designing pedestrian and bicycle facilities.

> *"Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities."*
>
> *– Smart Growth America*

Miami-Dade's Complete Streets initiative aims to devote the County's most extensive resource, its publicly owned streets and sidewalks, toward affordable, equitable, and healthy mobility options for all users. This approach adopts and champions innovative designs which treat all people equally whether they are walking, bicycling, taking transit, or using an automobile. People are at the heart of the Complete Streets approach; this initiative embraces design as a tool to advance the health and safety of the community while promoting sustainable transportation options and vibrant public spaces.

BACKGROUND

The Miami-Dade County Commission adopted a Complete Streets policy through Resolution 995-14 in November 2014. Following on that progress, Neat Streets Miami organized a Complete Streets forum which brought together more than 120 professionals to work with experts on implementation strategies for Complete Streets in Miami-Dade in April 2015. In September 2015, Miami-Dade Mayor Carlos A. Gimenez and Miami-Dade Commissioner Dennis C. Moss of District 9 appointed a Local Action Team to develop the Miami-Dade *Local Action Plan for Safer People, Safer Streets* in coordination with state and regional partners.



The Miami-Dade County Local Action Plan for Safer People, Safer Streets identified the need to develop and utilize Complete Streets Guidelines. Local governments depend on design manuals for guidance and criteria on modifying, retrofitting, and building streets, and for integrating street design with surrounding land development projects. Complete Streets Guidelines allow practitioners, including engineers, planners, and other local officials, to follow a new approach to street planning and design that incorporates context-sensitivity and a safe streets philosophy during project decision-making.

BENEFITS OF COMPLETE STREETS

Complete Streets provide several benefits across areas as diverse as public health, economic vitality, aging, safety, and environmental quality. Streets and sidewalks represent a large amount of publicly owned land; orienting the design and programming of these assets toward Complete Streets represents a new, and yet straightforward, opportunity to advance numerous County goals effectively and efficiently.

Health

The Florida Department of Health reports that in 2013, nearly two-thirds (63.6%) of adults in Miami-Dade County were overweight or obese. In addition, over half of adults in the County (55.8% in 2013) were inactive or insufficiently active. Sedentary lifestyles double the risk of cardiovascular diseases, diabetes, and obesity, and increase the risks of colon cancer, high blood pressure, osteoporosis, lipid disorders, depression, and anxiety.[1]

Walking or bicycling for transportation is both an efficient and affordable means of incorporating physical activity into their everyday lives. Switching from sitting in a car to walking or bicycling or walking to transit can provide health benefits, even just for short trips, can have an advantageous outcome for physical health.

1 http://www.who.int/mediacentre/news/releases/release23/en/

Equity

Per the American Public Transportation Association, residents of Miami can save approximately $8,700 a year by switching to transit instead of the personal automobile for their daily commute.[2] Residents and visitors in Miami-Dade County should have equal access and equal opportunity to the transportation network, without having to own a car. Providing safe and complete walking, bicycling, and transit networks allows all users to get to work, appointments, and recreational opportunities without the investment in a personal vehicle.

The addition of active transportation components to streets has been shown to increase the economic value of the surrounding land. On average, a one-point increase in a neighborhood's walkability as measured by WalkScore.com increased home values by $700-$3,000.[3]

Safety

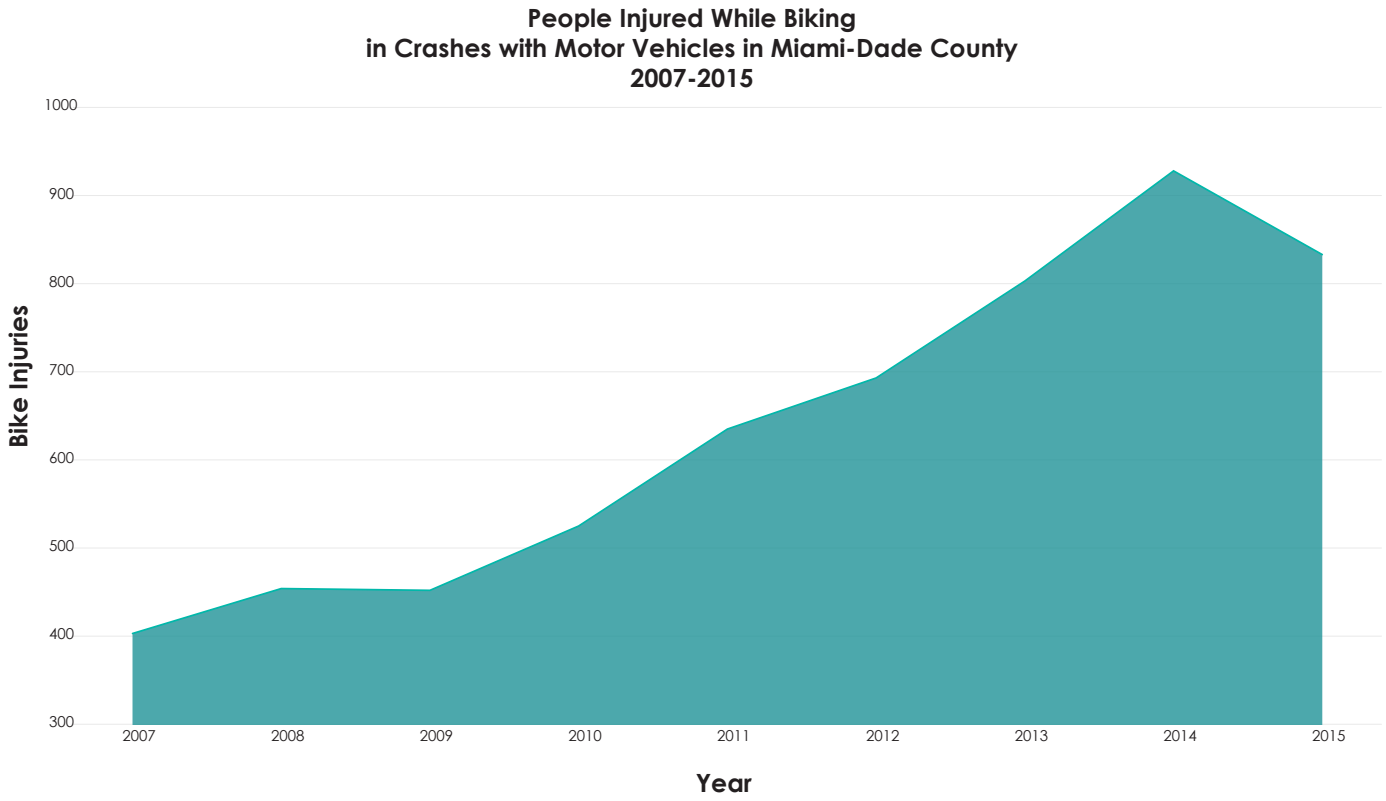
Numerous studies have demonstrated the increases in safety for all modes of transportation with the provision of Complete Streets infrastructure. Pedestrian crashes are more than twice as likely to occur in places without sidewalks and those streets with sidewalks on both sides have the fewest crashes.[4] More than 50% of pedestrian fatalities occurred where no crosswalk was available.[5] **Figure 1-1** and **Figure 1-2** illustrate the trend of injuries and fatalities on Miami-Dade County streets from motor vehicle collisions with pedestrians and cyclists.

2 http://www.apta.com/mediacenter/pressreleases/2016/Pages/160324_Transit-Savings.aspx

3 Joe Cortright, Impresa, Inc. (2009) Walking the Walk, CEOs for Cities

4 NCSC Safety fact sheet.

5 https://www.fhwa.dot.gov/publications/research/safety/13098/13098.pdf - FHWA *Human Factors Assessment of Pedestrian Roadway Crossing Behavior January 2014*

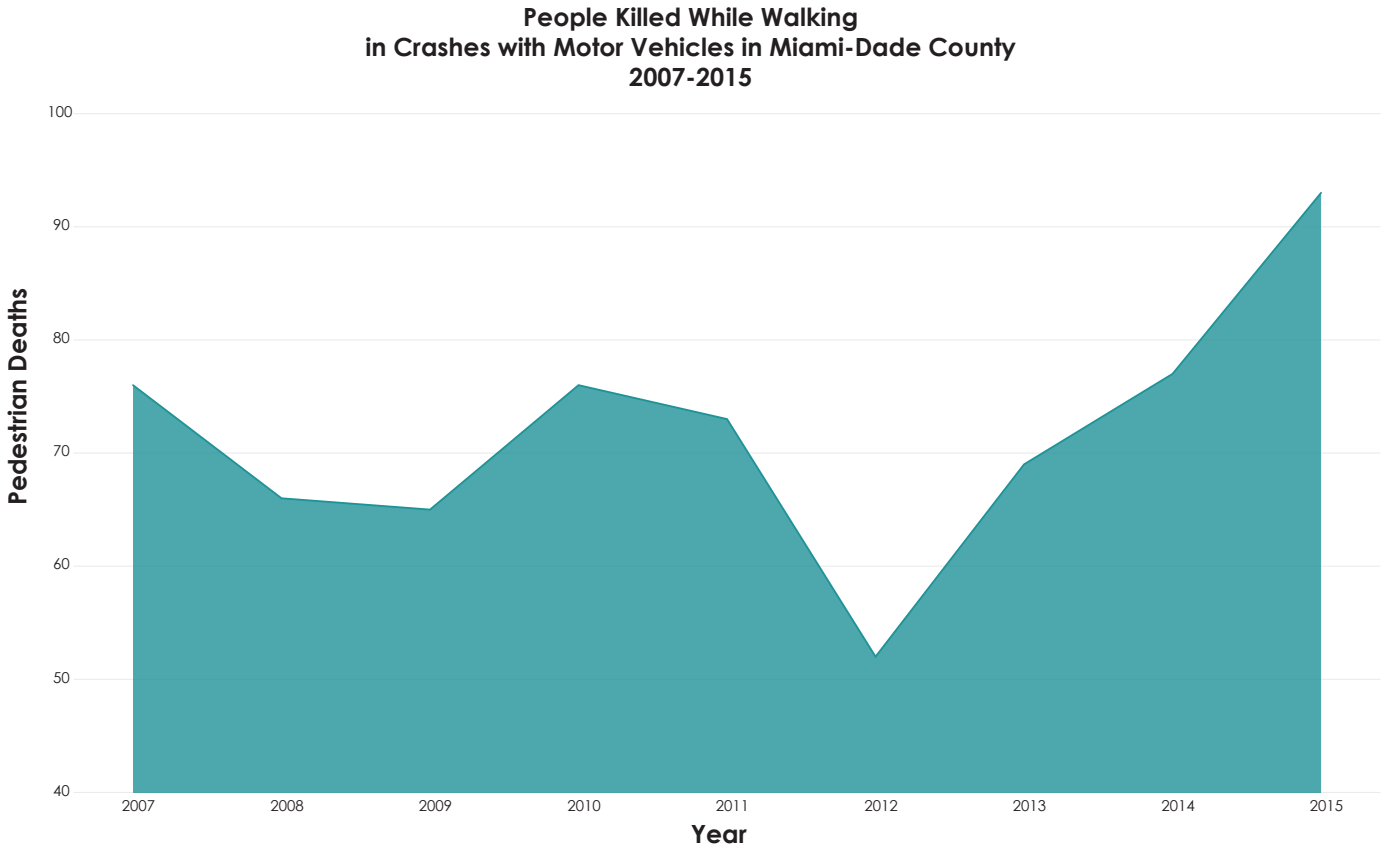


Data: Florida DHSMV

Figure 1-1 ***Growth in Bicyclist Injuries***

Bicycle crashes can often be attributed to a lack of bicycle facilities, which cause bike riders to ride on the sidewalk. Sidewalk riders are often unanticipated by drivers accustomed to looking for conflicts in the roadway, particularly at driveways. On-road bicycle lanes can reduce rates of injuries and crashes by about 50%.

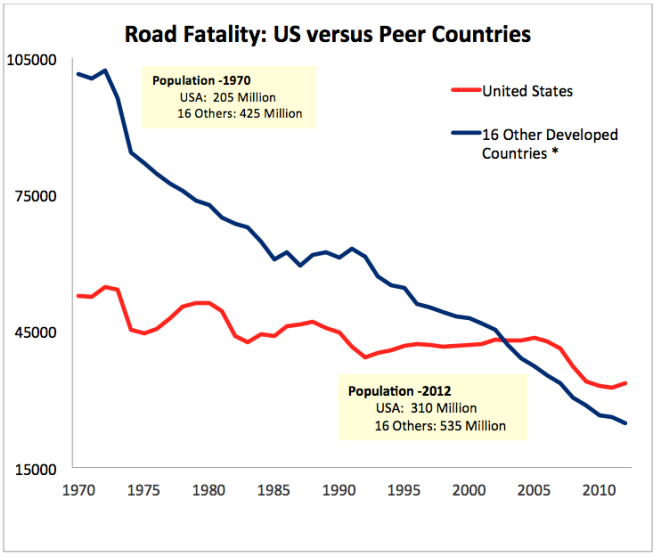
Complete Streets can also reduce the speed of vehicles. Speed reduction can increase safety for all road users, including motorists, and can even increase the vehicle throughput of a street by reducing the necessary gap between vehicles. Reduced vehicle speeds can also provide an economic benefit along streets, as drivers slow down and can observe storefronts as they pass through an area.



Data: Florida DHSMV

Figure 1-2 ***Growth in Pedestrian Fatalities***

Figure 1-3 presents a comparison of road fatalities in the United States and sixteen other developed countries. In the United States, the reduction in road fatalities has failed to keep pace with the drop that other developed nations have experienced. Furthermore, the United States has more road fatalities than the sixteen comparison countries combined, despite only having approximately 60% of the combined population of the comparison countries.



Sources: Vox, Norman Garrick, Carol Atkinson-Palombo, Hamed Ahangari[6]

Figure 1-3 ***Fatalities in the U.S. vs Peer Countries***

Mobility

Complete Streets focus on mobility, providing a safe space for people of all ages and abilities to move around Miami-Dade County. With the focus of these design guidelines, streets will have provisions for people to access the streets however best suits them, by foot, bike, transit, or car. Goods movement, the mobility of freight and deliveries, is a key component of streets, and the network is designed to allow for deliveries throughout the County; these guidelines balance the movement of people and goods.

Complete Streets design can shift mode share. For each additional mile of bike lanes per square mile, there is roughly a 1% increase in the share of workers commuting by bicycle.[7] Designing transit corridors to provide priority to buses reduces travel time, which usually results in an increase in ridership and a decrease in vehicle congestion in the corridor.

Environmental

Miami-Dade's streets provide a framework for the County to work with to achieve its environmental goals. Streets are large conveyors of stormwater during rain events; this creates an opportunity to design them in ways to capture and clean that water, rather than convey it to a storm drain. As part of Complete Streets guidelines there are often opportunities to add rain gardens or swales that reduce water runoff to medians, crossing islands, or along the curb.

The addition of trees to the streetscape provides environmental benefits through increased air filtration and ecosystem habitat, all while creating a more inviting sidewalk environment with increased shade coverage. Trees create living and nesting places for birds, helping

6 http://www.vox.com/the-big-idea/2016/11/30/13784520/roads-deaths-increase-safety-traffic-us

7 http://www.ltrc.lsu.edu/TRB_82/TRB2003-002134.pdf - *Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look Dill and Carr, TRB 2003*

add biodiversity to urban environments while creating a more natural environment for all. Flowering plants can also add to the biodiversity of the street environment, creating supportive systems for bees and other critical insects.

The reduction in single occupancy vehicle dependency can decrease emissions associated with motor vehicles, through reductions in vehicle miles traveled and reduced congestion.

PRINCIPLES

These guidelines build off the increasing array of national guidelines for Complete Streets design. Lessons and applications from cities such as Chicago, Boston, New York, and Los Angeles mix with local priorities and opportunities to place Miami-Dade County's Complete Streets Guidelines at the very forefront of guidelines across the nation. Best practices in design guidelines are incorporated throughout this guide; the principles below were established through research of comparable guidelines and a focus on how to best achieve the vision and goals of the Miami-Dade County Commission Complete Streets policy and the *Local Action Plan for Safer People, Safer Streets*.

SAFETY

Prioritize safety over traffic flow

Use design to enforce safe use

HEALTH

Increase walking and biking, particularly for shorter trips

Support the Age Friendly Initiative

MODAL EQUALITY

Provide facilities for every mode on every street

Establish a connected network for all users

CONTEXT SENSITIVE

Align speeds and features with neighborhood character

Use opportunities to placemake with street design

SUSTAINABILITY

Use streets as the first line of stormwater capture and filtration

Increase tree canopy and landscaping to support comfortable sidewalks and increased biodiversity

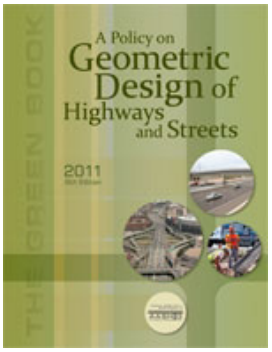
STREET MANUALS AND THEIR PURPOSE

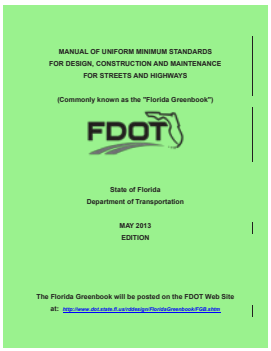
Engineers and planners follow established standards and guidelines to prepare designs for roadway projects. Many of the existing standards and guidelines available at the federal and state levels provide some guidance on Complete Streets and their design. The most relevant of those standards and guides are:

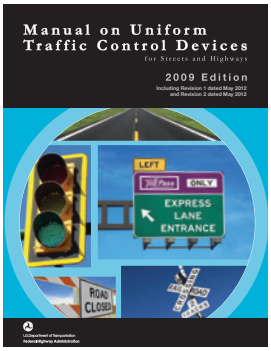
- The American Association of State Highway and Transportation Officials' (AASHTO) A Policy on Geometric Design of Highways and Streets (the "Green Book")
- The Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways (the "Florida Greenbook")
- The Manual on Uniform Traffic Control Devices (MUTCD)
- FDOT Plans Preparation Manual (PPM)
- Americans with Disabilities Act (ADA) Standards for Accessible Design
- Miami-Dade County Public Works Manual

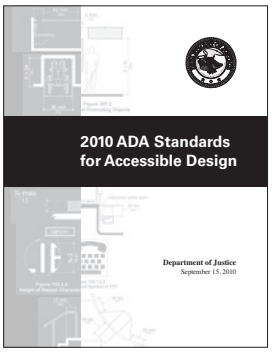
The Miami-Dade County Complete Streets Design Guidelines complement the existing resources with dedicated guidance for Complete Streets design.

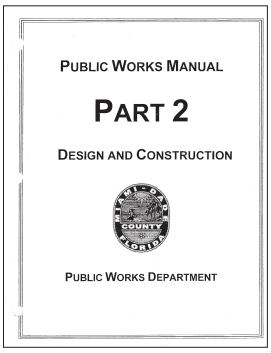
Local governments that wish to use certain federal funds must use a functional classification system based on arterials, collectors, and local streets. These funds are for streets and roads that are on the federal-aid system. Only arterials and certain collector streets are on this system. The federal aid system encourages cities to designate more of these larger streets, and to concentrate modifications along these larger streets. Complete streets design often recommends using a system of street typologies to supplement the functional classification system. To maintain access to these federal funds, local jurisdictions can use both systems.











AASHTO Green Book

AASHTO's *A Policy on Geometric Design of Highways and Streets* (AASHTO Green Book) provides national guidance for designing geometric alignment, street width, lane width, shoulder width, medians, and other street features. The AASHTO Green Book has been adopted by FHWA as the standard for design of streets and roads that are part of the National Highway System (NHS). These are Interstate Freeways, principal routes connecting to them, and roads important to strategic defense. These streets and roads comprise about 4% of all roadway miles . Although the Green Book's adopted application is limited to these roads, local governments may apply its guidelines to all streets.

The AASHTO Green Book provides guidance that local governments often treat as the sole source of street design guidance. The Green Book encourages flexibility in design within certain parameters, as evidenced by the AASHTO publication, *A Guide to Achieving Flexibility in Highway Design* and FHWA's *Achieving Multimodal Networks: Applying Design Flexibility & Reducing Conflicts*. For example, 10-foot lanes are well within AASHTO guidelines depending on desired speed, capacity, and context of a roadway.

Florida Greenbook

The *Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways* (Florida Greenbook) is intended to provide minimum standards for use on all public streets that are not part of the State Highway System. The May 2013 Florida Greenbook became effective September 7, 2015. The previous version, May 2011, included significant modifications expanding on Chapter 8 (Pedestrian Facilities) and Chapter 9 (Bicycle Facilities) to provide improved guidance, as well as the addition of a chapter on Traditional Neighborhood Development (TND).

FDOT Plans Preparation Manual (PPM)

The FDOT *Plans Preparation Manual* (PPM) Volume I outlines the design criteria and procedures for use on the State Highway System (SHS) and on FDOT projects. The criteria in the PPM represent requirements for the State Highway System, which must be met for the design of FDOT projects unless approved exceptions or variations are obtained in accordance with the procedures outlined in the PPM. PPM Volume I contains several chapters of interest to implementing Complete Streets on the SHS including Chapter 2 (Design Geometrics and Criteria), Chapter 8 (Pedestrian, Bicycle, and Public Transit Facilities), Chapter 21 (Transportation Design for Livable Communities), and Chapter 25 (Design Criteria for Resurfacing, Restoration, and Rehabilitation [RRR] projects).

Manual on Uniform Traffic Control Devices (MUTCD)

The MUTCD sets the national standard for the design and application of traffic control devices including roadway markings, traffic signs, and signals. The Federal Highway Administration oversees application of the MUTCD. The State of Florida chooses to adopt the Federal MUTCD as its manual for signs, pavement markings, and traffic control devices.

Local agencies have limited flexibility to deviate from the provisions of the MUTCD in the use of traffic control devices due to the relationship between the MUTCD, the Code of Federal Regulations, and state law. The MUTCD does provide flexibility within its general provisions for items such as application of standard traffic control devices, use of custom sign legends for unique situations, traffic sign sizes, and sign placement specifics.

In contrast, agencies do not generally have the flexibility to develop signs that are similar in purpose to signs within the manual while using different colors, shapes, or symbols. Agencies are also not authorized to establish traffic regulations that are not specifically allowed or conflict with state law. The provisions of the MUTCD and related state laws thus make it difficult to deploy new traffic control devices. This can result in complications, especially in the areas of speed management, pedestrian crossings, and bikeway treatments.

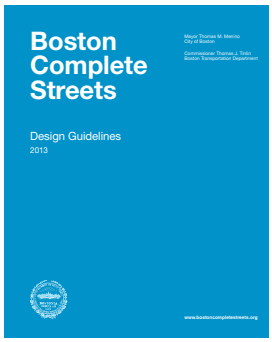
Miami-Dade County Public Works Manual

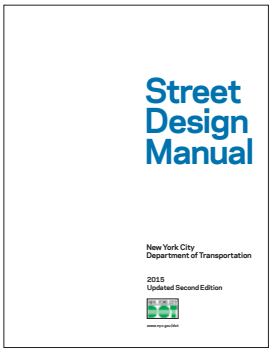
The County's Public Works Manual has long been the standard engineers and agency staff have used to make design decisions when building or reconstructing local streets. This manual is prescriptive, providing a defined solution or criteria for elements of street design. By contrast, the Complete Streets Design Guidelines provide a range of options to consider, allowing the practitioner to make an informed decision that is context sensitive, resulting in streets that more closely align with the purposes and environments they serve. The Complete Streets Design Guidelines empower the user to identify the elements of street design which make sense for the application being considered, while still allowing for conformity with the Public Works Manual.

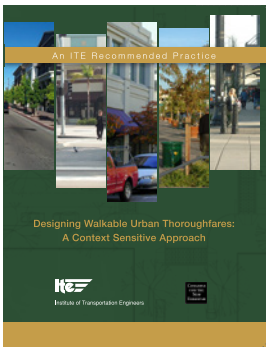
Warrants

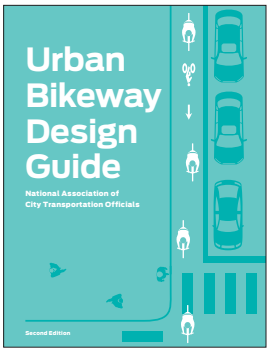
The federal MUTCD establishes warrants for the use of some traffic control devices. The FDOT *Traffic Engineering Manual* provides statewide guidance on a range of traffic engineering applications, including intersection traffic control devices. Stop signs, traffic signals, and flashing beacons are expected to meet minimum thresholds before application. These thresholds include such criteria as number of vehicles, number of pedestrians or other uses, distance to other devices, crash history, and more. These warrants often prevent local engineers from applying devices that, in their opinion, may improve safety. For example, trail and/or pedestrian crossings of busy, high-speed, wide arterial streets may need signals for user safety, but they may not meet the warrants.

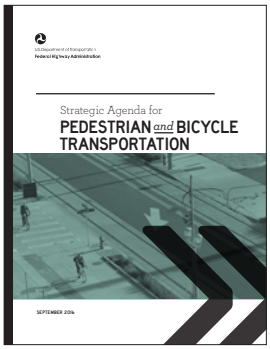
As with street design guidelines, cities may establish their own warrants or modify those suggested by the MUTCD to suit their context for use of some traffic control devices. In special circumstances that deviate from their own warrants, cities need to document their reasons for the exception. For example, they may say trail crossings or school crossings qualify for certain traffic control devices.

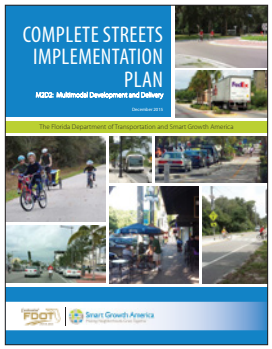












COMPLETE STREETS BEST PRACTICES DOCUMENTS

The movement toward designing with the Complete Streets approach has resulted in the creation of many excellent resources regarding Complete Streets design. The creation of this document was aided through a thorough review of best practice approaches across the country. Design standards were included based on their inclusion across a number of leading publications as well as a context-sensitive approach to the unique needs and opportunities in Miami-Dade County. The following list provides the main resources which were consulted in the formulation of these guidelines:

- Complete Streets Chicago Design Guidelines (2013)
- Boston Complete Streets Design Guidelines (2013)
- Street Design Manual, New York City Department of Transportation (2015)
- Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)
- National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, Second Edition (2014)
- NACTO Urban Street Design Guide (2013)
- NACTO Transit Street Design Guide (2016)
- FHWA Achieving Multimodal Networks, Applying Design Flexibility & Reducing Conflicts (2016)
- FHWA Strategic Agenda for Pedestrian and Bicycle Transportation (2016)
- FDOT Complete Streets Implementation Plan (2015)

DOCUMENT OVERVIEW

This set of guidelines builds on current thinking about street design, materials, lighting, and project implementation around the world to promote a great public realm. The layout and design of each chapter is organized in a hierarchy to guide readers from high level principles to individual design treatments. In contrast with other design manuals, this guide does not include separate automobile design standards from all other modes nor does it lump all other modes together as an afterthought. Instead these guidelines focus on sidewalks as the more intimate portion of the right-of-way, where interaction between land use and the built environment is most directly influenced by street design, and then focus on the traveled way, or the space between the curbs, as the space in which all modes get from one place to another. Finally, the document focuses on intersections as means to safely integrate the sidewalks and traveled way when they meet. A chapter on smart streets is included to promote innovation and flexibility for design and thinking in Miami-Dade County as emerging technologies are embraced in street design.

The typologies identified in Chapter 2 are the basis of these guidelines. Their development is intended to supplement the tradition functional street classifications to allow for context-aware decision making during the design process. They also allow communities to recognize the streets that best reflect their vision for improvements during design projects.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Typologies

2

The concept of typologies reflects the need to categorize and group items, whether streets or otherwise, by similar characteristics. By assigning streets to typologies based upon the character of the street as well as the context of the surrounding environment, design options can be best selected to achieve the Complete Streets goals on every street. The establishment of typologies must keep in mind how streets and surrounding conditions will evolve in the future, allowing for Complete Streets to be relevant to more than just the existing urban form.

This chapter presents three sets of typologies, based upon the elements that dictate the complete picture of a street's place in the overall environment.

Street – defines the uses and functions among the multiple transportation modes present. Relevant characteristics include width of available land (right-of-way), the design/target speeds for vehicles, parking demands placed on the street, the number of available travel lanes, and volumes by mode.

Overlays – defines the statutory and planning restrictions which have been placed on streets and which may impact design decisions.

Land Use – defines the character of the buildings form and function along the street and immediately surrounding. Relevant characteristics include the regulatory framework and economic characteristics of the land uses.

OVERVIEW OF TYPOLOGIES

Streets

The traditional system used to classify streets, functional classification, did so based upon motor vehicle capacity and travel considerations. This method of planning largely created auto-centric streets which focused almost exclusively on moving vehicles without consideration for the context of the surrounding neighborhood. The functional classifications below represent the traditional, auto-oriented street classifications:

- Arterials (primary and secondary)
- Collectors
- Locals

By considering the local context, typologies switch the focus of design decisions to placemaking and community preferences. The increased number of typologies in this methodology reflect the wide variety of contexts in which streets serve the community and reflect the need for the design to be more closely aligned with the environment it serves. **Table 2-1** aligns the following typologies with the traditional functional classification street types.

