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# **MetroPlan Orlando Active Transportation Plan Toolbox of Strategies**



# Introduction

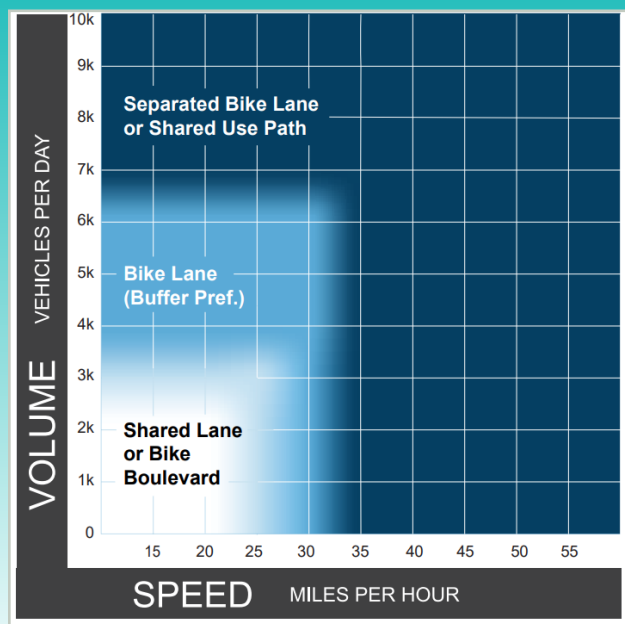
The MetroPlan Orlando Regional Active Transportation Plan (ATP): Ride & Stride 2050 will serve as a roadmap to enhance active transportation options on the MPO Roadway Network throughout Orange, Osceola, and Seminole Counties. This document outlines the Toolbox of Strategies for investments that place an emphasis on improving access and connectivity, improving transportation safety outcomes, and enhancing the mobility choices of existing and future residents.

The strategies outlined in this document are intended to be used in conjunction with the planned facility maps, and are organized in four categories: **Bicycle Infrastructure, Pedestrian Infrastructure, Transit Access, and Safety and Comfort.**

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### Bikeway Selection



Source: FHWA

Adding a bicycle facility that does not fit with the context may not improve mobility or safety for cyclists. It is important to take into consideration roadway volumes and speeds and the surrounding context when selecting a bicycle facility. The Federal Highway Administration has guidance for what type of facility to provide in a given context.

### Shared Use Path/Trail



Shared Use Paths are typically separate from the roadway network and provide two-way directional paths for bicyclists, pedestrians, and other non-motorized users. According to the Florida Design Manual (FDM) 224, shared use paths should meet the following widths:

- 10-14 feet wide (12 feet preferred)
- 8 feet wide for small sections when 10 feet is not possible

Guidance on designing inclusive facilities can be found in the Public Rights-of-Way Accessibility Guidelines (PROWAG).



### Side Path/Trail



A Side Path is similar to a shared use path but generally runs parallel to the roadway. Side paths typically cross the roadway at intersections and may cross driveways. In urban contexts, C5 and C6 context classifications, a separate sidewalk must also be provided to accommodate increased pedestrian traffic. Side paths are covered under FDM 224 and have the same width requirements as shared use paths, which include:

- 10-14 feet wide (12 feet preferred)
- 8 feet wide for small sections when 10 feet is not possible

Guidance on designing inclusive facilities can be found in the Public Rights-of-Way Accessibility Guidelines (PROWAG).

### Protected Bike Lane



Protected Bike Lanes are dedicated spaces for bicyclists that are physically separated from vehicles and pedestrians by vertical delineation. Protected bike lanes can be one-way or two-way.

According to the FHWA Separated Bike Lane Guide, protected bike lanes should meet the following width requirements:

- One-Way Lanes  
5 feet minimum (7 feet preferred to allow for passing)
- Two-Way Lanes  
12 feet combined width preferred



### Separated Bike Lane



Separated Bike Lanes are similar to Protected Bike Lanes. However, instead of being physically separated from vehicles and pedestrians by vertical delineation, they are separated by horizontal delineation or small, mountable delineation. Separated bike lanes can be one-way or two-way.

