



Town of Burlington

Streetscape Design Guideline Memorandum

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1. Introduction

A town's street network is one of the most defining elements of its public realm. It not only helps determine the access and mobility options available to residents, workers, and visitors, but contributes to the look and feel of space as people travel. A streetscape design guide provides the opportunity to provide a consistent and cohesive street network, as well as address safety, connectivity, comfort, and access by providing a framework for how streets within a community should look, feel, and function.

The Town of Burlington recognizes the importance of streetscape guidelines and their ability to enhance the quality of life for those who live, work, and play in town. Providing town-generated street and intersection standards is a recommendation of the 2018 Town of Burlington Comprehensive Master Plan (Master Plan). The plan recognizes the ability for street design guidelines to improve traffic circulation and create a more efficient street network, and to implement the Town's vision of reducing congestion while maintaining capacity of the street network. This memo provides a starting point for formulating street design guidelines for the Town of Burlington by identifying the hierarchy of existing street types, proposed typologies for design guidelines for each street type, and a toolbox of street design elements. This information is to serve as a framework for developing a complete street design guideline in the future.

2. Purpose & Need for Street Design Guidelines

Currently Burlington is auto-dependent, with about 90% of residents who are employed driving to and from work in private vehicles.¹ Factors such as wide roadways, the amount of vehicle traffic, high vehicular speeds, lack of sidewalks, and dangerous crossings were all cited as reasons in the Master Plan as to why people do not walk in town. In public forums conducted during the Master Plan process, there were no destinations listed where residents currently felt comfortable walking or biking. Residents identified that they would like to be able to walk within their neighborhoods on sidewalks that are linked to nearby destinations and longer pathway systems, as well as bike on safe routes between residential and commercial areas through on-street bicycle lanes and off-street shared paths.

Improving multimodal facilities and safety is a key feature of street design guidelines, and could help address several identified needs:

- Bridge the gap between regional employment centers and residential neighborhoods, providing more unity and transportation choices between the two.
- An opportunity to incorporate elements of Complete Streets Design, ensuring safe and connected facilities are provided for all travel modes for people of all ages and abilities.
- Integrating safe and accessible bus stops on Burlington's streets to make public transportation, currently provided by the Massachusetts Bay Transportation Authority (MBTA) and Lowell Regional Transit Authority (LRTA) a more desirable alternative.

3. Street Hierarchy

Although each street is grounded in its individual context, in terms of physical characteristics, abutting land uses, and operational elements, there are commonalities in scale and character for street types found within the

¹ Burlington Comprehensive Master Plan, 2018 <http://www.burlington.org/Burlington%20Master%20Plan%201-3-2018.pdf>

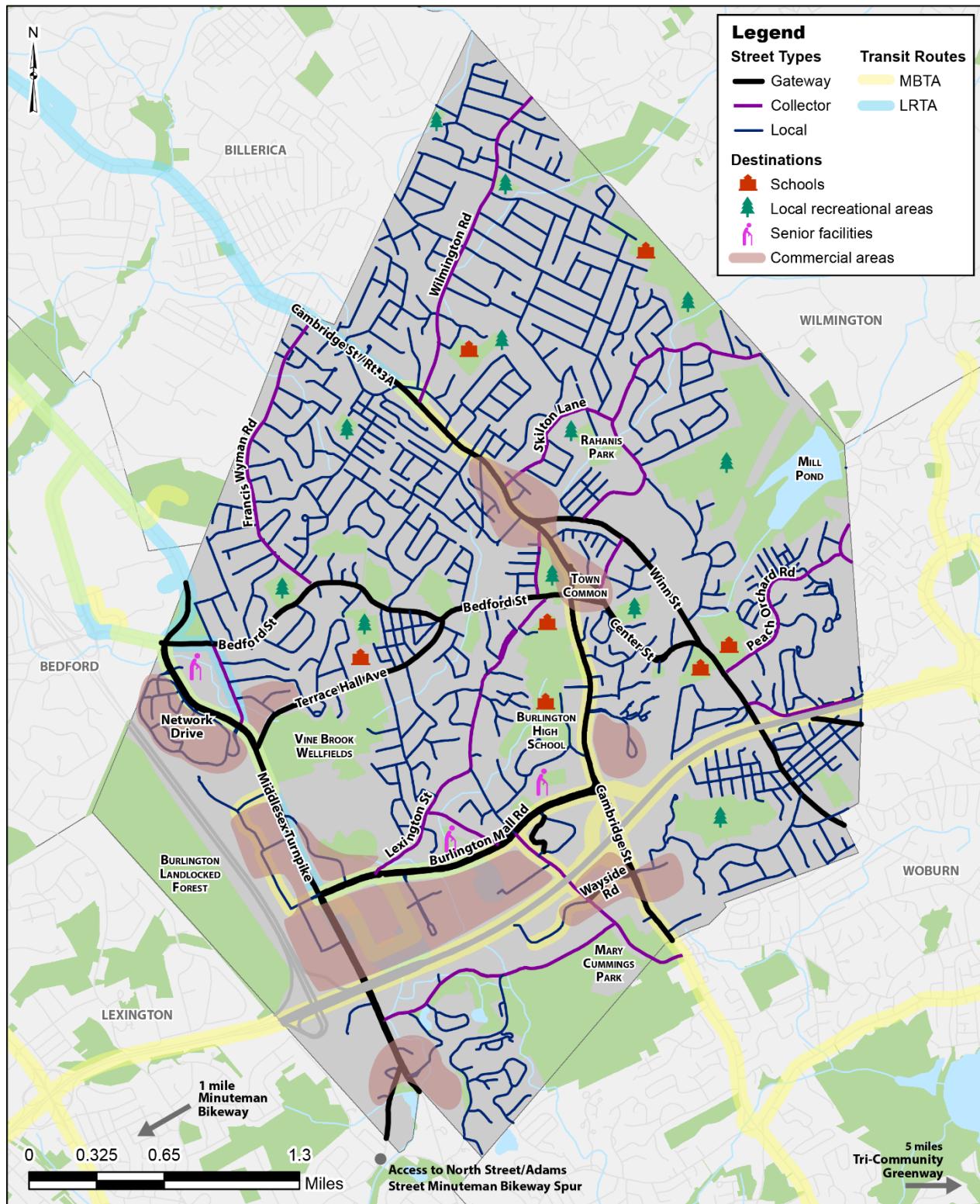
town. The following section highlights the general physical and contextual characteristics for street types in Burlington. The Town classifies its streets using the following terms:

Gateway roads provide connections between Burlington and neighboring communities and access to the major commercial centers of town. They are also the main routes served by MBTA and LRTA bus routes.

Secondary roads provide access to town-wide destinations such as schools and parks. Several destinations identified in the Master Plan as areas where people would like to walk or bike, but feel unsafe, are accessed by secondary roads, including Mill Pond, Rahalis Park, and Mary Cummings Park.

Neighborhood roads serve local trips and provide direct access to adjacent land uses. Although residents cited wanting to feel safe walking in neighborhoods, the Master Plan found that on streets with low traffic volumes, sidewalks may not be required for pedestrian safety and comfort.

Figure 1 illustrates the street network by street hierarchy, along with transit routes and community destinations. The typical characteristics and dimensions described below are to provide a framework for assessing the street design elements appropriate for each street type to accomplish the Town's goals. In developing a complete street design guide, it is recommended that the data summarized below be supplemented with field verification to identify variations in physical characteristics and understand the existing operational characteristics for each mode.

Figure 1: Street hierarchy, transit routes, and community destinations

Gateway Roads

Purpose and Function:

Gateway roads serve as Burlington's main arteries, and connect the town to its surrounding communities and region. Gateway roads are typically adjacent to a mix of commercial and industrial land uses, with some stretches of residential areas in between. Most of the town's transit service occurs along these roads, with two main route paths: first, along Cambridge Street in downtown



Gateway Road: Photo of Cambridge Street at Winn Street

Burlington; and second, along the southern and western borders of town where they converge at the Burlington Mall commercial center. Sidewalks are more common on gateway roads than other typologies, although currently they are only present on 52% of gateway roads, and only 17% have sidewalks on both sides. There are currently no bicycle facilities on gateway roads.

Although the majority of gateway roads only have two travel lanes, one in each direction, there are several areas where there are four lanes of travel, or additional turn lanes at intersections, as seen at Cambridge Street and Winn Street. The frequent curb cuts and wide roadway widths create an auto-oriented environment, and the current streetscape amenities may make traveling these roads by foot or by bicycle less comfortable and feel less safe.

Typical Dimensions & Characteristics:

Right-of-Way	50 ft. median width (63 ft. average) 26 ft. min 200 ft. max (Cambridge Street)
Typical Number of Travel Lanes	2 (one in each direction), up to 4 with turn lanes
Average width of Travel lanes	12 ft.
On-street parking	Typically no
Curb	75% of roads have at least one curb
Sidewalk Presence	52% with sidewalks 17% have sidewalks on both sides
Sidewalk Width	5 ft. average width 3 ft. min 6 ft. max
Streetscape Elements (grass buffer, street trees, decorative lighting)	Medians with occasional grass buffer, decorative street lighting
Speed Limit	35 MPH
Traffic Volume*	14,431

*Average annual daily traffic

Secondary Roads

Purpose and Function:

Secondary roads serve to connect residents from their homes to the town center, commercial areas, neighborhood destinations like parks and schools, and other residential neighborhoods. They are typically adjacent to residential land uses with an exception on the southern edge of town near the Burlington Mall commercial center and the Middlesex Turnpike, which have clusters of both commercial and industrial land uses. There are some secondary roads close to the Burlington Mall commercial center and the commercial and industrial areas near the Middlesex Turnpike that serve bus routes. Secondary roads are typically one lane in each direction with center striping and 15% of roads feature a sidewalk on one side. There are no bicycle facilities.



