Appendix F:
Design Guidance

Design guidance is an implementation tool for the street, transit, pedestrian, and bicycle system plans (Chapter 4). Together with system plans, this guidance helps clarify the intent for amending design standards and regulations contained in Redmond Zoning Code, Redmond Construction Design Standards, and other relevant documents as needed to be in alignment with the TMP. Also, design guidance directs the selection of engineering design parameter values for capital improvements, such as those included in the American Association of State Highway and Transportation Officials (AASHTO) Green Book.

Design guidance starts from streets, which is organized by street functional classifications (Figure 64). Table 21 includes important parameters for defining the street cross-section and refers to subsequent tables in this appendix for detailed guidance for system plans of transit, pedestrians, and bicyclists (Tables 22 to 30).

Street Design Guidance

In using the design guidance in Table 21, it is important to recognize the following:

1. Several design parameters affect street cross-section. These are: mid-block lane width, posted speed limit, and maximum number of general purpose lanes. Where there is a range between maximum and minimum values, the minimum value is preferred. Wide lanes, added turn lanes, and extended-length turn lanes will only be allowed following thorough evaluation of the land use context, multimodal context, right-of-way cost, and other compelling engineering considerations.
2. Table 21 is arranged by street classification. While functional classification is important in guiding street design, other controlling considerations include the land use context and the need to balance multimodal needs. Therefore, not all streets in the same functional classification may have uniform design. For example, in some cases, due to right-of-way constraints or the local context, streets may be narrower than other streets in the same functional classification.
3. There are exceptions to Table 21 parameters in cases where current conditions on certain streets differ from this table, where interim street improvements are made, or where there are unique site-specific design considerations. For example, the current posted speed limit on Willows Road (between NE 95th Street and north city limits) is 45 mph, higher than the maximum posted speed limit, 40 mph, for principal arterials. The Three-Year Action Plan provides direction for a speed limit revision study, which will review speed limits on select corridors to consider the interests of all street users. For new improvements, any such deviation from this table shall be documented through a thorough evaluation and deliberate decision process.

Table 21. Street design guidance

Functional Classification	Principal Arterial	Minor Arterial	Collector Arterial	Connector	Local Access	Woonerf
Maximum pedestrian crossing length	75 feet					Not applicable
Maximum number of general purpose through lanes in each direction	2	2	1	1	1	1
Mid-block lane width (feet)	11-12	10.5-11	10.5-11	10-10.5	10	10 max. 20 in both directions
Speed limit (mph)	35-40	30-35	25-30	25	25	10