According to the FHWA Separated Bike Lane Guide, separated bike lanes should meet the following width requirements:

- One-Way Lanes  
5 feet minimum (7 feet preferred to allow for passing)
- Two-Way Lanes  
12 feet combined width preferred

### Bike Lane



A Bike Lane provides dedicated street space, typically adjacent to outer vehicle travel lanes, with designated lane markings, pavement legends, and signage. Bike lanes improve safety by reducing conflicts between bicycles and vehicles on the road and by creating a road-narrowing effect with buffers or vertical barriers, which may reduce vehicle speeds.

While FDM section 223.2.1.1 provides the following guidance for bike lane widths:

- 4-foot minimum on RRR projects (5 feet is generally the preferred minimum)
- 7-foot wide bike lanes standard for new construction (See Wide Bike Lanes section for more details)

### Wide Bike Lane



A Wide Bike Lane is a bike lane with a painted double-6-inch white edge line between the bike lane and adjacent travel lane. According to the National Association of Transportation Officials (NACTO), wide bike lanes are desirable on roadways with higher vehicle speeds, higher traffic volumes, or a high percentage of heavy vehicles such as buses or large trucks. On roads with on-street parking, a parking buffer should also be added to avoid dooring crashes. Based on FDM 223.2.1, wide bike lanes should meet the following requirements:

- 6 feet wide (including buffer, 7 feet preferred)
- Shall not exceed 7 feet (including buffer)

### Neighborhood Street Connections



Neighborhood Street Connections do not have any dedicated space for cyclists, but are low volume, low speed roads that primarily serve local vehicle trips. These streets can provide valuable connections to the overall bicycle network. Traffic calming measures should be implemented on these streets to encourage drivers to drive the posted speed limit. Consider using sharrows, lane markings that indicate that motorists should expect to see bicycles sharing the roadway, and wayfinding elements to help cyclists know where to go and to remind drivers that bicyclists are present.

Section 223.3 of the FDM provides guidance for when to use sharrows. According to the FDM, sharrows can be used when any of the following conditions are met:

1. The travel lane is too narrow for bicycles and motor vehicles to safely travel side-by-side
2. With on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle
3. To fill a gap in an otherwise continuous bike facility, generally for a short distance
4. As part of an approved temporary traffic control plan, see FDM 240



### Rural Context



Confident riders commonly use rural, high-speed roads on long distance rides. While it may not be feasible to provide facilities that would be appropriate for all ages and abilities in these contexts, accommodations can still be made for cyclists who choose to travel along these roadways. Shoulders at least 4 feet wide can be provided to separate cyclists from vehicles. As speeds increase, the width of the shoulder should also increase.

### Bike Parking and End-of-Trip Facilities



Bike parking is a critical element in encouraging people to bike. In addition to standard bike racks, secure, enclosed, long-term parking should be provided. Zoning regulations that require office and residential buildings to provide this higher-quality, long-term parking would be beneficial to encourage people to commute by bike. Another common barrier to commuting via bike is the lack of shower facilities in office buildings. Zoning regulations can also require or offer benefits to office buildings that provide shower facilities.



### Bikeshare and Micro-mobility



While e-bikes, e-scooters, and other micro-mobility devices can be controversial, they provide valuable first-mile/last-mile connections. They are also useful devices to those with mobility impairments. Regulations surrounding micro-mobility devices should provide for equity, including providing vehicles that can accommodate people with disabilities, that vehicles are located in low-income areas, and that cash payment options are available. Regulations can also require that devices be parked in designated locations.

### Maintenance



Maintenance is important for preserving the usability and safety of bicycle facilities. Bicycle facilities should be cleared of debris and vegetation, and the surface should be repaired or resurfaced when necessary to maintain a smooth surface. Some types of bicycle facilities, like separated bike lanes, may need special equipment.

