



PARKING AND TRAFFIC SAFETY COMMITTEE

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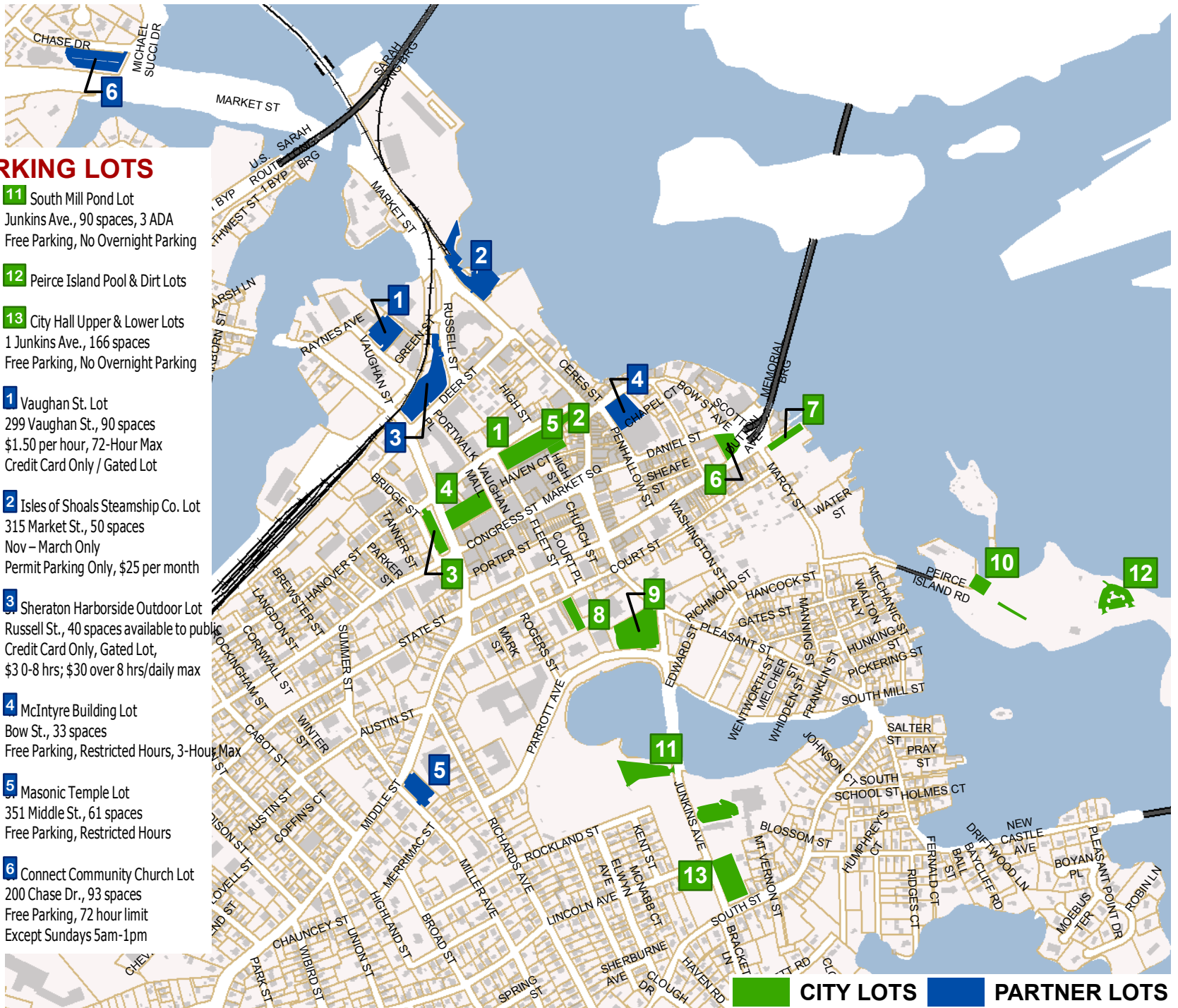
CITY ORDINANCES ARE AVAILABLE ONLINE:

<https://www.cityofportsmouth.com/cityclerk/city-ordinances>



PORTSMOUTH PARKING LOTS

- 1** Hanover Garage
37 Hanover St., 900 spaces, 18 ADA
\$1.50 per hour; \$30 daily max
- 2** Market Hanover Lot
Hanover St., 11 spaces, 1 ADA
\$2 per hour, 3-Hour Max, Pay & Display
- 3** Bridge Street Lot
Bridge St., 63 spaces, 3 ADA
\$1.50 per hour, 4-Hour Max, Pay & Display
- 4** Worth Lot
Maplewood Ave., 87 spaces, 5 ADA
\$1.50 per hour, 3-Hour Max, Pay & Display
- 5** Ladd St. Lot
Ladd St., 12 spaces, 1 ADA
\$1.50 per hour, 3-Hour Max, Pay & Display
- 6** Memorial Bridge Lot
Daniel St., 38 spaces, 2 ADA
\$1.50 per hour, 4-Hour Max, Pay & Display
- 7** Prescott Park Lot
Off State St., 10 spaces, 5 ADA
Free Parking, Two-Hour Max
- 8** Court St. Parking Area
170 Court St., 13 spaces
\$1.50 per hour, 4-Hour Max, Pay & Display
- 9** Parrott Ave. Lot
Parrott Ave., 186 spaces, 4 ADA
Free Parking, 72-Hour Limit
- 10** Four Tree Island Parking Area
Peirce Island Road
Free Parking, No Overnight Parking
- 11** South Mill Pond Lot
Junkins Ave., 90 spaces, 3 ADA
Free Parking, No Overnight Parking
- 12** Peirce Island Pool & Dirt Lots
- 13** City Hall Upper & Lower Lots
1 Junkins Ave., 166 spaces
Free Parking, No Overnight Parking
- 1** Vaughan St. Lot
299 Vaughan St., 90 spaces
\$1.50 per hour, 72-Hour Max
Credit Card Only / Gated Lot
- 2** Isles of Shoals Steamship Co. Lot
315 Market St., 50 spaces
Nov – March Only
Permit Parking Only, \$25 per month
- 3** Sheraton Harborside Outdoor Lot
Russell St., 40 spaces available to public
Credit Card Only, Gated Lot,
\$3 0-8 hrs; \$30 over 8 hrs/daily max
- 4** McIntyre Building Lot
Bow St., 33 spaces
Free Parking, Restricted Hours, 3-Hour Max
- 5** Masonic Temple Lot
351 Middle St., 61 spaces
Free Parking, Restricted Hours
- 6** Connect Community Church Lot
200 Chase Dr., 93 spaces
Free Parking, 72 hour limit
Except Sundays 5am-1pm