- **LA** – Limited Access/Expressway
- **TH** – Thoroughfare
- **FR** – Feeder Road
- **CS** – Civic Street
- **NS** – Neighborhood Street
- **SW** – Service Way
- **PS** – Paseo

TABLE 2-1 CLASSIFICATION BY STREET TYPOLOGY

	Thoroughfare	Feeder Road	Civic Street	Neighborhood Street, Service Way, Paseo
Primary Arterial	■	■		
Secondary Arterial	■	■	■	
Collector		■	■	
Local			■	■

Overlays

Overlays describe various special planning categories and statutory elements that may impact design decisions. The identified overlays for Miami-Dade County are listed below and are detailed in the subsequent Overlays section.

- **GS** – Gateway Street
- **HSS** – Historic/Scenic Street
- **SPC** – SMART Plan Corridor

Land Uses

Land use is integral to the transportation system; when land use is overlooked in the street design, there is a disconnect between the surrounding neighborhoods and the transportation facilities which serve them. Eight land use typologies have been identified within Miami-Dade County, based in part on the Miami-Dade Comprehensive Development Master Plan (CDMP) and the Open Space Master Plan. Their classification simplifies from zoning-based typologies into groups with characteristics that are easily understood and recognized. They are listed below:

- **UC** – Urban Center
- **UR** – Urban
- **RS** – Suburban Residential
- **MU** – Suburban Commercial/Mixed-Use
- **I** – Institutional
- **IN** – Industrial
- **P** – Parks and Open Space
- **AN** – Agriculture and Natural

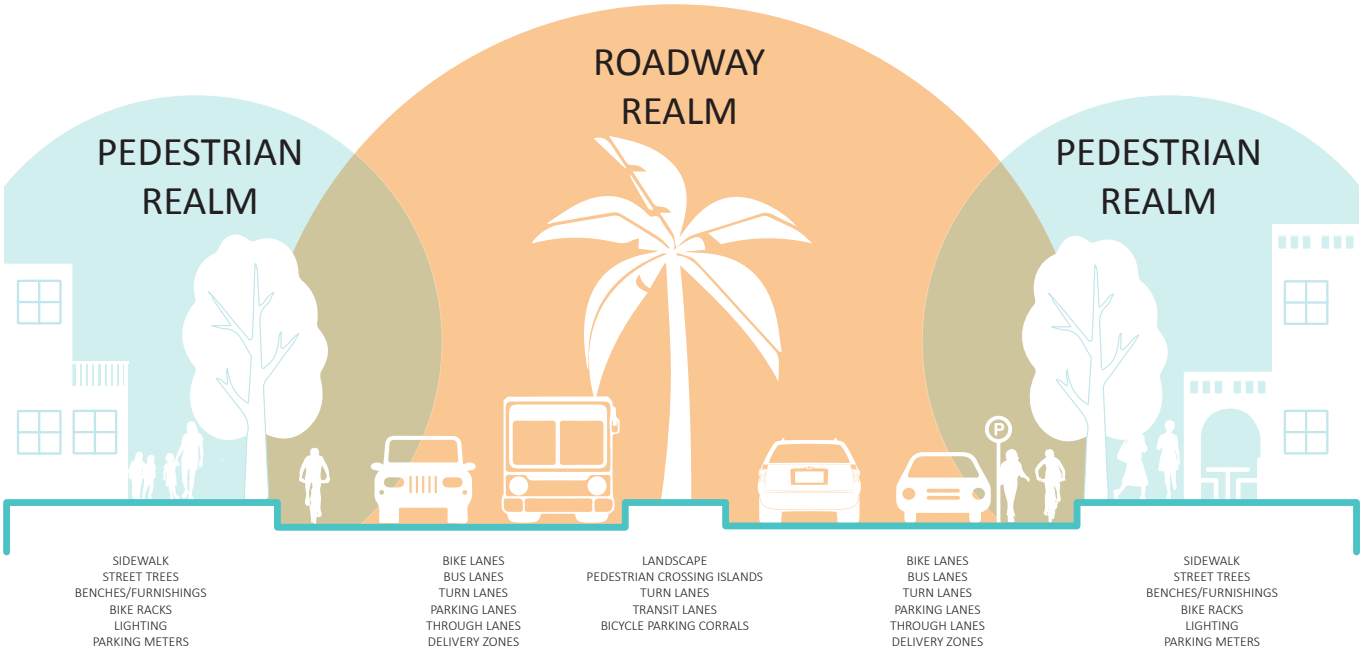


Figure 2-1 ***Cross-section elements***

STREET CHARACTERISTICS

Speed and Safety

Street typologies and their respective design guidelines are formed in large part on the understanding that speed is a major risk factor when it comes to road deaths. As speed increases, a driver's field of vision narrows, making it less likely that they will see another vehicle entering an intersection, someone riding a bike on the side of the road, or a child stepping off a curb. The distance it takes a vehicle to stop also increases as speed increases.

At 20 mph, a car will stop in 45 feet; at 30 mph, it will take that same car 85 feet to stop; at 40 mph, it will take 145 feet to stop. By going twice as fast, a car takes over 3 times as long to stop, making it much less likely that a driver will be able to stop before hitting someone.

Figure 2-1 demonstrates the danger to people walking from a driver's speed. The risk of death increases dramatically as speed increases; in fact, a doubling of speed is associated with an eight-fold increase in mortality rate for those struck.

"In urban areas, the design of the street should generally be such that it limits the maximum speed at which drivers can operate comfortably, as needed to balance the needs of all users."[1]

The speeds presented in the following tables are target speeds. Traditionally, streets have been designed for a speed of five or ten miles an hour faster than the posted speed limit to ensure a degree of safety for drivers who speed. However, this philosophy has shifted the impact from motorists to the most vulnerable road users, people walking and biking. A target speed reassigns risk and responsibility back to those taking the action, the drivers. Target speeds are both design speeds and posted speeds. If a street has a target speed of 25 mph, the design elements such as curb radii, lane widths, roadway superelevation, horizontal and vertical curvature should support a vehicle going no faster than that speed. Street design elements should enforce the chosen target speed.

1 FHWA, "Relationship between Design Speed and Posted Speed" memorandum, October 7, 2015. Sourced from FHWA *Achieving Multimodal Networks*

Figure 2-2 *Fatality Rates by Impact Speed*

Thoroughfare (TH)

A regionally significant roadway that plays a key role in movement of people, connects cities and districts and provides connectivity across barriers such as freeways and waterways. Supports movement of large volumes of people and accommodates longer trips.

TABLE 2-2 THOROUGHFARE CHARACTERISTICS

Typology Code	TH
Typology Name	Thoroughfare
Description	■ Widest right-of-way of the typologies ■ Raised, often landscaped medians ■ Sidewalks may be separated from traveled way by landscaping ■ Connects cities, districts ■ Provides connections across barriers (e.g. freeways, waterways) ■ Supports movement of large volumes of people, accommodates longer trips ■ Often identified as boulevards
Through Lanes	4-6
Target Speed	30-35 mph
Block Length	1/8 – ¼ mile (660-1320 ft)
ADT (2-way)	~20k +
Flow	2 way
On-Street Parking	Rare
Examples	■ SW 40th Street / Bird Road ■ NW 27th Avenue

TABLE 2-3 THOROUGHFARE FEATURES

Transit Service	Regional and Local
Median	Yes
Driveway Access	Minimal
Pedestrian Facilities	Sidewalk (Landscaped Buffer)
Bicycle Facilities	Cycle track or separated path
Freight	Regional truck route

SW 40th Street

NW 27th Avenue

SW 40th Street - Source Google Street View

NW 27th Avenue - Source Google Street View

Feeder Road (FR)

A key roadway that connect thoroughfares and civic streets to provide access between urban centers, between urban centers and neighborhoods or between neighborhoods themselves.

TABLE 2-4 FEEDER ROAD CHARACTERISTICS

Typology Code	FR
Typology Name	Feeder Road
Description	■ Main roads ■ Potential median ■ Connects both urban centers and urban centers with neighborhoods ■ Connects thoroughfares to civic streets
Through Lanes	2-4
Target Speed	20-30 mph
Block Length	1/16 – 1/8 mile (300-660 ft)
ADT (2-way)	5-25k
Flow	1 or 2 way
On-Street Parking	Rare
Examples	■ Miami Avenue ■ W 60th Street

TABLE 2-5 FEEDER ROAD FEATURES

Transit Service	Regional and Local
Median	Optional
Driveway Access	Yes
Pedestrian Facilities	Sidewalk (may have landscaped buffer)
Bicycle Facilities	Bike lane
Freight	Local truck route

N Miami Avenue

W 60th Street

N Miami Avenue - Source Google Street View

W 60th Street - Source Google Street View

Civic Street (CS)

A pedestrian-oriented street in shopping and entertainment destinations which provides access to businesses and institutional facilities. Must balance the needs of people passing through as well as the needs of those who live and work along the street.

TABLE 2-6 CIVIC STREET CHARACTERISTICS

Typology Code	CS
Typology Name	Civic Street
Description	■ Mostly serves local traffic ■ Connects commercial areas and neighborhoods ■ Prioritizes local activity ■ Allows for through movement
Through Lanes	1-3
Target Speed	15-20 mph
Block Length	150-300 ft
ADT (2-way)	3-15k
Flow	1 or 2 way
On-Street Parking	Frequent
Examples	■ Flagler Street ■ 41st Street / Arthur Godfrey Road

TABLE 2-7 CIVIC STREET FEATURES

Transit Service	Local
Median	No
Driveway Access	Yes
Pedestrian Facilities	Sidewalk (may have landscaped buffer)
Bicycle Facilities	Bike lane or shared
Freight	Local deliveries only

Flagler Street

41st Street / Arthur Godfrey Road

Flagler Street - Source Google Street View

41st Street / Arthur Godfrey Road - Source Google Street View

Neighborhood Street (NS)

Local streets with low vehicle volumes and slow speeds with the primary function of serving local trips. May provide access to parks, schools or institutional facilities as well as local retail and services.

TABLE 2-8 NEIGHBORHOOD STREET CHARACTERISTICS

Typology Code	NS
Typology Name	Neighborhood Street
Description	■ Almost exclusively serves local traffic ■ Characterized by lower volumes and lower speeds ■ Little to no striping necessary
Through Lanes	1
Target Speed	10-20 mph
Block Length	<300 ft
ADT (2-way)	<6k
Flow	1 or 2 way
On-Street Parking	Yes
Examples	n/a

TABLE 2-9 NEIGHBORHOOD STREET FEATURES

Transit Service	None
Median	No
Driveway Access	Yes
Pedestrian Facilities	Sidewalk (may have landscaped buffer)
Bicycle Facilities	Shared
Freight	Local deliveries only

Virginia Street

NE 69th Street

Virginia Street - Source Google Street View

NE 69th Street - Source Google Street View

Service Way (SW)

Supplemental streets and alleys that provide secondary means of vehicular service, with a focus on commercial delivery and loading/unloading of goods.

TABLE 2-10 SERVICE WAY CHARACTERISTICS

Typology Code	SW
Typology Name	Service Way
Description	■ Narrow traveled way ■ No sidewalks ■ Provides a short link between two streets
Through Lanes	1
Target Speed	5-10 mph
Block Length	NA
ADT (2-way)	NA
Flow	1 or 2 way
Parking	Loading Only
Examples	n/a

TABLE 2-11 SERVICE WAY FEATURES

Transit Service	None
Median	No
Driveway Access	Yes
Pedestrian Facilities	Shared space
Bicycle Facilities	Shared space
Freight	Local deliveries only

Alley, Ponce De Leon Boulevard

Alley, South Miami

Alley, Ponce De Leon Boulevard - Source Google Street View

Alley, South Miami - Source Google Street View

Paseo (PS)

A public walkway that provides pedestrian access between streets, pedestrian amenities, or gathering places and has limited vehicle access.

TABLE 2-12 PASEO CHARACTERISTICS

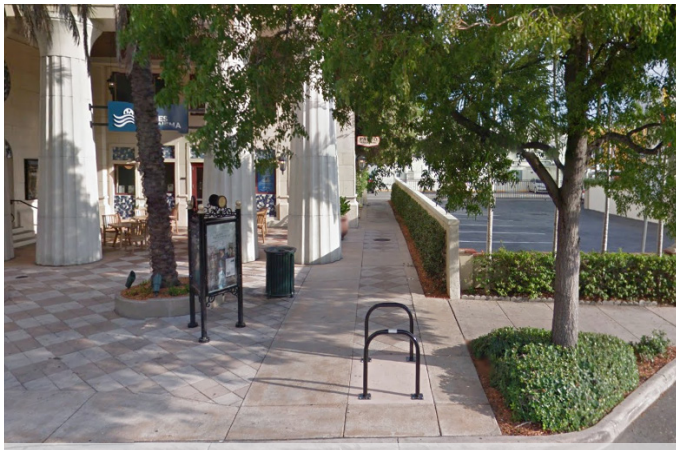
Typology Code	PS
Typology Name	Paseo
Description	■ Passageway or walkway ■ May not resemble a typical street ■ Limited vehicle access
Through Lanes	NA
Target Speed	NA
Block Length	NA
ADT (Average Daily Traffic)	NA
Flow	NA
Parking	No
Examples	■ 262 Aragon Ave, Coral Gables ■ 190 NE 3rd St, Downtown Miami

TABLE 2-13 PASEO SECONDARY CHARACTERISTICS

Transit Service	None
Median	No
Driveway Access	No
Pedestrian Facilities	Shared space
Bicycle Facilities	Shared space
Freight	No

Paseo, Aragon Avenue

Paseo, NE 3rd Street



Paseo, Aragon Avenue - Source Google Street View

Paseo, NE 3rd Street - Source Google Street View

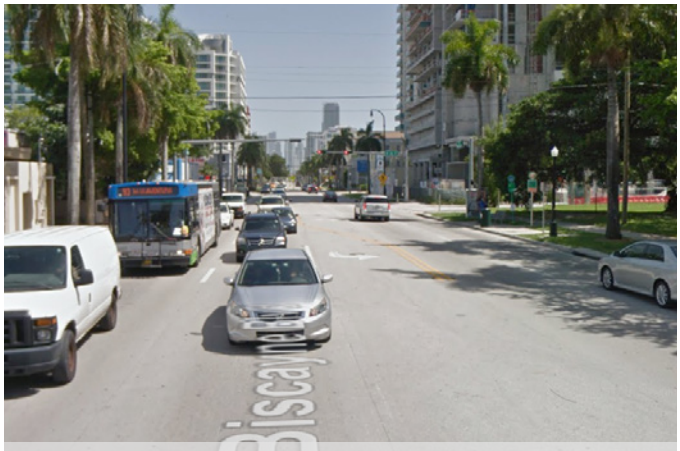
OVERLAY TYPOLOGIES

Gateway Street (GS)

TABLE 2-14 GATEWAY STREET CHARACTERISTICS

Typology Code	GS
Typology Name	Gateway Street
Source	Miami-Dade County Open Space Master Plan
Description	As identified in the Open Space Master Plan: Streets that are historically significant and may trace back to the original settlement patterns of the Miami-Dade area; those that have become regionally significant; and those that house premium transit.
Example	■ Sunset & Tamiami Trail ■ US 1 ■ US 27 – Okeechobee Road ■ Krome Avenue, 88th Street (Kendall), 27th Avenue

US 1 (Biscayne Boulevard)



US 1 (Biscayne Boulevard) - Source Google Street View

Historic/Scenic Street (HSS)

TABLE 2-15 HISTORIC/SCENIC STREET CHARACTERISTICS

Typology Code	HSS
Typology Name	Historic/Scenic Street
Source	Miami-Dade County Open Space Master Plan
Description	As identified in the Open Space Master Plan: The streets that provide access to heritage sites, historic or cultural districts, or are historic corridors. Additionally, these streets may also provide access to scenic natural resources or significant archaeological sites.
Example	■ Ocean Drive ■ Collins Avenue (A1A) ■ Old Cutler Road, Coral Way ■ Rickenbacker Causeway/ Commodore Trail

Coral Way

Ocean Drive

SMART Plan Corridor (SPC)

TABLE 2-16 SMART PLAN CORRIDOR CHARACTERISTICS

Typology Code	SPC
Typology Name	SMART Plan Corridor
Source	Strategic Miami Area Rapid Transit (SMART) Plan
Description	Streets designated in the Strategic Miami Area Rapid Transit (SMART) Plan as priorities for the advancement of rapid transit corridors and transit supportive projects.
Example	Rapid Transit Corridors: ■ Beach Corridor ■ East-West Corridor ■ Kendall Corridor ■ North Corridor ■ Northeast Corridor ■ South Dade Transit Way Bus Express Rapid Transit (BERT) Network: ■ Beach Express ■ Flagler Limited Express ■ Florida's Turnpike Express ■ Northwest Express ■ South Express ■ Southwest Express

South Miami-Dade Busway

LAND USE TYPOLOGIES

Urban Center (UC)

Moderate- to high- intensity designed unified areas which contain a concentration of different urban functions. Urban centers can be on a variety of scales—from larger downtowns to emerging urban centers such as Dadeland. These uses will contain business, employment, civic and/or high- or moderate- density residential uses.

Brickell

TABLE 2-17 URBAN CENTER CHARACTERISTICS

Typology Code	UC
Typology Name	Urban Center
Characteristics	■ Moderate to high intensity unified areas ■ Concentration of different urban functions ■ Range from larger downtowns to urban centers ■ Include business, employment, civic, and/or high- or moderate-density residential
Typical Zoning Designations	
Typical Buildings	Buildings are tall and dense. Wide sidewalks provide space for both through movement and gathering/café space. Buildings abut the sidewalk.
Examples	■ Downtown Miami ■ Dadeland ■ Brickell

Urban (UR)

Areas surrounding urban centers that provide a higher density of commercial, retail, office and residential uses and provide more efficient land use than suburban development forms. Areas will likely include mixed-use development and provide a more connected transportation environment including pedestrian-oriented streets and connections to transit.

TABLE 2-18 URBAN CHARACTERISTICS

Typology Code	UR
Typology Name	Urban
Characteristics	■ Areas surrounding urban centers ■ Provide a higher density of mixed uses ■ Include commercial, retail, office, and residential ■ Provide a connected transportation environment with pedestrian oriented streets, transit connectivity
Typical Zoning Designations	
Typical Buildings	Variable height, ranging from single story to mid-rise buildings, mixed-use buildings. Buildings abut the sidewalk. Surface parking lots may be present.
Examples	■ Upper East Side ■ Coconut Grove ■ South Beach

Coconut Grove

Miami Beach

Suburban Residential (RS)

Low- and low-medium density residential land uses generally characterized by single-family homes and may include townhouses and low-rise apartments with significant surrounding open space.

TABLE 2-19 SUBURBAN RESIDENTIAL CHARACTERISTICS

Typology Code	RS
Typology Name	Suburban Residential
Characteristics	■ Low- and medium-density residential ■ Density can vary with number of stories and spacing between houses
Typical Zoning Designations	
Typical Buildings	Single-family homes. May include townhouses or low-rise apartments with significant surrounding open space. Front yard setback from street.
Examples	■ Cutler Ridge ■ West Kendall

Miami Shores

Southwest Miami-Dade

Suburban Commercial/Mixed-Use (MU)

Areas near or within residential communities that provide basic retail and services to residents in the area. May include business parks, shopping centers or employment centers, where industries co-locate to gain benefits of shared resources and economies of scale. Includes mixed-use projects outside of designated urban centers, where a mixed of retail, office and residential uses are co-located. This also includes live-work development as transitional uses between commercial and residential areas.

TABLE 2-20 SUBURBAN COMMERCIAL/ MIXED-USE CHARACTERISTICS

Typology Code	MU
Typology Name	Suburban Commercial/Mixed-Use
Characteristics	■ Near or within residential communities ■ Provide basic retail and services to residents in the area ■ May include business parks, shopping centers, or employment centers ■ Can include mixed-use office, retail, and residential uses outside of urban centers; serves as a transition between commercial and residential areas
Typical Zoning Designations	
Typical Buildings	Community retail will typically be one story. Office parks and mixed-use buildings may range from 1-5 stories. Mixed-use buildings typically abut the sidewalk. Employment centers and shopping centers are typically focused away from the street.
Examples	■ Downtown South Miami ■ Miami Lakes Town Center ■ Coral Way

Downtown South Miami

Coral Gables

Institutional (I)

Includes major institutional land uses identified in the Institutions, Utilities, and Communications land use in the CDMP – Land Use Element, including major hospitals, medical complexes, colleges, universities, major government office centers and military installations.

TABLE 2-21 INSTITUTIONAL CHARACTERISTICS

Typology Code	I
Typology Name	Institutional
Characteristics	Typically sit on large sites (2+ acres) with a single use type (hospital, college, government center)
Typical Zoning Designations	
Typical Buildings	Typically oriented internally, away from the street. Building types may range from high density hospitals and office buildings to low density college campuses and military bases.
Examples	University of Miami

Barry University crosswalk on North Miami Avenue

Industrial (IN)

Includes the Industrial and Office land use category from the CDMP – Land Use Element.

TABLE 2-22 INDUSTRIAL CHARACTERISTICS

Typology Code	IN
Typology Name	Industrial
Characteristics	■ Wholesale, manufacturing and other industrial purposes ■ May be organized as an industrial park ■ Requires accommodations for frequent access by large trucks
Typical Zoning Designations	
Typical Buildings	Height is generally between 1-4 stories. Buildings typically have little to no setback but are not oriented toward the street.
Examples	■ Medley ■ Airport West

Typical Industrial Land Use

Parks and Open Space (P)

Includes the Open Land and Parks and Recreation land use categories from the CDMP – Land Use Element.

TABLE 2-23 PARKS AND OPEN SPACE CHARACTERISTICS

Typology Code	P
Typology Name	Parks and Open Space
Characteristics	■ Parks, open space preserves, and water ■ Streets may border or enter parks ■ Large, landscaped medians may double as parks
Typical Zoning Designations	
Typical Buildings	May contain internal buildings. Most parks have a definite edge.
Examples	■ A.D. Doug Barnes Park ■ Greynolds Park ■ Matheson Hammock Park

Doral Park

Miami Gardens Trail

Agriculture and Natural (AN)

Includes the Agriculture and Environmental Protection land use categories from the CDMP – Land Use Element.

TABLE 2-24 AGRICULTURE AND NATURAL CHARACTERISTICS

Typology Code	AN
Typology Name	Agriculture and Natural
Characteristics	■ Cultivated or natural land ■ May contain some buildings for residences or ranger stations/visitor centers
Typical Zoning Designations	
Typical Buildings	Low density buildings meant to fit within the natural context
Examples	Redland

Tamiami Trail

Natural Area Along a Canal


HEART
HEALTH
WALK

Sidewalks

3

PRINCIPLES

Most trips begin and end on foot. These sidewalk design guidelines are established to enhance the accommodations and amenities focused toward people walking and enjoying public spaces. All memorable streets have inviting, vibrant sidewalks: Avenue des Champs Elysee, La Rambla, O'Connell Street. Continuing in this tradition of excellence, these guidelines establish the experience of people as the guiding factor in space allocation and amenities.

Quality sidewalks and public spaces promote walking, whether it is to connect to transit, to buy groceries at the corner store, or from parking a vehicle or bike. Increasing the amount that Miami-Dade's citizens walk can improve physical and emotional wellbeing, can reduce air pollution, and can reduce the number of vehicles competing for space on streets.

A well-designed public realm can also promote a sense of community and improve social capital among residents, visitors, and businesses in neighborhoods across the county. Creating an environment in which people can sit, linger, and see and be seen sets the stage for the formation of strong social bonds and a dynamic community.

These guidelines empower communities to design resilient public spaces that provide for stormwater detention and filtration, improving both the public waterways as well as improving how streets respond to rain events. The inclusion of a healthy tree canopy can promote biodiversity within the urbanized area, can improve emotional wellbeing, and can improve air quality by absorbing particulate matter.

A missing sidewalk creates a dangerous situation and an unpleasant environment.

A well-designed sidewalk is inviting and safe.

Zones

The sidewalk, or pedestrian realm, is regularly divided into three zones for the purposes of design. **Figure 3-1** illustrates how the three zones are arranged to create a comprehensive pedestrian realm.

Frontage Zone

The frontage zone is the area between buildings, fences, or yards, and the Pedestrian Zone. For buildings that abut the sidewalk, this zone provides a buffer between building activities (doors opening, window shoppers) and through movement along the sidewalk. This space is for café seating, store displays, and building entrances.

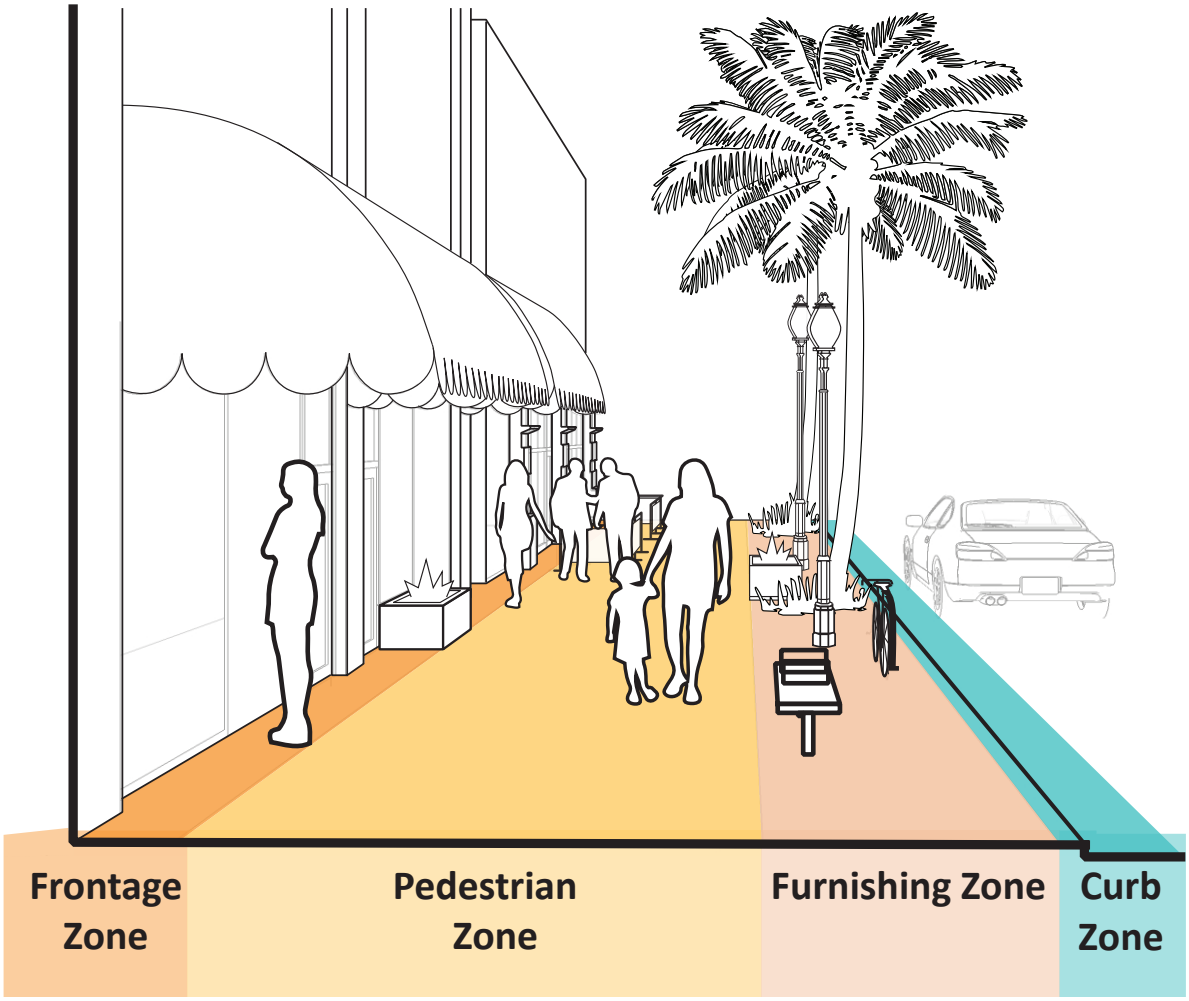


Figure 3-1 ***Sidewalk Realm Zones***

Pedestrian Zone

The pedestrian zone is the area dedicated to walking or moving along the sidewalk. It should provide a logical, straight path and line up with crosswalks if at all feasible. Obstructions, displays, plantings, and furniture should not extend into the pedestrian zone. ADA-compliant surfaces and slopes are required for all sidewalks. Surfaces should allow for this zone to retain its mobility function in all weather conditions. Lighting and width are important to creating a welcoming environment that accommodates all users.

Furnishing Zone

The furnishing zone is the area between the curb and the Pedestrian Zone. This zone contains street trees and landscaping, benches and transit shelters, lighting and signal poles, utility boxes, parking meters, and trash cans. Locating these items in the Furnishing Zone prevents obstructions within the Pedestrian Zone. These items also establish a comfort and safety buffer between moving traffic and pedestrians on the sidewalk and can also provide space for people accessing parked cars.

Curb Zone

The area between the edge of the roadway and the Furnishing Zone. May be expanded to include “flush” cycle tracks and traffic calming features such as parklets and mid-block crosswalks. The curb zone should remain clear of obstacles to allow for access to parked vehicles.

PREFERRED DESIGN STANDARDS

Width

The proper width for a sidewalk contributes to a feeling of comfort and scale for pedestrians. Too narrow of a sidewalk can create collisions between people or may lead to people walking in the street to move around crowds. Too large of a sidewalk can feel empty or barren.

Adequate width should be provided to support social and staying uses on streets within the land use contexts of Urban Center, Urban, and Suburban Commercial/ Mixed-Use. Allowing for gathering spots contributes to the vitality of a street and the service it provides to the community.