### Bicycle Facilities at Intersections



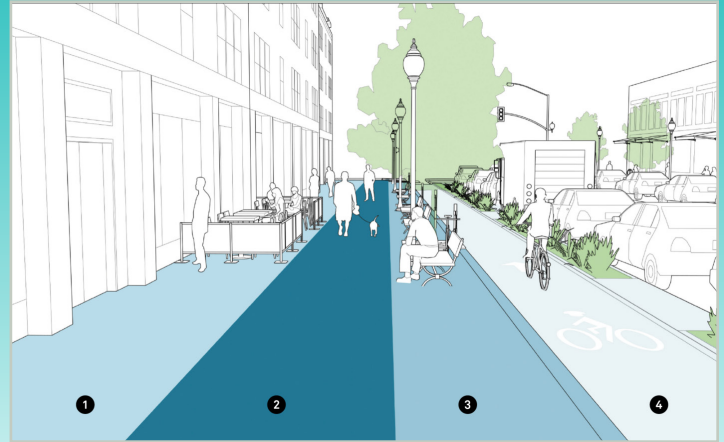
To be comfortable, bicycle facilities need to continue through intersections. Mixing zones should only be used on low speed, low volume roads and should be avoided when possible. If a right turn lane crosses a bike lane, then the designs should encourage drivers to reduce their speed. Reduced curb radii, green paint, bike boxes, and two-stage turn boxes (allow cyclists to make a left turn by crossing the intersection on the right-hand side to a staging area where they rotate left and wait for the corresponding signal to cross again) are strategies that can be incorporated at intersections. Shared use paths typically cross roadways at mid-block crossings. Enhanced crossings that include rectangular rapid-flashing beacons or pedestrian hybrid beacons are preferred treatments at these crossings.

### Wayfinding



Wayfinding systems use signs and markings to tell bicyclists and pedestrians that they are on a designated route and help guide them to their destination. Wayfinding also alerts drivers of the route. Signs can be placed at decision points along the route. Signs that indicate distances or time to destination can also help overcome public perception that destinations are too far to reach.

### Sidewalks



Source: NACTO

Sidewalks are the core element of the pedestrian network. While they are typically designed with pedestrians in mind, they are also used by cyclists and other micro-mobility users, particularly when dedicated facilities for those users are not provided. Generally, sidewalks should be at least six feet wide, but should be wider in urban areas with high pedestrian demand, and areas where bicyclists, pedestrians, and other active transportation users are expected to share the space. According to NACTO, Sidewalks can be divided into four categories or zones.

1. **Frontage Zone:** This is the area between adjacent buildings and the sidewalk. In residential and rural areas, this may be lawns, or landscaped areas. In urban areas, it may include outdoor seating or displays for businesses, architectural features, etc.
2. **Pedestrian Zone:** This is the dedicated walking space. It should be at least six feet wide, but should be wider depending on the location and pedestrian demand.
3. **Amenity/Buffer Zone:** This zone provides a buffer between the Pedestrian Zone and the roadway. Sidewalks without a buffer or with narrow buffers (less than three feet) can be highly uncomfortable walking environments. The amenity/buffer zone can provide amenities such as benches, bike racks, street trees, street lights, trash cans, etc. In residential areas, this space is typically a landscaped buffer.
4. **Curb Zones:** This is the space directly adjacent to the roadway and is commonly six inches wide and vertically separates the sidewalk from the roadway. If not used as a travel lane, common uses for this space include parking, loading zones, and transit stops. Some urban areas extend the pedestrian realm into this space by creating parklets or allowing business to use it for outdoor seating.

In suburban or rural contexts, sidewalks typically only include the pedestrian zone. When possible, a landscape buffer should be provided between the travel way and the sidewalk. In some rural or suburban areas, it may be beneficial to construct a shared use path or side path in lieu of a sidewalk. FDM Section 222 provides guidance on pedestrian facilities including sidewalks. The standard sidewalk width is dependent on the context classification:

- C1 and C2 - 5 feet
- C2T, C3, and C4 - 6 feet
- C5 - 10 feet (6 feet minimum in constrained areas)
- C6 - 12 feet (6 feet minimum in constrained areas)



### Shared Use Path/Trail



Shared Use Paths are typically separate from the roadway network and provide two-way directional paths for bicyclists, pedestrians, and other non-motorized users. According to the Florida Design Manual (FDM) 224, shared use paths should meet the following widths:

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### Side Path/Trail

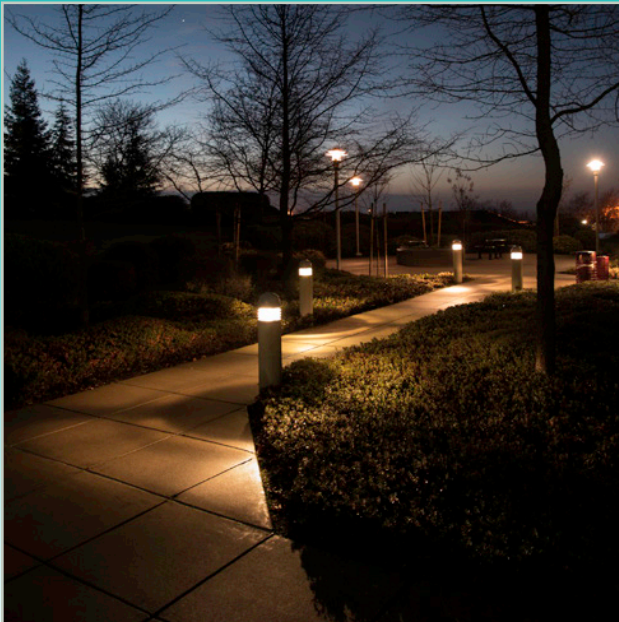


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### Lighting



Roadway and pedestrian scale lighting can help encourage walking at night. This particularly benefits those who work night shifts. Lighting is crucial at intersections and crosswalks, as drivers need to be able to see a pedestrian in order to stop for them. At crosswalks, overhead lights should be placed in front of the crosswalk to prevent the silhouette effect. The silhouette effect occurs when an object, in this case a pedestrian, is darker than its background, causing the pedestrian to be less visible. In addition to reducing the risk of collisions, lighting also makes pedestrians feel more secure walking during non-daylight hours. Even if an area is not prone to crime, if it does not feel safe, pedestrians will not walk there.

### Wayfinding



Wayfinding systems use signs and markings to tell bicyclists and pedestrians that they are on a designated route and help guide them to their destination. Wayfinding also alerts drivers of the route. Signs can be placed at decision points along the route. Signs that indicate distances or time to destination can also help overcome public perception that destinations are too far to reach.



### Public Art



Public art can make walking more comfortable and interesting. It can also help create a sense of community. Art can include sculptures, murals, decorative signal cabinets, decorative lighting, landscaping, hanging elements, performances, and interactive art, such as giant rocking horses, chalkboards with prompts, motion sensor screens or lights, etc.

### Public Squares



Having a public realm where people can gather is a great way to develop communities and encourage people to walk. These spaces are different than parks which are typically tailored to recreation. Public squares give locals a place to come together. These spaces can have street vendors and food trucks, art, lighting, etc. There can be programming and street performers to help attract people to the space.



### Land Development Patterns



Having buildings with windows that front the sidewalk and provide amenities such as awnings and seating can create a more comfortable walking environment. Parking lots, parking entrances, and loading areas should be behind buildings. Access to these spaces should be off side streets or alleys, so that they don't negatively impact the walking experience.

### Landscaping and Shade



The heat of the summer months can be enough to discourage walking even short distances. Urban areas where a high percentage of the land is paved can be several degrees higher than the surrounding area. Shade is an important part of the pedestrian network to provide a more comfortable walking environment. Trees, where they can be planted, are a great option for providing shade. Man-made shade structures should be carefully designed to provide shade throughout the day. Shade structures at signalized intersections can provide protection to pedestrians waiting to cross the street.

### Intersection and Crossing treatments



Pedestrians need high-quality facilities at intersections and mid-block crossings. The type of crossing should be dependent on the context and pedestrian demand. Ideally, intersections, particularly in urban areas, should have crosswalks on all sides. Urban areas should also have crossings every 300 - 400 feet.

Different crossing treatments include:

- Raised Crosswalks
- High Visibility Crosswalks
- Decorative Crosswalks
- Rectangular Rapid-Flashing Beacons
- Pedestrian Hybrid Beacons
- Advanced Warning Signs
- Raised Intersections

### Transit Stop Improvements



Transit stops can often be located in areas that are difficult to travel to via active transportation. This discourages potential riders who have other options and creates uncomfortable, unsafe conditions for riders who have no other choice. Transit stops need to be connected to the pedestrian network. Additionally, stops should be co-located with crosswalks so that passengers can safely cross the street to a destination on the other side. Transit stops should also have shade structures/shelters, seating, and trash receptacles. Adding lighting at transit stops is also beneficial for the comfort and security of riders.