FOR MORE DETAILED PARKING INFORMATION VISIT PARKPORTSMOUTH.COM

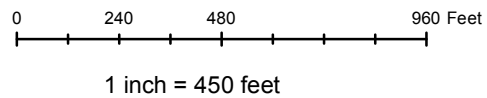
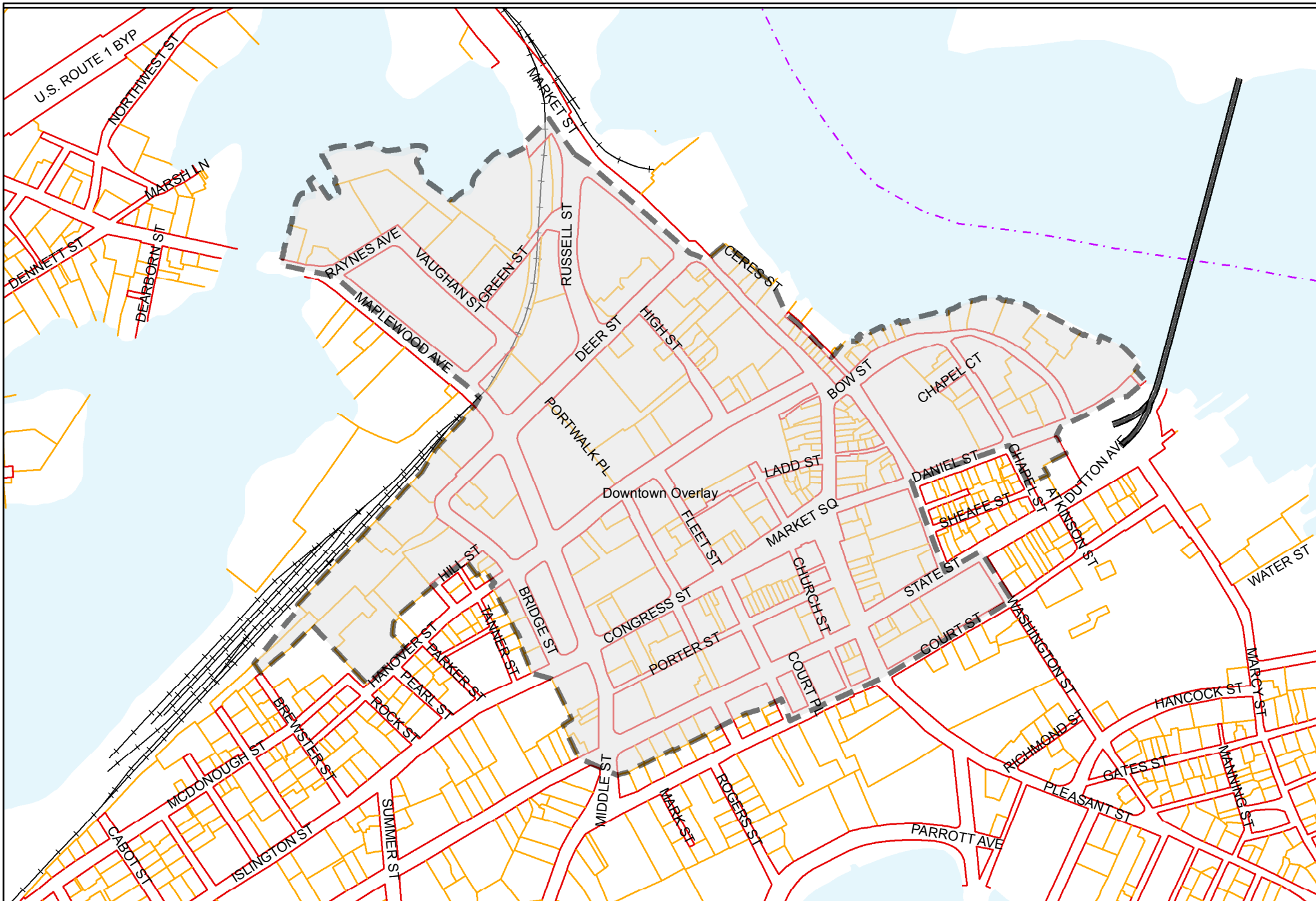