Frontage Zone: should be maximized to provide space for café seating, green elements, and gathering, but not at the expense of reducing the Pedestrian Zone below the recommended minimum widths.

Pedestrian zone: should be kept clear of obstructions; should be as straight as is feasible; should provide adequate width, particularly in high pedestrian volume areas.

Furnishing Zone: should be maximized to provide as great a buffer as possible between traffic and pedestrians, this can be accomplished with bike lanes or street parking where there is not sufficient room for a large enough furnishing zone. Where on-street parking is provided, curb extensions or other elements can be used to calm traffic and provide extra space for furniture and greenscaping.

Curb Zone: should be free from all objects. Should not be counted as width for other zones.

Driveways

Driveways provide access between streets and off-street parking or loading areas. Driveways should be designed to continue the priority of people walking on the sidewalk. To provide for a safe walking environment, a continuous and level Pedestrian Zone should be maintained across driveways. An effective way to prioritize people walking is to continue the pavement type of the Pedestrian Zone across a driveway, indicating to drivers that they are encroaching upon the pedestrian realm. Driveways should be kept as narrow as possible to encourage slower speeds entering and leaving driveways.

TABLE 3-1 RECOMMENDED DRIVEWAY WIDTHS

	Minimum	Maximum
Residential	10'	12'
Commercial	20'	24'

SIDEWALKS BY STREET TYPE

The street types identified in Chapter 2 serve varying functions for mobility across Miami-Dade County. As such, the sidewalks along these streets must accommodate and even promote the street's function for its pedestrian users. The following pages provide a description of the intended sidewalk character for each street type, as well as design considerations to be mindful of when trade-offs are being considered.

Thoroughfare

The thoroughfare's focus on mobility and providing connections between communities typically is associated with lower density, inwardly-focused land uses. Pedestrian trips along thoroughfares can be uncomfortable due to the auto-oriented scale of the street and the higher volumes of fast-moving vehicles. The street's sidewalk should thus be characterized more by its separation and protection from the traveled way and less by the need for places to people watch or interact with storefronts. In locations where thoroughfares do pass through more pedestrian-oriented land uses (such as Urban, Urban Center, or Suburban Commercial/Mixed-Use typologies) balancing space between the Frontage and Furnishing Zones may necessitate a reduction in lanes to create space for a parking-buffer or an extension of the curb.

Feeder Road

Feeder Roads provide connections between communities and between neighborhoods and urban centers and are thus well situated to promote a switch from personal vehicles to walking for short errand and work trips. Like thoroughfares, the land uses along the street are often residential in nature. Sidewalks along feeder roads will focus on pedestrian mobility and a furnishing zone buffer of trees or landscaping. A frontage zone will likely only be necessary where land uses abut the sidewalk and right-of-way, such as townhome stoops. As feeder roads enter urban or commercial centers, parking may again substitute for a narrower furnishing zone to provide a buffer, while the frontage zone is expanded to support the land uses and public realm goals of the street.

Civic Street

Civic Streets exist in pedestrian-oriented shopping and entertainment districts and provides access to businesses and institutional facilities. As such, they must strike a balance between allowing through movement and supporting the public life and economic activities in the district. Civic streets should provide ample space for congregating, encouraging people to activate the street at all times of the day, in turn creating a safer environment. A frontage zone should be provided to support shops and restaurant seating. As a lower speed street, the buffer purpose of the furnishing zone can be refocused toward the pedestrian zone in providing sufficient width to support large volumes of people.

Neighborhood Street

Neighborhood Streets are designed for lower vehicle volumes and slower target speeds with the primary function of serving local trips. The residential or low density commercial land uses associated with these streets likely require little to no frontage zone. The pedestrian realm should be well lit to allow for a perception of safety in areas where activity at night may be too low to provide ample “eyes on the street.”

Service Way

Service Ways are streets and alleys that provide secondary means of vehicular service, with a focus on commercial delivery and loading/unloading of goods. Sidewalks may be provided in some instances, but the primary focus of these streets is on deliveries and loading spaces. Sidewalks may be prohibited to discourage people from walking in these spaces.

Paseo

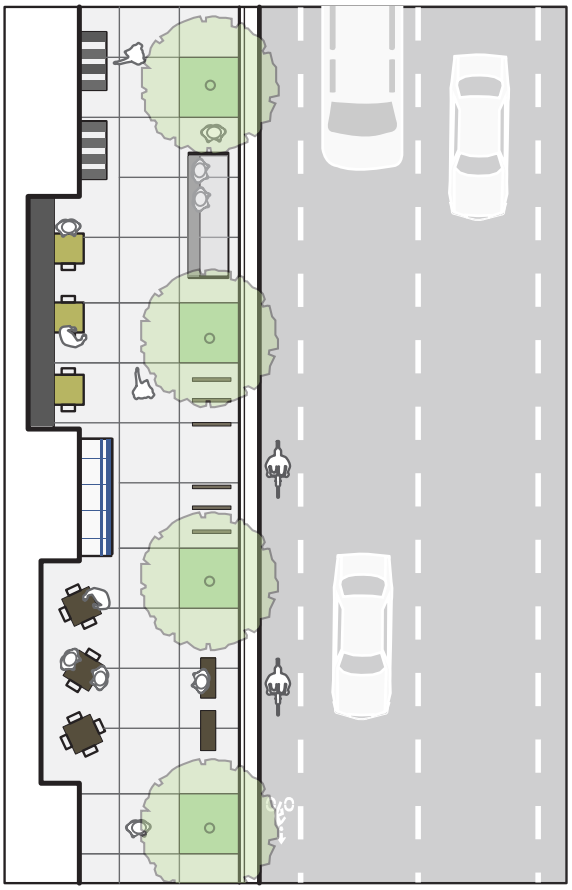
Paseos are public walkways that provide pedestrian access between streets, pedestrian amenities, or gathering places and have limited vehicle access. In most circumstances, paseos will not feature and curb or official sidewalk zone since people walking are their primary focus. In cases where limited vehicle access or bike facilities are included, items such as paver textures and colors, landscaping, or pavement markings can be used to designate where pedestrians should be. On these streets, the frontage, pedestrian, and furnishing zones may meld together, with the higher pedestrian volumes and lower speeds of all users allowing for a more creative organization of amenities.

Land Use Context

A key component of designing a context-sensitive pedestrian realm is identifying the appropriate context zone which the street traverses. Notably, the tables on the following pages provide guidance for five of the identified land use typologies and do not provide guidance for institutional, parks and open space, or agricultural and natural types. For these land uses it is recommended that designers take into consideration the overall context within which these highly specific land use types exist. For example, an institutional use such as a government center may exist within an urban center environment or a suburban commercial/mixed-use context. The appropriate sidewalk design for the institutional building will reflect the larger surrounding land use context.

TABLE 3-2 THOROUGHFARE SIDEWALK WIDTHS BY ZONE (IN FEET)

A regionally significant roadway that plays a key role in movement of people, connects cities and districts and provides connectivity across barriers such as freeways and waterways. Supports movement of large volumes of people and accommodates longer trips.

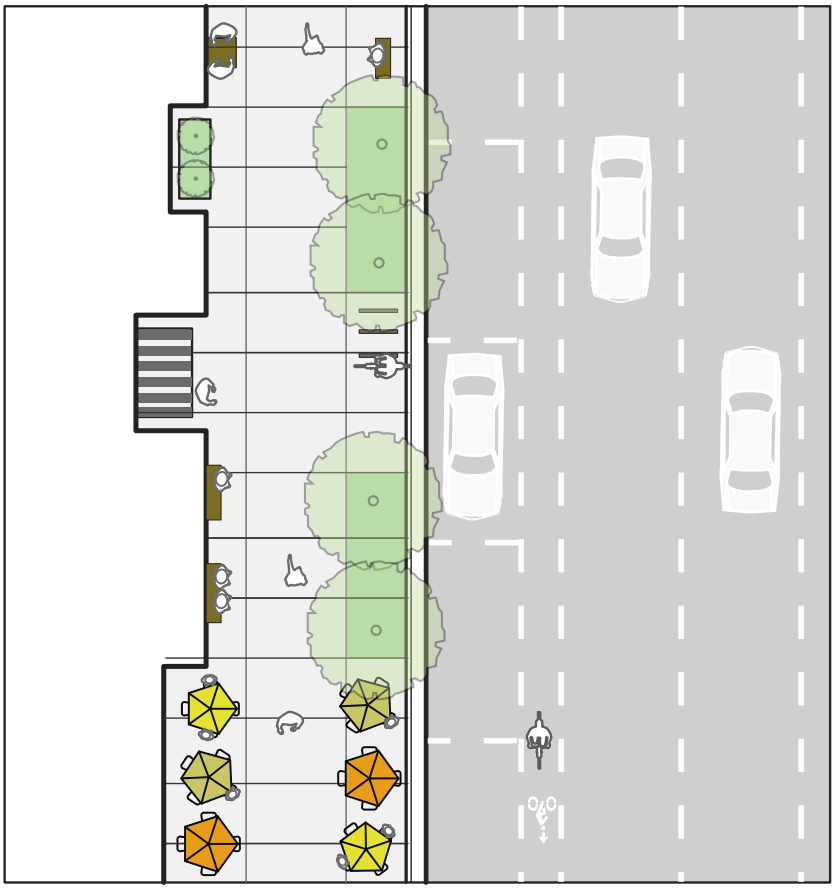


Thoroughfare in a Mixed-Use Context

Context Zones			Thoroughfare (TH)			
			Frontage Zone	Pedestrian Zone	Furnishing Zone	Total Width
UC	**Urban Center**	Preferred	5	12	8	25
		Minimum	1	10	5	16
U	**Urban**	Preferred	1	10	6	17
		Minimum	1	8	5	14
RS	**Suburban Residential**	Preferred	0	6	8	14
		Minimum	0	5	5	10
MU	**Suburban Commercial/ Mixed-Use**	Preferred	4	6	6	16
		Minimum	1	6	5	12
IN	**Industrial**	Preferred	1	6	5	12
		Minimum	1	5	0	6

TABLE 3-3 FEEDER ROAD SIDEWALK WIDTHS BY ZONE (IN FEET)

A key roadway that connect thoroughfares and civic streets to provide access between urban centers, between urban centers and neighborhoods or between neighborhoods themselves.

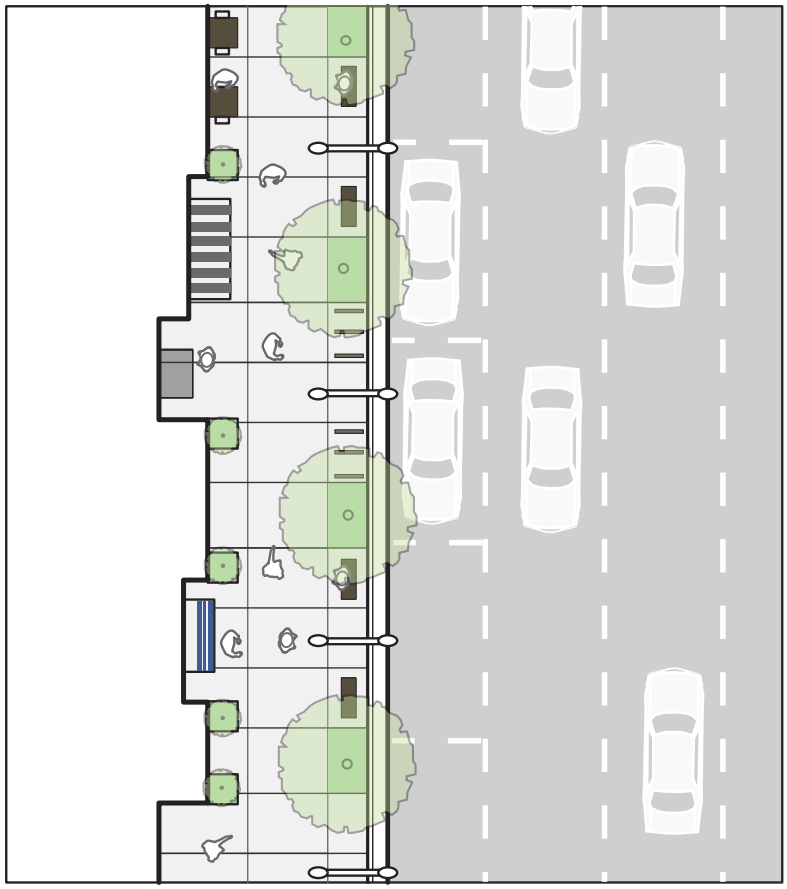


Feeder Road in an Urban Center Context

Context Zones			Feeder Road (FR)			
			Frontage Zone	Pedestrian Zone	Furnishing Zone	Total Width
UC	**Urban Center**	Preferred	4	10	6	20
		Minimum	1	8	5	14
U	**Urban**	Preferred	1	8	6	15
		Minimum	1	5	5	11
RS	**Suburban Residential**	Preferred	0	8	8	16
		Minimum	0	6	0	6
MU	**Suburban Commercial/ Mixed-Use**	Preferred	4	6	6	16
		Minimum	1	6	5	12
IN	**Industrial**	Preferred	1	6	6	13
		Minimum	1	5	0	6

TABLE 3-4 CIVIC STREET SIDEWALK WIDTHS BY ZONE (IN FEET)

Civic Streets are pedestrian-oriented street in shopping and entertainment destinations which provide access to businesses and institutional facilities. They must balance the needs of people passing through as well as the needs of those who live and work along the street.

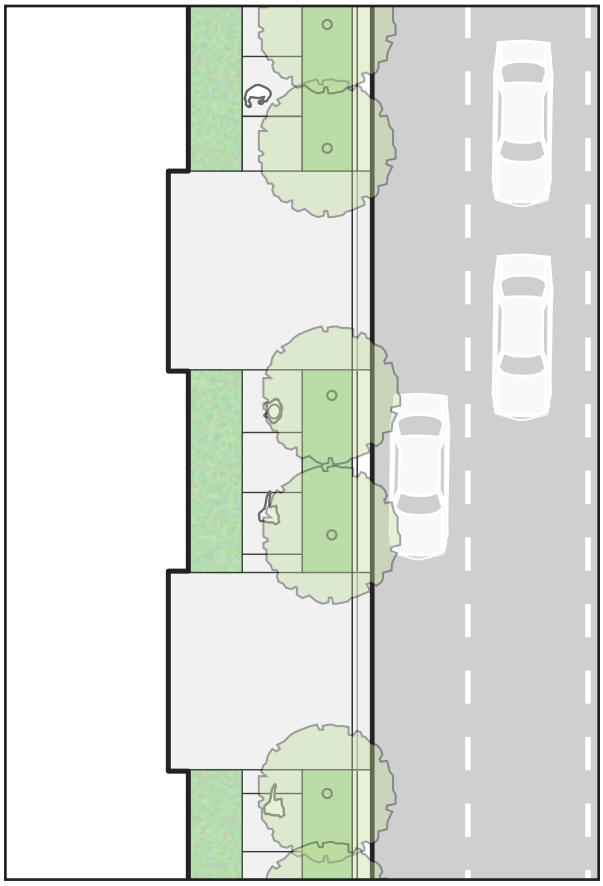


Civic Street in a Mixed-Use Context

Context Zones			Civic Street (CS)			
			Frontage Zone	Pedestrian Zone	Furnishing Zone	Total Width
UC	**Urban Center**	Preferred	4	10	6	20
		Minimum	1	6	4	11
U	**Urban**	Preferred	1	10	6	17
		Minimum	1	5	4	10
RS	**Suburban Residential**	Preferred	0	6	6	12
		Minimum	0	6	2	8
MU	**Suburban Commercial/ Mixed-Use**	Preferred	4	8	4	16
		Minimum	1	5	4	10
IN	**Industrial**	Preferred	1	5	5	11
		Minimum	1	5	0	6

TABLE 3-5 NEIGHBORHOOD STREET SIDEWALK WIDTHS BY ZONE (IN FEET)

Neighborhood streets are local streets with low vehicle volumes and slow speeds with the primary function of serving local trips. They may provide access to parks, schools or institutional facilities as well as local retail and services.



Neighborhood Street in a Suburban Context

Context Zones			Neighborhood Street (NS)			
			Frontage Zone	Pedestrian Zone	Furnishing Zone	Total Width
UC	**Urban Center**	Preferred	1	6	5	12
		Minimum	0	5	4	9
U	**Urban**	Preferred	1	6	5	12
		Minimum	0	5	4	9
RS	**Suburban Residential**	Preferred	0	5	5	10
		Minimum	0	5	2	7
MU	**Suburban Commercial/Mixed-Use**	Preferred	1	6	5	12
		Minimum	0	5	4	9
IN	**Industrial**	Preferred	0	5	5	10
		Minimum	0	5	2	7

SUSTAINABILITY (GREENSCAPE)

Greenscape, a collection of street trees, shrubs, planters, and grasses plays a key role in using public streets to increase Miami-Dade County's sustainability. Among the many environmental benefits that greenscaping provides:

- Shade from street trees can keep buildings cooler, reducing the need for air conditioning
- Plantings absorb greenhouse gases (carbon dioxide) and filter particulate matter which can be extremely harmful to those with asthma
- Greenscape elements clean, remove, and stabilize contaminants that are either washed from sidewalks and streets by stormwater or are already in the soil
- Trees and flowers can support native natural ecosystems and help restore a balance to the urban environment

With the numerous environmental benefits, practitioners should work to implement these elements properly to provide for their successful growth and anticipated impact on the street. A range of issues from soil compaction, lack of space for roots to grow into, physical damage or abuse, and litter all can create a hostile environment for landscaping to flourish. Elements for inclusion in greenspaces should be carefully selected and incorporated early in the design process to allow for consideration of their needs in the constrained environment of sidewalk design.

STREET TREES

Street trees play a large role in creating a comfortable and enjoyable sidewalk experience. Think of the most beautiful and well-regarded streets across the world and you'll likely picture a street with a colonnade-type line of trees. These trees provide a "wall" that mirrors the street wall, creating a pedestrian scaled space. These trees provide shade for café seating and benches, allowing for street life to flourish even the warmer months, and help block the wind. In addition, trees that overhang the street provide a sense that the traveled way is more narrow than it is, helping to slow speeds and calm traffic.

Several options for street trees and ground cover have been identified as suitable in the Miami-Dade County area. Trees should be selected based upon the desired

Mature street trees provide shade and beauty.

size, shading, water, and maintenance required. Consult the Miami-Dade Street Tree Master Plan for a more detailed list.

Tree options: Crape Myrtle, *Lagerstroemia indica*, Verawood, *Bulnesia arborea*, Silver Buttonwood, *Conocarpus erectus var. sericeus*, Green Buttonwood, *Concocarpus erectus*, Live Oak, *Quercus virginiana*, Wild Tamarind, *Lysiloma latisiliquum*, Royal Palm, *Roystonea regia*

Ground Cover options: Creeping Fig, *Ficus pumila*, Mondo Grass, *Ophiopogon japonicas*, Asiatic Jasmine, *Trachelospermum asiaticum*

Tree Siting

Trees should be sited in a continuous fashion along a street to create continuous shade and framing of the street. It is important to provide ample space for growth of tree roots to allow for healthy trees that can reach maturity and provide the intended shade. Siting should avoid interfering with first floor uses such as entries and cafes. Additionally, trees should not be planted in loading zones or within 10 feet of a bus stop landing zone to ensure access to the curb.

TABLE 3-6 RECOMMENDED STREET TREE SPACING

	Short Stature Tree	Medium Stature Tree	Large Stature Tree
On-Center Spacing	20'	25'	30'
Offset from Curbs or Path	2'-6"	2'-6"	2'-6"
Offset from Light Poles	15'	15'	15'
Offset from Driveways, Hydrants, Loading Zones	10'	10'	10'
Offset from Intersections (for sight distances)	20'	20'-40'	20'-40'

Tree Accommodations

There are several methods for planting trees along sidewalks. Each is applicable to the scenario and environment in which trees are being considered. Consult the Miami-Dade Street Tree Master Plan for further details.

Open Tree Trenches

An open tree trench is generally located in the Furnishing Zone and consists of an area of soil connecting a row of trees. The soil can be covered with mulch, groundcover, or other greenscape elements. Sidewalk drainage should be designed to flow into the tree trench. The open trench allows for water to reach the roots and reduces soil compaction, providing a healthier environment for trees. Sizing is typically 4' wide by 3' deep.

A tree trench should not be considered in locations with heavily-used curbside parking, as people entering and exiting vehicles will compact the soils. Small patches of pavement can be provided to allow pedestrians to cross the trench.

Covered Tree Trenches

Like an open tree trench, a covered tree trench provides a linear trench of connected soil, but is covered with sidewalk material. Engineered structural soils can be used to provide the support for pavement materials while still allowing for a soil environment that supports tree health. Paving materials, such as pervious pavement, should allow for infiltration of water from the sidewalk.

As an alternative to the open tree trench, the covered tree trench is supportive of tree growth in locations where heavy pedestrian traffic and heavy use of on-street parking is present. The trench should be at least 5' wide by 3' deep. A small 2- by 2-foot opening should be provided around the tree trunk. Underdrains should be provided to ensure proper drainage of subgrades which drain poorly.

Raised Tree Beds

Raised tree beds provide planting opportunities where the subsurface conditions may not allow for traditional planting of trees, including utility conflicts. The limited soil provided in raised tree beds necessitates the planting of smaller trees to ensure their health. As an added amenity, seating can be provided along the edge of the beds, with a height between 16” and 20”. The beds should be placed to avoid obstructing the Pedestrian Zone. If there is room available, additional structural soil can be provided adjacent to the tree bed to provide increased space for root growth. Underdrain infrastructure should be included for subgrades which drain poorly.

Tree Pits

Tree pits can be used where there is insufficient room for tree trenches. Below the surface, the pit should be open to the surrounding subgrade to provide space for roots to expand. Pits should be 4' by 10' by 3' deep. The pit can be covered with mulch, pervious pavers, or a tree grate. A 2- by 2-foot opening should be left around the trunk, and a tree grate should allow room for the trunk to expand.

For sidewalk accessibility, a grate cannot be counted toward the minimum accessible pedestrian space.

Vegetated Stormwater Management

Miami-Dade County’s sidewalks provide an opportunity to improve how the County manages stormwater runoff on its streets. By using vegetated stormwater features runoff to the drainage system can be reduced, reducing the potential for system overflows in large rain events. Runoff that is captured by stormwater features can be cleaned and filtered by vegetation and recharge groundwater in the process. Green drainage infrastructure has also been found to be cheaper than traditional pipe drainage infrastructure.

Runoff from both the street and sidewalk flow directly into this planted space, thereby reducing stormwater runoff and flooding.

Stormwater Planters

Stormwater planters are structures formed by retaining walls which allows for drainage soil, an underdrain, and plantings. They can be placed in the Furnishing or Frontage Zones as well as on medians curb extensions. Both trees and vegetation can be used depending on the size of the planter and any sight line constraints.

Drains and overflow pipes are typically connected to storm drains. An infiltration bed should be included at the base of the planter to allow for groundwater recharge, although a liner can be applied to the bottom of a planter if needed.

Plants and vegetation that can withstand both inundation and long dry periods should be selected. Selected materials should also be able to hold up to pollutants that are washed in to the planter.

Rain Gardens

Like stormwater planters, rain gardens filter and slow runoff but do not include structural walls and appear as more natural landscaping elements. They are typically larger than stormwater planters and allow for a more diverse set of plants. Rain gardens can be used to convey runoff while reducing flow speeds and pollutants. They are ideal for use along sidewalks, plazas, and

parking lots as means of intercepting sheet flow from paved surfaces.

Dense vegetation is desirable to avoid erosion of soils during rain events. Plants should be selected to withstand pollutants and inundation and should fit with a site's aesthetic.

AMENITIES

Street furniture adds life and comfort to the sidewalk, changing it from a barren stretch of concrete to the front steps of the public realm. Benches create opportunities to sit and rest, socialize, and watch the world go by. Bike racks allow for easy access between bike lanes and store fronts and apartments. Bollards and planters can create a barrier between the sidewalk and traveled way, increasing safety from dangerous vehicles and framing the space. Trash and recycling containers help keep the street clean and facilitate collection by the appropriate group.

Benches

Seating can be provided through the provision of traditional benches or through extensions of landscaping planters. The provision of seating opportunities can greatly enhance the sidewalk's liveliness which can be good for businesses and improve the social wellbeing of the community.

Seats should be oriented toward views of people walking by and with the backs of seating options toward a fixed object (such as a tree trunk or building) to provide a sense of security. The Pedestrian Zone should be respected as a clear space, with seating placed either in the Frontage Zone or in the Furnishing Zone. Armrests or dividers should be provided for seating longer than 4' to discourage laying down along the seating.

Clear zones should be provided around benches for ADA access and to allow for maintenance of both seats and other street items. The following clearances should be following:

- 3' minimum on either side of bench (except in case of transit shelter ad panel)
- 5' minimum to fire hydrants
- 1' minimum to any other amenity or utility
- 6' clear path (includes 1' for legs extending from seats) in front of seating placed at the back of the sidewalk
- 5' minimum clear path behind seating placed at the front of the sidewalk

Bike Racks

Convenient bike parking is part of a comprehensive strategy to encourage biking as a transportation option. Bike racks should be provided in the Furnishing Zone to provide a buffer between the traveled way and the Pedestrian Zone, and to avoid conflicts between bike riders and pedestrians in the Pedestrian Zone. Where the Frontage Zone is large enough, placing racks in this zone can allow for use of a building's overhang or awning to provide sheltered bike parking.

Racks should generally be placed in a line, allowing for an organized and efficient parking area. Rack design should support the frame at two points to allow for stability of a locked bike and should allow for easy locking of at least one wheel along with the frame. Providing parking at a 45-degree angle allows for efficiency while reducing the depth of parked bikes on the sidewalk. Racks should be setback at least 3 feet from the curb.

Bollards

Bollards are an effective treatment to create physical separation between the realms of a street. Bollards can be permanent or temporary vertical elements (most often posts) which offer physical protection from vehicles. They are most often used to separate motor

Bollards can be used to keep vehicles off of wide sidewalks.

vehicles from pedestrians or bikes and can also be used to restrict vehicular access to plazas or buildings.

Flexible or “breakaway” bollards are effective means of providing separation while still allowing for emergency vehicle access.

Bollards must be clearly visible regardless of weather or lighting condition and thus should contain reflective materials and colors that contrast with the surrounding environment.

Potential uses for bollards:

- Limit vehicular access to car-free areas, including boardwalks and trails
- Prevent delivery vehicles from using sidewalks to park
- Reduce turning radii through curb extensions
- Protect spaces for parklets, street furniture, and green stormwater features
- Traffic calming installations such as chicanes and mid-block crosswalks
- Security for key institutional buildings

Lighting

Street lighting is an important part of creating a safe and welcoming environment on the sidewalk. It can also be used to highlight features of an area. Lighting fixtures can be part of the creation of a cohesive sidewalk design for designated districts and neighborhoods. Lighting should be energy efficient and focus light down onto the sidewalk, minimizing stray light that can disturb neighbors or create light pollution. By properly lighting the public realm, sidewalks can remain activated during nighttime, further promoting safety of all users and activity for nearby stores.

To stimulate nighttime activity, person-scaled lighting (lower than 20’) should be used in areas with higher pedestrian volumes. Lighting should also focus on critical points such as crosswalks, ramps, transit stops, and benches. The alignment of poles can be used to frame a streetscape; the poles may also offer opportunities for hanging banners or pennants to advertise for districts or upcoming events.

Thoroughfare, Feeder Roads: 25' high poles with 90'-120' spacing

Civic Streets, Neighborhood Streets: 11'-16' high poles with 50'-80' spacing

Light fixtures should be in the Furnishing Zone where space allows, leaving the Pedestrian Zone clear. Clearances from surrounding amenities and objects should be provided as detailed in **Table 3-7**.

TABLE 3-7 RECOMMENDED STREET LIGHT SPACING

Minimum Light Centerline Clearance	Traffic Light or Tree	15'
	Curb Ramp	5'
	Fire Hydrant	6'
Minimum Pole Centerline Setback from Curb	Sidewalks <7' wide	20"
	Sidewalks >7' wide	2'-3"
Minimum Vertical Clearances for Pole Amenities	Banner Bracket	15'
	Bottom of Banner	9'
	Hanging Plant Bracket	13'
	Bottom of Hanging Plant	9'

TRANSIT AMENITIES

Sidewalks provide the interface between transit riders and the various origins and destinations the transit system serves. The sidewalk includes space for passengers to wait for, and transfer between, buses. The design of the transit stop has implications for bus operations and ridership and can play an integral role in the branding of an entire transit system or individual bus route.

A host of amenities should be considered for all bus stops. Routes with higher numbers of people waiting at stops and premium corridors will likely receive a larger investment of amenities. Sidewalk widths and sidewalk pedestrian volumes will also inform how much space a transit stop ought to occupy. In cases where there is insufficient sidewalk width, curb extensions, “bus bulbs” in a transit context,” can provide space to place transit stop amenities with a smaller impact on the existing sidewalk space. Bus bulbs can also improve rider safety and bus operations by allowing buses to stop in the travel lane rather than pull in and out of moving traffic.

Amenities to consider:

- Benches
- Shelters
- Trash cans
- Bike racks or lockers
- System/route map
- Real-time information display (bus arrival times) if available
- Lighting
- Local wayfinding displays (for both boarding and alighting passengers, as well as passers-by)

Stop Characteristics

The placement of a bus stop on a Complete Street should be an intentional decision rather than simply fitting the stop in to whatever space is unclaimed by other features of the sidewalk. Stops can be located near-side of an intersection (immediately before an intersection), far-side of an intersection (immediately after an intersection), or mid-block (between intersections).