### Trail Counters



Trail counters are helpful to understanding how many people are using a facility. This knowledge can help a jurisdiction plan for and accommodate demand.

Trail counters can be temporary or permanent. Temporary counters are typically a combination of infrared sensors and tube counters (a tube that crosses the trail that senses when a bike rides over it). Common permanent counters are a combination of infrared sensors and inductive loops. Both temporary and permanent counters can distinguish between bicycles and pedestrians and identify the direction of travel.

### Pedestrian Bridges/Tunnels



At high speed, high volume intersections, it is best to have a grade separated crossing for bicyclists and pedestrians. A pedestrian bridge or tunnel can be used. Both structures should have a sloped grade or elevator in addition to stairs (if stairs are provided) to accommodate users in a wheelchair. Bridges and tunnels can also be used at railroad crossings so bicyclists and pedestrians do not have to wait for stopped trains. Flooding can be a concern for tunnels, and therefore may not be suitable for all locations. Both tunnels and bridges should be well lit to make users feel secure and to encourage use of the facilities.



### Amenities



Amenities such as benches, tables, trail parking, shade structures, etc. make walking facilities more comfortable, and it is more likely for the public to use the facility. Benches are particularly helpful for those with mobility impairments that might need to take breaks while walking.

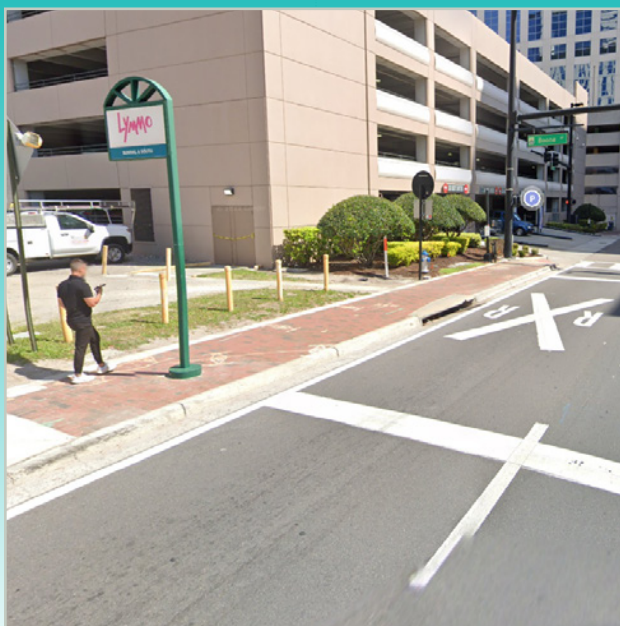
### ADA Accommodations



It is necessary that pedestrian facilities be compliant with the Americans with Disabilities Act (ADA), from the width of the facility, to the grade of curb ramps, and the type of materials used. While not an ADA requirement, new signalized intersections should provide audible pedestrian signals (APS) to accommodate pedestrians with visual impairments.

The ADA Accessibility Guidelines (ADAAG) provides accessibility design standards and requirements primarily for buildings and recreational facilities. The Public Rights-of-Way Accessibility Guidelines (PROWAG) regulations are more applicable to the street setting. Both sets of guidelines should be followed when designing new facilities. ADA Title II also requires public entities to identify existing accessibility barriers, steps to remove the barriers, and a schedule to complete the process.

### Bus Stops/Bus Stop Location



Most traditional bus services have buses stop at a specific marked location to allow passengers to board and/or alight. Stops can be as simple as a sign on a pole or can have additional amenities such as shelters, benches, trash cans, etc. Bus stops can be in-lane or have a pull-out. In-lane bus stops are usually preferred because buses do not have to wait for traffic to clear to be allowed back in the travel lane. Occasional pull-out stops, particularly on single-lane roadways can allow queued traffic to pass.