**CITY OF PORTSMOUTH
DOWNTOWN HIGH OCCUPANCY METER ZONE**

Legend

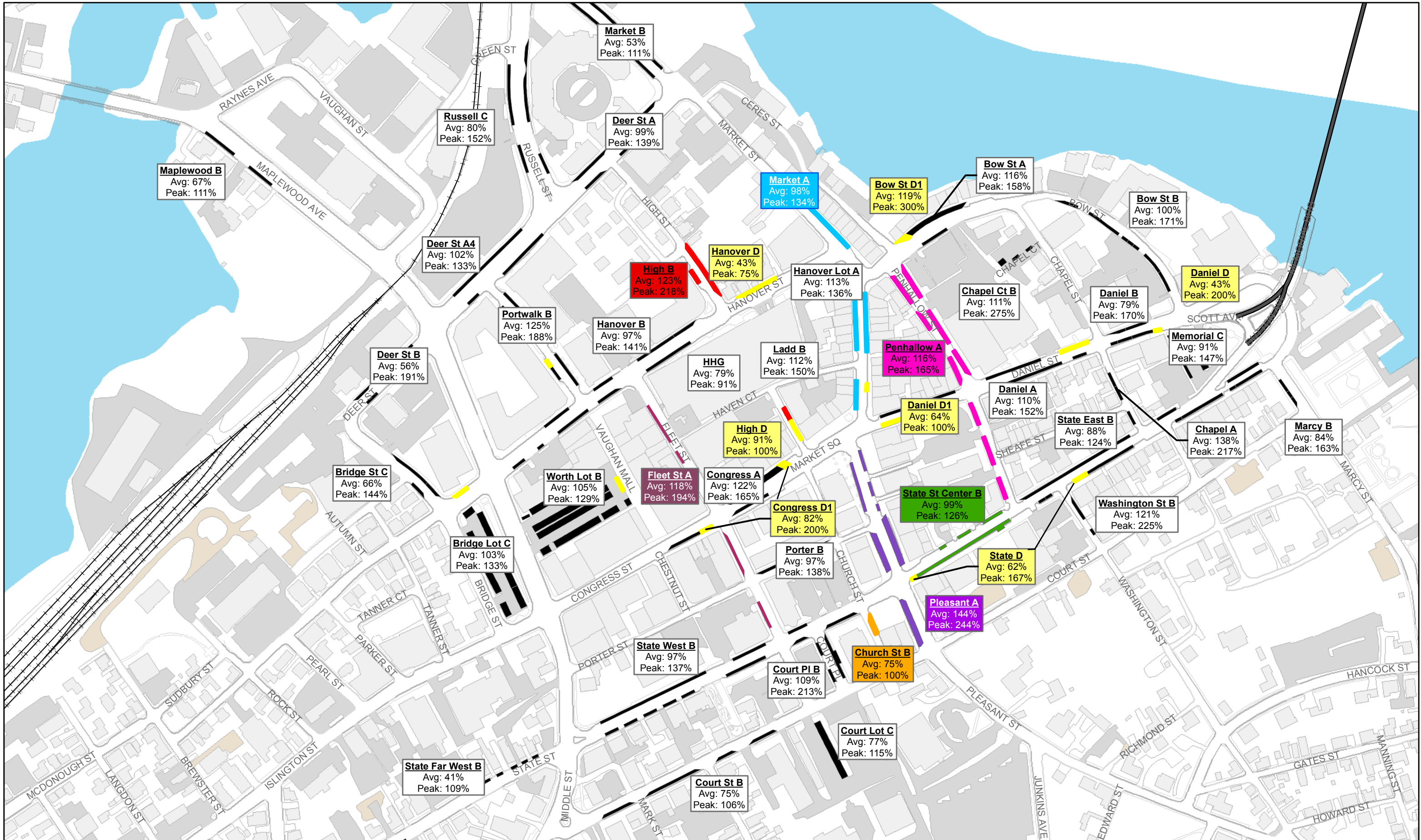
High Occupancy Meter Zone