Roadway Functional Classification System

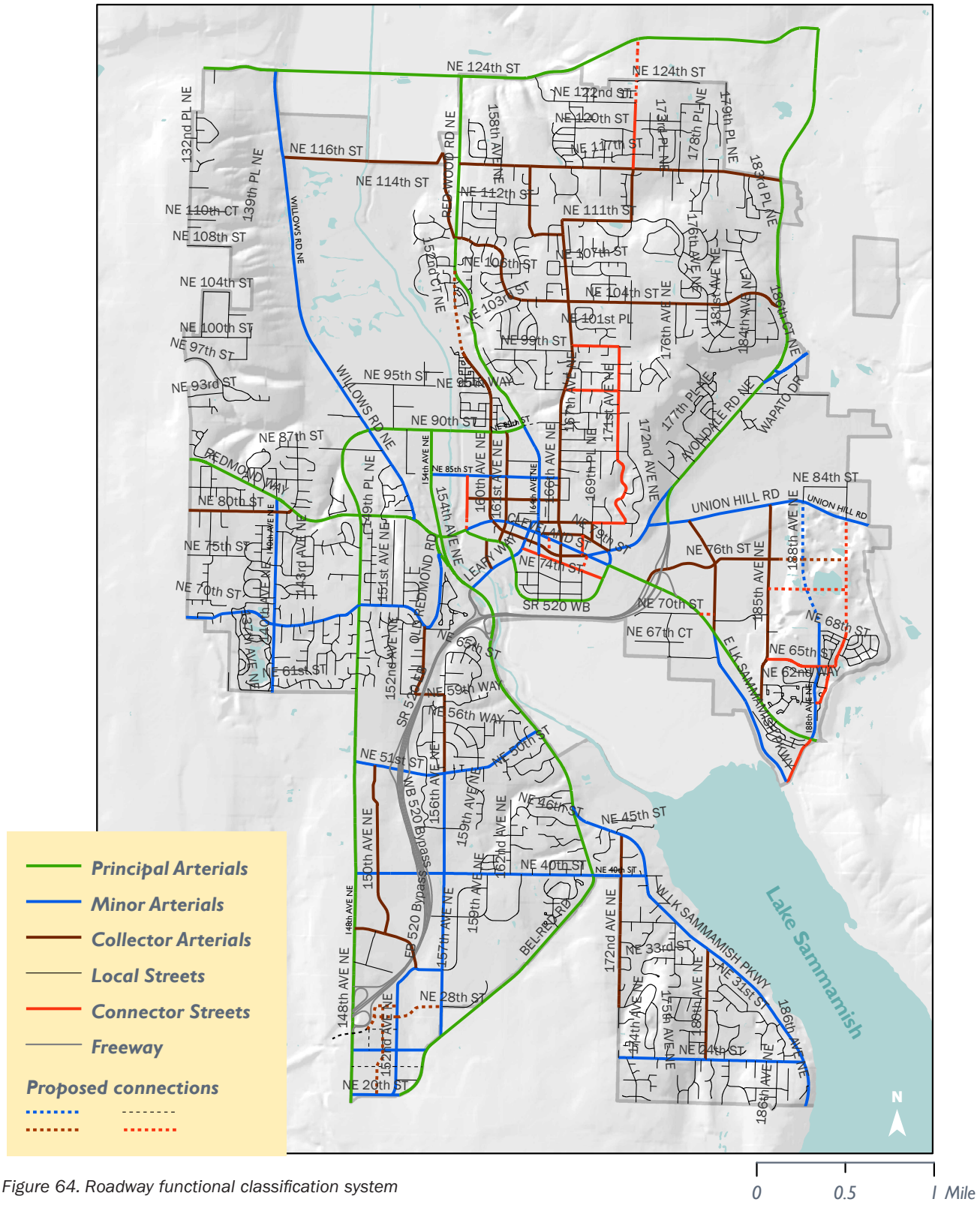

Figure 64. Roadway functional classification system

Table 21. Street design guidance (continued)

Functional Classification	Principal Arterial	Minor Arterial	Collector Arterial	Connector	Local Access	Woonerf
Access management	Maintain spacing between any adjacent streets and driveways of 150 feet. Only connect driveways from parcels to public streets with the lowest functional classification.					
Transit facilities	Refer to Tables 22 and 23 for design guidance.					
Bike facilities	Generally dedicated bike facilities on both sides of arterials; mixed with traffic for local access streets and woonerf. See Tables 24 through 27 for detailed design guidance.					
On-Street parking (7 - 8 feet in width, 8 feet preferred)	Generally discouraged along principal and minor arterials and encouraged along other types of streets. However, parking is encouraged regardless of functional classifications in three areas: Downtown Urban Center, Overlake Urban Center, and the Southeast Redmond light rail station area.					
Landscape strip	Stormwater bioretention swales, treatment planters, or other types of natural stormwater drainage treatment methods. See Table 29 for required width.					Stormwater facilities at edge or through pervious pavement
Sidewalks	Required for both sides of all streets. See Table 29 for design guidance. Design shall support natural infiltration of stormwater. Facility and landscaping locations are adjacent to the street to provide pedestrian buffers.					

Transit Design Guidance

There are two categories of transit modal corridors in the transit system plan. They are high and medium demand transit modal corridors.

High Demand Transit Modal Corridors

These corridors include major arterials and SR 520, connecting Redmond's urban centers and major neighborhood activity centers. These are recommended as high priority. They possess the highest demand for transit, have the highest levels of service today and into the future, and represent the local and regional transit spine. The person-carrying capacity of transit in these corridors is similar to an entire general purpose lane of travel and is critical to the functioning of the transportation system, particularly in the urban centers where transit is critical to the functioning of the entire transportation system and represents the most significant ability to accommodate peak travel growth. These corridors are the highest priorities for service hour and infrastructure investments, creating service that is fast, frequent, reliable, and easy to get to.

The transit service standard for these corridors is that they should contain one or more routes with a combined frequency of 15 minutes or better throughout the day. Wherever possible, service should be focused in these corridors.

Medium Demand Transit Modal Corridors

These corridors support active transit patronage and provide important coverage and local access functions throughout the city by providing convenient access to Redmond's urban centers and the regional transit spine. These corridors may not see the City's highest levels of service investment or ridership. Investments should focus on improving access to adjacent housing and important services in order to maximize this function.