All stops must be fully ADA accessible, with a clear path to the bus front door as well as ADA-compatible transit amenities and pavement slopes.

A landing zone should be provided at each door of the bus and should be kept clear to allow for unobstructed boarding and disembarking. The minimum landing zone should be 5’ in length (parallel to the curb) and 8’ deep (from the curb back toward the buildings). An 8’-12’ long landing zone is preferred to allow for the variation in door location during operation. A bus bulb should be built where possible to create an 8’ deep loading zone.

Bus stop lengths vary by vehicle type and stop location. For bus stops that require buses to pull out of and into traffic, the dimensions in **Table 3-8** provide minimum stop lengths to allow for safe stopping and merging. See NACTO *Transit Street Design Guide* for more details.

TABLE 3-8 RECOMMENDED BUS STOP LENGTHS, PULLOUT STOPS

Stop Position	40' Vehicle	60' Vehicle	2 x 40' Vehicles	2 x 60' Vehicles
Near-Side	100	120	145	185
Far-Side	90	100	125	165
Far-Side (right turn to access)	140	160	140	230
Mid-Block	120	145	185	210

Bus stops with in-lane boarding, served with a bus bulbs, require less curb space and do not use valuable sidewalk space. The minimum dimensions for platform lengths are shown in **Table 3-9**. Note that the transition space for a curb bulb out is not included in these dimensions.

TABLE 3-9 RECOMMENDED BUS STOP LENGTHS, IN-LANE STOPS

Stop Position	40' Vehicle	60' Vehicle	2 x 40' Vehicles	2 x 60' Vehicles
Near-Side	35	55	80	115
Far-Side	45	65	90	130
Mid-Block	35	55	80	115

Stops should always be located at least 10 feet from a crosswalk or curb return to allow for visibility between people walking and drivers. For near-side stops, the bus stop pole should be 10 feet before a crosswalk. For far-side stops, the rear of the transit vehicle at the stop should be 10 feet from the crosswalk.

Shelters

Shelter placement must consider ADA-accessibility as well as appropriate clearances for transit vehicles at stops. All shelters must provide a minimum 2.5- x 4-foot clear space to allow space for wheelchair users underneath the shelter. A typical shelter should be 4 feet deep, with allowances for more narrow shelters in constrained sidewalk environments. Shelters should provide protection from the sun, rain, and wind. Wind screens should be transparent to allow visibility and a sense of safety under the shelter. Where sidewalk width is too narrow to provide a clear path between the building and the shelter and between the shelter and the curb, a shelter can be oriented toward the building face, allowing both the shelter and the buildings to share the same pedestrian through zone.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4

PRINCIPLES

Safe

Miami-Dade County's streets will balance the competing demands for space among all potential users in a manner that is safe for all users. Promoting safety on all streets may include speed reductions, traffic calming, and enhanced facilities for bikes and pedestrians.

Sustainable

Investing in environments conducive to biking and transit use can reduce the rate of driving alone, helping to reduce congestion and emissions. Refocusing on providing only the necessary space for vehicles on the street can create an opportunity to reduce impervious cover and add landscaping elements to slow and filter stormwater. With a sustainable approach in mind, materials and construction can be chosen to increase the longevity of the traveled way, reducing costs, emissions, and waste associated with frequent street reconstruction.

Sensible

Sensible design considers current and future uses to optimize the investment in the traveled way. The location of street elements, utilities, and infrastructure should allow for easy maintenance accessibility. Maintenance that is straightforward to accomplish is less likely to be avoided or postponed and is less likely to burden street users through prolonged closures and detours. Sensible design also recognizes the importance of flexibility in today's infrastructure environment. Streets should include current technology including sensors for traffic conditions and user counts to provide decision-makers with as much information as possible about usage trends. Lastly, streets should be designed to for intuitive usage. Wayfinding should be provided for all modes in manners that work best for them. Providing relevant information when and where it is most useful can greatly improve the user experience on Miami-Dade County's streets.

SAFETY AND SPEED

Speed is the most prominent factor in both the perceived comfort and safety of streets. Historically, street design was adapted from highway design criteria which prioritized the quick movement of vehicles from one area to another. In this environment lanes were wide, curves were sweeping, and obstacles were setback a considerable distance from the traveled way. When applied to local streets, these design principles created inviting environments for cars to travel significantly faster than posted speed limits, while reducing the space available for people walking and biking.

In the event of a crash between a person in a vehicle and a person on a bike the driver has a roughly two-ton steel exoskeleton which can absorb crash impact while numerous safety features can limit injuries from any movement within the vehicle. In contrast, the cyclist has little protection and is thus a vulnerable road user. Consider the relative risk that a person on a bike is asked to assume when using a bicycle lane alongside traffic with no physical separation compared to the risk a driver assumes in that same situation. Safe street design should reinforce safety elements for all users, particularly the most vulnerable, and reductions in speed play a large role in that effort.

OPTIMAL USE OF STREET SPACE

The traveled way has traditionally been designed to the maximum width allowed by rights-of-way except for a small space for sidewalks. This pattern has developed streets with almost all available space dedicated to vehicle travel lanes even in circumstances where vehicle volumes do not warrant such roadway capacity. Often, streets have been constructed or widened in anticipation of traffic growth which does not materialize, leaving municipalities with "left-over" asphalt that must be maintained but does not improve mobility.

Streets should be reviewed for instances where the current number of travel lanes, travel lane configuration, and/or lane sizes are inconsistent with the purpose that the street serves. An investment in the community mobility and the backbone of the local economy, wasted space on a street is a sign of poor management of this key asset.

Several strategies exist to right-size, improve person-throughput, and focus on safety on Miami-Dade County's streets.

Road Diet

Road diets are an effective strategy for streets which have excess motor vehicle capacity. Once identified, this excess space can be reallocated to other modes. A road diet can also create an opportunity to improve traffic operations for motor vehicles by introducing turn lanes at intersections.

The most common type of road diet takes a 4-lane undivided street and converts to a street with 3 lanes, including 1 in each direction and 1 center turn lane. The addition of a center turn lane helps to reduce crash frequency by preventing left-turning vehicles from stopping in a through lane while waiting for an acceptable gap in opposing traffic. The change from two to one lane in each direction also limits speeding and hazardous lane changes, resulting in a safer street overall. Such conversions have been found to reduce crashes by an average of 29%.[1] Reducing the number of lanes is often used to add bike lanes or buffered bike lanes on both sides of the street within the "newly found" space.

Road diets can be accomplished as simply as with a resurfacing and restriping project or through larger reconstruction projects which can be used to increase sidewalk width, add curb extensions, or add landscaping.

Lane Diet

Lane diets restore lane widths to sizes more appropriate for the urban context of lower speeds and a higher focus on safety. Streets that have more antiquated 12' wide travel lanes, as well as wide parking lanes and center turn lanes, have space that can be repurposed to support safe facilities for other modes, most often resulting in the inclusion of bike facilities.

1 http://www.cmfclearinghouse.org/detail.cfm?facid=199

TRAVELED WAY ELEMENTS

Maximizing the utility of the traveled way calls for use of a toolbox of design elements and facilities for inclusion on Miami-Dade streets. These range from safety elements incorporated to slow speeding vehicles and promote livable streets to dedicated facilities for bikes and transit to increase the efficiency, throughput, and safety for all modes of travel.

Vehicle Lane Widths

Lane widths have traditionally been wide (12') to provide a more forgiving buffer for drivers, allowing for less precise driving at the expense of space within the traveled way for other modes. Lane dieting, a reduction in lane widths, can be an effective way to repurpose space on streets which otherwise seem full. Narrower lanes have been shown to result in slower vehicle speeds, a key component of the Miami-Dade County approach to safer streets.

The AASHTO Green Book offers substantial flexibility on lane widths depending on the desired speed, capacity, and context of the road. Per FHWA guidance, 10' lanes are appropriate for urban environments where "narrower lane widths may be chosen to manage or reduce speed and shorten crossing distances for pedestrians."[2] An 11' outside lane may be provided on designated truck or transit routes to allow for increased safety of all users and to improve the efficiency of bus operations. **Table 4-1** provides FHWA recommendations for travel lane widths within the traditional street classification system. **Table 4-2** provides a breakdown of recommended widths by lane type for Miami-Dade County. 11' lanes may be provided to reduce the potential for head-on collisions in adjacent lanes in opposing directions.

Parking lanes should be minimized to reduce space dedicated to non-traveling vehicles within the traveled way, where present. The parking lane should be indicated via markings to separate it from the adjacent travel or bike lane. Wide parking lanes (up to 15') can be used in areas where loading is frequent.

TABLE 4-1 FHWA LANE WIDTH GUIDANCE

Lane Type	FHWA Recommended Width Rural	FHWA Recommended Width Urban
Arterial	11-12'	10-12'
Collector	10-12'	10-12'
Local	9-12'	9-12'

Source: A Policy on Geometric Design of Highways and Streets, AASHTO

TABLE 4-2 RECOMMENDED LANE WIDTHS BY LANE TYPE

Lane Type	Recommended Width
Through Lane	10'
Bus/Truck Lane	11'
Turn Lane	10'
Parking Lane	8'

Lanes have traditionally been built 12' wide due to a reported decrease in lane capacity (saturation rate) as noted in the Highway Capacity Manual. However, research by the Florida Department of Transportation has shown that saturation flow rates do not change for lanes between 10'-12'[3]. Lane diets should be considered to increase the space available to other modes and should not be rejected on claims of reduced lane capacity.

2 http://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/chapter3/3_lanewidth.cfm

3 Florida Department of Transportation *Conserve by Bicycle Report* http://www.fdot.gov/safety/4-reports/Bike-Ped/CBBphase1%20Apps%20A-P.pdf

Safety Design Elements

As was noted in Chapter 2, the target speed design philosophy calls for streets to be designed to limit vehicles to the intended speed for the street. Thus, a neighborhood residential street, designed to 20 mph, should be designed to limit vehicle operation speeds rather than relying on a speed limit sign to act as the sole enforcer of speeds.

Traffic calming can be achieved through cost-effective, tactical retrofits using paint, flexposts, and planters as well as through more permanent reconstruction projects.

Mid-Block Neckdowns

Land use contexts characterized by long blocks tend to favor high speeds as vehicles have longer travel distances between intersections. The tendency to continue accelerating can be tempered through mid-block neckdowns, often called “pinch-points,” which are mid-block curb extensions. They can add public space to the sidewalk realm by allowing for additional landscaping or seating and can also be used to facilitate mid-block crosswalks.

Benefits:

- Can add public space to the sidewalk realm by allowing for additional landscaping or seating
- Can be used to facilitate mid-block crosswalks

Considerations:

- Greenscaping should maintain visibility between vehicles and pedestrians
- Cyclists should be accommodated through shared lane markings

Chicanes

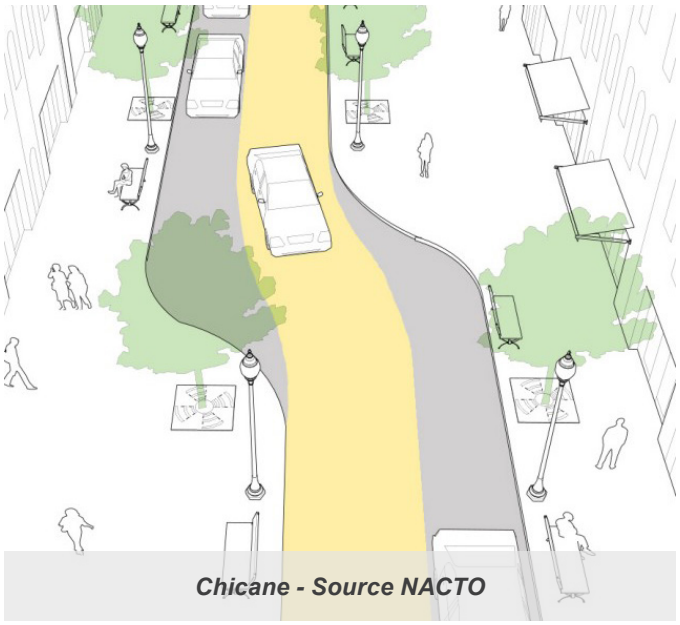
Chicanes create horizontal changes in the path of vehicles on streets, essentially creating “S” curves that cause vehicles to slow down. These can be achieved through alternating parking on opposite sides of the street or through intermittent curb extensions. Vegetated stormwater management features such as stormwater planters can be integrated into streets as chicanes, allowing for the treatment of stormwater runoff as well as providing a calming effect on streets. Chicanes are most appropriate on streets with up to two lanes which do not function as trucking or transit routes and are often best on low speed streets which do not have a painted centerline.

Benefits:

- Vegetated stormwater management features such as stormwater planters can be integrated into chicanes allowing for the treatment of stormwater runoff as well as providing a calming effect on streets
- On narrower roads chicanes can slow traffic to a greater degree as drivers yield to one another

Considerations:

- Chicanes are most appropriate on streets with up to two lanes which do not function as trucking or transit routes
- Best on low speed streets which do not have a painted centerline



Chicane - Source NACTO

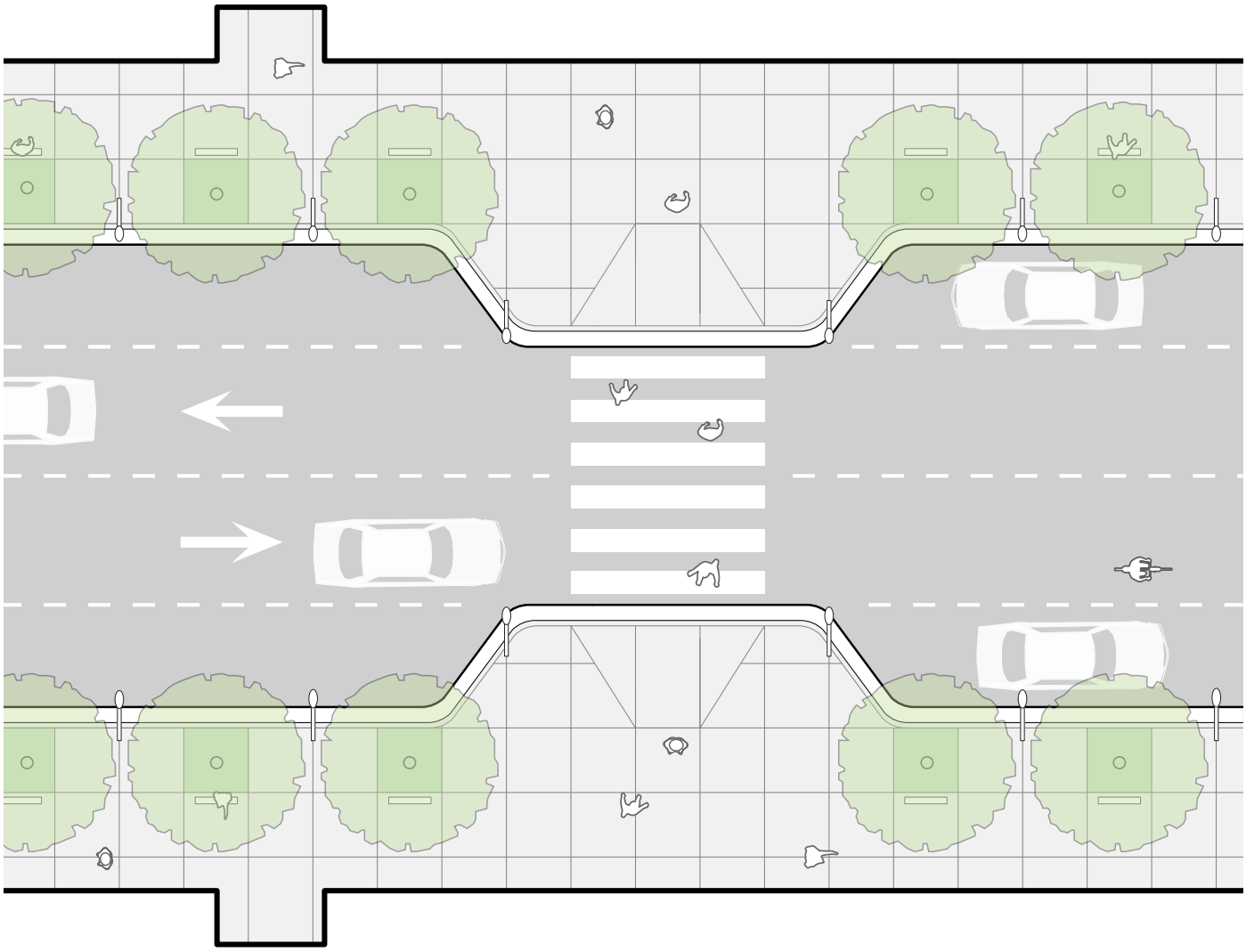


Figure 4-1 *Neckdown with mid-block crossing*

Center Islands

Center islands are effective tools for narrowing the street at key locations and providing for pedestrian crossings and the inclusion of greenscape elements. Center islands are short medians parallel to the direction of travel and act as inverted mid-block neckdowns, reducing available street width from the middle rather than from the edges. Safety is improved by slowing speeds, providing a barrier to head-on collisions, and by limiting left-turns to locations where it is expressly permitted. Center islands that provide a pedestrian refuge should be at least 6' wide. Like chicanes, center islands can incorporate stormwater planters to collect and filter stormwater runoff.

Benefits:

- Safety is improved by slowing speeds
- Provides a barrier to head-on collisions
- Limits left-turns to locations where they are expressly permitted

Considerations:

- Center islands that provide a pedestrian refuge should be at least 6’ wide
- Like chicanes, center islands can incorporate stormwater planters to collect and filter stormwater runoff

Speed Cushions

On emergency vehicle routes, speed cushions should be used. These include wheel cutouts to large vehicles to pass them unaffected by the vertical deflection. Speed cushions can also be used to install traffic calming devices on routes that may have bus or truck activity.

Speed Table

Speed tables are vertical elements which are longer than speed humps (22') and flat on top rather than the rounded speed hump design. They allow for slightly higher operating speeds and can support transit and emergency vehicle access. They can also be incorporated into mid-block crossings and curb extensions to increase the safety of such crossings and signal that priority should be given to pedestrians rather than vehicles. Clear markings and signage are necessary to alter street users of their presence.

Benefits:

- Can be incorporated into mid-block crossings and curb extensions to increase the safety of such crossings
- When incorporated into crosswalks, speed tables provide a level path for pedestrians
- Signal that priority should be given to pedestrians rather than vehicles

Considerations:

- Clear markings and signage are necessary to alert street users of their presence.
- Should be used in sequence or supplemented with other tools to avoid speed spiking

Speed Table - Source NACTO

Paving Treatments *(consideration – can be used with any of the above tools)*

Variation in paving materials can heighten the awareness of all street users to changes in street purpose, user priority, and special features. Treatments can include stamped concrete or asphalt, colored pavements, or special pavers.

Benefits:

- Their presence can slow street users and aid in compliance of street design elements.

Considerations:

- Materials must be ADA-compliant with slip-resistance and a smooth surface
- Any colored pavement used in a traffic control setting is subject to MUTCD regulation. An experimental permit may be required with FHWA to allow for its inclusion in projects
- The chosen material should also be considered for long-term maintainability, as pavers may chip or crack and require facility closures to repair or replace and colored materials may fade over time
- The varying settling patterns of materials should be considered to avoid lips where surfaces meet

Emergency Vehicle Accommodations

The traveled way must be designed with consideration for the particular needs of emergency response vehicles. Emergency vehicle operations prioritize the minimization of response times and the vehicle needs have often been a controlling element in how streets are designed. It bears repeating that a key goal of Complete Streets is to improve the safety of street users; these improvements are in-line with the goals of the emergency responders, they are intended to reduce the severity and frequency of crashes on Miami-Dade County streets and thus increase the overall safety within the community.

Streets must meet the relevant fire codes that govern emergency vehicle street criteria. This includes the minimum width of a street, sufficient access for vehicles to pull adjacent to buildings, and parking restrictions approaching intersections to allow for safe turns. Curb radii are often built larger than necessary to allow fire trucks to traverse intersections. While radii and curb extensions should be designed with these needs in mind, the strategies provided in this document, including increasing the effective curb radius and recessing stop bars, can accommodate emergency response vehicles without jeopardizing the everyday safety of street users.

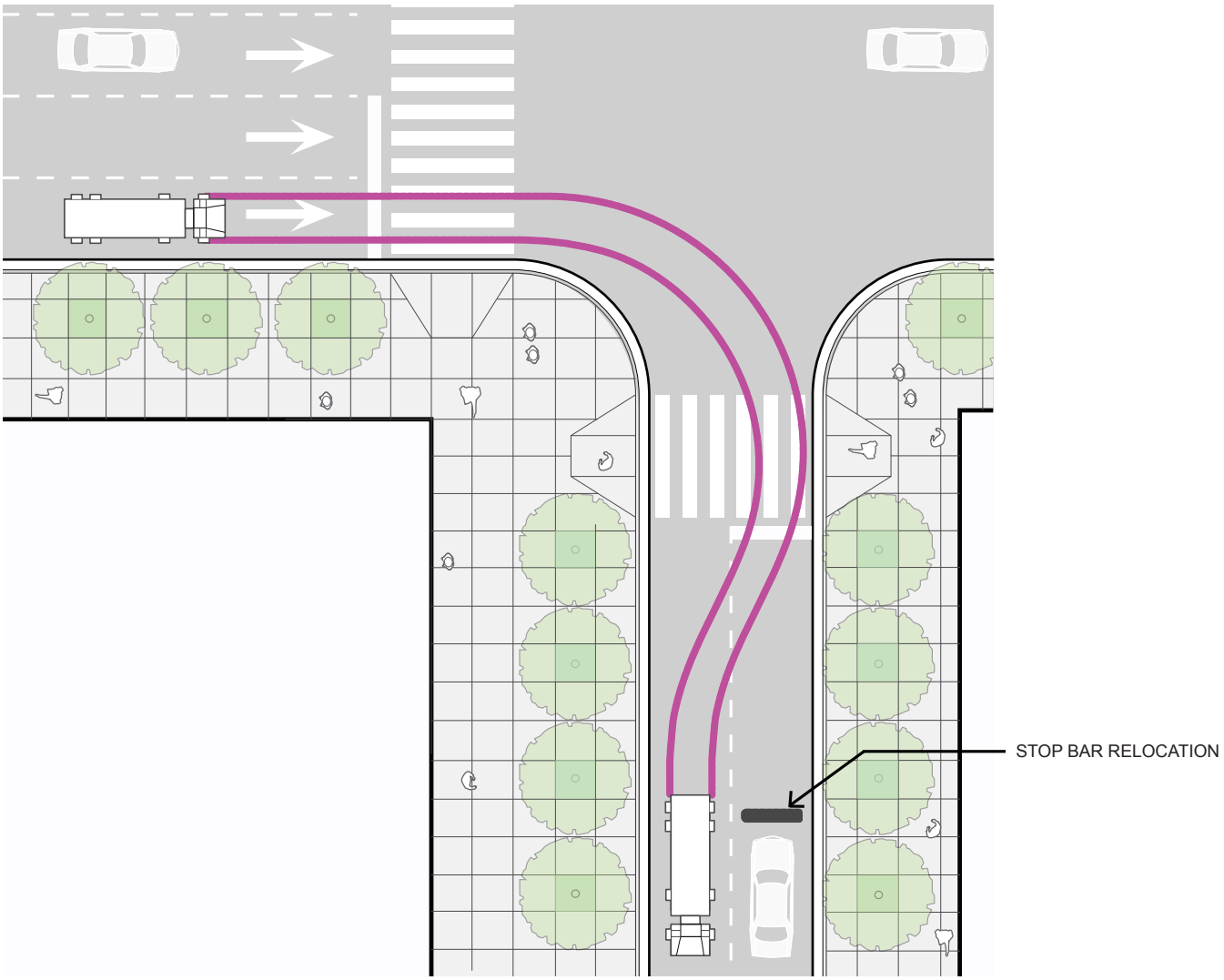


Figure 4-2 ***Stop Bar Relocation to Accommodate Large Vehicle Turns***

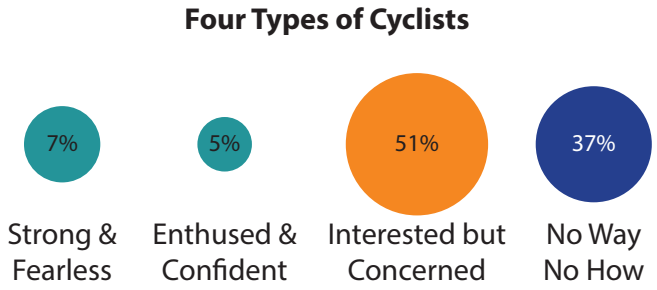
Bicycle Facilities

Facilities for bikes have come a long way from the modest 3' striped lane at the edge of streets, which would often collect street debris. Today's bike facilities offer a range of design options to fit the street type and emphasize safety over preserving maximum room for motor vehicles. Options range from shared-lane facilities for low-speed, low-volume environments to raised and protected cycle tracks for higher volume streets that favor mobility and separation. This section provides a general overview of the range of bicycle facilities permitted on Miami-Dade County roadways, as well as recommended and minimum width dimensions. Practitioners are encouraged to consult the NACTO *Urban Bikeway Design Guide, Second Edition*, and the AASHTO *Guide for the Development of Bicycle Facilities, Fourth Edition* as additional resources.

As general guidance, the safest or most protected bicycle facility should be selected for inclusion on streets wherever space permits. However, exclusive facilities are generally not appropriate for neighborhood streets where traffic calming elements and lower volumes support shared street space. Space for bike facilities can be provided through right-sizing the motor vehicle lanes, both via road diets and lane diets as discussed earlier in Chapter 4.

Bike facilities, routes, and networks should emphasize direct and contiguous facilities. Vehicles are rarely asked to take a winding path to arrive at their destination and are almost never met with an unexpected dead-end; bikes should be given the same consideration toward easily understood and navigated routes.

Figure 4-3 provides a national breakdown of the public's willingness to bike on streets into four classifications. The largest grouping is considered "Interested but Concerned." This group stands to gain the most from the provision of safer on-street, exclusive bike facilities. Whereas bike facility design has traditionally been oriented toward the "Strong and Fearless" group (small unprotected facilities on high speed arterials), new bike facility design should focus on bringing all potential riders into the mix. By focusing on all segments, Miami-Dade County can have the greatest impact on increasing bike ridership as a travel mode, particularly for short trips.



Source: Dill & McNeil, TRB 2016

Figure 4-3 ***Breakdown of National Comfort Toward Biking on Streets***

TABLE 4-3 RECOMMENDED BIKE FACILITY DIMENSIONS

	Recommended		Minimum	
Element	**Lane**	**Buffer**	**Lane**	**Buffer**
Cycle Track	7'	3' (next to parked cars)	5'	3' (next to parked cars)
Two-way Cycle Track	12'	3' (next to parked cars)	8'	3' (next to parked cars)
Raised Cycle Track	6.5'	1' (for vertical element) 3' (next to parked cars)	5'	1' (for vertical element) 3' (next to parked cars)
Buffered Bike Lane	4'	3'	5'	20"
Bike Lane	6'	n/a	5'	n/a
Contra-Flow Bike Lane	6'	3'	5'	6"

Cycle Tracks

A cycle track provides exclusive space for people on bikes within the traveled way adjacent to the Furnishing Zone or Curb Zone. This arrangement allows for enhanced comfort and safety for users while allowing for the efficiency of riding along a street rather than an off-street path. Cycle tracks are sometimes referred to as separated bike lanes or protected bike lanes.

Cycle tracks can be provided in a variety of manners depending on the local street context and available space. Facilities can be one- or two-directional and can be raised to sidewalk level or placed at street level. Protection of the facility can be provided by a curb or median in the case of a raised cycle track, while street level facilities can be protected via bollards, planters, or on-street parking. Protected spaces like cycle tracks can be key tools to encouraging all types of bike riders to bike on County streets.

Benefits:

- Provides a safer and more comfortable environment for riders of all comfort levels
- Reduces or eliminates conflict between parking cars, parked car doors, and bikes
- Prevents double-parked or loading vehicles from blocking the facility
- For parking-protected cycle tracks, implementation is largely comprised of re-striping a street

A two-way cycle track in Vancouver, BC.

Considerations:

- When provided on the same side of the street as transit stops, a boarding island should be provided between the cycle track and the travel lanes to reduce bike and pedestrian conflicts
- May not be appropriate for streets with frequent driveways and/or narrower sidewalks with high pedestrian volumes due to the likelihood that people may use the cycle track as an extension of the sidewalk
- Design should allow for regular maintenance like roadway street sweeping to keep the path clear of debris
- Careful consideration is required at intersections to ensure bicyclists are visible to motorists

Buffered Bike Lanes

Buffered bike lanes are on-street bike lanes with a painted buffer that separates the bike lane from the adjacent travel lane. A buffer may also be provided between the bike lane and parking lanes to avoid "dooring" of cyclists by vehicle occupants.

The enhanced safety perception broadens the appeal of cycling to a wider audience.

Benefits:

- Provides greater separation between motor vehicles and bikes
- Provides extra space to allow for passing or obstacle avoidance in the bike lane without entering the vehicle travel lanes
- Can provide greater space between bikes and parked cars with a buffer between the parking and bike lanes

Considerations:

- Signage and/or enforcement may be required to prevent loading and waiting vehicles from using the space
- Markings and/or color should be considered for driveway intersections to enhance awareness of the potential for bike presence

Buffered bike lanes allow room for cyclists to pass one another.