Downtown Overlay District



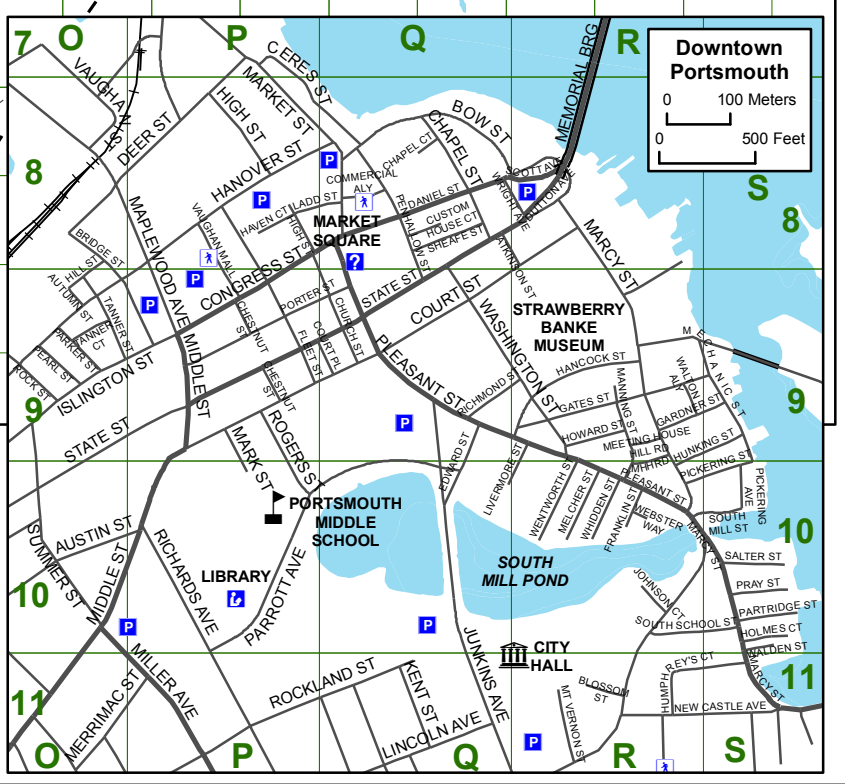
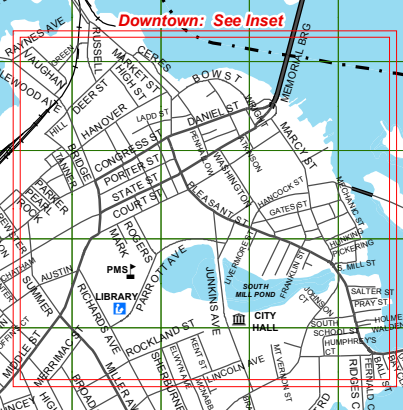
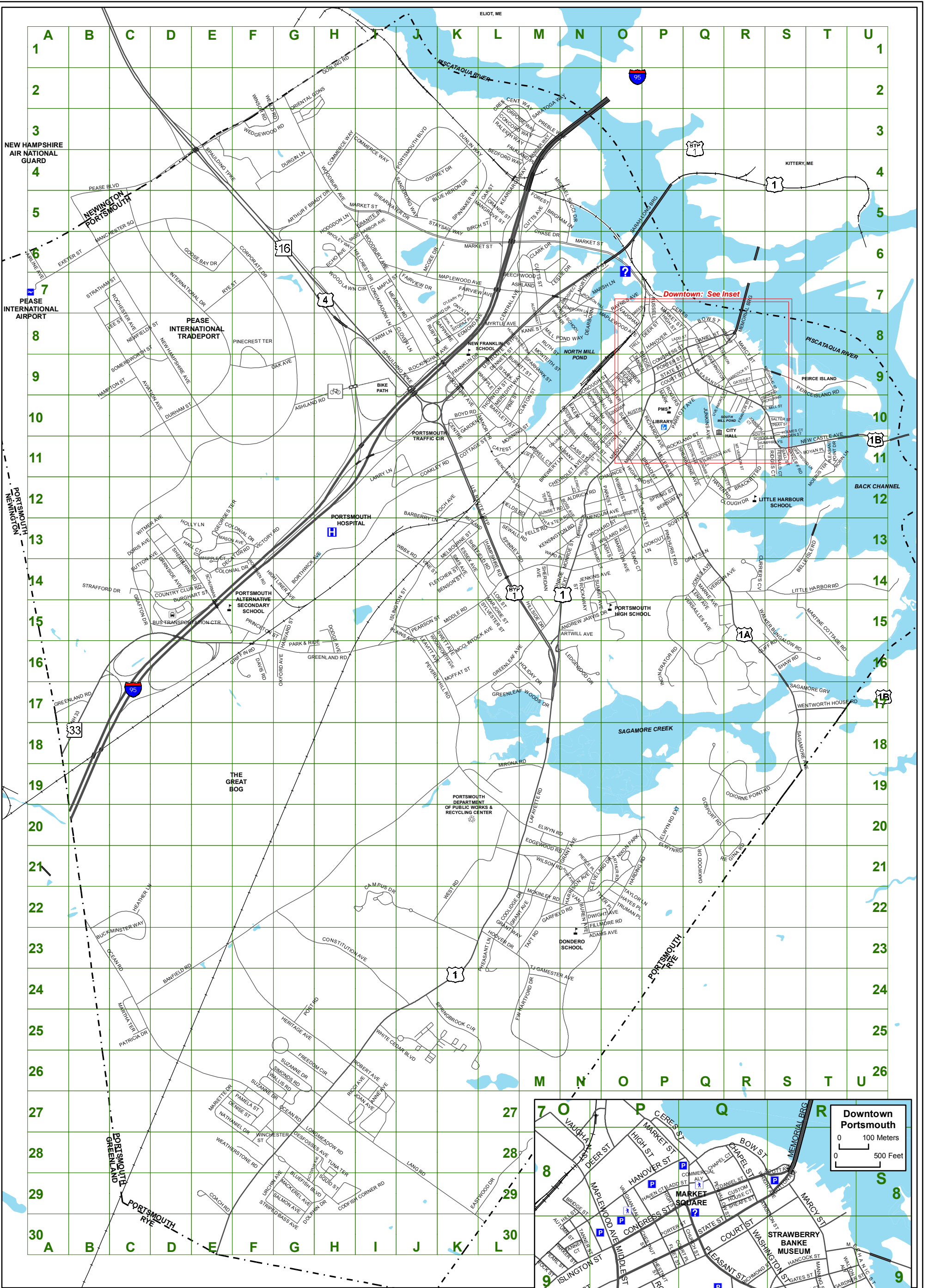