Secondary Road: Lexington Street

Typical Dimensions & Characteristics:

Right-of-Way	50 ft. median width (44 ft. average) 40 ft. min 50 ft. max
Typical Number of Travel Lanes	2 (one in each direction)
Average width of Travel lanes	13 ft.
On-street parking	Typically no
Curb	35% of roads have at least one curb
Sidewalk Presence	15% with sidewalks 0% have sidewalks on both sides
Sidewalk Width	5 ft. average width 4 ft. min 5 ft. max
Streetscape Elements (grass buffer, street trees, decorative lighting)	Some street lighting
Speed Limit	30 MPH*
Traffic Volume**	4,208

*Median speed limit from available data. Not enough data to confirm consistency across all roads.

**Average annual daily traffic

Neighborhood Roads

Purpose and Function:

Neighborhood roads represent the majority of Burlington roads. They serve the residential areas of the town and are typically two-way, unmarked roads with curbs on each side. Of the three street types, neighborhood roads have the narrowest right-of-way, lowest volume, and are more likely to have slower speeds. Although only 15% of these roads have sidewalks on at least one side, pedestrians may feel



Neighborhood Road: Garrity Road

comfortable walking on the street due to the lower volumes and slower vehicular speeds. For example, on street parking is likely to have a traffic calming effect as it reduces the usable roadway width and slows vehicular speeds. Currently neighborhood roads do not have public transit service or bicycle facilities.

Typical Dimensions & Characteristics:

Right-of-Way	40 ft. median width (41 ft. average) 40 ft. min 50 ft. max
Typical Number of Travel Lanes	2
Average width of Travel lanes	12.5 ft.
On-street parking	No marked parking, but residents use the shoulder/curb for occasional on-street parking
Curb	60% of roads have at least one curb
Sidewalk Presence	15% with sidewalks <1% have sidewalks on both sides
Sidewalk Width	4 ft. average width 3 ft. min 8 ft. max
Streetscape Elements (grass buffer, street trees, decorative lighting)	Occasional street lighting
Speed Limit	30 MPH*
Traffic Volume**	1,450

*Median speed limit from available data. Not enough data to confirm consistency across all roads.

**Average annual daily traffic

4. Road Type Style Guide

The Town of Burlington passed a Complete Streets policy in October 2018, and the recommended elements for each road type present an opportunity for implementing Complete Streets design features in accordance with the Town's goals identified in the Master Plan. Complete Streets are defined as streets for everyone, and to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

Complete Streets also encompasses elements that help with traffic calming. According to the US Department of Transportation, traffic calming can be defined as, "the combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming consists of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists."²

Complete Streets design features that could be implemented to help enhance walking, biking, and taking transit in Burlington include:

- Improved, accessible sidewalks with street trees and benches so people with limited mobility have shade along their route and places to stop and rest.
- Safer crossings with raised crosswalks or curb extensions connecting to local destinations.
- Well-marked bicycle lanes with horizontal or vertical separation from vehicular traffic to help all Burlington residents, regardless of age or ability, feel comfortable using a bicycle for short, local trips.

Higher traffic speeds are linked to a higher likelihood of a crash between someone driving and someone walking or biking causing a serious injury or fatality. Traffic calming measures can include narrowing or removing driving lanes, providing opportunities for on-street parking, improving accommodations for bicyclists along corridors, and improving visibility of pedestrian sidewalks and crossing locations.

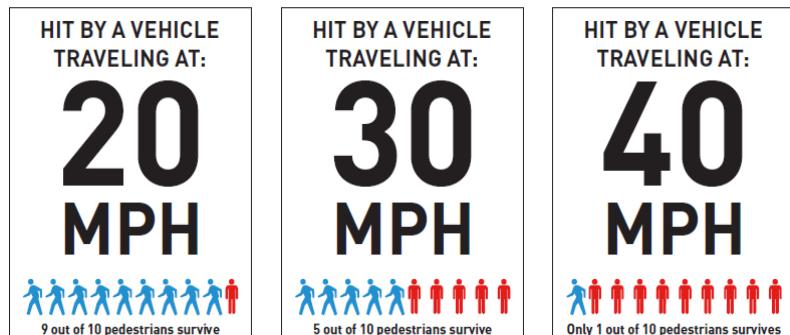


Image source: Seattle Department of Transportation

² "Traffic Calming to Slow Vehicle Speeds". U.S. Department of Transportation.

<https://www.transportation.gov/mission/health/Traffic-Calming-to-Slow-Vehicle-Speeds>

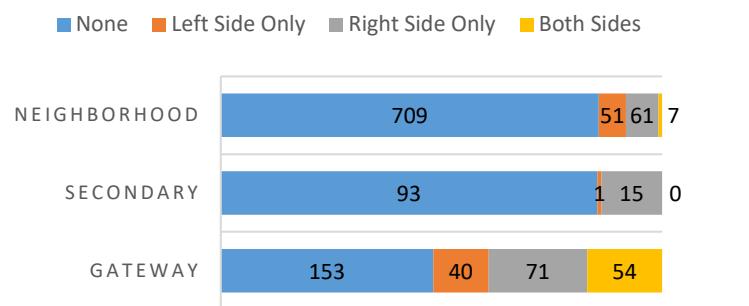
Based on information from the town and analyzed data sources, a limited number of sidewalk facilities are present on town roads. Gateway roads displayed the highest number of sidewalks present, with 52% of Gateway roads having at least one sidewalk. For both Secondary and Neighborhood roads, only 15% of roads audited for each type had any sidewalk (see Figure 2).³ This data is supported by town documents from Burlington's Sidewalk Committee which reported that a lack of sidewalk presence on roads has been raised by residents or at Planning Board and Master Planning Committee meetings on a variety of different projects.⁴