Bike Lanes

Bike lanes are on-street lanes which provide an exclusive space for bikes adjacent to vehicle lanes. While bike lanes are often considered the most basic form of exclusive bike facilities, they provide for more predictable travel patterns for cyclists which can help increase safety.

Bike lanes should accommodate space to separate bikes both from the street gutter and associated debris and from adjacent vehicles.

Benefits:

- Provides greater predictability of bike position for both bikes and vehicles
- Increases the total throughput capacity of the street as compared to a mixed vehicle/bicycle lane

Considerations:

- For bike lanes adjacent to a parking lane provide an edge stripe on the parking lane to keep vehicles from parking partially in the bike lane. Providing a wider parking lane can also allow for space to avoid the “dooring” of passing bikes.
- If there is enough space, consider upgrading the bike lane to a buffered bike lane

A typical on-street bike lane.

Contra-Flow Bicycle Lanes

Contra-Flow bike lanes provide an exclusive-use bike facility for travel in the opposite direction of vehicle traffic, typically on a one-way street. This facility is useful in environments where many one-way streets require out-of-direction travel for bikes, making short trips longer and less desirable than they otherwise should be. Contra-flow lanes can be effective facilities for eliminating gaps in the bike network that were created as a result of designing local streets to facilitate vehicle travel.

Benefits:

- Can reduce or eliminate out-of-direction travel for cyclists
- Increases the use of lower volume streets for biking, reducing reliance on busier roads for connectivity
- Can reduce the number of bikes riding the wrong way or using the sidewalk to get through street network gaps

Considerations:

- For bike lanes adjacent to a parking lane provide an edge stripe on the parking lane to keep vehicles from parking partially in the bike lane. Providing a wider parking lane can also allow for space to avoid the “dooring” of passing bikes.
- With sufficient space, consider adding a buffer or protective median against opposing traffic. This creates a contra-flow buffered bike lane or contra-flow cycle track, respectively.

A contra-flow bike lane along a shared lane.

Shared Lanes

While not an exclusive bike facility, shared lanes are appropriate for use on low volume, low speed streets where separated bicycle facilities may not be in keeping with the context zone or street typology. Shared lanes can be marked with the shared lane marking, often referred to as “sharrows,” which advise bicyclists regarding optimal lateral positioning within the travel lane. Similar to on street signage, shared lane markings also serve as a reminder to motorists to expect bikes to be in the lane.

Shared lanes can reinforce the belief among cyclists that they are welcome on the street and remind motorists that the street is a shared space. They can play a key role in connecting bike facilities through lower volume parts of the roadway network.

Benefits:

- Shared lane markings can help less experienced riders know where in the lane they should ride, helping to keep them out of the door zone of parked vehicles
- Low cost of implementation, typically just includes applying markings and street signage where necessary
- Can reduce the number of bikes using the sidewalk compared with streets with no visible bike facilities

A shared lane marking designates the shared lane.

Considerations:

- In constrained environments with no passing space, vehicles will likely have to travel a similar speed to bikes. Shared lanes are thus not appropriate for higher speed streets which provide for longer trips.
- Wide lanes with shared lane markings may create opportunities for vehicle speeding and dangerous passing of bikes. Consider reducing lane widths or lane dieting to create exclusive bike facilities if space exists.
- Traffic calming measures such as neckdowns, center islands, and diverters can be effective in creating a more welcoming and safer environment for bikes.
- To date, there is no proven correlation between the provision of shared lane markings and a decrease in crashes.

Transit Facilities

Transit facilities, like bike facilities, can transform the inclusion of transit on Complete Streets from an afterthought to a priority element for the safe and efficient movement of people along the street. Transit patrons are closely linked to the experience of the street; patrons generally walk to and from transit stops and the quality of stops and lanes affect travel time reliability and convenience of the service.

Transit facilities can range from shared-lanes, where transit operates in general vehicle lanes and mix with all other traffic to exclusive, physically separated facilities which promote high-quality transit service. Facility selection is often based on the number of transit routes and their respective peak frequencies, which governs the expected number of transit vehicles per hour on a street. The decision can also be based on available right-of-way and general traffic conditions which may negatively impact the travel time and reliability of transit service. Transit can move significantly more people per hour than a lane of general vehicle traffic; dedicating space to transit can greatly increase the throughput capacity of streets without requiring widening.

TABLE 4-4 RECOMMENDED TRANSIT FACILITY DIMENSIONS

Lane Type	Minimum Recommended Width
Curb Lane	11'
Offset Lane (bulb-out stations)	10'
Dedicated Median lane	11'
Combined Bike/Bus Lane	12'

Curbside Bus Lanes

A curbside bus lane is a dedicated transit lane adjacent to the curb. This can be an effective facility on streets where parking is either not provided or underutilized. Curbside lanes can also be combined with peak time restricted parking lanes, which allow for parking in off-peak periods, but create a bus lane during periods of peak bus service and peak traffic congestion.

These lanes require little modification to streets beyond signage and lane markings. Vehicles entering driveways or turning right can use the lane to make their turn. Conflicts can arise between transit vehicles and taxis and delivery vehicles using the curb as loading space.

A curbside bus only lane.

A bus only lane with colored pavement, separated from the right-turn lane.

Offset Bus Lanes

An offset bus lane is in the right-most travel lane and is separated from the curb by a parking lane or cycle track. This facility allows for loading curbs and on-street parking to remain, limiting the impact from vehicles using a curbside bus lane as a loading zone. However, buses may be interrupted by vehicles pulling in and out of on-street parking lanes.

Double parking and commercial loading can still impact offset bus lanes. Enforcement of bus-only lanes is critical to their success. Stops are located as bus-bulbs to allow the bus to remain in its lane while stopped while also creating additional space for stop amenities.

Transit operating in a center lane.

Center Bus Lanes

Center bus lanes are most appropriate for major bus corridors with high frequency and high ridership where travel times may be impacted significantly by congestion. By moving the bus from the curb lane to the median of the street, conflicts with parking and loading vehicles are eliminated. Left turns can be restricted for driveways with accommodations made for turns at major intersections.

Stops are located on the right-size of the median to allow for traditional bus boarding. Due to the increased space needed for the stops and the need for riders to cross half the street to access the stop, center bus lanes should be paired with stop consolidation on the route to maximize the use of the investment while also enabling more efficient service.

A median guideway BRT service in Bogota, Colombia.

Median Guideway (Protected Lanes)

Median guideway bus lanes are a further enhanced application of center bus lanes. In the case of guideway lanes, medians or other elements of vertical protection are used to physically separate traffic from the transit lanes. Similar to center bus lanes, a median guideway is most appropriate for high-quality, frequent transit service on larger streets. This treatment supports a bus rapid transit or “rail-like” transit service with dedicated operating space, independent stops with amenities, and potential priority at intersections.

Median guideways are also effective tools for changing the character of a street by dividing it in two. This allows for wider, faster streets to take on a scale more supportive of pedestrian and local activity.

A bike lane passes behind a bus stop on the sidewalk.

Transit/Bicycle Combinations

One of the common conflicts that arise in typical urban travel is between buses and bikes along the curb lane.

On highly constrained streets with low speeds and moderate bus frequencies, a shared bus-bike lane may be considered. In this environment, it is generally found that buses will not pass bikes as frequently as bikes will pass buses at bus stops. Where space exists, a wider bus/bike lane (13’-15’) could allow for safer passing between buses and bikes, but will still create conflicts at stops.

For cycle tracks and bike lanes that intersect with bus stops, a bus-bulb can be constructed with space for bikes to pass between the bus-bulb and the curb. This can be accommodated by leaving the cycle track at street level and letting pedestrians cross to the bus-bulb or by raising the cycle track to sidewalk level, allowing bus passengers to cross the cycle track on a consistent level.


Sapient


Parking
Parking


MARKED
EMERGENCY
VEHICLES
ONLY
Lincoln Rd
Art Basel
UBS

Intersections

5

PRINCIPLES

Intersections are the greatest source of conflicts for all modes of transportation in Miami-Dade County. They also represent some of the greatest inefficiencies and inconveniences found in today's street network. The priority placed on vehicle flow has created intersections which favor vehicular movement; crosswalks may not be present, bike lanes may be taken over by right-turning vehicles, and signals may not work or may cause excessive delay for people walking and biking.

This chapter sets a new vision for intersections in Miami-Dade County. People should feel comfortable approaching and crossing them. Intersections should be efficient for all users. And above all, every intersection should work for every person, regardless of how they choose to interact with the street.

Green – Designed for All

Complete intersections do more than just accept people walking, biking, or taking transit. They facilitate these mode choices and create environments in which a child riding her bike through an intersection feels just as comfortable as the elderly man crossing the street and the commuter driving his car. Central to this philosophy is the acceptance that each mode requires specific accommodations; a person walking or biking is not expected to pass through an intersection the same as a vehicle and it is important to anticipate the needs of different users at intersections.

Yellow – Safety is Paramount

Intersections represent significant potential for conflict on any street network. Conflicting traffic movements combine with often deadly consequences and vulnerable road users are at the greatest risk in these situations. The safety of all users, including vehicle occupants, is placed at greater risk when higher vehicle speed is the priority at intersections. Clear zones, large turn radii, and extended signal phases combine to reinforce drivers' belief that intersections should be approached and traversed at high speed. Intersection design plays a critical role in street safety.

Red – No Larger than Necessary

Just as road diets and lane diets seek to align street sizes with the needs of all modes, so too must intersections be sized appropriately for all users. A vehicle may pass through an intersection at 20 mph; by comparison, a person biking may pass through at 8 mph and a person walking may pass through at 2 mph. The larger an intersection is, the longer it takes a user to cross through it. This creates a longer period of exposure to dangerous conflicts and necessitates longer signal phases to provide ample time for someone who has just started crossing to make it across. By reducing the additional space traditionally provided for drivers at intersections, vulnerable road users can feel less exposed and safer while also helping to speed up signal cycles.

GEOMETRY

Curb Radii

The curb or corner radii at intersections control the speed at which vehicles can turn and determine the distance which people must walk to cross an intersection. Corner radii should be designed as small as possible to enhance the safety and suitability of an intersection for all users.

Actual curb radius is the radius of the curb line at an intersection. It is easily seen and understood, but generally is not the governing radius for vehicles. Effective curb radius is the measure of a vehicles path while turning from one lane to another. It is made larger by the presence of parking and bike lanes which require vehicles to make wider turns around a corner.

In situations where a minimum actual curb radius is desired but a larger effective radius is needed to accommodate frequent trucks or buses there are several solutions available to allow access while maintaining a safe environment.

- Add a parking and/or bike lane to increase the effective radius
- Recess the stop bar on the receiving street to allow vehicles to take wider turns
- Use pavement textures or colors to create a smaller actual curb radius while allowing larger vehicles to turn through that space (note this space will not be appropriate for waiting pedestrians)

TABLE 5-1 RECOMMENDED CURB RADII

	Land Use Context	Actual Curb Radius	Effective Curb Radius (the vehicular path) (2)
Minimum (1)	All intersection corners without vehicle turns	5'	N/A
	UC, UR	5'	10'
	RS, MC, I, P	15'	20'
	IN, AN	30'	35'
Maximum	All intersection corners without vehicle turns	5'	N/A
	UC, UR	20'	25' (3)
	RS, MC, I, P (4)	30'	35'
	IN, AN (5)	45'	50'

Notes:

(1) Minimum is generally desirable except where circumstances warrant a wider curb radii.

(2) Bicycle lanes and parking lanes may increase the effective curb radius.

(3) Effective curb radius may be increased to 30 feet in urban center and urban areas to accommodate a bus or a truck along certain corridors.

(4) Consider alternate strategies such as recessed stop bars and mountable curbs in unusual situations where 30 feet maximum actual curb radius cannot be met.

(5) Where the potential for conflicts with pedestrians is high and intersection geometry necessitates an effective radius greater than 50 feet, evaluate installation of a channelized right-turn lane with a pedestrian refuge island.

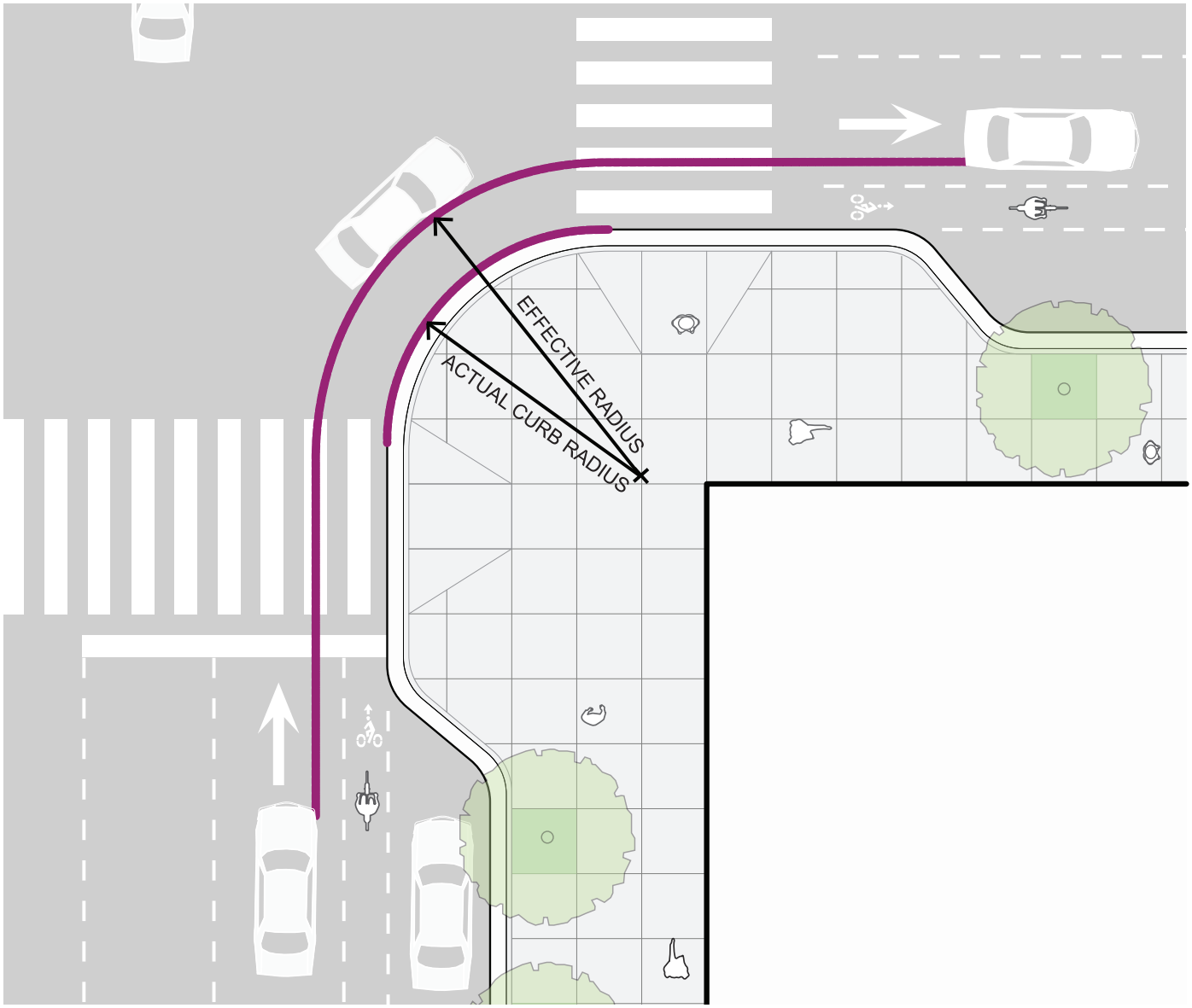


Figure 5-1 *Actual vs Effective Radius*

Curb Ramps

Curb ramps provide a transition between the sidewalk and the street. Although they are often thought of as features required by the Americans with Disabilities Act (ADA), curb ramps are an important component of designing safe and useful intersections for all people. Curb ramps are federally mandated; they allow people pushing strollers, wheeling bikes, and towing suitcases to easily use crosswalks. They are equally as important as part of making streets easier for people with lower mobility, for whom stepping off a 6” curb may be physically difficult or impossible.

Curb ramps should be aligned with the most direct path of travel to channel people crossing an intersection to the proper and most useful path. All ramps must be ADA-compliant with a 4' deep by 5' wide level landing pad and a detectable warning strip at the street edge. Curb ramp configuration should be selected based on the specific corner conditions.

Curb Extensions

Curb extensions were highlighted in Chapter 4 as traffic calming neckdowns. They play a similar traffic calming role at intersections and can be used as effective means of reducing curb radii as noted earlier in this chapter.

Curb extensions are expansions of the curb and sidewalk into the roadway, usually where a parking lane ends at an intersection. They enhance pedestrian safety by shortening intersection crossing distances, add queuing space at intersections, and help place people waiting to cross in the sight line of drivers. Extensions also create room for street furniture on otherwise narrow sidewalks and allow space for ADA-accessible curb ramps and increase overall safety of an intersection by preventing vehicles from parking too close to the intersection and reducing sight lines.

Benefits:

- They enhance pedestrian safety by shortening intersection crossing distances
- Increase queuing space for pedestrians at intersections
- Help place people waiting to cross in the sight line of drivers
- Can create room for street furniture on otherwise narrow sidewalks and allow space for ADA-accessible curb ramps

Considerations:

- The typical curb extension is the width of a parked car (6'), but can be reduced to accommodate turning vehicles if necessary
- Extensions are not appropriate at intersections where traffic operates in the curb lane
- The length should be as wide as the crosswalk, at a minimum
- An extension can be located on one intersection approach or one multiple approaches depending on the intersection configuration
- Street furniture and plantings placed on an extension should not interfere with pedestrian flow or visibility between people walking and driving

Curb extensions at mid-block crosswalks can create shorter and more visible crossing opportunities.

TABLE 5-2 PEDESTRIAN RAMP GUIDELINES

	Land Use Context	Minimum	Desired	Maximum
Curb Ramp Width	All	4	Width of Pedestrian Walking Zone	Width of Sidewalk Realm
Curb Extension Width	All	4	8	Do not block an existing or potential bike lane
Curb Extension Length	All	Width of Curb Ramp	20	As needed to improve pedestrian visibility and prohibit parking near intersection
Crossing Refuge Island Width	All	6	10	Width of Median

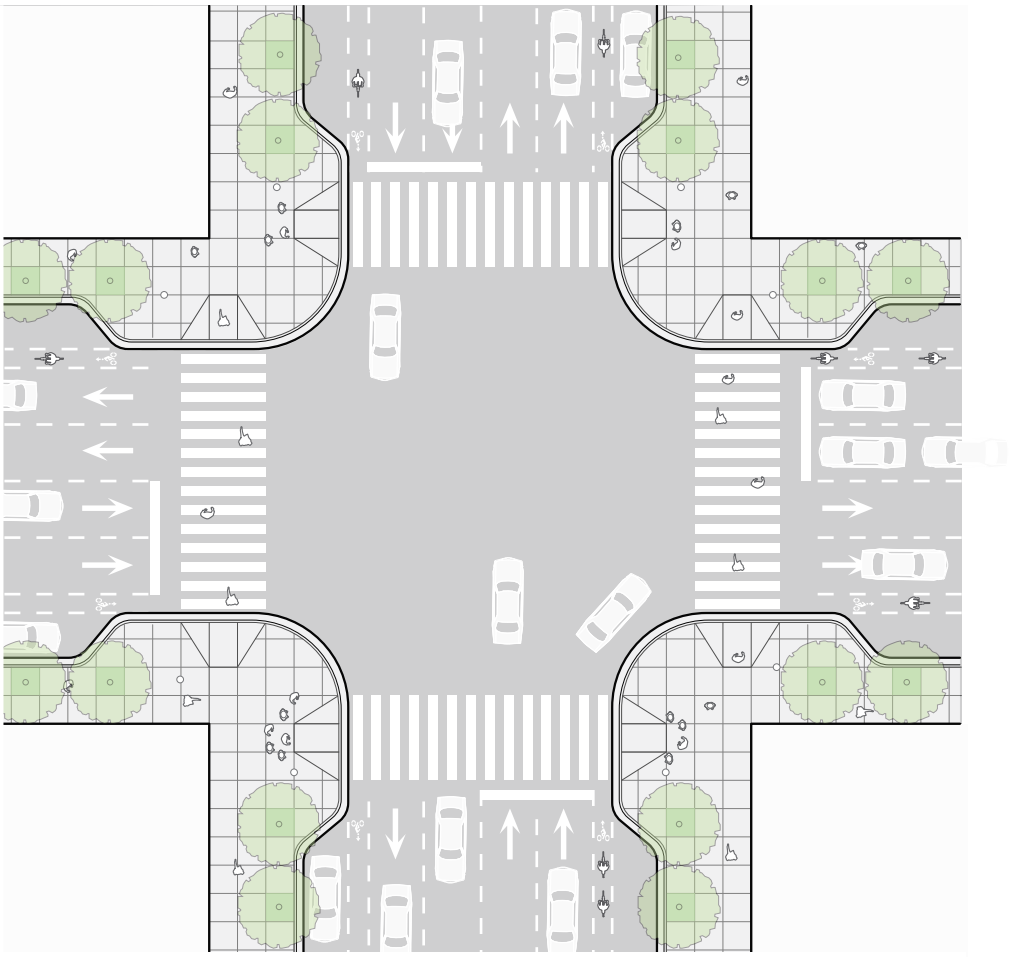


Figure 5-2 *Curb extensions at an intersection*

Pedestrian Refuges

A pedestrian refuge creates a protected space for people while crossing multi-lane, bi-directional traffic. Refuges are particularly valuable at unsignalized crossings where people can people crossing can find gaps in traffic from one direction at a time. Refuges resemble median cut-throughs, where pedestrians are provided a space to continue through a median at street level while the median provides protection on both the left and right of the crosswalk.

Benefits:

- Reduce the unprotected time that people spend in the intersection
- Allow for two-stage crossing of larger streets

Considerations:

- Refuges should be at least 6' wide to provide space for a person with a stroller or bike, see **Figure 5-4**
- The cut-through space should be as wide as the striped crosswalk
- Plantings in refuge medians should maintain intersection visibility
- Detectable warning strips are required on both sides of the refuge, even for at-grade crossings
- A “nose” should always extend from the pedestrian refuge into the intersection to protect people waiting from turning vehicles
- Refuges are most appropriate for streets with 3 or more lanes

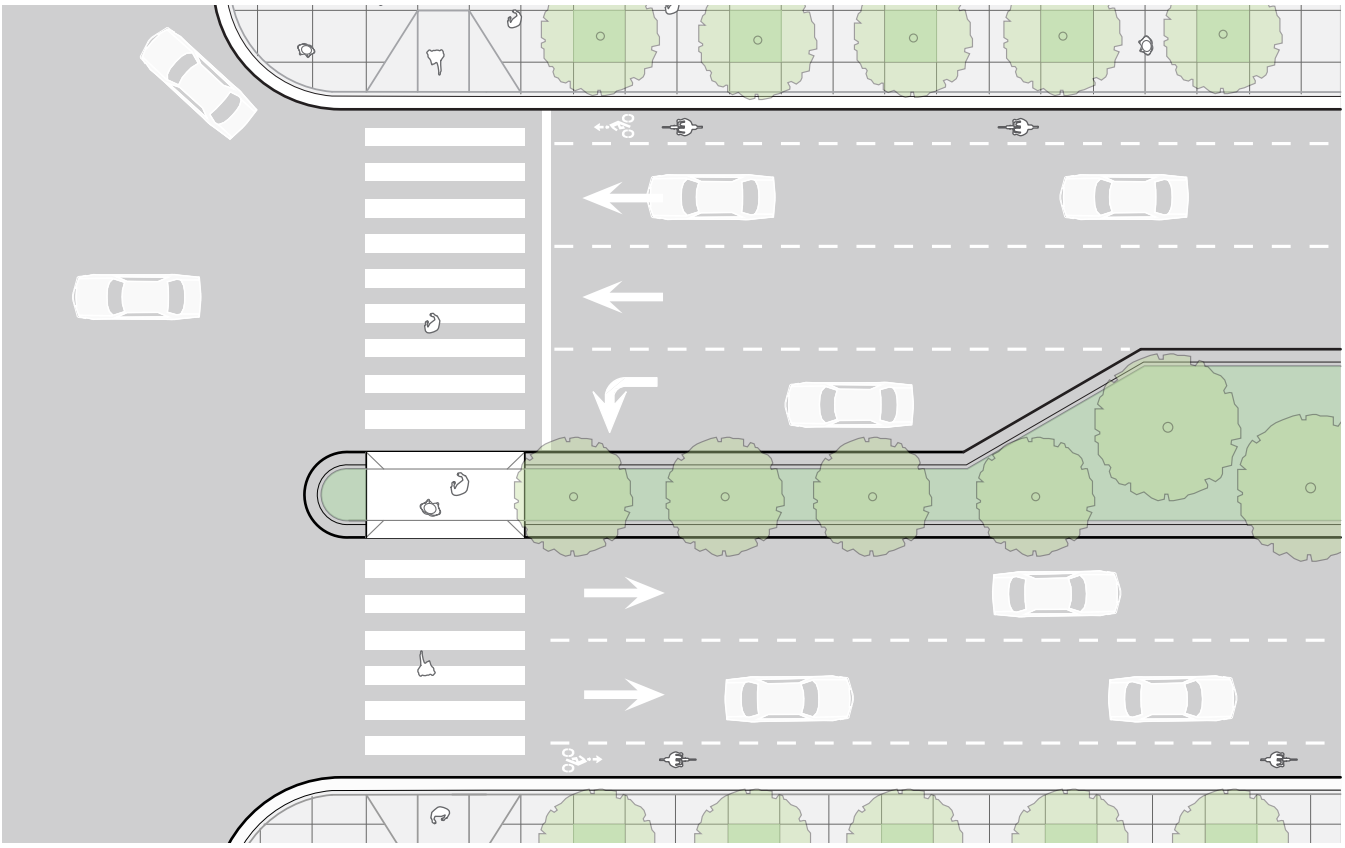


Figure 5-3 ***A pedestrian refuge with a protective "nose" divides a crossing into two shorter segments with a protected space in between.***

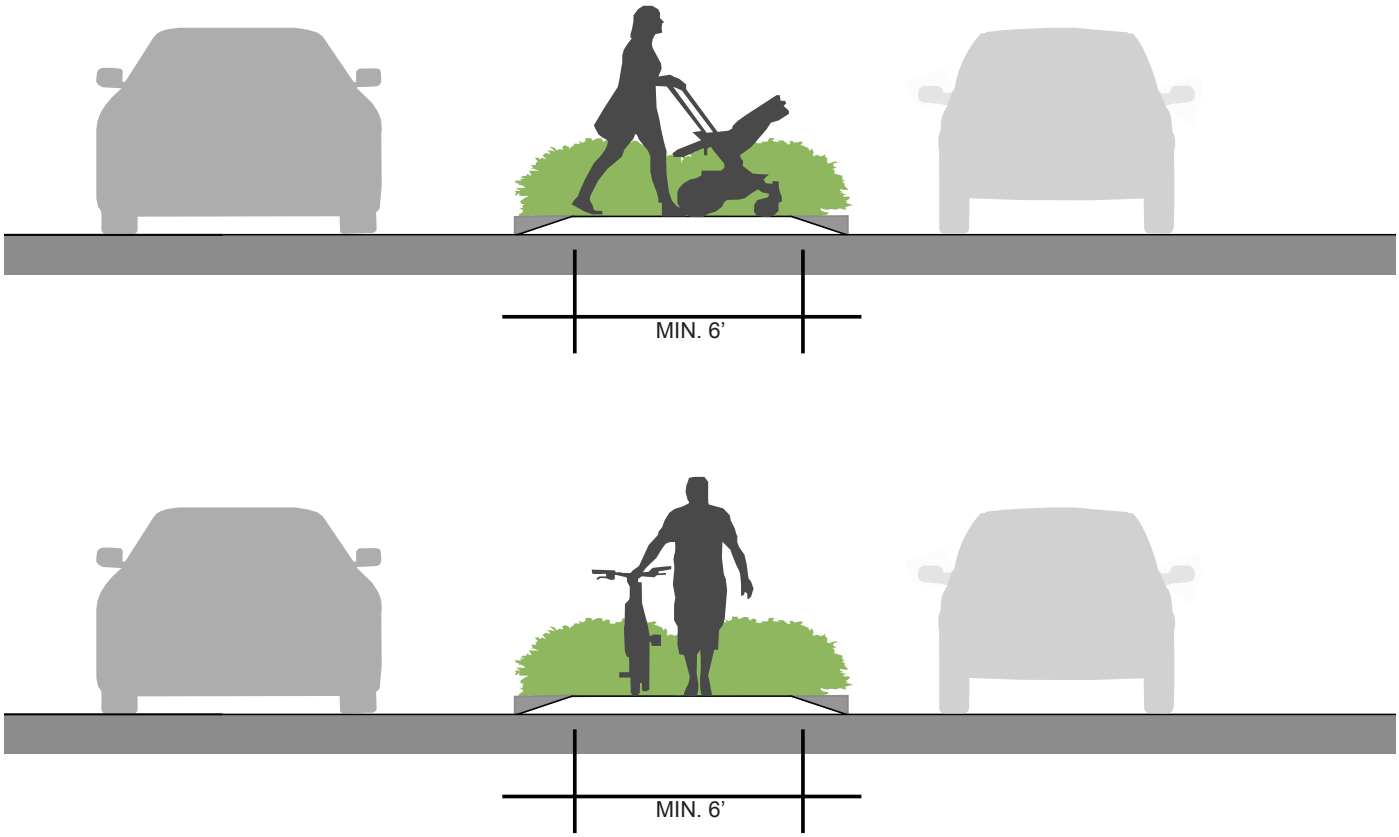


Figure 5-4 ***Pedestrian refuge dimensions safely accommodate a stroller or bike***

Neighborhood Traffic Circles

Traffic circles are small circular devices which act as roundabouts in intersections. They can take the place of Stop signs by sufficiently deflecting vehicle paths, which slow users. This design is beneficial to people biking through the intersection because they are no longer required to come to a full stop; this design allows them to slow down but retain their momentum. Furthermore, neighborhood traffic circles provide a design where motorists and bicyclists pass through the intersection at roughly the same speed, which eliminates the dangers of speed differentials. Neighborhood traffic circles also reduce the potential for motorists to not see the Stop sign and pass through the intersection at an unexpectedly high speed.