Designated Transit Corridors

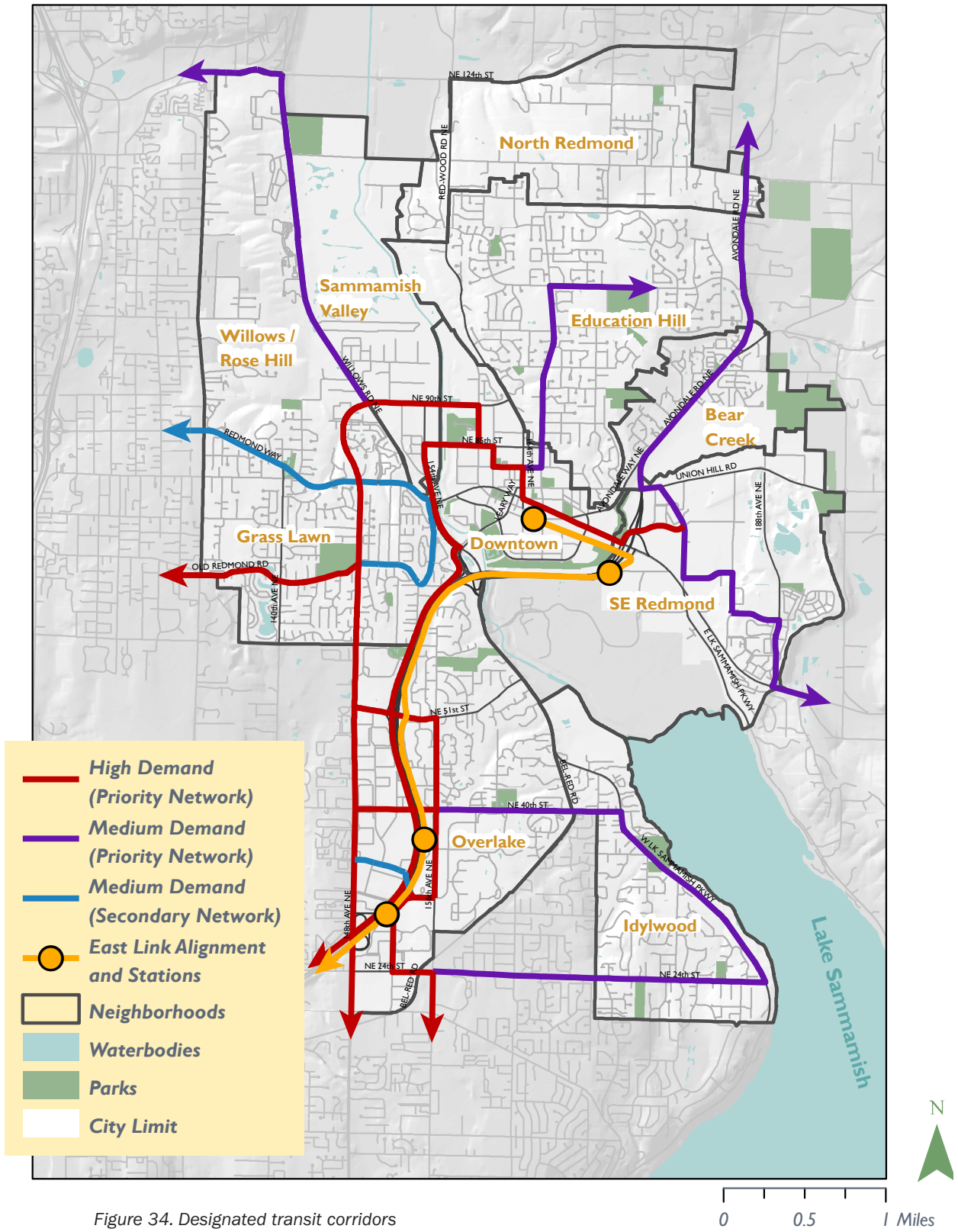

Figure 34. Designated transit corridors

The transit service standard for these corridors requires including one current or future route with a target of 30-minute frequency all day.

Table 22. Design guidance for high demand corridors

Treatment	Definition	Intent	Standard
Queue Jump Lane	A bus only lane with a dedicated signal call that advances the bus only lane ahead of the general purpose lanes at a signalized intersection.	Improve speed and reliability. Emphasis on reliability in highly congested corridors. 5-25 percent reduction in travel times at a signal.	Recommended
Business Access and Transit (BAT) Lanes	A through lane exclusively for use by buses and general purpose right-turn movements.	Improve speed and reliability. Emphasis on reliability in highly congested corridors. 5-25 percent reduction in corridor travel times.	Recommended