Additionally, a 2016 technical study conducted by the University of Florida and the Florida Department of Transportation Research Center found that the absence of sidewalks along roadway segments was one of the primary factors to having a significant impact on the expected number of pedestrian crashes at a specific location.⁵ Their analysis showed that the expectancy of a pedestrian crash along roadways with no sidewalk was three times greater than the expectancy of a crash with the presence of a sidewalk. The analysis also showed that the average population within a half mile radius was a significant factor in the likelihood of crashes occurring, which is of particular relevance to Burlington's secondary and neighborhood roads.

Given the collective data and public response, adding more sidewalks to Burlington's gateway and secondary roads should be considered a main priority. More specifically, Burlington's sidewalks should be thought of as an overall pedestrian network connecting residents from their homes to main destinations including the town center, commercial corridors, and schools and recreational areas. A more complete network of sidewalks could encourage residents to choose walking for short, local trips.

Based on the purpose and function of each road type, as well as the town's goals, recommended dimensional requirements have been determined for each road type. The recommendations take into account the minimum requirements specified in the 2010 Americans with Disability Acts (ADA) Standards for Accessible Design, and the recommended minimums from the MassDOT Project Development and Design Guide (PDDG), National Association of City Transportation Officials (NACTO), Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO) and the Massachusetts Bay Transportation Authority (MBTA). The recommended dimensions serve as general guidelines to provide the desired access and atmosphere on each type of road.

Figure 2: Sidewalk presence by road type within Town of Burlington. Data source: MassDOT Roads.



³ The right side of the sidewalk represents the side to the right of a driver traveling in the primary (NB/EB) direction of travel.

⁴ "Sidewalk Minutes, December 27, 2018", Town of Burlington. <http://www.burlington.org/Sidewalk%20Minutes%2012-27-2018.pdf>

⁵ "Assessment of sidewalk/bicycle-lane gaps with safety and developing statewide pedestrian crash rates", published May 31, 2016. Hosted by the National Transportation Library Repository & Open Science Access Portal.

<https://rosap.ntl.bts.gov/view/dot/30998>

Gateway Roads

Recommended Elements

Gateway roads have the largest traffic volumes of the three roadway types and serve popular destinations for residents, visitors, and employees of Burlington. Notable destinations include the commercial areas along Cambridge Street, near the Burlington Mall, and along Middlesex Turnpike. Gateway roads also serve nearby schools and senior housing facilities like Stonebridge at Burlington and Sunrise of Burlington, and major employment areas where workers may be interested in walking to nearby shops and restaurants during lunch or after work.

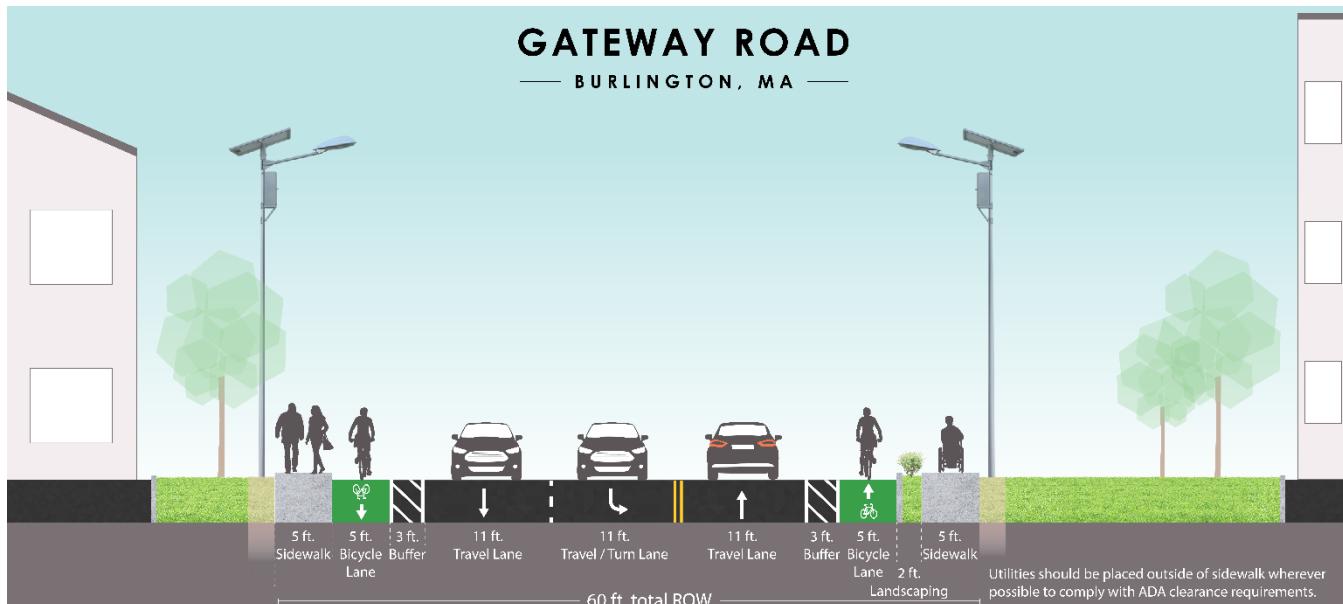


Burlington Mall Road with bus stop

For an ideal gateway road, the town should prioritize adding design elements that could make choosing walking, biking, and public transit safer and more convenient for reaching these destinations. Gateway roads are notable by their wide travel lanes and higher speeds, which encourage visiting destinations along these routes by car. This current dynamic, coupled with the general analysis conclusions outlined in the section above, makes providing streetscape amenities beyond a standard five-foot sidewalk crucial for creating an environment where people feel safe outside their cars.