Bus stops can be located on the near-side or far-side of an intersection or mid-block. Regardless of whether the stop is located at an intersection or mid-block, the stop should be co-located with a marked crossing and should be connected to the larger pedestrian network.

Bus stops at intersections are generally placed on the far-side of the intersection because it allows the bus to pass through the intersection before having to stop. Far-side locations are also preferable where there are sight-distance issues or when a transit vehicle is making a left-turn.

Near-side stops are beneficial at stop-controlled intersections so that the bus only has to stop once. They can also be considered on single lane roadways where there is a concern that queued vehicles behind the bus will block the intersection. Far-side and near-side stops can be used interchangeably to reduce intersection delay.

### Shelters



Bus shelters are important for protecting passengers from sun, rain, and other inclement weather, and should be designed with the local climate in mind. Shelters should also have proper lighting and be transparent for the safety and security of passengers. Seating and other amenities, such as trash cans, can also be added for passenger comfort.

### Sidewalk Connections



Transit stops can often be located in areas that are difficult to travel to via active transportation. This discourages potential riders who have other options and creates uncomfortable, unsafe conditions for riders who have no other choice. Transit stops need to be connected to the pedestrian network. Additionally, stops should be co-located with crosswalks so that passengers can safely cross the street to a destination on the other side.



### Bus Bulbs



In some areas, where on-street parking is provided, a bus pull-out will be provided for the bus to move out of traffic. An alternative is a bus bulb, where the curb is extended to the travel lane so the bus can pick-up/drop-off passengers without merging in and out of traffic. The additional space can also be used for bus shelters and other amenities.

### Separated Bike Lanes and Transit Stops



Separated bicycle facilities commonly conflict with transit stops. When possible, these conflicts should be eliminated. One way to do this is to construct transit islands and place the separated bike facility behind the transit stop. Pedestrians access the island via a clearly marked crosswalk across the bike lane. Any amenities, such as bus stops, that are placed in the island should not interfere with the vision or motion of bicyclists and pedestrians.

### First Mile/Last Mile



Often transit passengers will need to walk or bike to/from their destination to transit stops. Increasing the ease and comfort of these “first mile/last mile” trips can improve safety and comfort for existing riders and encourage additional riders. Some strategies to improve these connections include:

- Bike Lanes
- Short and Long-term Bike Parking
- Bike Racks on Buses
- Bikeshare/shared Micro-mobility Devices
- Sidewalks
- Pedestrian Bridges/Tunnels
- Lighting
- Identification and Wayfinding Signage
- Trails

### Vision Zero



Vision Zero is the goal of achieving zero traffic related serious injuries or fatalities. Vision Zero considers human error in the process and takes a holistic system-wide approach to eliminating fatal and severe crashes in particular, instead of focusing on all collisions. Vision Zero has 10 core elements:

1. Public, High-Level, and Ongoing Commitment
2. Authentic Engagement
3. Strategic Planning
4. Project Delivery
5. Complete Streets for All
6. Context-Appropriate Speeds
7. Equity-Focused Analysis and Programs
8. Proactive, Systemic Planning
9. Responsive, Hot Spot Planning
10. Comprehensive Evaluation and Adjustments

### Work Zone



Work Zones can be particularly dangerous for the workers; 80 percent of pedestrian work zone fatalities in 2021 were due to motor vehicle incursion. Extra precaution needs to be taken in slowing vehicles down in work zones. However, workers are not the only ones threatened in work zones; around 75 percent of pedestrians killed in work zones in 2021 were not “at work.” Work zones often close sidewalks, sometimes without notice, leaving pedestrians to walk in dangerous situations. Keeping sidewalks open and protected during construction should be a priority, along with developing and signing detours for active transportation users (National Work Zone Safety Information Clearinghouse).