Table 23. Design guidance for both high and medium demand corridors

Treatment	Definition	Intent	Standard
Transit Signal Priority (TSP)	Signal communication device used to trigger a bus only signal phase to speed bus movement.	Typically used for reliability, may also be used for speed. Up to 10 percent time savings at signals.	Recommended – High Optional – Medium
Bus-Supportive Roadway Surface	Roadway-wide or spot (bus stop or general purpose lane with bus traffic) pavement thicker and stronger than typical pavement.	Improves pavement life cycle. Also maintains bus service reliability and passenger comfort.	Required as pavement rehabilitation occurs – High Recommended – Medium
Bus Bulbs	Bus stop extended to be adjacent to travel lane where on-street parking or other roadway configuration would locate bus stop away from general purpose and require bus to pull out of general purpose lane to serve bus stop.	Removes the need for the bus to merge back into traffic and adds queuing space for riders at busy transit stops. Speed improvement of eight seconds per stop has been demonstrated locally.	Recommended – High Optional – Medium
Level Boarding Platforms	Boarding platform raised to height of bus floor.	Remove the need to hydraulically lift mobility- impaired passengers onto the vehicle. Only applicable for low floor buses with no stairs. Notable reliability benefit.	Optional – High Optional – Medium
Bus stop spacing	The distance between bus stops.	Balance access needs with improved speed by removing underutilized stops that do not meet spacing criteria. Stop consolidation to standard distance can improve route speed by 2-20 percent.	Approximately every 1,000 feet (both High and Medium).