In areas with a high concentration of destinations and pedestrian activity, priority should be given to wider sidewalks buffered from the street with landscaping and/or green infrastructure to provide a more pleasant walking experience. As the majority of bus routes run along gateway corridors, areas where sidewalks are wide enough to accommodate shelters, benches, and other amenities like trash and recycling receptacles at bus stops should be considered. Elements like curb extensions can also provide additional passenger waiting space at bus stops and shorten crossing distances, improving visibility of pedestrians and reducing the time they are exposed in an intersection on high-speed roads. Bicycle facilities should be considered along these roads to provide access to commercial and recreational areas, for both residents and employees. In locations with high speed traffic and multiple destinations, buffered or separated bicycle facilities could be considered to improve visibility. Adequate bicycle parking should also be prioritized next to popular destinations, and located as close as possible to a destination's main entrance. Bicycle facilities should also be prioritized in areas that link to nearby parks and regional off-road paths in the future, such as the Minuteman Bikeway and the Tri-Community Greenway.

In areas providing connections to schools and senior housing facilities, the town should consider additional traffic calming measures that promote the use of walking and public transit, as the people who use these facilities are more vulnerable to injuries from high-speed traffic. At these locations, pedestrian facilities such as curb extensions, raised crosswalks, refuge islands, and rapid flashing beacons could be considered to allow improved crossings for those on foot.



Recommended Dimensional Requirements:

Right-of-Way	50 ft. – 80 ft.
Number of Travel Lanes	2 (one in each direction, and occasional areas with additional travel and turning lanes)
Width of Travel lanes	11 ft. minimum 12 ft. preferred
On-street parking lane	7-9 ft. On-street parking can be provided where needed to support local businesses and town activity. On-street parking could replace the width of a travel lane and serve as a traffic calming measure.
Shoulder	0-4 ft. 4 ft. minimum to accommodate bikes Yes, in areas with additional right-of-way
Bicycle Facility	4 ft. minimum, 6 ft. preferred on-street bicycle lane 3 ft. buffer minimum in areas with additional right-of-way 6.5 ft. minimum with 3 ft. buffer for raised separated bicycle lane Yes; due to the higher traffic speeds present on these types of roads, a marked bicycle lane is recommended. When space and budget allow, a buffered bicycle

	lane is preferred, and ideally the lane would also be physically separated (ex., by flex posts, or at the sidewalk level.)
Sidewalk Presence	Both sides
Sidewalk Width	5 ft. minimum, with 9 ft. preferred where space is available
Streetscape Elements	In high pedestrian areas: grass buffer, green infrastructure, street trees for shade, decorative lighting
Traffic Calming Elements	In high pedestrian areas or areas with vulnerable populations: on-street parking, pedestrian refuge islands, pedestrian beacons, curb extensions

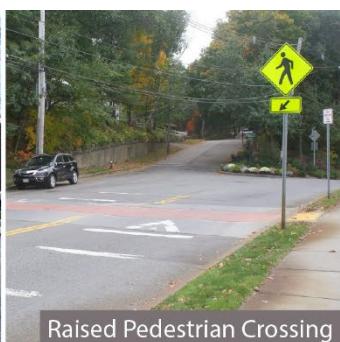
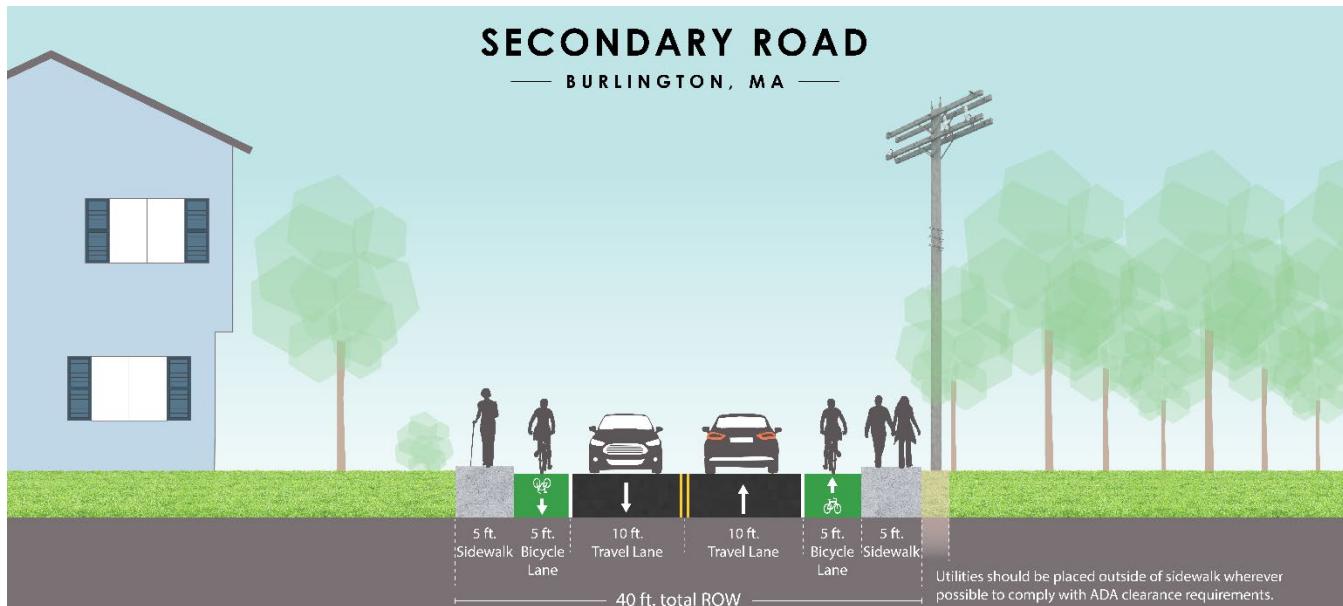
Secondary Roads