Considerations:

- Emergency vehicle and large truck access may need to be maintained. A mountable curb apron around the circle can allow these vehicles to use the intersection
- Adding greenscaping to the center of the circle can provide stormwater filtering and retention benefits. Plantings should be kept low to avoid blocking sight lines
- Circle diameter should be large enough to avoid vehicles being able to pass straight through the intersection without slowing or changing direction
- Neighborhood traffic circles should be given strong consideration along bike routes through residential neighborhoods, sometimes referred to as neighborhood greenways, due to the traffic calming and bicycling benefits provided.

A traffic circle accommodates all modes.

Diverters

Diverters are intersection devices which prevent vehicles from entering a street from an intersection. Importantly, diverters are generally not considered as speed-control traffic calming devices; rather, they are useful in managing use of the street network.

Benefits:

- Can prevent “cut-through” traffic which may use local or residential streets as parallel or secondary routes to using the main thoroughfare
- Cut-through openings can still allow for people walking or biking to continue through the diverter.

Considerations:

- Accessible pedestrian paths must be retained with diverter installation
- Diverters can include greenscaping stormwater features
- Emergency vehicle access may need to be maintained and should be coordinated with the appropriate authority
- A diverter can help reduce volumes at periodic intervals along a bike boulevard

CROSSWALKS – DESIGN AND TYPE

Standard

Standard crosswalks are the primary paths by which people will cross intersections. It is important that their design emphasize the safety of the user and highlight their presence to drivers. Crosswalks should be as short as feasible to limit the amount of exposed crossing distance, and markings should be as wide as possible to provide visibility to drivers and create sufficient safe space for multiple users.

Benefits:

- Increase visibility of pedestrians, particularly to turning drivers

Considerations:

- Stripe all crosswalks at signalized intersections
- Striping should include markings perpendicular to the path of travel (e.g. ladder, zebra, continental)
- Crosswalks should be well lit
- Striping should be at least as wide as the pedestrian paths that it connects
- Stop bars should provide at least 8' of clearance from the crosswalk to increase comfort of users and reduce the likelihood of cars pulling forward and blocking the crosswalk

The absence of a marked crosswalk can create a dangerous situation.

A marked crosswalk with RRFB indications creates a significantly safer environment.

Raised

Crosswalks can be raised through an intersection, just as the speed tables in Chapter 4 can support mid-block crosswalks. In this design crosswalks continue through an intersection at the same level as the sidewalk, while vehicles are required to come up to the pedestrian level. In this sense raised crosswalks define the space as pedestrian first, with cars sharing it, rather than the standard crosswalk where people step from the pedestrian realm down into the traveled way.

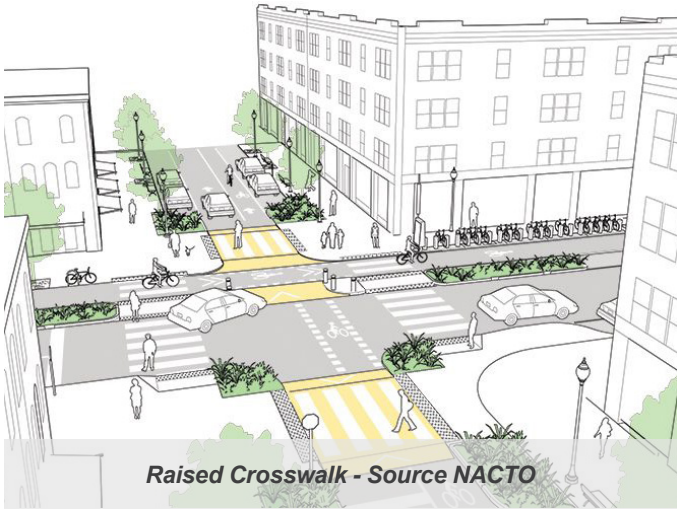
Raised crosswalks are appropriate for high pedestrian volume locations, particularly in locations where yielding to people in crosswalks has been problematic. They serve a dual purpose of enhancing the experience of people walking through an intersection and calming traffic; thus, raised crosswalks situated parallel to main roads can slow traffic turning from larger roads onto smaller side streets.

Benefits:

- Appropriate for high pedestrian volume locations, particularly in locations where yielding to people in crosswalks has been problematic
- Serve a dual purpose of enhancing the experience of people walking through an intersection and calming traffic
- Raised crosswalks situated parallel to main roads can slow traffic turning from larger roads onto smaller side streets.

Considerations:

- Crosswalks should still be signed and marked just as a standard crosswalk is
- Detectable warning strips are required at the edge of the sidewalk
- Raised crosswalks may not be appropriate for streets with higher target speeds
- Emergency vehicle routes should be considered before placing raised crosswalks



Raised Crosswalk - Source NACTO

SIGNAL CONTROL

Traffic signals allocate the time in which people can be in the intersection and strive to balance the needs of all users moving across the transportation network. Signals must also align with the Complete Streets goals of equal provisions for all modes, moving toward signal timing and design which supports people walking and biking in addition to the motor vehicle traffic that was historically the sole focus of signals.

Signals that are timed for high-speed traffic on major roads can contribute to unsafe driving and can cause delays which act as significant barriers to people attempting to cross from secondary streets. These delays can decrease compliance with red lights, creating unsafe behavior from users who may experience waits of multiple minutes for their turn to use an intersection.

These problems can be addressed by focusing on the needs of all users and implementing solutions which support the most vulnerable users. A 70-second delay in a vehicle may feel long and tedious, but that same 70-second delay to a person on a bike, without AC or an umbrella, may be unbearable.

Principles:

- Signal cycle times should be reduced, allowing for shorter wait times for all users.
- Reducing the number of separate phases with a signal cycle can reduce delay for all users.
- On corridors where signals are synchronized so that vehicles can maintain speeds, these signals should be timed at or below the street's target speed to keep vehicles from speeding to catch green lights. On major bike corridors, consider synchronizing lights for bike speeds.
- Fixed-time signals can increase predictability of intersection wait times for all users

Pedestrian Signals

Pedestrian signal heads are used to communicate signal timing to people walking. These familiar devices provide three indications to people on the street:

Walk – signified by the symbol of a person walking; this means that people are allowed to enter the intersection to cross the street. This phase must be a minimum of 7 seconds long.

Change Interval – signified by the flashing hand (Don't walk) symbol and a countdown display; this signifies that people should no longer enter the crosswalk and should finish crossing the street within the remaining time. All change intervals should display a countdown timer.

Don't Walk – signified by the solid hand symbol; this signifies that people should not cross the street. This symbol also indicates the Buffer interval, during which people can finish crossing the street while all other movements are stopped.

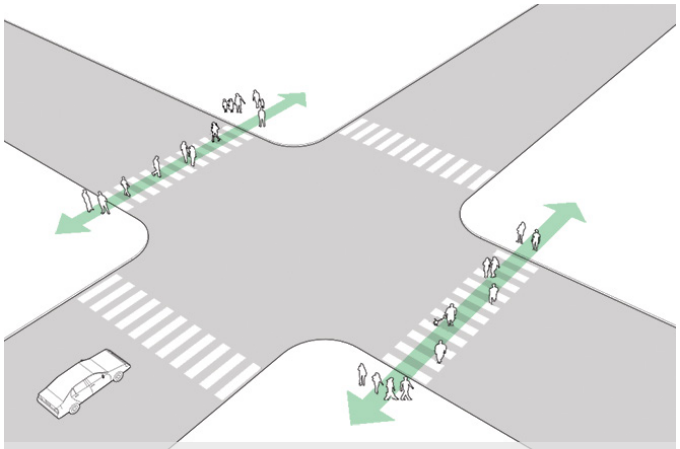
Pedestrian signal timing is based on the pedestrian clearance time, the time it takes someone to completely walk across the intersection, and is usually based on a calculation of people walking at 3.5 ft/sec, although this can be reduced to 2.8 ft/sec to allow for longer crossing times. This time should be allowed for through a combination of the Change and Buffer intervals. A pedestrian signal head should be provided at each leg of an intersection to prevent people from guessing whether they are crossing with traffic or not.

A pedestrian signal can help people cross multi-lane, high speed roads that would otherwise be unsafe to cross.

Pedestrian Scramble - Source LA Great Streets

Pedestrian Scramble (Exclusive Phase)

At key, busy intersections with a large volume of pedestrian crossings a scramble or exclusive pedestrian phase can be used. In this situation, all intersection approaches are held and people may cross freely for the given period, including walking diagonally across an intersection. This allows for people to choose efficient paths and reduces the need to cross diagonally via two separate signal phases. Importantly, this approach can eliminate the conflict between turning vehicles and people crossing; this conflict is a large source of driver collisions with people walking at intersections.



Leading Pedestrian Interval - Source NACTO

Leading Pedestrian Interval

Another approach to keeping people safe from turning drivers is to provide a Leading Pedestrian Interval. In this situation, the pedestrian phase begins 3-7 seconds before the vehicles are given a green light. People crossing are thus already in the crosswalk before vehicles begin to turn, increasing their visibility to drivers and reinforcing that those in the crosswalk have the right-of-way.

Bike

For exclusive bike facilities, a bike signal can be provided at signalized intersections to facilitate communication and provide accommodation for bikes crossing the intersection. They play an important role in limiting conflicts between bikes and turning vehicles and provide assurance to bikes as to what the proper action is. Bike signals can be used to facilitate contra-flow bike lanes and help remind drivers to expect bikes to be traveling through an intersection.

Actuation

Actuation of signals can be challenging for bikes which typically are not detected by vehicle detection devices such as cameras or loops. Detection should be provided automatically, like it is for vehicles, rather than through a push button device. Bike loop detectors can be installed within bike boxes or bike lanes, and should be marked in the pavement to advise people on bikes where to position themselves.

Leading Bike Interval

A Leading Bike Interval, like a Leading Pedestrian Interval, provides people biking with a short head start on entering the intersection, allowing them to be more visible to turning vehicles. This interval requires a bike signal to communicate that bikes should proceed through the intersection while traffic on that approach is held at a red signal. Right turn on red for vehicles should be prohibited in conjunction with lead intervals.

Transit

Transit service can also be accommodated by the design of traffic signals, helping to ensure travel time reliability and provide an enhanced customer experience. The simplest form of accommodation is to focus on shorter signal cycles, similar to the accommodation for bikes and people walking. This can reduce the time that transit vehicles spend waiting for a green light. Dwelling at stop and red lights greatly affect the average running speed of transit; reducing the time spent at signals can greatly improve transit reliability.

Signal progression timed to bus operating speed is a bigger step in supporting transit along a corridor. Just like signal progression for vehicles, signals are timed to allow a vehicle traveling at a specified speed to continually receive green lights at intersections. With transit service, the progression is offset at intersections with transit stops to allow time for buses to dwell while passengers board or alight. Typically, the signals will be timed to allow for a travel speed between 12-20 mph. Short signal cycles are still preferred as they reduce the time penalty associated with missing a green phase due to congestion or a longer than average dwell.

Transit Signal Priority

Transit signal priority, known as TSP, is a more powerful method which allows for modification of signal timing for transit vehicles. Note that this is different from preemption (commonly used for rail applications or emergency vehicles). TSP can be used to shorten a red phase or lengthen a green phase to accommodate an approaching transit vehicle. This accommodation can be applied to all approaching transit vehicles or only to those running behind schedule.

INTERSECTION TREATMENTS

Bike

People riding bikes are particularly vulnerable at intersections, where conflicts are numerous. Drivers may not anticipate the presence of bikes in or around intersections as they look for conflicts with other vehicles. Markings and facilities for bikes can be placed in intersections to increase rider comfort and increase driver awareness and anticipation of potential conflict points. The following treatments are summarized to provide an overview of treatments available. Further guidance on the use of these treatments is available in the NACTO *Urban Bikeway Design Guide, Second Edition*.

A bike rider uses a bike box to position for a left turn ahead of a vehicle.

Bike Boxes

A bike box provides a space in front of stopped traffic for bikes to wait for a green phase. This allows bikes to be visible to stopped drivers, a safer situation than a bike waiting between car lanes, visible to few, if any, vehicles.

Bike boxes are effective tools for dealing with turning conflicts. For bikes turning left, positioning in a bike box that extends across all lanes can allow them to turn ahead of traffic behind them. For bikes continuing straight, positing ahead of right turning vehicles can reduce the likelihood of right hook collisions with unsuspecting drivers.

Bike boxes should be 10-16 feet deep, with a stop line indicating to vehicles to stop prior to the box. Right turns on red must also be prohibited to keep vehicles from entering the box during a red phase.

A marked intersection crossing positions bikes to align with a facility across an intersection.

Cyclists can use the turn box to complete a left turn without leaving the exclusive bike facilities.

Markings

Markings for bikes can be provided through the intersection to continue on-street markings before and after intersections. These treatments help to make drivers aware of the presence of bike priority space, particularly aimed at conflicts with turning vehicles. Markings can also increase the comfort of riders by providing them with confidence regarding their priority within the intersection and the proper path to take.

Wider or offset intersections are particularly good candidates for intersection markings. They can reinforce the proper path for bikes and instill confidence in crossing larger intersections.

Typical markings include dotted lines through the intersection with a width and position consistent with the bike facility it follows. Shared lane markings and colored pavement can be used to further highlight the bike treatments. Colored pavement can be especially useful at conflict points both through intersections and at conflict points with driveways.

Two-Stage Turn Boxes

A two-stage turn box allows bikes to complete a turn through an intersection in two-stages and avoids bikes having to cross traffic lanes to position for turns. A person biking through an intersection can pull into a two-stage turn box and complete the second movement when allowed either by a traffic signal or when allowed at an unsignalized intersection.

This application is most appropriate for higher speed and higher volume streets where it may be unsafe for bikes to cross traffic lanes to turn along with vehicles. It is also an appropriate treatment for cycle tracks given that their separation generally precludes bikes from changing lanes for turns at an intersection.

Cycle Tracks

Cycle tracks require careful consideration at intersections, where the exclusive space of the cycle track must interact with vehicles turning. This can be accommodated by ending the protection of the cycle track and bringing the bikes closer to the vehicle lane. There are a variety of treatments which can be used to either separate or mix vehicles and bikes at the intersection.

Benefits and Considerations:

Bikes can be kept adjacent to vehicle lanes with a buffer or bike box, allowing for clear priority of the bikes traveling through the intersection. Right turning vehicles are thus farther removed from the bikes, a configuration which can increase visibility of bikes in the intersection as vehicles turn.

Alternatively, the right turn lane can mix with the bike lane. In this instance, it is important to create a deflection of the vehicles path that makes it clear to drivers that they are crossing, and thus must yield to, bikes.

The safety and comfort of people biking through intersections with cycle tracks can be improved with intersection marking treatments, as discussed earlier in this chapter.

Transit

Transit-specific intersection treatments can elevate transit to an equal standing with other modes on Miami-Dade County's streets by creating an environment supportive of reliable and efficient service. The following treatments are summarized to provide an overview of treatments available. Further guidance on the use of these treatments is available in the **NACTO *Transit Street Design Guide***.

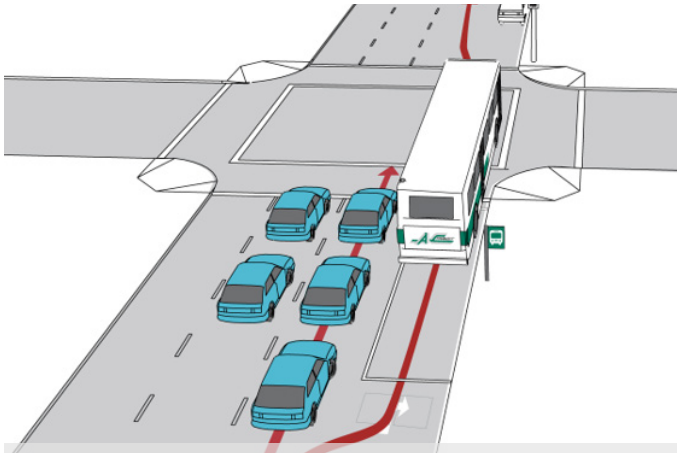
Right Turn Lanes

The interaction of Bus Only Lanes and right turn lanes can provide priority for buses through an intersection. For moderate right turn volumes, turning vehicles can share a bus lane approaching an intersection. This treatment can also be used on intersections without dedicated bus lanes; in this case, a bus can still use a right turn lane and will instead continue directly through the intersection.

At intersections with higher right turn volumes that would otherwise delay transit operations through an intersection, a right turn pocket can be added to the right of the bus lane. In this case a Bus Only Lane is broken (much like a bike lane's interaction with a right turn pocket) to allow cars to merge across the lane into the turn pocket and is then restored closer to the intersection. For nearside bus stops, a floating bus bulb can be added to allow for passenger access to the stop.

Queue Jump Lanes

A queue jump lane creates a short, dedicated transit lane in combination with a dedicated transit priority signal. In this instance, a bus will approach an intersection in the queue jump lane and trigger an early green light, like a Leading Pedestrian Interval. This allows the bus to bypass traffic queued at the intersection and can also be used to help a bus merge back into traffic from a nearside bus stop. For congested intersections, this treatment can greatly improve on-time performance and reliability of the route.



A queue jump allows a bus to advance through an intersection ahead of queued vehicles.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OPEN FOR STYLE
34
CHAMPS

Smart Streets

6

Chapters 3-5 have provided detail on infrastructure management and investment; a framework for considering the Complete Streets approach was outlined and design elements to support the safety of all modes were identified for inclusion on Miami-Dade County's streets.

Few, if any, of the elements discussed previously are new to street design. Rather it is the renewed emphasis on incorporating safety and efficiency for all users that is driving their inclusion in today's street design process. This renewal reflects the changing priority of street stakeholders. The County is becoming increasingly urban and residents, particularly the younger "Millennials" and older retirees are putting an emphasis on walkable, livable environments which support a sense of community and a healthy lifestyle free of reliance on a personal vehicle.

Investment in streets must be mindful of the ever-changing transportation paradigm. Personal vehicle ownership has been declining. The advent of app-based ride hailing services as well as the proliferation of car rentals by the minute or hour have reduced the need for personal car ownership, particularly in mixed-use, urban neighborhoods. This trend is likely to continue to grow. Indeed, the transportation system of 2030 may be all but unrecognizable to the 2017 user of these design guidelines. With that in mind, investments should allow for maximum flexibility in street space programming.

PREPARING FOR AUTONOMOUS VEHICLES

Autonomous vehicles (AVs), often referred to as "self-driving cars," are poised to alter the transportation landscape as no other invention has since the personal vehicle arrived on the scene. It is important to remember that when, and if, fully autonomous (Level 4 automation) AVs enter the transportation market, they will do so in a piecemeal fashion; adoption rates may be slow at first, with AVs first replacing ride-for-hire services such as taxis and Uber/Lyft before they replace the family automobile. The first wave of adoption then will likely further reduce car ownership rates among the urban population leading to a reduction in parking demand in urban areas. There may be an increase in street safety with fewer drivers behind the wheel, but with a mixed fleet of AVs and driver-operated vehicles, street design will still play an important role in user safety.

The real impacts will be felt if and when the entire vehicle fleet is converted to AVs. These vehicles could have significant effects on roadway safety, reducing or even, in the most optimistic cases, eliminating roadway crashes and fatalities. It is critical that policies regarding AVs be used to continue support for Complete Streets and safety improvements rather than focusing design solely on AVs, much as design was focused on traditional motor vehicles for the past 60 years. Full fleet automation could result in significant flexibility in the following areas of street design:

- Lane widths; AVs may allow for lane widths to be reduced to 8'-9' resulting in more non-vehicle space on streets
- On-street parking; could be replaced by loading zones spaced similarly to today's transit stops
- Signage, road markings; Vehicle-to-Infrastructure communications may render much of today's street signage and markings oriented toward vehicles useless, helping to declutter the Furnishing Zone and reducing street maintenance

- Furnishing zone; elements could be designed toward comfort and away from serving as a barrier to errant driver
- Clear zone; the clear zone setback at the edge of the roadway could potentially be eliminated, restoring even more sidewalk space from vehicles to pedestrians

CURB-LANE FLEXIBILITY

The economic and mobility role of the curb-lane continues to evolve. The curb-lane has filled many important purposes on streets, including: pick-up and drop-off zones, freight delivery zones, short-term parking for retail, long-term parking in residential contexts, transit operating space for streetcars and buses.

The market penetration of Transportation Network Companies (e.g. Lyft, Uber) has increased demand for curbside loading zones, largely in urban areas, with high demand around nightlife destinations. The provision of a safe loading space is important for the safety of all street users; vehicles that drop-off and pick-up by double parking put other drivers at risk, can block bike lanes, and require their passengers to walk in the street. The demand for curbside space will likely increase with the market penetration of AVs. While a decreased need for on-street parking may allow for great curb-lane flexibility, portions of the curb-lane may need to be retained as an interaction point between vehicles and their patrons.

While the curb-lane will likely continue to act as the place where transit, parking, and pick-up/drop-off interact with sidewalk life, shifts in how streets are used provide opportunities to extend the sidewalk realm into the curb-lane. Items such as parklets, bike parking, and bikeshare stations represent traditional sidewalk uses that are suited to curb-lane use. By moving larger furniture items to the curb-lane more sidewalk space can be preserved for café seating and through movement space.

PARKING TECHNOLOGY

Of late, the curb-lane has primarily focused on providing on-street vehicle storage for retail districts, supporting the economic centers of cities and communities. Smart technology streets recognize the potential to better manage the asset that is on-street parking. Miami-Dade County can continue innovation in parking management, expanding on the use of pay-by-phone and multi-space meters which are both user friendly and decrease maintenance costs associated with parking planning and operations.

The next evolution of parking management includes sensors which detect parking space occupancy and allow for dynamically-priced on-street parking. Sensor installation can help direct vehicles to on-street parking availability, helping reduce the congestion and emissions which are generated by drivers looking for parking. The City of San Francisco has had success in using real-time occupancy to price spots dynamically; this method allows the City to aim for a target occupancy which allows drivers to find spaces more quickly. Generally, dynamic pricing can help balance the demand for spots and encourage turnover where it is important to street-level retail.

INFORMATION (OPTIONS FOR ALL)

Wayfinding

Digital and interactive wayfinding displays are increasingly popular in cities and help provide information to people who may not be able or understand how to find that information via a smartphone or another internet-connected device. These large displays can provide maps and directions to different destinations, advertisements for local businesses and city events, and transit maps and bus arrival times near transit stops. Wayfinding displays can be linked to positive health encouragement by including messages about health and wellness benefits of walking to nearby destinations.

It is important that wayfinding information be provided in convenient locations but outside the Pedestrian Zone so as not to obstruct movement along the sidewalk. All signs and interactive consoles must be ADA-compliant.

Mobility Hubs

Mobility Hubs extend the reach of transportation hubs into communities to provide a seamless connection between people and the services that help move them. The traditional transit station exists in semi-isolation; oftentimes there may be a connecting bus route and signage on the block and perhaps a parking lot in a suburban setting. The mobility hub concept broadens the reach of transportation through the creation of this "hub." Expanded wayfinding, opportunities to connect with upgraded biking and walking facilities, bikeshare and carshare stations, and convenient transit service all combine to significantly improve the options available for transportation connections, with options available for all distances, price points, and carbon footprints.

DATA COLLECTION

Decisions regarding infrastructure investment are aided by data that documents how streets are being used. Sensors can be included in street infrastructure to gather information, which should be stored and analyzed in a central database. This information should be made available to the public so that researchers, advocacy groups, and agencies have easy access to as much information as possible. Recent partnerships between FDOT and Strava and between Miami-Dade County and Waze allow much greater access to data. Agencies are now utilizing data from online activity applications and wayfinding applications to influence transportation planning and project development decisions. The following list details some of the metrics which should be collected:

- Parking occupancy and duration for all public on- and off-street spaces
- Air pollution levels
- Vehicle, bike, and pedestrian counts
- Bikeshare usage and patterns
- Transit ridership and patterns


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SUPPLY

7

Implementation

PROJECT IMPLEMENTATION

Implementation of projects at the municipal and County level is comprised of a multi-step process which requires clear goals and objectives to maintain focus on the core elements of designing, building, and maintaining Complete Streets on every street. These projects offer challenges that are different, but not more difficult, than projects that have been completed in the past. Conflicts and competing priorities will require a steadfast commitment to the principles of safe, healthy, and equitable facilities for all.

The guidelines presented in this document provide the philosophy, language, and background needed to support safe street designs and achieve successful projects that can reshape the landscape of our streets and communities.

PROJECT DELIVERY

The project delivery process follows the model used widely for infrastructure projects; implementation is facilitated by a process which is methodical in its establishment of goals and designs while remaining flexible to respond to the needs of users and the input of stakeholders, both external and internal.

- **Step 1 – Project Planning and Selection:** Projects are identified by the responsible department. This includes projects identified through typical needs assessments, planning efforts, and community input. Projects may also be initiated by developments that require street modifications or through Florida or federal agencies.
- **Step 2 – Scope Development:** Project scoping sets the goals and bounds for a project. This includes establishing project goals and objectives, assembling relevant background information, developing a project budget and timeline, identifying potential funding sources, and beginning the outreach process with stakeholders.
- **Step 3 – Design:** Project design applies guidelines and design criteria to develop alternative concepts for balancing the various project objectives. Existing data is analyzed and informs the design decision making process. Input from stakeholders and the public helps to move from concepts to a final alternative and final design of the project.
- **Step 4 – Construction:** The project is constructed with a Complete Streets approach throughout the process. Street and building access are maintained for all users wherever possible; this includes the possibility of on-street parking removal or lane closures to ensure people walking and biking remain safe for the duration of construction.
- **Step 5 – Data Collection and Evaluation:** Projects should be monitored and data collected to allow analysis of real usage against stated project objectives. This data should be used for the development of future projects and can be shared with County, regional, and nationwide researchers. A performance-based approach to planning and design enables planners and engineers to make informed decisions about future projects.
- **Step 6 – Maintenance:** Project maintenance is critical to the continued success of Complete Streets projects. Pavement should be maintained, bike facilities should be kept clear of debris, and sidewalks should remain level and clear of obstacles. Greenscape features should be properly maintained to both enhance the street visual as well as to keep them functioning as intended. Greenscape and basic maintenance (e.g. sidewalk sweeping, trash collection) can be facilitated through maintenance agreements with business and residential districts.

QUICK BUILDS

Some projects may be suitable for an alternative project delivery approach that reduces the time associated with the implementation process. Quick build projects capitalize on opportunities to shorten project delivery timeframes by planning and designing with the expectation that the project may undergo change after installation. Quick build projects typically utilize materials that efficiently allow such changes to be made. For example, flex posts or planters can be used to create a curb extension in advance of a more permanent installation that may require more funds and more time. However, the public will gain much of the benefit of the project sooner.

Quick build projects occupy the spectrum between demonstration projects and permanent installation. Whereas demonstration projects are often implemented with temporary materials that are not meant for long-term use (such as chalk or cardboard signs that mark a weekend cycle track installation), quick build projects are built using permanent or semi-permanent traffic control materials.

Two examples of quick build project types are pilot projects and interim design projects.

- Pilot projects allow agencies to demonstrate the effectiveness of a project or test the impacts on traffic flow before finalizing the permanent design. For example, a road diet pilot project may be implemented with flexible traffic delineator posts where as a road diet permanent design would likely be implemented by reconstructing the curb-and-gutter drainage infrastructure to narrow the street. Pilot projects should include a data collection component to analyze effectiveness.
- Interim design projects take advantage of opportunities to implement projects in a more cost-effective way in advance of a longer-term more permanent strategy. Interim design projects may include implementing a buffered bike lane through pavement markings in advance of curbing being built to create a barrier-separated bike lane.

Implementation can sometimes be achieved through restriping and flexible traffic delineators without full reconstruction

PROJECT PRIORITIZATION

Prioritization of projects requires transparency and methodology to maintain adherence to the goals of Complete Streets, namely equity and safety. A prioritization methodology can be set by policy and should include the weighting of such factors as:

- Crash frequency
- Crash severity
- Presence of pedestrian facilities
- Presence of bike facilities
- Presence of transit facilities
- Inclusion in planning documents
- Role within multi-modal network (missing links, access to key destinations)
- Sensitive populations surrounding project (Age Friendly Initiative)
- Income of surrounding population (providing affordable transportation options to residents)
- Health of surrounding population (obesity and asthma prevalence; much of this data may be available through Miami Matters)

Measures used for project prioritization double as performance measures for completed projects. These criteria should be monitored for the life of the project to track progress in accordance with project objectives and to better inform future efforts.