Bicycle System Map

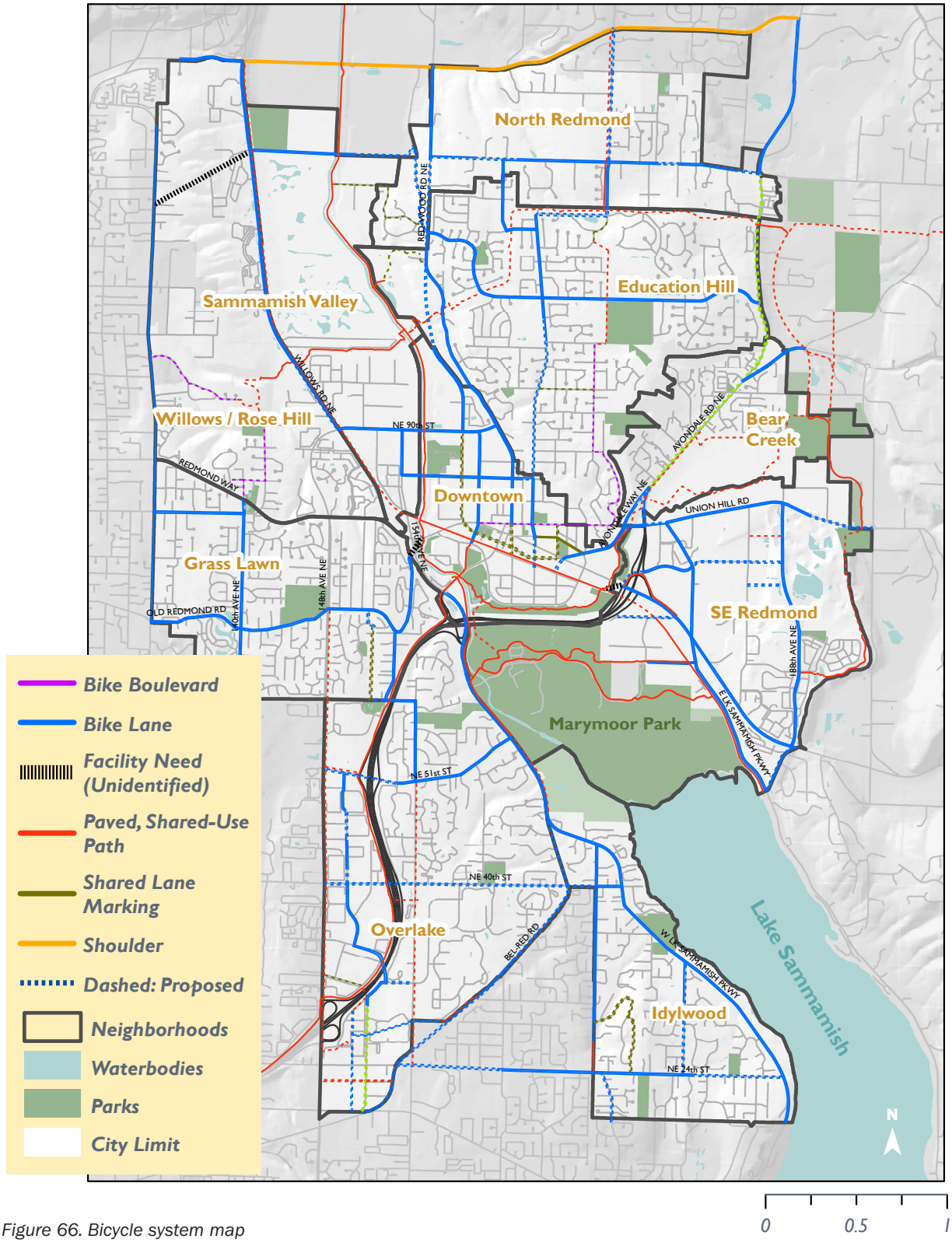

Figure 66. Bicycle system map

Table 23. Design guidance for both high and medium demand corridors (continued)

Treatment	Definition	Intent	Standard
Off-board fare payment	Fare payment device located at the bus stop.	Significant reduction in dwell times at high-volume stops. Speed improvement of one second per boarding passenger.	Recommended – High Optional – Medium

Bicycle Design Guidance

An extensive toolbox of bicycle facilities will ensure that high comfort facilities along streets and continuing up to and through intersections are installed on key bicycle routes where feasible. A wide variety of other bicycle facilities should be available where street cross-sections are too constrained to allow high comfort bicycle facilities. This broad toolbox provides an important step forward by focusing not only on bicycle facilities that continue along corridors, but also enabling bicycle guidance and positioning for bicycles to proceed up to and even through street intersections. This is a challenge today. Bicycle lanes often end before an intersection once space in the street cross-section is too constrained, leaving many bicyclists uncomfortable and unsure how to proceed.

Design guidance for bicycle facilities is broken into four tables (24, 25, 26, and 27.) For corridors, the Modal Map and the Bicycle System Map (below) determine the facility type. Tables 24, 25, and 26 provide recommended design guidance. Table 27 provides design guidance for signal control and markings for bicycle travel. While corridor improvements are required, improvements at intersections are recommended. The Modal Map assigns a higher priority for bicycle intersection improvements that are on modal corridors, but these treatments should be applied anywhere warranted on the bicycle system.

These design standards will be reviewed under Action Plan item 13: Bicycle Facilities Design Manual Update.

Table 24. Tier 1 high comfort bicycle facilities

Facility	Definition	Intent	Design Guidance
Paved, Shared-Use Path	A two-way operation bike and pedestrian facility physically separated from motorized vehicular traffic. Typically significantly setback or entirely independent from roadways.	Physical separation from automobiles provides high comfort for bicyclists.	Width: 14 feet recommended 10-foot minimum Lighting: recommended to ensure facilities are safe and usable year round, particularly when it is dark during commuting times. Connections: Adjacent properties shall connect to adjacent paved, shared-use paths (exceptions may be granted because of topography or environmental conditions). Modal Conflicts: Segments with high numbers of modal conflicts require additional improvements. Solutions include widening or creating two parallel paved, shared-use paths, grade separating roads and paved, shared-use paths, and adding a centerline stripe.

Table 24. Tier 1 high comfort bicycle facilities (continued)

Facility	Definition	Intent	Design Guidance
Cycle Track	An exclusive bicycle facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. Cycle tracks are found within or adjacent to a roadway but separated from motor vehicle traffic by a physical barrier, such as a curb or vehicle parking lane.	Physical separation from automobiles provides high comfort for bicyclists.	One-way operation (recommended): Width: Recommended 6-8 feet, 5-foot minimum Intersections: Raised and protected cycle tracks transition to be adjacent to general purpose lanes at intersections. Two-way operation (not recommended): Width: Recommended 12-14 feet, 10-foot minimum Intersections: Significant intersection treatments, including bicycle signals and green bicycle lanes, strongly recommended
Greenways/ Bicycle Boulevards	Streets with low motorized traffic volumes and speeds designated and designed to give priority to bicycles. Bicycles share streets with vehicles.	Utilize low-volume streets more effectively by engineering streets to be high comfort for bicycles. Automobiles and bicycles mix, with high comfort for bicycles due to low automobile speed and volume.	Vehicle volumes: recommended 1,000 ADT or less, maximum 3,000 ADT.
Buffered Bicycle Lanes	Bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.	Greater separation from automobiles provides higher comfort for bicyclists than bicycle lanes with no buffer.	Buffer width: minimum 2 feet Width: see “Bicycle Lanes” in Table 25.