Recommended Elements

Secondary roads are a vital link between Burlington's residential neighborhoods and its schools, park. They are also the road type where residents voiced particular concern with safety while walking and biking. Secondary roads typically have one car lane in each direction and some feature a sidewalk, but more amenities are necessary to make people feel comfortable walking and bicycling as an alternative for short trips to local destinations.

Secondary roads are typically narrower and more winding than gateway roads which, despite their lower speeds, can create poor sight lines for vehicles as they approach someone on a bicycle or someone crossing the street. It is therefore important to provide specified bicycle lanes as well as enhanced pedestrian infrastructure. Options such as flexible posts provide physical separation for bicyclists, and can be removed over winter to allow for snow plows to access the entire right of way. Where flexible posts seem like a less feasible option, providing a simple striped buffer lane between bicycles and travel lanes or a green painted bicycle lane can provide distance and increase perceived comfort for all road users.

While many secondary roads presently feature sidewalks on one side of the road, it is recommended that sidewalks be included on both sides – especially in areas that directly connect residents to local destinations. A secondary road that provides access from a neighborhood to a commercial center may generate more pedestrian activity than other secondary roads, which makes attention to sidewalk presence, width and additional pedestrian amenities more important than segments along high speed connectors or those with very low pedestrian volumes. At places where pedestrians may wish to cross, facilities such as curb extensions, raised crosswalks, refuge islands, and rapid flashing beacons should be considered.



Recommended Dimensional Requirements:

Right-of-Way	40 ft. - 50 ft.
Number of Travel Lanes	2
Width of Travel lanes	11 ft. preferred 10.5 ft. minimum without shoulder, 10 ft. minimum with shoulder
On-street parking	No on-street parking
Shoulder	1-2 ft., required with 10 ft. travel lanes 4 ft. minimum to accommodate bicycles
Bicycle Facility	4 ft. minimum, 6 ft. preferred 3 ft. buffer On-street bicycle lanes, with marked buffer where space is available
Sidewalk Presence	Both sides are recommended where space is available. One side at minimum.
Sidewalk Width	5 ft. minimum, 8 ft. preferred where space is available Can be as low as 3 ft. at pinch points
Streetscape Elements	Lighting, street trees, grass buffer, green infrastructure and benches
Traffic Calming Elements	Raised pedestrian crossings, pedestrian beacons, curb extensions

Neighborhood Roads

Recommended Elements

Neighborhood roads provide the most opportunity for residents to enjoy walking and bicycling with family and friends. They typically have lower traffic volumes than gateway or secondary roads, which allows more space for roadway features that encourage outdoor play in addition to more comfortable walking and biking. The lowest width and lowest volume roads without sidewalks may provide opportunities for pedestrians to walk on the street. The 2011 AASHTO Policy on the Geometric Design of Highways and Streets cites that on roadways with 400 or fewer vehicles per day the road can safely be used as a shared space for walkers, bikers, and drivers; presently, the fewest calculated vehicles per day on a Burlington neighborhood road is 1,154. Additionally, the FHWA's Small Town and Rural Multimodal Networks guide illustrates several treatments for slow-speed, low-volume roads such as yield roadways, bicycle boulevards, and paved shoulders that can be used in place of a formal sidewalk network to provide safety for all modes with less infrastructure. These treatments are particularly recommended for areas with familiar users, such as residents.

On neighborhood roads with wider widths that might encourage higher speeds, including pedestrian infrastructure like sidewalks and curb extensions could lower vehicular speeds and provide residents with more opportunity to use their block as a neighborhood space. Most neighborhood roads allow enough space for bicycle lanes, but Burlington could also consider a moderate option such as bicycle sharrows and signage to notify road users that they are sharing the road with people on bicycles.