MAINTENANCE

Maintenance is regularly neglected as a component of project implementation and bears further consideration. Project scoping and design can be an exciting process where stakeholders, staff, and the public are energized by the potential for change. Zealous maintenance must be part of the project process long into the future; while a casual user does not observe the process of project selection or design, potholes, debris, and cracks negatively affect the street experience and endanger the safety of users which the project was designed to protect. Tools should be established to allow for citizens to easily request street maintenance and track the progress of their request. Simpler, more transparent tools facilitate use and simplify the maintenance response process for agencies.

Design

The design process can and should be the first technique in the maintenance process. Design elements that aid in maintenance have been noted throughout the guidelines. An effective design process keeps the maintenance process in mind and maintains clear zones around utility access locations, street furniture foundations, and digital elements to lower the time and costs associated with maintenance.

Maintenance Agreements

Maintenance agreements are a powerful tool for providing a high-level of service across the myriad street assets that agencies are tasked with maintaining. Enhanced design features such as greenscaping and sidewalk pavers may be included in projects with commitments by local governments, community groups, or property owners to maintain the street elements. Agency oversight of agreements is required to ensure obligations are honored and standards are met.


DEAD
END
Typhoon

Moving Forward

8

ADOPTION OF GUIDELINES

The Miami-Dade Complete Streets Design Guidelines are intended to inform and assist a wide variety of local government officials, planners, designers, stakeholders, and decision makers about incorporating Complete Streets elements. The guidelines were developed consistent with a variety of national, state, and local street design guides, such as the *AASHTO Green Book*, while also incorporating best practices from leading municipal Complete Streets guides, such as the Boston Complete Streets Design Guidelines.

The guidelines can be incorporated into the development or updating of both municipal and County-level manuals covering the various aspects of streets (e.g. Public Works Manual). These guidelines can also be adopted in whole both at the County and local level as a means of establishing guidelines for Complete Streets projects within their jurisdictions. This provides all parties which get involved in street design projects, from stakeholder groups representing diverse interests to agency staff to decision makers, with guidelines to point to in pursuing the project that best fits their needs within the Complete Streets framework.

REGULATORY CHANGES/ REQUIREMENTS

Not all elements included in this document are consistent with existing regulatory standards. Depending on the regulatory oversight a variance process or request for experimentation may be required to move forward with the preferred design elements. Agencies can more easily facilitate Complete Streets adoption and implementation by updating regulations to reflect the guidelines put forth in this document. While this document acknowledges that elements of the guidelines are different from existing regulatory standards, these guidelines have been developed through a thorough review process of best practices from cities and organizations that are well-regarded nationally and represent the leading edge of Complete Streets in the United States.

OVERLAPPING PRIORITIES

Streets across Miami-Dade County are likely included in a variety of plans, often with overlapping jurisdictions and stakeholder priorities. Corridors may be designated for regionally-significant transit projects or bikeways. Others may be freight mobility routes, disaster-evacuation routes, or carry other distinctions which guide their development. The Complete Streets design philosophy carries guidance for balancing these competing priorities and thus should be used in tandem with priorities set by other planning efforts to meet a variety of objectives.

In situations where plans contradict elements of Complete Streets principles (vehicle-only streets, sidewalk limitations, incomplete street networks), policy makers should analyze why these plan priorities were established and attempt to reconcile those priorities with the policies and priorities established in this document.


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Appendix A Model Complete Streets Ordinance

DRAFT Model Complete Streets Policy

(To be used as a framework)

Whereas, the City of _____ has a thriving population of residents who have indicated they want safe, healthy options to driving, and;

Whereas, the pedestrian and bicycle crash rate in the City of _____ is_____ and represents a public health risk, and;

Whereas, the City of _____knows that by balancing all transportation modes and accommodating all users, Complete Streets policies and guidelines can help encourage the design, planning and construction of safer, healthier streets and ultimately increase physical activity and the vibrancy of neighborhoods, and;

Whereas, the Miami-Dade Board of County Commissioners unanimously adopted a Complete Streets resolution in November, 2014, and the Miami-Dade County Comprehensive Development Master Plan includes numerous references to planning livable streets and communities;

Whereas, Complete Streets can help calm traffic, increase physical activity and create safer, more welcoming environments for pedestrians, bicyclists and transit users, and;

Whereas, Complete Streets provide more independence and mobility for those unable to use cars, and;

Now, therefore be it resolved: The Commission (or Council) adopts the following Complete Streets policy:

Objective: To adopt and implement Complete Streets policies, practices and projects so that transportation improvements are planned, designed, constructed, operated and maintained to encourage walking, bicycling, and transit use while promoting safe operations for all users.

Vision: The City of _____ will plan, design and create livable, safe and connected streets with a highly efficient, multimodal transportation network that promotes the health and mobility of all citizens and visitors of all ages and abilities while reducing the negative impacts on the environment.

CONNECTIVITY

(A) The City of _____ will design, operate and maintain a transportation infrastructure that provides a connected network of facilities and services accommodating all modes of travel and all users.

(B) The City will actively look for opportunities to repurpose rights-of-way to enhance connectivity for pedestrians, bicyclists, and public transit.

(C) The City will focus non-motorized connectivity improvements on services, schools, parks, civic uses, regional connections and commercial uses.

(D) The City will require large new developments and redevelopment projects to provide interconnected street networks with small blocks.

(E) The City will review the zoning regulations and the land development code related to parking location, building setbacks and other factors adjacent to Complete Street Corridors to promote pedestrian oriented development.

JURISDICTION

(A) Complete Streets policies and guidelines are intended to cover all development and redevelopment in the public domain and all street improvement assessment districts within _____, but will also focus on regional connectivity.

(B) Every City Department including_____ will follow the Guidelines.

(C) The City requires all developers and builders to obtain and comply with the City's standards.

(D) The City requires those agencies that it has permitting authority over, including, but no limited to, utilities and service contractors to comply with the Guidelines.

(E) The City will leverage the resources of other agencies, including, but not limited to, federal agencies, Miami-Dade County Government, Florida Department of Transportation, Miami Dade Public School District, Florida Department of Health in Miami-Dade County, Tri-Rail, and the Miami-Dade MPO, to achieve Complete Streets.

APPROACH

The City of _____ will adopt Complete Streets Guidelines and apply this policy to all roadway projects. This includes projects involving new construction, reconstruction, retrofits, repaving, rehabilitation, or changes in the allocation of pavement space on an existing roadway, as well as those that involve new privately built roads and easements intended for public use. Complete Streets elements may be achieved through single projects or incrementally through a series of smaller improvements or maintenance and operation activities over time.

(A) The City will reference and modify the Transportation Element of its Comprehensive Plan, its land development regulations, and its roadway design standards to ensure consistency with the Guidelines.

(B) The City shall coordinate its infrastructure investments with the Metropolitan Planning Organization's (MPO) Transportation Improvement Program (TIP) and the Long Range Transportation Plan (LRTP), agency work programs, and the MPO's Pedestrian and Bicycle Master Plans to increase the coordination of Complete Streets implementation.

EXCEPTIONS

The City of _____ will pursue Complete Streets elements in all corridors. Complete Streets principles will be included in street construction, reconstruction, repaving, and rehabilitation projects, as well as other plans and manuals, except under one or more of the following conditions:

(A) A project involves only ordinary or emergency maintenance activities designed to keep assets in serviceable condition such as mowing, cleaning, sweeping, spot repair, concrete joint repair, or pothole filling, or when interim measures are implemented on temporary detour or haul routes.

(B) The City Council exempts a project due to excessive and disproportionate cost (20 percent as recommended by the Federal Highway Administration) of establishing a bikeway, walkway or transit enhancement as part of a project.

(C) Unless otherwise determined by the City Council, the_____ departments (whichever entity the City determines) will jointly determine through a process open to the public if certain Complete Streets projects/features are not feasible or cost effective to implement the provisions of this policy through public or private project design or manuals or other plans.

DESIGN

Additionally, _____'s City Council declares it is the City's policy to:

(A) Adopt new Complete Streets Guidelines to guide the planning, funding, design, construction, operation, and maintenance of new and modified streets in _____ while ensuring a context sensitive approach to unique circumstances of different streets and communities.

(B) Within two years of the passage of this policy, incorporate Complete Streets Design Guidelines' principles into all City plans, manuals, rules, regulations and programs as appropriate.

(C) Provide well-designed pedestrian accommodations on all streets and crossings. Pedestrian accommodations can take numerous forms, including, but not limited to, traffic signals, access management, lighting, roundabouts, bulb-outs, curb extensions, sidewalks, buffer zones, shared-use pathways, and perpendicular curb ramps, among others.

(D) Provide well-designed bicycle accommodations along all streets. Bicycle accommodations can take numerous forms, including, but not limited to, the use of bicycle boulevards, striping, access management, slow streets, low auto volume streets, bicycle storage, traffic calming, signs, and pavement markings, among others.

(E) Where physical conditions warrant, landscaping shall be planted or other shading devices installed whenever a street is improved (such as the addition of medians or wider sidewalks) newly constructed, reconstructed, or relocated. An emphasis shall be placed on the addition of native trees that provide shade.

CONTEXT SENSITIVITY

(A) In accordance with Smart Growth Principles, the City of _____ will plan its streets in harmony with the adjacent land uses and neighborhoods and promote walkable, livable communities through the design of a strong street network.

(B) The City will solicit input from local stakeholders during the planning process.

(C) The City will integrate natural features, such as beaches and waterways into design of streets.

(D) The City will design streets with a strong sense of place. It will use architecture, landscaping, street furniture, public art, signage, etc. to reflect the community and neighborhood.

(E) In and along retail and commercial corridors, the City will coordinate street improvements with merchants to develop vibrant and livable districts.

PERFORMANCE MEASURES

The City will evaluate policy implementation using the following performance measures:

1. Total miles of on-street bikeways defined by streets with clearly marked or signed bicycle accommodation.
2. Total miles of streets with pedestrian accommodation. (goal-all)
3. Number of missing or non-compliant curb ramps along City streets. (goal-0)
4. Percentage of tree canopy along City streets.
5. Percentage of new street projects that are multi-modal.
6. Number of alternative modes of transportation available.
7. Total number of people (instead of cars) moved on street rights of way.
8. Number and severity of pedestrian-vehicle and bicycle-vehicle crashes.
9. Number of pedestrian-vehicle and bicycle-vehicle fatalities. (goal-0)
10. Number of residents diagnosed as overweight or obese (data collected at the County level).

11. Number of residents engaging in physical activity (moderate/vigorous) three times per week (data collected at the County level.)

IMPLEMENTATION

(A) Lead Department: The City shall identify a department to lead the implementation of this policy and to coordinate with other impacted departments to ensure a comprehensive adoption of the Guidelines.

(B) *Advisory Group.* The City will establish an advisory committee to oversee the implementation of this policy. The committee will include members from various City Departments. In addition, the committee may include representatives from Miami-DadeTransit and/or Tri-Rail, representatives from the bicycling, disabled, youth and older adult community, and other advocacy organizations, as relevant.

(C) *Inventory.* The City will maintain a comprehensive inventory of the pedestrian and bicycling facility infrastructure integrated with the City's database and will prioritize projects to eliminate gaps in the sidewalk and bikeways networks.

(D) *Capital Improvement Project Prioritization.* The City will reevaluate Capital Improvement Project prioritization to encourage implementation of bicycle, pedestrian, and transit improvements.

(E) Revisions to Existing Plans and Policies. The City will reference and modify the Transportation Element of its Comprehensive Plan and any other existing plans related to the design of the public right of way to ensure consistency with the Guidelines.

(F) *Storm Water Management.* The City will prepare and implement a plan to transition to sustainable storm water management techniques along its streets (per public health, City and State regulations).

(G) *Public Official and Staff Training.* The City will train (through online tools such as Webinars and brief videos) pertinent leaders and staff on the content of the Complete Streets principles and best practices for implementing the policy.

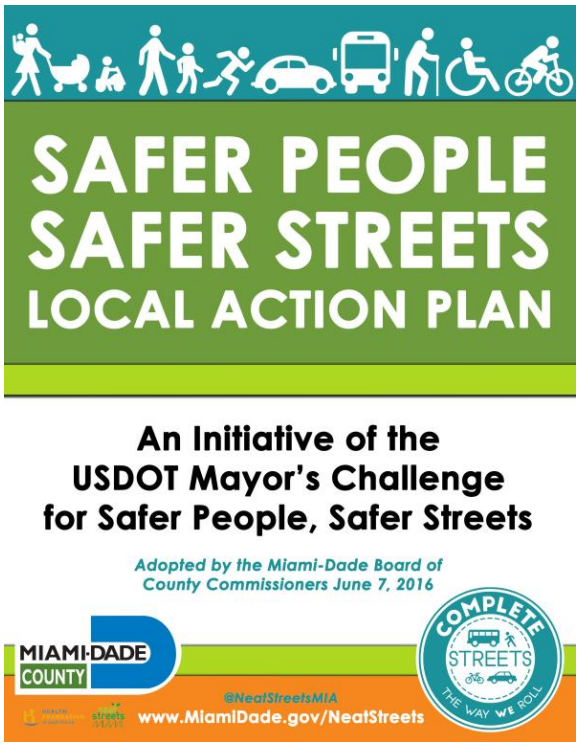
(H) *Coordination.* The City will utilize inter-departmental project coordination to promote the most responsible and efficient use of fiscal resources for activities within the public right of way.

(I) *Funding.* The City will actively seek sources for public and private funding to implement Complete Streets. Furthermore, the City shall attempt to coordinate its infrastructure investments and Complete Streets implementation with the Metropolitan Planning Organization’s (MPO) Transportation Improvement Program (TIP), and the Long Range Transportation Plan (LRTP), other agency work programs, and the Miami Dade Transit Master Plan.

Appendix B Literature Review

B

Complete Streets Literature Review



Context

This report provides a summary of the Complete Streets Literature Review undertaken by Kimley-Horn and Associates, Inc. to provide context for the *Miami-Dade Complete Streets Design Guidelines*. The *Local Action Plan for Safer People, Safer Streets* identified the need to prepare Complete Streets Design Guidelines to provide standards and guidance to local practitioners implementing non-motorized transportation improvements. The *Local Action Plan for Safer People, Safer Streets* was adopted by the Miami-Dade Board of County Commissioners on June 7, 2016. (http://www.miamidade.gov/neatstreets/local-action-plan.asp)

What are Complete Streets?

Complete Streets ensure that everyone, regardless of travel mode, can move safely and comfortably along and across a street. The National Complete Streets Coalition (NCSC) defines a Complete Street as a street where the entire right-of-way is planned, designed, and operated for all modes of transportation and all users, despite of age or physical ability. Founded in 2005, the NCSC, a product of Smart Growth America, encourages sustainable road design, efficient road networks and effective, pedestrian-friendly initiatives. Complete Streets is a movement with various interdisciplinary visions that encourage and promote multiple modes of transportation that are safe and accessible for all persons of a community, including the elderly and physically-challenged. By introducing various enhancements to roadways, such as bike lanes, sidewalks, crosswalks, and cycle tracks, and by using low-speed design principles in within a context-sensitive solution, practitioners can create safer more complete streets.

Although there are no specific design prescriptions for Complete Streets, there are some elements that Complete Streets should possess. Complete Streets in urban environments will differ from those in suburban environments. Although there are no one-size fits all prescriptions, Complete Streets should be planned and engineered to respond to each community's context.

Incomplete streets are designed with only one mode in mind, usually cars, and tend to marginalize walking, bicycling, and public transportation to the point that these modes may become inconvenient and unattractive. Incomplete streets directly or indirectly cause problems for communities that can lead to disparities in health, quality of life, local economies, environmental wellness, and livability.

Conversely, complete streets improve communities by providing the following benefits among others.

- The efficiency and capacity of a roadway can be improved by allowing for more modal diversity, as opposed to roadway systems that are dependent on single-occupancy vehicles.
- Complete Streets can bring equity to communities by providing efficient and safe transportation services to those for whom traveling by car is inaccessible or undesirable.

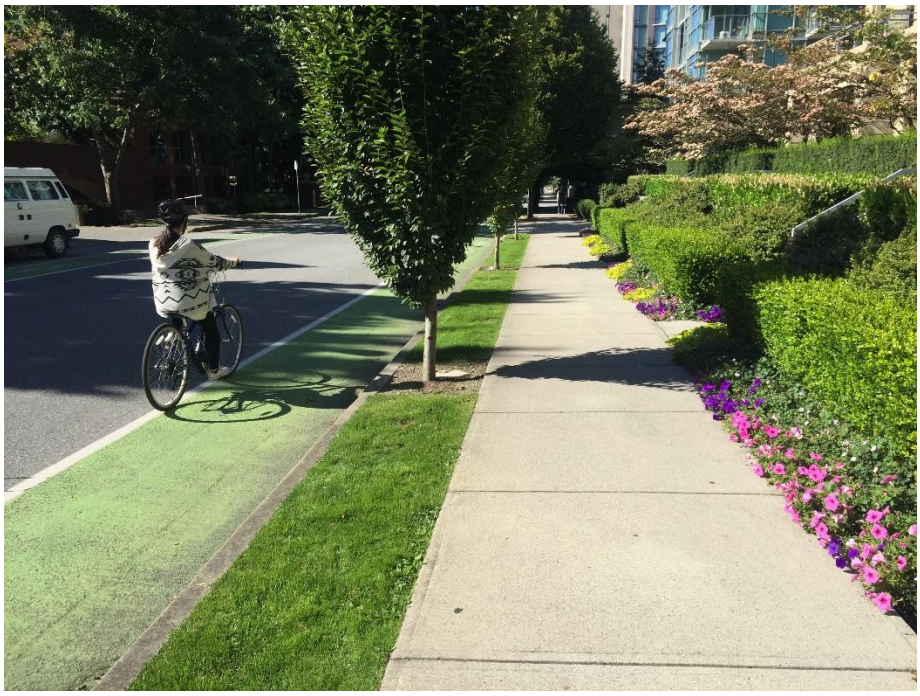
- Complete Streets can improve public health in communities by making walking, bicycling, and use of public transit safer and more desirable.
- Complete Streets strategies involve traffic calming measures that lead to improvements in public safety.
- Additionally, Complete Streets strategies can reduce carbon emissions by decreasing the number of short trips made by car consistent with Miami-Dade's *Greenprint: Our Design for a Sustainable Future*.

http://www.miamidade.gov/neatstreets/complete-streets.asp

Complete Streets Assessment

The following sections are a review of best practices related to safety countermeasures, Complete Streets policies, and implementation strategies.

Complete Streets Policy



The NCSC works to develop model policies to be used by advocates, law makers, and transportation professionals to achieve systematic change in transportation engineering and planning. According to the National Complete Streets Coalition, comprehensive Complete Streets policy should:

- Include a vision of how and why a community wants Complete Streets
- Specify that a Complete Streets approach will be inclusive to all users and all modes of travel
- Be applicable to new and existing projects in the design, planning, and maintenance of the entire right-of-way
- Be systematic when dealing with specific exceptions and sets a clear procedure that requires high-level approval
- Encourage street network connectivity
- Be adoptable by all agencies
- Encourage the use of innovative design criteria
- Emphasize that Complete Streets solutions will complement the context of a community
- Establish performance standards with measurable outcomes
- Include specific action items for the implementation of the policy

Miami-Dade County Resolution No. R-995-14 was passed in November 2014 directing the Mayor or designee to develop in conjunction with FDOT, the MPO, and other applicable entities, a plan for implementation of a Complete Streets program for Miami-Dade County. Miami-Dade County joined some 700 plus other communities that have adopted Complete Streets policies in recent years. The County is now in the process of

moving from a Complete Streets policy to a Complete Streets program. The ultimate goal is to ensure that all County departments and all developers plan, evaluate, and implement projects related to the upgrade and delivery of improvements to roadways through a Complete Streets "lens." Making that transition involves multiple steps and an active management process.

http://www.miamidade.gov/govaction/matter.asp?matter=142232&file=true&yearFolder=Y2014

The National Complete Streets Coalition publishes an annual report of all Complete Streets policies including ranking the policies of jurisdictions that adopted new Complete Streets policies in the previous year. Miami-Dade's Complete Streets Resolution ranks highly amongst "County Resolution" type policies, scoring 1st place within that category of newly adopted Complete Streets resolutions. Overall Miami-Dade County's Complete Streets resolution ranks 5th of 30 "County Resolution" type policies on the books. Furthermore, Miami-Dade County is the most populous county in the nation to pass a Complete Streets resolution as of 2015.

Miami-Dade County's Comprehensive Development Master Plan (CDMP) includes numerous policies related to Complete Streets, pedestrianism, and non-motorized transportation. Appendix A provides more information related to Miami-Dade County CDMP policies related to Complete Streets.

Complete Streets Guidelines

Local governments rely on street design manuals for the guidance in the development of new streets and in the retrofitting of existing streets. Street manuals supplement land-use planning and play an important role in determining the urban form of public spaces. However, local jurisdictions often treat guidance manuals solely as policy and do not make use of opportunities where they can adopt their own standards.

The National Complete Streets Coalition has identified five implementation steps to move from a complete streets policy to changes that apply across all departments within a jurisdiction.

1. Planning: Assessing current procedures and activities and planning for the full implementation of Complete Streets.
2. Changing procedure and process: Updating documents, plans, and processes used in transport decision-making, from scoping to funding, and creating new ones if necessary.
3. Reviewing and updating design guidance: Updating or adopting new design guidance and standards to reflect current best practices in providing multimodal mobility.
4. Offering training and educational guidance: Providing ongoing support to transportation professionals, other relevant agency staff, community leaders, and the general public so that they understand the Complete Streets approach, the new processes and partnerships it requires, and the potential new outcomes from the transportation system.
5. Measuring: Creating or modifying existing metrics to measure success in accommodating all users on the project and network levels.

The national scan reveals several best practice complete streets design guidelines. The following list organizes the guideline publications by type from national to local jurisdiction.

National Publications

- National Association of City Transportation Officials (NACTO)
  - *Urban Street Design Guide*
    http://nacto.org/publication/urban-bikeway-design-guide/

  - *Urban Bikeway Design Guide*
    http://nacto.org/publication/urban-street-design-guide/
- Institute of Transportation Engineers (ITE)/Congress for the New Urbanism (CNU)
  - *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*
    http://www.ite.org/css/

Local Government Publications

- City of Boston
  - *Boston Complete Streets: Design Guidelines*
    http://bostoncompletestreets.org/
- City of Charlotte
  - *Urban Street Design Guidelines*
    http://charmeck.org/city/charlotte/Transportation/PlansProjects/pages/urban%20street%20design%20guidelines.aspx
- City of Dallas
  - *Complete Streets Manual*
    http://dallascityhall.com/departments/pnv/strategic-planning/Pages/completestreets.aspx
- City of Philadelphia
  - *Complete Streets Design Handbook*
    http://www.philadelphiastreets.com/complete-streets
- City of Chicago
  - *Complete Streets Design Guidelines*
    http://www.cityofchicago.org/city/en/depts/cdot/provdrs/future_projects_andconcepts/news/2013/mar/complete_streetsdesignguidelines.html
- Washington, D.C. DOT
  - *Complete Streets Policy*
    http://odd.greatergreaterwashington.org/files/2010/ddotcompletestreets.pdf
- Los Angeles County
  - *Model Design Manual for Living Streets*
    http://publichealth.lacounty.gov/place/PLACE_The_Model_Design_Manual_for_Living_Streets.htm

Research shows that in implementing "complete streets" programs, many leading cities update their street design guidance as a way to assess, inventory and better align across departments and agencies the many processes and procedures involved in the design, delivery and maintenance of city streets and street networks. In most cases, these processes have evolved across multiple departments with reference only to the specific mandate of those departments, and without regard to the experience of the full range of users of any given streets.

Among cities with best-in-class approaches to Complete Streets, many, including Chicago, Boston, Philadelphia, and Dallas – have developed guidelines that focus at least as deeply on process and context as on technical design guidance. This is in part because jurisdiction over every element of the roadway involves so many different local departments. Clear guidance about context and usage as they relate to specific design elements—as well as about the agencies that must be consulted regarding each element of the roadway—helps to provide a path toward resolving competing priorities that must be resolved in order to achieve complete streets goals.

Best in class complete streets design guidelines typically address the following items.

- Overarching complete streets approach and goals
- Street elements (sidewalks, intersections, curbsides, etc.)
- Street typologies and land use considerations by street type
- Design parameters (cross-sections)
- Roles of agencies and entities involved in delivery of streets

Federal Design Flexibility

The controlling design criteria for streets and highways are undergoing a makeover to facilitate the ability of engineers to implement Complete Streets. According to *Toward More Flexible Design* (FHWA-HRT-16-003), Hilton and Goodman (2016) note that the changes to the controlling criteria are a significant step in supporting FHWA's partners and stakeholders as they work to implement projects that result in better and more sustainable outcomes, such as improved connectivity and mobility for people of all ages and abilities, enhanced safety, and increased equity. The changes to the controlling criteria also demonstrate how much the focus of the Federal-aid highway program has evolved since its creation. Today, FHWA focuses on the safety of all users of the transportation system and on connecting people to work, schools, and other important destinations in ways that meet the needs of all modes and are sensitive to community character, livability, and quality of life.

In addition, FHWA supports taking a flexible approach to bicycle and pedestrian facility design. The American Association of State Highway and Transportation Officials (AASHTO) bicycle and pedestrian design guides are the primary national resources for planning, designing, and operating bicycle and pedestrian facilities. The National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* and the Institute of Transportation Engineers (ITE) *Designing Urban Walkable Thoroughfares* guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. According to *Bicycle and Pedestrian Design Flexibility* (2013), FHWA supports the use of these resources to further develop non-motorized transportation networks, particularly in urban areas. https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_flexibility.cfm

The FHWA *Strategic Agenda for Pedestrian and Bicycle Transportation* is a collaborative framework for pedestrian and bicycle planning, design, and research efforts to be developed during the five-year period from 2016 to 2021. It is an action-oriented plan that synthesizes and builds upon FHWA's ongoing and planned efforts, and that acknowledges and incorporates opportunities to support related initiatives by external partners and stakeholders. The types of actions included in the plan are organized into four categories including capacity building, data, policy, and research.
http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/strategic_agenda/page03.cfm

FDOT Complete Streets

In 2014, FDOT adopted a Complete Streets Policy. FDOT Policy Topic No. 000-625-017-a establishes the goal of the Department of Transportation to implement a policy that promotes safety, quality of life, and economic development in Florida. The policy recognizes context-sensitivity and the needs of transportation system users of all ages and abilities including not limited to cyclists, freight handlers, motorists, pedestrians, and transit users. The policy recognizes that Complete Streets require transportation system design that considers local

land development patterns and built form, and covers all of the State Highway System including the Strategic Intermodal System (SIS).

http://www.dot.state.fl.us/rddesign/CSI/000-625-017-a.pdf

To improve implementation of Complete Streets in Florida, FDOT partnered with Smart Growth America to develop and publish the *Complete Streets Implementation Plan: Multimodal Development and Delivery* in December 2015. The recommendations in this plan address the findings of a series of interactive workshops conducted for FDOT's Complete Streets Implementation Team in the spring and summer of 2015. The plan outlines a five-part implementation framework and process for integrating a Complete Streets approach into FDOT's practices to ensure that future transportation decisions and investments address the needs of all users of the transportation network and respond to community goals and context. The implementation framework in this plan includes the following items.

- Revising guidance, standards, manuals, policies, and other documents.
- Updating decision-making process.
- Modifying approaches for measuring performance.
- Managing internal and external communication and collaboration during implementation.
- Providing ongoing education and training.

http://www.flcompletestreets.com/

Implementation Strategies

Effective implementation of Complete Street guidelines relies on a shift in the mindsets, habits, and business practices of the multiple parties involved. The adoption of tools such as checklists, training programs, and implementation plans by public entities in the focus States and cities has helped ensured the efficacy of implementation. The following are among the elements needed for an effective implementation of Complete Street strategies: training of transportation staff, checklists and schedules to ensure accountability, strategic implementation plans, funding policies, enforcement campaigns, and evidence-based assessments.

Miami-Dade County's Complete Streets resolution was passed in 2014, and ranked in first place within the "County Resolution" category for newly adopted Complete Streets resolution. As of the date of the *Local Action Plan for Safer People, Safer* Streets, the Miami-Dade County's Complete Streets resolution ranked 5th out of 30 similar policies. Miami-Dade County is mentioned to be the most populous county in the nation to pass a Complete Streets resolution.

The following points were among the elements addressed by effective Complete Streets design guidelines:

- A clear set of goals and approach measures for Complete Streets
- Specifications for street elements such as sidewalks, intersections, and curbsides
- Street typologies and land use considerations
- Design parameters such as cross-sections
- Specific roles of the agencies and entities that are vested in the delivery of the Complete Streets
- The use of transportation modal hierarchies which prioritize the most vulnerable users (pedestrians), and adapt to the needs of a corridor

Securing funding was described as an essential step for the sustainable implementation of Complete Streets initiatives. Washington D.C. reduced traffic fatalities by 73 percent in the span of 11 years through the

implementation of low-scale improvements aimed at reducing motor vehicle speeds. The D.C. Department of Transportation was able to incorporate traffic calming measures into projects already in local budgets in lieu of seeking external funding for the implementation of Complete Streets projects. Low cost Complete Streets improvements were incorporated into existing maintenance projects in New York, which has led to a significant reduction in traffic fatalities.