Table 25. Tier 2 standard bicycle facilities

Facility	Definition	Intent	Design Guidance
Bicycle Lanes	A roadway lane designated exclusively for bicycle use.	Provide space in street cross-section dedicated for bicycle travel.	Width (includes maximum 1-foot gutter pan and bicycle-friendly storm drains): 6 feet recommended, 5.5 feet standard, 5-foot minimum on streets with over 30 MPH speed limit or streets with on-street parking (with minimum 7.5 feet on-street parking width), 4-foot minimum when adjacent to curb and speed limit 30 MPH or lower
Bike Runnel	A trough-shaped device integrated into staircase design that enables bicycles to be rolled up or down a staircase.	Enable bicycles to utilize staircases rather than staircases being a barrier.	Locations: required at all public staircases Design: Adequate space and correct height to ensure that bicycle pedals and handlebars move freely. Additionally, the top of a staircase typically includes signage advising bicyclists of the staircase ahead.

Table 26. Tier 3 bicycle facilities

Facility	Definition	Intent	Design Guidance
Shared Lane Markings ("Sharrows")	A pavement marking that delineates where bicycles should be positioned.	Delineate where bicyclists should be positioned and link bicycle facilities together. This calls attention to automobiles that bicyclists are expected on this street more so than other shared streets.	Location: Place along the right side of the lane when bicyclist should be positioned on right side of lane. Place in center of lane when lane width is less than 14 feet and lane should be shared by vehicles and bicycles; maximum speed limit 30 MPH.

Table 27. Intersection bicycle facilities

Facility	Definition	Intent	Design Guidance
Green Bicycle Lanes	Bicycle lane or cycle track colored green, denoting conflict areas on bicycle facilities, such as at intersections and locations where vehicles or bicycles must merge across a lane.	Increase bicycle and automobile knowledge of conflict areas, promoting orderly merging of automobiles and bicycles.	Continue to or through intersection.
Bicycle Boxes	An area designated for bicyclists at the approach to intersections. Typically colored green. Box includes bicycle facility and rightmost general purpose lane.	Reduce threat of right hook collisions and proceed to front of intersection queue.	Continue to an intersection.
Intersection Crossing Markings	Pavement markings such as dashed lines the width of a bicycle lane or shared lane markings that position bicycles through an intersection.	Increase bicycle comfort by positioning bicycles and providing guidance on how to proceed through intersection. Bicycle facilities continue rather than end before intersections.	Continue through intersection.

Pedestrian Design Guidance

Walking is an attractive travel choice when the public pedestrian network encourages easy, short walking trips to destinations (whether to a restaurant in an urban center, a bus stop, or a neighbor's house); and when the pedestrian environment is comfortable and visually appealing. Table 28. Network Connectivity, ensures a pedestrian system that provides the shortest possible walking trip to destinations, not just a denser, finer-grained pedestrian network. This is a key element of achieving the neighborhood connections strategy. Design guidance (not already incorporated into the Zoning Code) that ensures a comfortable, aesthetically pleasing pedestrian environment is included in Table 29. Sidewalk Design Guidance, and Table 30. Pedestrian Crossing Design Guidance. The focus is on ensuring a comfortable width of sidewalk space (minimum through walkway) and on providing