On-Street Parking Utilization Data
Data Compiled by Portsmouth Parking Division

Map prepared by Portsmouth Department of Public Works
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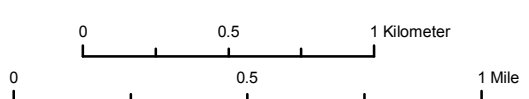
Average Occupancy Rate
For Seven Hour Period (12PM to 7PM)
 Thursday, June 2, 2016, Saturday, June 4, 2016,
 Thursday, October 13, 2016, Saturday, October 29, 2016 ,

1 inch = 240 feet



Portsmouth Street Map

City of Portsmouth, New Hampshire, USA
www.cityofportsmouth.com



This map shows both public and private streets. Inclusion of a street on this map does not indicate acceptance by the City of Portsmouth.
 Map by Portsmouth Department of Public Works, 08 May 2014

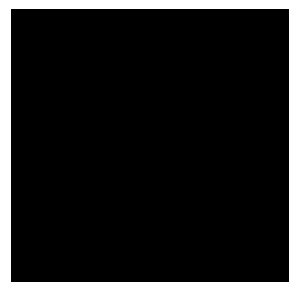
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WIBIRD ST: O11-13
WILLARD AVE: N13, O13
WILLOW LN: O12, P12
WILSON RD: L21, M21, N21
WINCHESTER ST: F27-28, G27-28
WINSOR RD: F3
WINTER ST: O10
WITMER AVE: C13, D13
WOODBURY AVE: G2-4, H4-5, I5-7, J7-9, K9-10, L10
WOODLAWN CIR: H6-7, I7
WOODWORTH AVE: J15, K15-16
WORTHEN RD: F14
WRIGHT AVE: Q8, R8

Portsmouth Street Map



City of Portsmouth, New Hampshire

CITY OF PORTSMOUTH
CITY COUNCIL POLICY No. 2013 – 01

COMPLETE STREETS POLICY

WHEREAS, an objective of the City of Portsmouth’s 2005 Master Plan is to “ensure that all transportation projects in Portsmouth provide for full consideration of all modes (automobile, truck, bicycle, pedestrian, transit) in their design, as appropriate;” and

WHEREAS, the City Council recognizes that in support of this objective it will be beneficial to provide guidance to City Boards, Committees and Departments as to project planning, design standards, implementation and monitoring;

NOW THEREFORE, the City Council adopts the following policy:

I. VISION

Streets and roadways in the City of Portsmouth will be convenient, safe and accessible for all transportation users, including pedestrians, bicyclists, transit vehicles and riders, children, the elderly, and people with disabilities.

II. CORE COMMITMENT

Definition

“Complete Streets” means streets that are designed and operated to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across as street.

All Users and Modes

The City of Portsmouth will plan for, design, construct, operate and maintain appropriate facilities for pedestrians, bicyclists, transit vehicles and riders, children, the elderly, and people with disabilities in all new construction and retrofit or reconstruction projects subject to the exceptions contained herein.

Planning

The City will incorporate Complete Streets principles into the City’s Master Plan, area plans, transportation plans, the Zoning Ordinance and Site Plan Review Regulations, standards and specifications documents, and other plans, manuals, rules, regulations and programs as appropriate. Implementation of projects supported by adopted plans shall be a priority under this policy.

Projects and Phases

The City of Portsmouth will approach every transportation improvement and project phase as an opportunity to create safer, more accessible streets for all users. These phases include, but are

not limited to: planning, programming, design, right-of-way acquisition, construction engineering, construction, reconstruction, operation and maintenance.

Complete Streets principles will be applied on all new City projects and privately funded developments, and incrementally on existing streets through a series of small improvements and activities over time.

Maximum financial flexibility is important to implement Complete Streets principles. All sources of transportation funding, public and private, should be drawn upon to implement Complete Streets within the City of Portsmouth.

It is understood that maintenance activities do not necessarily trigger requirements for major street improvements and should not be expected to do so. However, maintenance activities do present some opportunities that can improve the environment for other roadway users.

Exceptions

Complete Streets principles will be applied in all street construction, retrofit, and reconstruction projects except in unusual or extraordinary circumstances contained below. Even under the conditions outlined below, a project's impact will be evaluated for the effect it would have on the usefulness of the street for all users, now and in the future, and the ability to implement other adopted plans in the future.