If a neighborhood road is immediately adjacent to a school or recreational destination, additional Complete Streets design elements are recommended to encourage local walking and biking trips. Sidewalks are encouraged on at least one side of the road in these areas to allow families with children to walk to school. It is especially important to include designated crossing points at intersections with other neighborhood and secondary roads so that residents are unhindered by high-stress crossings and are less inclined to cross the road mid-block. These crossings can include: curb extensions to narrow the roadway and encourage lower speeds; raised crosswalks so pedestrians, especially smaller children, are visible to drivers; and accessible curb cuts for residents pushing strollers or who have limited mobility. These roads also provide an opportunity to add green infrastructure and landscape elements such as street trees, bioswales and local shrubs. In areas near schools, native plants that feature tactile elements and support local animal habitats can enhance the local environment and engage children with their surroundings. Striped bicycle lanes could be considered on neighborhood roads that lead to local destinations, as opposed to sharrows which may suffice on lower volume roads.



Recommended Dimensional Requirements:

Right-of-Way	40 ft. – 50 ft.
Number of Travel Lanes	2
Width of Travel lanes	9 ft. minimum
On-street parking	7 – 9 ft. Parking on one or both sides; can be unmarked
Shoulder	0-4 ft. 4 ft. paved shoulder to accommodate pedestrians and bikers on low-volume, low-speed roads where other infrastructure not provided
Bicycle Facility	4 ft. minimum, 6 ft. preferred Striped bicycle lanes on roads with higher volumes or that lead to local destinations; sharrows on lower volume roads
Sidewalk Presence	At least one side on roads with higher volumes or that lead to local destinations; one side or no sidewalk on lower volume roads
Sidewalk Width	5 ft. minimum, 8 ft. preferred in areas that approach local destinations like schools or senior housing 3 ft. minimum at pinch points

Streetscape Elements (grass buffer, street trees, decorative lighting, curb extensions)	Street trees, grass buffer, local plants and shrubs that engage the senses and support local wildlife, benches
Traffic Calming Elements	Raised crosswalks, pedestrian crossing signage

5. Street Design Elements

There are many components to street design, as its intent is not just to facilitate access and mobility for all users, but generate a comfortable and desirable environment for all users. This section provides a menu of options that can contribute to the recommended typology of each street type in order to meet the town's goals. This approach allows for specific treatments to be selected based on site-specific needs at particular locations, such as additional seating on corridors serving senior housing or bicycle facilities that connect to recreational areas.

Design Element	Description	Dimensional Requirement
<i>Vehicles</i>		
Travel Lane	Road lane primarily for moving vehicular traffic.	9 – 12 ft. 11 ft. requirement for lanes with bus route
Parking Lane*	Road lane for parked vehicles.	7 – 9 ft.
Shoulder	Roadway pavement (marked or unmarked).	0 – 4 ft. 4 ft. to accommodate bikers
Curbside Bus Stop	Marked bus stop on sidewalk with no shelter.	4 ft. width minimum 40 ft. min at curb extension, up to 100 ft. mid-block ⁶
<i>Bicycle Facilities</i>		
Sharrows Lane (see p. 16)	Travel lane with stamped image of bicycle and chevrons to denote presence of bicycles.	9 – 12 ft.
On-Street Lane (no buffer) (see p. 14)	Striped lane with bicycle stamp to denote dedicated space for bicycles. May be treated with green painted markings.	4 - 6 ft.
On-Street Lane with marked buffer/plastic flexposts* (see p. 12)	Striped lane with bicycle stamp, with additional striped space that may feature vertical elements to provide physical separation from travel lanes.	5-7 ft. for bicycle lane, 3 ft. buffer
Raised Cycle Track with Concrete Buffer	Lane with bicycle stamp, raised and separated from travel lane by curb.	6.5 ft. lane with 3 ft. buffer

⁶ Refer to Table 4.1 of the MBTA Bus Stop Planning and Design Guide (2018) for bus stop lengths dependent on placement and configuration

On-street Bike Corral* (see p. 12)	Large-scale bicycle parking provided along the curb, typically in a parking lane.	One parking space
Pedestrian Facilities		
Accessible Sidewalk (see p. 14)	A sidewalk at least 5-feet wide with a smooth level surface void of obstructions.	5 ft. 2 ft. 6 in. allowed at pinch points
Sidewalk – width for two people walking side by side	A sidewalk wide enough for two people to walk side by side.	8 ft. minimum 10 ft. preferred
Crosswalk	A marked part of a road where pedestrians have right of way to cross.	8-10 ft.
Raised Crosswalk* (see p. 14)	A higher section of pavement with a marked crosswalk placed across the street to encourage drivers to slow down.	8-10 ft.
Pedestrian Refuge Island* (see p. 14)	A small section of pavement or sidewalk, completely surrounded by asphalt or other road materials, where pedestrians can stop before finishing crossing a road.	6-10 ft.
Curb Extension* (see p. 16)	An area where the curb is extended, physically narrowing the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees.	6 ft.
Rapid Flashing Beacon* (see p. 12)	Pedestrian-actuated signals typically used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks.	N/A
Landscaping, Green Infrastructure, & Street Furniture		
Vegetative Buffer with Native Plantings (see p. 16)	An area of land preserved for grass or other vegetation in the public right-of-way. These areas may be used for snow storage.	2 ft. minimum
Street Tree*	Any tree planted by or on behalf of a municipality in the public right-of-way.	2.5 ft. minimum, with 18 in. setback from curb face
Bioswale (see p. 16)	Vegetated, shallow landscape depression designed to capture and treat stormwater runoff.	18 in. wide minimum 3 – 15 ft. length
Street Furniture	Street furniture includes elements like seating, trash and recycling receptacles, bollards, and bicycle racks. It can be used to enhance pedestrian comfort by providing places to rest and a buffer from vehicular noise and congestion.	Variable. A 4-ft. wide clear path of travel on the sidewalk must be maintained. For benches a minimum 5 ft. and ideal 6 ft. clear path should be provided to account for people's legs ⁷