MPO Bicycle Pedestrian Program

The Miami-Dade Metropolitan Planning Organization (MPO) conducts numerous bicycle and pedestrian planning initiatives including area-wide mobility plans, corridor studies, data collection including non-motorized transportation counts, safe routes to school, and Complete Streets studies. More than 100 miles of paved paths, bike lanes, and trails have been planned and ultimately implemented through the MPO process. One example of the MPO's robust bicycle and pedestrian program is the *Complete Streets Manual* prepared in 2014. This study employs site-specific planning decisions that reconfigure existing road space in a manner that better accommodates the needs of all road users within three target corridors. In addition, a Complete Streets Toolkit, contexts for design, and corridor evaluation criteria were developed.
http://miamidadempo.org/complete-street.asp

Sustainability

Responsible Land Use and Smart Transportation represent fundamental tenets of the Miami-Dade County *Greenprint: Our Design for a Sustainable Future* (2010). The plan's aspirational goals for transportation are consistent with Complete Streets themes including providing more transportation options and reducing time spent in cars. Performance measures include adding 10 million trips to our public transportation system, increasing the percentage of trips taken by bicycling and walking from 10 percent to 16 percent, and increasing resident satisfaction with the availability of sidewalks. Greenprint culminates in the County's first *Climate Change Action Plan*. There are 137 separate initiatives outlined in Greenprint, many of which will directly contribute to a reduction in greenhouse gas emissions.
http://www.miamidade.gov/greenprint/

Safety Countermeasures

Transportation safety continues to be a priority to agencies at the federal, state, and local levels. The Federal Highway Administration (FHWA) recommends the provision of pedestrian and bicycle facilities as a countermeasure for improving safety.

Miami is currently listed as one of 26 FHWA focus cities for pedestrian safety. The *FHWA Focused Approach to Safety* provides additional resources to eligible high priority States to address the Nation's most critical safety challenges through additional program benefits such as people, time, tools and training. This approach increases awareness on critical severe crash types, leads to key safety infrastructure improvements, assists in prioritizing limited resources, and creates positive organizational changes in safety culture, policies and procedures.

FHWA provides a wealth of information related to conventional safety countermeasures that have been shown through evidence-based performance outcome studies to reduce pedestrian fatalities. Still pedestrian safety remains a key concern in urban transportation. Pedestrian fatalities represent as much as 20 percent of all traffic-related fatalities in Florida, despite accounting for less than 10 percent of all trips and probably less than 1 percent of miles traveled. In Miami-Dade, pedestrian fatalities are an even higher percentage of total fatalities typically representing more than 30 percent of all traffic-related fatalities.

Cities that implement aggressive pedestrian safety campaigns have enjoyed the most dramatic reduction in pedestrian crashes. The Vision Zero Initiative is one such example. Stockholm's implementation of a Vision Zero

policy (http://www.visionzeroinitiative.com/) led to a significant decrease in traffic fatalities. Instead of working to change people's behavior, Vision Zero aims to address the fundamental design decisions that may create the environment for crashes to occur in urban areas. The country's most dangerous roads and urban streets were redesigned to reduce vehicle speed and protect pedestrians and cyclists. Today, Stockholm's traffic death rate is 0.7 per 100,000 people, among the lowest in the world.

A similar policy in the Netherlands resulted in a dramatic reduction of traffic death rates. building national infrastructure to slow vehicles and protect vulnerable road users in urban areas. In 1975, its traffic death rate was 20 percent higher than in the United States, but in 2008, it was 60 percent lower. Today, roads in the Netherlands are among the safest on Earth.

New York City adopted recommendations from the publication *Cities Safer by Design* by the World Resources Institute (WRI). New York City saw a 63 percent reduction in overall traffic crashes and injuries on a key corridor by creating a protected on-street bike path.

Effective Design

Effective Complete Streets created by context-sensitive designs including the use of slow speed design principles in urban areas reduce potential conflicts between motor vehicles and non-motorized users and reduce the severity of injuries when they do occur.

Evidence-based studies demonstrate that narrower streets result in slower travel speeds and could ultimately lead to lower crash frequencies. According to European data presented in *Cities Safer by Design*, each meter or yard of crosswalk shortening can reduce pedestrian crashes by 6 percent. Well-designed bike lanes with physical separation also protects cyclists from car traffic, while the bike lane width should allow comfortable cycling.

Research shows that narrower streets result in slower travel speeds. In *Residential Street Typology and Injury Accident Frequency*, Peter Swift (2003) found that as streets widen, accidents per mile increase exponentially, which can only partially be explained by increased traffic volumes. The Texas Transportation Institute (TTI) found that on suburban arterial straight sections, higher speeds should be expected with greater lane widths. A study called *Relationship of Lane Width for Urban and Suburban Arterials* was conducted by the Midwest Research Center and found no indication, except in limited cases, that the use of 10- to 11-foot lanes caused more crashes than the use of 12-foot lanes on arterial roadways. The narrower lane widths were either associated with lower crash frequencies or showed no statistically significant difference in crash frequencies.

Data reported in *Cities Safer by Design* emphasize two ways to improve traffic safety in cities.

- Build and retro-fit urban environments to reduce the need for individual vehicle trips.
- Reduce vehicle speeds in urban areas where cars, pedestrians, and bicyclists mix.

Design features found to be associated with cities exhibiting lower pedestrian fatality rates include the following.

- Urban design that includes smaller block sizes, frequent street connections, and narrower streets.
- Arterials and intersections that reduce conflicts between road users by providing clear crossings, medians, and refuge islands.
- Provision of a wide range of pedestrian facilities ranging from pedestrian-only streets to basic, consistent sidewalks.
- Bicycling networks that feature separated bicycle lanes and special attention to design at intersections.
- Safety improvements around mass transportation stations.

Safety in Numbers

Effective Complete Streets created by context-sensitive designs including the use of slow speed design principles in urban areas reduce potential conflicts between motor vehicles and non-motorized users and reduce the severity of injuries when they do occur.

Research shows that walking and bicycling injury rates are lower in areas where a greater percentage of the population walk or bike frequently. In a 2003 study that appeared in the peer-reviewed journal *Injury Prevention*, Peter L. Jacobsen found a clear link between lower injury rates and greater numbers of walkers and bicyclists. Based on comprehensive data from over 100 American and European cities, Jacobsen found that per-capita injury rates are lower as walking and bicycle riding increase. The data suggest that a place where walking and bicycling rates doubled would result in one-third more pedestrian and bicyclist injuries, but the risk of injury in these same places would fall 34 percent. If the number of walkers and bicyclists halved, fewer total injuries would occur, but the risk of injury would go up 52 percent. Jacobson offered a theory as to why this phenomenon occurs – drivers become more attentive when there are lots of bicyclists and pedestrians in their immediate area. Since it is unlikely that the people walking and bicycling become more cautious if their numbers are larger, the result indicates that the behavior of motorists likely controls the frequency of collisions with people walking and bicycling.

Subsequent studies have confirmed the lower injury rate finding for areas with higher non-motorized mode shares. In a 2015 Canadian study published in *BMJ Open*, Kay Teschke et al. found that for traffic-related injuries, areas with higher shares of bicyclists among all travelers had lower hospitalization rates than other regions. Interestingly, the study also found that areas with compulsory helmet-wearing legislation did not experience reduced hospitalization rates.

Public Health

The health benefits of Complete Streets, which enhance connectivity and active transportation options, are numerous. Street designs impact the likelihood residents will engage in walking, bicycling, or wheeling (physical activity) as a mode of active transportation. Active transportation can reduce the risk of diseases impacted by sedentary lifestyles, including Type 2 Diabetes, heart disease, high blood pressure, stroke, dementia, breast and colon cancer, as well as those related to poor air quality such as impaired lung development, lung cancer, and asthma, among others according to *Total Daily Physical Activity and the Risk of Alzheimer's Disease and Cognitive Decline in Older Adults* by Buchman et al. (2012); *Physical Activity and Stroke Risk: A Meta-Analysis* by Folsom and Blair (2003) and *The Transportation Prescription: How Transportation Policies and Plans Influence Health*, PolicyLink and Prevention Institute, 2009.

Aging

Complete Streets initiatives and their pedestrian-friendly policies are an important step in assisting the elderly. In *Planning Complete Streets for an Aging America*, the AARP Public Policy Institute (2009) estimates that roughly 25 percent of U.S. drivers will be 65 years or older by 2025 – an indication that road design will inevitably increase in importance in regard to the aging population. In a poll conducted by AARP, it was found that 50 percent of adults aged 50 years or more reported that main roads closest to their homes were not safe to cross. Furthermore, roughly 40 percent of those surveyed reported deficient sidewalks in their neighborhood.

It is important to understand that much of the current road system fails to consider not only the average pedestrian, but also fails to take into account the elderly and the more fragile populace. By encouraging initiatives at the local, regional and state level, Complete Streets emphasizes three main principles to enhance

the road environment for older users – slowing speeds; simplifying the task of navigating the network; and making it easier to understand signs, cues, and basic transit information.

Disabled Persons and the Transportation Disadvantaged

Much of the issues that relate to the average pedestrian intensify in seriousness when dealing with persons with disabilities. Many disabled persons are in wheelchairs, have limited vision, cannot hear well, or are simply physically slower moving. Roughly one in five Americans suffers from at least one of these hindrances according to the AARP Public Policy Institute. Incomplete streets without pedestrian-friendly accommodations cause a hazard for disabled persons.

Burden and Litman (2011) cited that one-third of Americans are transportation-disadvantaged, typically defined by age, ability, or income. According to *The Adoption of Complete Streets Policies in Transportation Disadvantaged Communities: Lessons from U.S. Case Studies*, Clifton et al. (2013) found that although Complete Streets are beneficial to the transportation disadvantaged, the benefit to them may not be acknowledged as a leading factor in the implementation of such projects. These authors emphasize that the most vulnerable populations should rank as the highest priority in the decision-making process with transportation equity as one of the most essential public health objectives. In addition to the role of communities in advocating for Complete Streets, there is also a role for transit providers to play in ensuring successful implementation of these projects.

Choice

Complete Streets allow for individuals to have an array of choices in transporting themselves. Instead of being limited to drive a car for a quick errand, bike lanes, sidewalks, frequent crossings allow for people to walk, bike, or take transit to their destination, creating convenience, a healthier environment, and an active lifestyle. Having options in the community also creates a sense of freedom when multiple options can be accessed easily and safely.

Public Engagement

Researchers have learned that Complete Streets embody the principles that many people want in urban street design. According to *America Needs Complete Streets*, Burden and Litman (2011) found that there is evidence that shifting consumer preferences are increasing the demand for the alternate modes of transit, bicycling, and walking. These shifting preferences can be due to several factors, including changing demographics, economic issues, health concerns, and environmental concerns.

In *Drivers, Pedestrians, and Cyclists in California Want Complete Streets: A Comparison of Results from Roadway Design Surveys of Pedestrians, Drivers, Bicyclists, and Transit Users in Northern and Southern California*, Sanders et al. (2014) found that surveys of all four groups of travel modes wanted to see better crossings, more and better bike lanes, and other characteristics associated with Complete Streets.

Young people in particular are more balanced in their transportation choices and advocate for Complete Streets principles. A body of research has grown to study the transportation preferences of young people and how they may influence transportation policy and project design as described in *Transportation and the New Generation: Why Young People Are Driving Less and What It Means for Transportation Policy* by Davis et al. (2012).

A wide variety of groups also advocate for Complete Streets. These groups include the Institute of Transportation Engineers (ITE), National Association of City Transportation Officials (NACTO), AARP, the U.S. Conference of Mayors and the National League of Cities, according to *Complete Streets in the United States* (LaPlante and McCann, 2011).

Equity

The Pedestrian and Bicycle Information Center (PBIC) completed *Pursuing Equity in Bicycle and Pedestrian Planning* by Sandt et al. (2016). Enhancing the ability of traditionally underserved populations to travel by non-motorized transportation is one of the primary benefits of Complete Streets, which can also lead to improved public health and safety outcomes. These outcomes include strengthened neighborhood ties, improved access to health care services, reduced exposure to vehicular collisions by non-motorized travelers, and lower health care costs. Expanding opportunities for non-motorized transportation was found to strengthen workforces, improve economic productivity by providing better access to educational and employment opportunities, and improve access to and expand customer bases for local businesses. Transportation practitioners and those engaged in pedestrian- and bicycle-related efforts are uniquely positioned to lead, facilitate, advocate for, and contribute to improving transportation equity top better meet community members' varying needs and abilities to access employment, education, and other opportunities safely and conveniently.

Public Transportation

Complete Streets improvements offer an amazing opportunity to improve access to and convenience of public transportation. The integration of bicycling, walking, and transit networks allow people to extend trips farther than individual modes. Miami-Dade's Bike & Ride on Transit program is a good example. Metrorail cars have designated areas for bike and luggage storage. Metrobus vehicles are equipped with bicycle racks that are attached to the front of the bus. Bicycles are also allowed on Metromover cars.

Transit Center, an independent civic philanthropy, prepared *Who's On Board: 2014 Mobility Attitudes Survey* of transit patrons. Miami-Dade was identified as one of the transit-progressive areas in the South region of the U.S. Some of the key findings from the survey documentation include that mixed-use neighborhoods are a major reason for motivating people to use transit. However, many Americans find themselves unable to get out of the bedroom communities of their youth. These findings show the importance of smart growth policies and well-connected neighborhoods for walking and bicycling. The survey also found that millennial parents of school-age children are more likely to be transit users than their older counterparts regardless of income level. Regarding the provision of transit service, the basics of travel time, cost, and reliability are more important than frills and add-ons.

Smart Streets – Technology-Focused Complete Streets

The City of Boston has developed a Complete Streets approach that focuses on multimodality, environmental sustainability, and technological innovation. The approach is incorporating Intelligent Transportation Systems (ITS), connected parking technologies, electric vehicle sharing, car and bicycle sharing, mobile way-finding, social networks, and virtual information available through digital tags into the Complete Streets approach to achieve greater system efficiencies and user convenience. Boston included a Smart Curbsides chapter in their *Complete Streets Guidelines*. https://issuu.com/bostontransportationdepartment/docs/5_smartcurbsides_issuu

Conclusion

Complete Streets are crucial due to the many benefits they provide, including safety improvements, environmental improvements, use of sustainable modes, increased capacity, improving quality of life for vulnerable populations such as the elderly, disabled, and youth, and economic benefits. Complete Streets are supported by a broad coalition of people including transportation engineers, planners, public health professionals, recreation groups, business interests, and elected officials. The Federal Highway Administration (FHWA) has adopted a policy of flexibility in design that expands the ability to implement Complete Streets. The Florida Department of Transportation (FDOT) has published the Complete Streets Implementation Guide that firmly commits to furthering the ideals of safe streets. Miami-Dade County has adopted a Complete Streets Resolution and completed an award-winning *Local Action Plan for Safer People, Safer Streets*. The stage is set for the preparation of the *Complete Streets Design Guidelines*. The time is now for Complete Streets in Miami-Dade.

Appendix A

Comprehensive Development Master Plan (CDMP) Policies Related to Complete Streets

Comprehensive Development Master Plan (CDMP)

Miami-Dade County's Comprehensive Development Master Plan (CDMP) includes numerous policies related to Complete Streets, pedestrianism, and non-motorized transportation.

Complete Streets Policies

Objective TE-4. By 2015, Miami-Dade County shall develop a "Complete Streets" program to be considered in the design and construction of new transportation corridors and reconstruction of existing corridors, wherever feasible.

Policies TE-4A and TC-3C. By 2015, Miami-Dade County shall develop a "Complete Streets" program which will be sensitive to the needs of the users of all modes of transportation including bicyclists and pedestrians and include the following components: street typology based on land use context due to how a roadway passing through different land uses will vary in character; hierarchy of street types and designs; provision of sidewalks and bicycle facilities; adequate landscaping and street furniture; bus lanes and transit facilities; improve aesthetics, and design for the safety of all users, including vulnerable populations such as children and seniors.

Policy LU-9U. By 2015, Miami-Dade County shall evaluate and propose update(s) to the Guidelines for Urban Form, Mixed Use Development and Urban Center provisions of this plan in coordination with the "Complete Streets" program to be developed pursuant to Transportation Element Objective TE-4. The updates shall address, as appropriate, the maximum allowable FARs (floor area ratios), intensity and density of development, allowances that facilitate transit supportive mixed developments, and shall enhance and further the implementation of the County Area Planning Program and support the intent of the Complete Streets Program.

Policy ROS-8D. Miami-Dade County shall update the *Miami-Dade Urban Design Manual*, the *Standard Details of the Public Works Manual*, and other relevant county plans and regulations to incorporate where appropriate, the "Great Streets Planning Principles" contained in the *Miami-Dade Parks and Open Space System Master Plan* and incorporation of "Complete Streets" components, where feasible. Changes to be incorporated include a hierarchy of street types and designs (gateway streets, civic streets, heritage streets, and neighborhood streets), and complete street measures such as provision of sidewalks and bicycle facilities,

pedestrian friendly design, adequate landscaping and street furniture, on-street parking, bus lanes and transit facilities, and clearly defined crosswalks and signalization to provide safe routes to parks.

Other Relevant CDMP Policies

Policy LU-1D. In conducting its planning, regulatory, capital improvements and intergovernmental coordination activities, Miami-Dade County shall seek to facilitate the planning of communities which include recreational, educational and other public facilities, houses of worship, places of employment, and safe and convenient circulation of automotive, pedestrian and bicycle traffic throughout the communities.

Policy LU-1T. Miami-Dade County through its land development regulations shall encourage developments that promote and enhance bicycling and pedestrianism through the provision of bicycle and pedestrian facilities and other measures such as building design and orientation, and shall discourage walled and gated communities.

Policy LU-9K. By 2016, Miami-Dade County shall initiate the review and revision of its Subdivision Regulations to facilitate the development of better planned communities. The Public Works Department shall specifically review and update the Subdivision Regulations for urban design purposes. Changes to be considered shall include provisions for:

i) Open space in the form of squares, plazas, or green areas in residential and commercial zoning categories; and

ii) A hierarchy of street types and designs, ranging from pedestrian and bike paths to boulevards that serve both neighborhood and areawide vehicular and pedestrian trip making needs by addressing cross sections, corner radii, connectivity and rationality of street and pathway networks, and balanced accommodation of automobiles, pedestrians, bicyclists, and landscaping.

Objective TE-1. Miami-Dade County will provide an integrated multimodal transportation system for the circulation of motorized and non-motorized traffic by enhancing the Comprehensive Development Master Plan and its transportation plans and implementing programs to provide competitive surface transportation mode choice, local surface mode connections at strategic locations, and modal linkages between the airport, seaport, rail and other inter-city and local and intrastate transportation facilities. These plans and programs shall seek to ensure that, among other objectives, all transportation agencies shall consider climate change adaptation into their public investment processes and decisions.

Objective TE-2. In furtherance of pedestrianism and other non-motorized modes of transportation in the planned urban area, Miami-Dade County shall enhance its transportation plans, programs and development regulations as necessary to accommodate the safe and convenient movement of pedestrians, non-motorized vehicles and motorized vehicles.

Policy TE-2A. The County shall continue to promote and assist in the creation of a Countywide system of interconnected designated bicycle ways, and promote the implementation of the *Miami-Dade Bicycle Facilities Plan.*

Policy TE-2B. The County shall continue to develop a comprehensive countywide greenways network providing continuous corridors for travel by pedestrians and non-motorized vehicles incorporating elements of the adopted South Dade Greenway Network Master Plan and the North Dade Greenways Plan.

Policy TE-2C. In road construction and reconstruction projects, roadway designs shall protect and promote pedestrian comfort, safety and attractiveness in locations where the Land Use Element seeks to promote activity along road frontages, such as in areas planned for community- or neighborhood-serving businesses, and all existing and planned Urban Center and rapid transit stations and mass transit corridors. Such measures should include, wherever feasible, on-street parking, wide sidewalks, and abundant landscaping at the street edge. Additionally, boulevard section designs should be utilized where appropriate, including central through lanes and frontage lanes for local traffic and parking, separated from the through lanes by landscaped areas, with frequent opportunities for pedestrians to safely cross the through lanes, and right of way to facilitate these designs should be reserved or acquired where necessary. Roadway pedestrian facility considerations shall also be consistent with the policies addressing pedestrianism contained in the Land Use Element.

Policy TE-2D. Miami-Dade County's top priority for constructing new sidewalks and bicycle facilities after completion of the "Safe Routes to Schools" program shall be to provide continuous sidewalks and bicycle facilities along the following: a) existing rapid transit stations and transit centers, b) existing parks and recreation open spaces, c) both sides of all County collector and arterial roadways within 1/4 mile of all existing transit stations and centers, and d) at least one side of County collector and arterial roadways between 1/4 and 1/2 mile of all existing transit stations, centers and corridors. All new development and redevelopment in these areas shall be served by sidewalks and bicycle facilities. It is the policy of Miami-Dade County that municipalities in the County establish similar priorities for their jurisdictions, and that FDOT do the same with regard to State roads. In all new construction and reconstruction of collector and arterial roads inside the UDB

served by Metrobus, sidewalks and bicycle facilities should be provided along all such roads between bus stops and any existing or planned intersecting residential or community-serving business streets within, at a minimum, 1/4 mile of the bus stops.

Policy TE-2E. The County shall require accommodation of non-motorized transportation facilities in plans for future arterial and collector road construction, widening or reconstruction projects where designated by the Bicycle Facilities Plan, wherever feasible.

Policy TE-2G. The County shall encourage inclusion in, and review, all plans and development proposals for provisions to accommodate safe movement of bicycle and pedestrian traffic, and facilities for securing non-motorized vehicles in all new development and redevelopment and shall address this as a consideration in development and site plan review.

Policy TE-2H. The County shall ensure that sidewalks are well-maintained and free from tripping hazards and barriers to promote comfortable and safe sidewalk conditions for pedestrians of all ages and abilities through actions such as, but not limited to, providing tree grates covering tree planting areas in or adjacent to sidewalks; trimming overgrown bushes and trees within road rights-of way, as appropriate; and the repair or replacement of broken and uneven sidewalk pavement.

Objective TE-5. By 2015, Miami-Dade County shall evaluate the designation of multimodal transportation corridors as "Activity Corridors" on the Land Use Plan Map, Land Use Element and Transportation Element.

Policy TE-5A. By 2015, Miami-Dade County shall evaluate the designation of multimodal transportation corridors as "Activity Corridors" on the Land Use Plan Map, Land Use Element and Transportation Element such as NW/SW 27, 42, 57, 87, 107 and 137 Avenues, and NW 103, 36/41 Streets, W. Flagler Street, Tamiami Trail (SW 8 St.), Coral Way (SW 24 St.), Bird Road Drive (SW 40/42 St.), Kendall Drive (SW 88 Street), Coral Reef Drive (SW 152 St.), and South Dixie Highway (US 1). The evaluation shall address the following objectives:

a) Allowed uses,
b) Development density and intensity,
c) Urban design guidelines, and
d) Multimodal components.

Traffic Circulation (TC) Goal. Develop, operate and maintain a safe, efficient and economical traffic circulation system in Miami-Dade County that provides ease of mobility to all people and for all goods, is consistent with

desired land use patterns, conserves energy, protects the natural environment, enhances non-motorized transportation facilities, supports the usage of transit, and stimulates economic growth.

Policy TC-2A. The County shall continue to maintain and enforce the minimum right-of-way requirements as established in the *Public Works Manual* and in Chapter 33, Zoning, *Code of Miami-Dade County*, to ensure Countywide continuity of the thoroughfare system. The County shall review roadway design standards and right-of-way reservations and shall propose changes as may be necessary to better accommodate projected vehicular and non-vehicular movement in the corridors and design features recommended in the Transportation and Land Use Elements.

Objective TC-3. The County's transportation system will emphasize safe and efficient management of traffic flow, the safety of pedestrians and bicyclists, and enhance and encourage the use of transit.

Policy TC-3D. The County shall design new roadways in a way that supports transit usage and incorporates planned rapid transit corridors, dedicated bus lanes and other transit improvements to further incentivize and facilitate the use of transit, wherever feasible.

Policy TC-4F. The County shall consistently improve strategies to facilitate a Countywide shift in travel modes from personal automobile use to pedestrian, bicycle and transit modes. The priority for transportation infrastructure expenditures shall be to insure that pedestrian, bicycle and transit features are incorporated into roadway design.

Policy TC-5D. The County shall encourage interconnectivity between neighborhoods, local services, schools, parks, employment centers, and transit stops and stations; discourage cul-de-sac and walled-in subdivision designs; and facilitate pedestrian-oriented urban design that connects neighborhoods and provides accessibility for non-drivers.

Policy TC-6E. The County shall pursue and support transportation programs (e.g., rapid transit, premium bus service, managed lanes, and bikeways) that will help to maintain or provide necessary improvement in air quality and which help conserve energy.

Policy TC-6F. Design new roadways in such a manner as to make them compatible with the surrounding environment, complement adjacent development and provide aesthetically pleasing visual experience to the user and the adjacent areas.

Policy MT-8A. Miami-Dade County shall enhance transit facilities to ease transfer with other modes (e.g., park-ride garages and lots with short-term and long-term parking, kiss-and-ride areas, ride-sharing priority parking spaces for carpool and vanpool, motorcycle/scooter parking, bicycle lockers and racks, covered pedestrian walkways, taxi and jitney stands).

Policy MT-8B. In the planning and design of rapid transit sites and stations and transit centers, high priority shall be given to providing a safe, attractive and comfortable environment for pedestrians, bicyclists and transit users; such amenities shall include weather protection, ample paved walkways, sidewalks, lighting, and landscaping, and ancillary uses that provide conveniences to transit patrons such as cafes, newsstands and other retail sales.

Policy ROS-3B. The County shall improve and promote non-motorized access to existing park and recreation open spaces by implementing the North Miami-Dade Greenways Master Plan and South Miami-Dade Greenway Network Master Plan, as well as improved sidewalks and trails, to improve connectivity between parks and residences, schools, activity centers, and transportation nodes.

Policy ROS-5F. Continue to implement and consider expansion of segments of the North Miami-Dade Greenways Master Plan and South Miami-Dade Greenway Network Master Plan that provide recreation and environmental benefits while improving connectivity to parks, natural areas, and other recreational facilities.

Objective ROS-8. The Miami-Dade County Parks and Open Space System Master Plan (OSMP), through a 50-year planning horizon, shall guide the creation of an interconnected framework of parks, public spaces, natural and cultural areas, greenways, trails, and streets that promote sustainable communities, the health and wellness of County residents, and that serve the diverse local, national, and international communities.

Policy ROS-8C. Miami-Dade County shall utilize the Parks and Open Space Design Criteria or "Pattern Book", to guide the development of the public realm. The public realm includes new and existing parks, public spaces, natural and cultural areas, greenways, trails, street corridors, and private spaces that are open to the public. The criteria shall promote beauty, community character and connectivity and include standards to assure compatibility with adjoining uses, conservation and energy efficiency, as well as signage and way-finding requirements.

Policy ROS-8E. By 2014, Miami-Dade County shall develop a greenways prioritization plan to prioritize areas to be designated for greenways, trails, and bicycle lanes, and update the North Miami-Dade Greenway Master

Plan and South Miami-Dade Greenway Network Master Plan and the CDMP to include such greenways. The update shall include the designation of the Western Greenway and implementation of the Miami-Dade County Trail Design Guidelines and Standards. On an on-going basis, Miami-Dade County shall coordinate with State, regional, federal, and local government agencies to establish a countywide interconnected system of non-motorized pathways that link neighborhoods, parks, natural areas, civic centers, schools, and commercial areas to achieve goals and objectives through a diverse combination of financing methods, partnerships, and interagency coordination.

Policy EDU-3E. When considering a site for possible use as an educational facility, the Miami-Dade County Public Schools should review the adequacy and proximity of other public facilities and services necessary to the site such as roadway access, transportation, fire flow and portable water, sanitary sewers, drainage, solid waste, police and fire services, and means by which to assure safe access to schools, including sidewalks, bicycle paths, turn lanes, and signalization.

Policy EDU-4D. Miami-Dade County shall coordinate with the Miami-Dade County Public Schools and municipalities to provide for pedestrian, bicyclist and traffic safety in the school areas, and signalization for educational facilities.

Policy CHD-1A. Miami-Dade County shall create a network of sidewalks, trails, accessible parks and recreation facilities that establishes a pedestrian-friendly environment, which encourages physical activity and links destinations, such as restaurants, shops, work places and neighborhood-based retail to each other and residential areas.

Policy CHD-1E. Designate locations for carpooling and bus stops that encourage residents to maintain a daily level of walking as part of their commute, and are designed in a manner that reflects the character of the community or district where the stops are located.

Policy CHD-1F. Adopt and implement by 2014 high-quality streetscape design standards and facade treatments to reflect the character of the community to attract pedestrian activity.

Policy CHD-1G. Promote coordination between jurisdictions in the planning and implementation of bicycle, trail, transit, pedestrian and other alternative transportation modes to establish continuous networks that support healthy communities.

Policy CHD-1H. Adopt and implement by 2014 a signage and way-finding program within the public realm that is an aesthetic enhancement to the community. It should clearly inform residents and visitors of key locations, corridors and pedestrian/bicycle routes to destinations and amenities.

Policy CHD-1I. Create walkable environments between tourist destinations through design guidelines that take measures to enhance the public realm and encourage pedestrian/bicycle activity.

Policy CHD-3A. Design and develop neighborhoods that can facilitate children walking safely to Miami-Dade County Schools.

Policy CHD-3B. Encourage walking and bicycle riding as a means of transportation to and from school, by implementing capital projects that support the development of safe routes to school.

Policy CHD-3C. Prepare design standards for lighting as a pedestrian safety measure along streets, paths, crosswalks and other points of vehicular conflict, as well as within public spaces.

Policy CHD-3D. Update street design standards to incorporate traffic-calming measures, such as special paved crosswalks at key intersections and/or mid-block crossings, where applicable to promote pedestrian safety.