### Signal Strategies



There are several signalization strategies that can be implemented to improve conditions for active transportation users. In areas with high pedestrian and bicycle demand, cycle lengths should be minimized to reduce the amount of time cyclists and pedestrians are waiting. This also reduces the likelihood that a pedestrian or bicyclist will cross during a red signal. The latest version of FDOT's Traffic Engineering Manual provides several signalization strategies to accommodate pedestrian movements including but not limited to:

- Automatic pedestrian recall - the pedestrian phase is called automatically instead of manually called by the pedestrian by pushing a button
- Restricted turning movements - restricting left and/or right-turning movements during pedestrian phases; static or dynamic "No Turn on Red" signs can be used to restrict right-turns
- Leading Pedestrian Interval (LPI) - the "Walk" sign activates before the corresponding green signal is provided for vehicles, giving pedestrians a head start and reducing the likelihood of conflicts with right-turning vehicles
- Pedestrian Scramble - an exclusive pedestrian phase that allows pedestrians to cross any leg of an intersection or diagonally; right turns should be prohibited during a pedestrian scramble

### Complete Streets



Complete streets is the concept of converting auto-centric roads to streets that are safe for everyone. There is no set design for what a complete street should look like, rather it should fit the local context. They often include elements such as narrow travel lanes, protected intersections, dedicated bicycle and pedestrian facilities, street trees and other amenities, etc.

### Lane Repurposing



Jurisdictions can decide whether a roadway's purpose is to move people or vehicles. For streets where the purpose is to prioritize walking and biking, vehicle lanes can be re-purposed to allocate space to other uses. Particularly at times of the day when volumes on a roadway are lower, having multiple lanes makes drivers feel safer driving at higher speeds. Having one, narrow lane in each direction with lots of other activity (parking, side streets, people walking and biking) causes drivers to slow down and pay more attention to their surroundings. Repurposed lanes can be used to provide expanded sidewalks, dedicated bicycle facilities, on-street parking, parklets/landscaping, outdoor seating for restaurants, transit stops, and/or other amenities. Lane re-purposing has several safety benefits including reducing pedestrian crossing distances and reducing the risk of pedestrian crashes, among others.

### Speed Feedback



Speed feedback signs have shown to be a useful tool to slowing down drivers, though they tend to only reduce the risk of a collision by 5 to 7 percent. The signs alert drivers of the speed limit and the speed at which they are driving. Jurisdictions should be careful about how the signs operate. At a predetermined speed over the speed limit, i.e. 10 mph over the speed limit, the sign should display a static message such as "SLOW DOWN" or "TOO FAST." Speed feedback signs are not long term solutions, but can be used as an intermediate strategy until changes can be made to the roadway design.

### Target Speed, Design Speed, Speed Limit Setting



Speeds are one of the biggest components affecting crash severity. In its 2022 Speed Management Network Screening report, MetroPlan Orlando acknowledged a desire to reduce speed limits in residential and business districts in urban areas to 20 mph. However, simply changing the speed limit typically is not enough to encourage drivers to drive at that speed. Speed changes should be accompanied by changes in the street design.

In Florida, the state legislature has set the default speed limit in residential areas at 30 mph. Municipalities can set a speed limit of 20 or 25 mph in residential districts after conducting an investigation to justify the lower speed limit. For projects that do not qualify for the residential speed limit reduction, the jurisdiction can reduce speeds on a project-by-project basis, including resurfacing, restoration, and rehabilitation projects. The standard method for changing a speed limit on a roadway where the speed limit is already posted is the 85th percentile method, which bases the speed limit on how fast 85 percent of people drive.

This method may lead to increases in the posted speed limit over time because roadways have traditionally been over-designed, which makes drivers feel safe while driving at speeds in excess of the posted speed limit. The FDOT Speed Zoning Manual allows for target speeds to be set in accordance with the Florida Design Manual (FDM) (Section 201.5.1). A target speed is the speed that a jurisdiction thinks is appropriate for a given roadway based on a variety of factors, including adjacent land use and the level of multi-modal activity.

The FDM provides a range of speeds that could be acceptable based on the context classification. While the target speed can be any approved value, the posted speed limit must incorporate speed management countermeasures so that the design speed is aligned with the speed limit. It may take several projects for the target speed to be achieved.

#### Definitions:

- Speed Limit/Posted Speed - the number on the speed limit sign
- Operating Speed - how fast cars are actually going
- Target Speed - the speed cars should go for a safe environment, based on the setting of the street (ex: neighborhood, commercial area, industrial area, etc.)
- Design Speed - the speed used to determine the geometrics of the roadway