Pedestrian Priority Zones

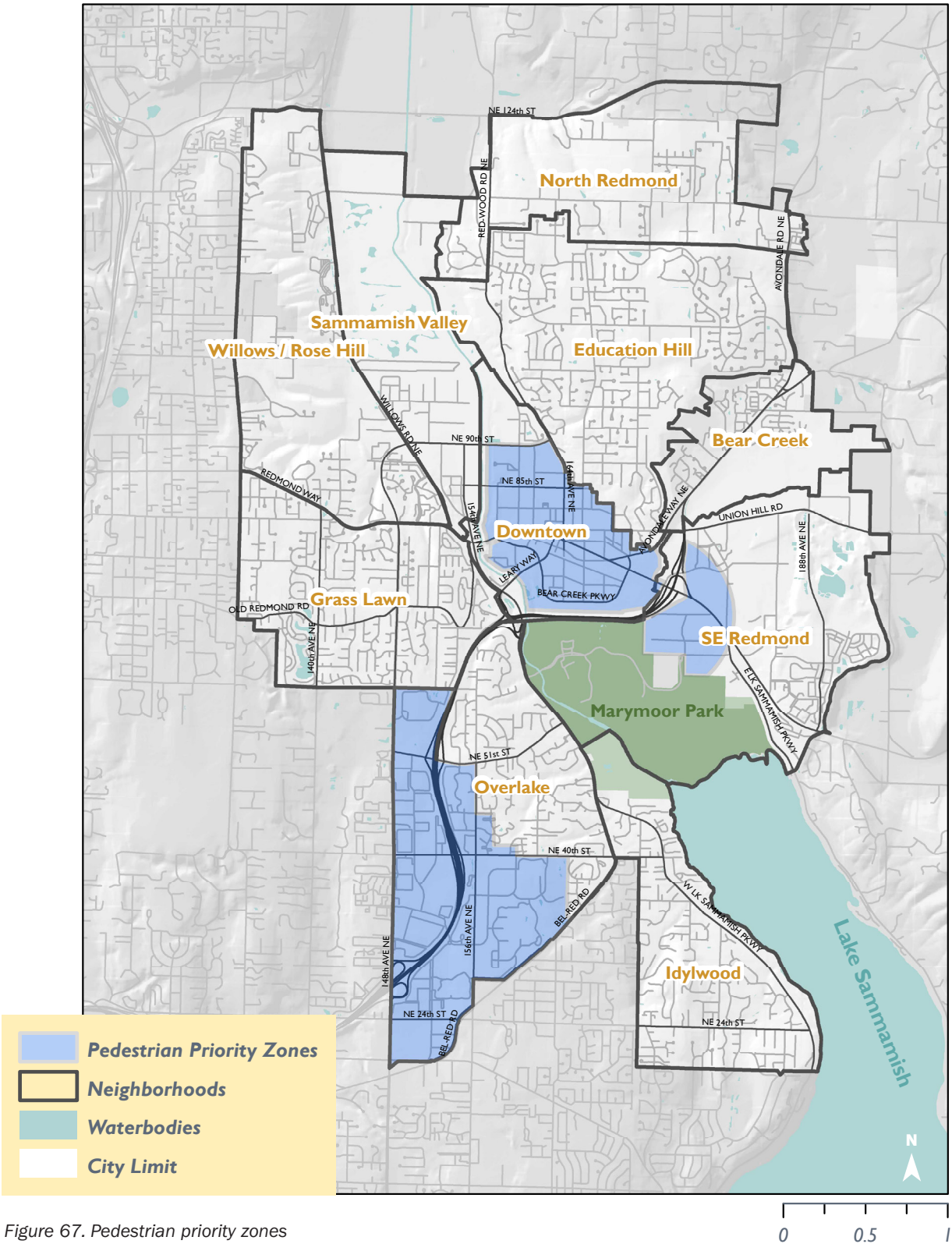

Figure 67. Pedestrian priority zones

crosswalks where pedestrian activity is anticipated, such as urban centers, transit stops, schools, and community parks.

The Pedestrian System Map shows areas of the city where the highest level of pedestrian activity is anticipated compared to areas where lower pedestrian activity levels are anticipated. Design standards in the pedestrian design guidance tables reflect these differences, enhancing the environment in urban areas (urban centers and light rail station areas) and also enhancing neighborhood character.

Table 28. Network connectivity

Network Linkage Recommended	Intent and Illustration	Guidance
Build any connection specifically identified in the Comprehensive Plan, Transportation Master Plan, or Parks, Arts, Recreation, Culture, and Conservation (PARCC) Plan.	Build specific network connections that have been identified through planning. 	Build minimum 5-foot-wide concrete (or width and material specified in the Comprehensive Plan, PARCC Plan, or elsewhere in TMP) pedestrian connection.
Connections to any public right-of-way or publicly accessible way will be built, connecting to all adjacent facilities at least once, and connecting a minimum of once per every 500 feet for a parallel facility.	Complete a dense, well-connected network. 	
Cul-de-sacs connect to any segment of the public pedestrian system and to other cul-de-sacs within 528 feet. Exception: connections are not required to existing cul-de-sacs built prior to 2013 when there is not already an established pedestrian connection.	Complete a dense, well-connected network. Disconnected cul-de-sacs are the most significant cause of low connectivity. 	
Main building entrance shall have a direct connection to the publicly accessible pedestrian system.	Provide direct, safe pedestrian connections from the pedestrian system to buildings. 	