⁷ Additional ADA clearance widths for benches include 3 ft. on either side of the bench, 5 ft. from a fire hydrant, 1 ft. from any other amenity, utility, or fixture

Transit		
Landing area (on sidewalk)	The area where riders board and exit a bus at the front door.	8 ft. deep by 5 ft. wide
Shelter (see p. 12)	Covered open-air structure with at least 2 walls that provides protection from the elements.	Shelter width plus 5-6 ft. sidewalk to provide 4 ft. path of travel and clearances

*Elements that can be used to promote traffic calming

In addition to the street design elements identified above, additional consideration must be given to other essential street elements such as light poles, utilities, hydrants, traffic control devices, benches, bike racks, and parking meters. Attention must be paid to the location of above and below-grade utilities to allow adequate space for pedestrians, be aesthetically integrated into the landscape, and facilitate maintenance that is not disruptive. The layout of elements on the sidewalk in particular should take into account accessibility and functionality. For example, it is preferable to keep elements such as hand-holds, vaults, tree grates, and other utility access points outside of the pedestrian path of travel. If this is unavoidable, a level stable sidewalk surface should be maintained. The location of utility access points in the street should also be considered in relation to the placement of bicycle lanes. The town should work with utility companies and other providers to relocate sidewalk obstructions and eliminate double poles.

Practices that enable a more functional and accessible street include:

- Placing signage on poles or light posts to increase visibility and reduce clutter
- Locating hydrants to maximize curbside space for parking or loading needs
- Locating traffic control devices outside of curb ramps
- Orienting traffic control devices and signage to maximize visibility for the anticipated user
- Ensuring a minimum 4 ft. path of travel on sidewalks clear of obstacles such as utility poles, sign posts, and signal control boxes

Maintenance needs should also be considered. This includes locating utilities to maximize accessibility for maintenance and considering access for snow clearance and locations for snow storage. Meeting the needs for accessibility, functionality, and maintenance for street elements requires coordination and collaboration between town departments. Comprehensive street design guidelines can outline a consistent set of priorities and practices that may then be implemented across departments.

6. Next Steps

Burlington's history in streetscape design has been focused on automobile travel; however the town has increasingly recognized walkability as a pivotal component to both livability and environmental sustainability. As a result, creating streets designed for all modes of travel, particularly walking, has been a discussion at recent Town Meetings, with many residents advocating for additional funding for sidewalks and pedestrian safety improvements.

The streetscape tools represented in this document help support the town's Master Plan recommendation to develop street design guidelines that create a more efficient street network and provide facilities that make walking and biking comfortable alternatives. It is envisioned that this document provides a basis for integrating streetscape improvements throughout Burlington, especially in areas that help connect residents to local destinations. The town has expressed a commitment to continue to inventory and prioritize improvements, starting with areas of high pedestrian density, such as the Town Center, around schools, and dense commercial areas. The town's focus is on creating comfortable, safe and interesting areas that promote walkability to these key destinations.

This document is the first step in standardizing the tools to revitalize Burlington's roadway network to accommodate all users. To continue in this direction, the town understands that a comprehensive street design guide is the next step. A comprehensive guide will build on the foundation of street hierarchy characteristics, surrounding environments, and recommended multimodal tools to identify more context specific approaches throughout Burlington. A comprehensive guide will expand on the following items, also essential to creating inviting, multimodal streetscapes:

- Street lighting
- Accessibility including pedestrian signals and ramps
- Street furniture and pedestrian amenities
- Street trees and plantings
- Utility requirements
- Access management
- Wayfinding

As the Town moves forward, additional research and analysis should be undertaken on the principles presented both in this document and in the above list as an interim step to the creation of a comprehensive street design guide. This will help the Town of Burlington continue to design, fund and develop policy around the enhancement of public streetscapes.

Referenced Guidelines:

MassDOT Project Development and Design Guide (2006)

AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (2011)

AASHTO Guide for the Development of Bicycle Facilities (2012)

NACTO Urban Street Design Guide (2013)

NACTO Urban Bikeway Design Guide (2014)

MBTA Bus Stop Design Guidelines (2018)

NACTO Transit Street Design Guide (2016)

Boston Complete Streets Design Guidelines (2013)

FHWA Small Town and Rural Multimodal Networks (2016)