Table 29. Sidewalk design guidance

Facility	Definition	Intent	Urban Centers	Pedestrian Priority Zones (Outside Urban Centers)	Neighborhoods
Minimum Through Walkway	Area of sidewalk clear of any physical objects.	Ensure pedestrian facility accommodates pedestrian comfort and volume and is retained for pedestrian transportation.	8-foot standard 6-foot minimum	6-foot minimum	5-foot minimum
Through Walkway Buffer	Distance from either side of clear zone of physical encroachment by walls, fences, above-grade utilities, and signs.	Ensure that clear zone continues in a linear fashion and obstructions do not reduce capacity and decrease comfort.	1 foot	1 foot	1 foot
Through Walkway Taper	Linear geometric through walkway.	Ensure effective through walkway by retaining through walkway along pedestrian path of travel. Lack of through walkway taper can be a notable issue in urban centers.	1.5:1 taper	1.5:1 taper	1:1 taper
Sidewalk Width: Principal, Minor, or Collector Arterial	Street space designated for pedestrians. Material is hard surface, typically concrete.	Pedestrian volume and comfort needs are met based on land use context.	See Redmond Zoning Code 21.10.150 and 21.12.150 – dated 2012.	8-foot minimum, both sides of street.	6-foot minimum both sides of street. Recommended: Additional width of pedestrian realm (combined width of sidewalk and furnishing zone) near schools and community parks.

Table 29. Sidewalk design guidance (continued)

Facility	Definition	Intent	Urban Centers	Pedestrian Priority Zones (Outside Urban Centers)	Neighborhoods
Sidewalk Width: Connector Arterial	Street space designated for pedestrians. Material is hard surface, typically concrete.	Pedestrian volume and comfort needs are met based on land use context.	See Redmond Zoning Code 21.10.150 and 21.12.150 – dated 2012.	8-foot minimum both sides of street.	On both sides of street. Option 1: Attached to back of curb – 6-foot minimum. Option 2: Separated from curb by landscaping strip – 5-foot minimum. Recommended: Additional width of pedestrian realm (combined width of sidewalk and furnishing zone) near schools and community parks.
Furnishing Zone: Principal, Minor, or Collector Arterial	Space physically buffering the sidewalk from the street. Typically hardscape with trees in urban areas and typically a planting strip in neighborhoods.	Provide physical separation from vehicle and an attractive environment. Additionally this improves sight distance.	See Redmond Zoning Code 21.10.150 and 21.12.150 – dated 2012	5-foot minimum both sides of street.	5-foot minimum both sides of street.
Furnishing Zone: Connector Arterial	Space physically buffering the sidewalk from the street. Typically hardscape with trees in urban areas and typically a planting strip in neighborhoods.	Provide physical separation from vehicle and an attractive environment.	See Redmond Zoning Code 21.10.150 and 21.12.150 – dated 2012.	5-foot minimum both sides of street.	On both sides of street Option 1: Sidewalk attached to back of curb. Option 2: Sidewalk separated from curb by minimum 5-foot Furnishing Zone.
Pedestrian Amenities	Street furniture such as benches, newspaper stands, art, community boards, etc., and sidewalk cafes.	Support an engaging, vibrant area to walk and help create desired community character.	Recommended.	Recommended near retail.	Recommended near neighborhood commercial.
Pedestrian Scale Lighting	Street lighting oriented to pedestrian needs.	Lighting is necessary for a safe environment and can add to an attractive pedestrian environment.	Required.	Recommended.	Optional.

Table 30. Pedestrian crossing design guidance

Crossing Facility	Definitions	Intent	Urban Centers	Outside Urban Centers
Maximum distance between marked crossings	Distance between crosswalks with pavement markings.	Frequent pedestrian crossings of roadways are critical to pedestrian travel time and safety because of significant out of direction travel.	Maximum every 528 feet. Recommended every 250 feet to 330 feet.	Maximum every 1,320 feet. Recommended within 330 feet of pedestrian generators, including schools, community parks, and transit stop.
Signalized crosswalks at signalized intersections	A crosswalk with pavement markings located at a traffic signal.	Crosswalks at each leg of an intersection facilitate pedestrian movements, which is particularly important in areas with high volumes of pedestrians such as urban centers. When legs of an intersection are unmarked, a pedestrian is then forced to wait an extra cycle length, adding significant delay and pressure for the pedestrian to jaywalk.	Ladder style crosswalk strongly recommended at all legs of intersections.	Strongly recommended at all legs of intersection.
Curb Extensions	Extending the curb out to be adjacent to the general purpose lane. For example, moving the curb out from on-street parking to the general purpose lane.	Shorten crossing for pedestrian and increase visibility of pedestrian to improve safety and comfort.	Install in conjunction with on-street parking or as applicable for safety.	Consider installing in conjunction with on-street parking or as applicable for safety.
Slip Lane	A turn lane providing an unsignalized “free” right turn at a signalized intersection.	Facility reduces driver attentiveness to pedestrians and is uncomfortable for pedestrians. Stop building new slip lanes and retrofit existing slip lanes.	Retrofit existing slip lanes to add a compound curve (mountable by freight). Recommend no longer installing slip lanes.	Retrofit existing slip lanes to add a compound curve (mountable by freight). Recommend no longer installing slip lanes.