- 1 Where pedestrians and bicyclists are prohibited by law from using the facility.
In this case, alternative facilities and accommodations shall be provided within the same transportation corridor, and the ability to reasonably and conveniently cross the facility will be part of the facility design and construction.
- 2 Where existing right-of-way does not allow for the accommodation of all users.
In this case alternatives shall be explored such as obtaining additional right-of-way, use of revised travel lane configurations, paved shoulders, signage, traffic calming, education or enforcement to accommodate pedestrians, cyclists, transit vehicles and riders and persons with disabilities.
- 3 Where the cost of establishing walkways or bikeways or other accommodations would be disproportionate to the need, particularly if alternative facilities are available within a reasonable walking and/or bicycling distance.
- 4 Where application of Complete Streets principles is unnecessary or inappropriate because it would be contrary to public safety and increase risk of injury or death.
- 5 Where the construction is not practically feasible or cost effective because of unreasonable adverse impacts on the environment or on neighboring land uses, including impact from right-of-way acquisition.
- 6 Ordinary maintenance activities designed to keep street and other transportation assets in serviceable condition or when interim measures are implemented on temporary detour or haul routes. However, all temporary detours shall comply with temporary traffic control requirements of the Manual of Uniform Traffic Control Devices.

- 7 Ordinary public works or utility maintenance activities, including, but not limited to: water, sewer and storm sewer main repairs; installation of new or removal of existing water or sewer service lines, installation or repair of fire hydrants, installation or repair of private utility fixtures.

Exclusive of exceptions 6 and 7 above, any determination that a project that will not meet Complete Streets principles based on the above exceptions will have said determination reviewed and confirmed by City Council.

III. BEST PRACTICES

Design Guidance and Flexibility

The City shall follow accepted or adopted design standards and use the best and latest design standards available, including:

- American Association of State Highway and Transportation Officials (AASHTO)
 - *Guide for the Development of Bicycle Facilities* (4th Edition, 2012)
 - *Guide for the Planning, Design and Operations of Pedestrian Facilities* (2004)
- American Planning Association (APA)
 - *Complete Streets: Best Policy and Implementation Practices* (2010)
- American Planning Association (APA) & American Society of Civil Engineers (ASCE)
 - *U.S. Traffic Calming Manual* (2009)
- Federal Highway Administration (FHWA)
 - Manual of Uniform Traffic Control Devices (MUTCD)
 - PEDSAFE: Pedestrian Safety Guide and Countermeasures Selection System
- Institution of Transportation Engineers (ITE)
 - *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* (2010)
 - *Neighborhood Street Design Guidelines* (2010)
- National Association of City Transportation Officials (NACTO)
 - *Urban Bikeway Design Guide* (2nd Edition, 2012)
 - *Urban Street Design Guide* (2013)
- U.S. Architectural and Transportation Barriers Compliance Board (the Access Board)
 - *Accessible Rights-of-Way: A Design Guide*
- Active Transportation Alliance
 - *Complete Streets Complete Networks: A Manual for the Design of Active Transportation*

Context Sensitivity

The implementation of this Policy shall reflect the context and character of the surrounding built and natural environments, and enhance the appearance of such.

Performance Measures

Complete Streets should be continuously evaluated for success and opportunities for improvement. This policy encourages the regular evaluation and reporting of progress through the following performance measures:

- User data – bike, pedestrian, transit and traffic
- Crash data

- Use of new projects by mode
- Compliments and complaints
- Linear feet of pedestrian accommodations built
- Number of ADA accommodations built
- Miles of bike lanes/trails built or striped
- Number of transit accessibility accommodations built
- Number of street trees planted
- Number of exemptions from this policy approved

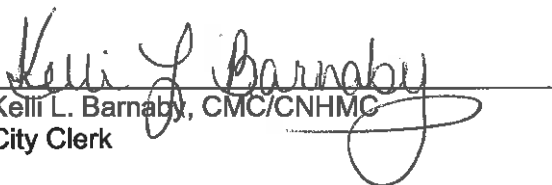
IV. IMPLEMENTATION

The City views Complete Streets as integral to everyday transportation decision-making practices and processes. To this end:

1. The Planning Department, Department of Public Works, and other relevant departments, agencies or committees shall incorporate Complete Streets principles into the City's Master Plan, the Pedestrian and Bicycle Master Plans, and other appropriate plans, and other manuals, checklists, decision trees, rules, regulations, and programs as appropriate.
2. The Planning Department and Department of Public Works shall review current design standards, including subdivision and site plan review regulations, to ensure that they reflect the best available design guidelines, and effectively implement Complete Streets.
3. When available, the City shall encourage staff professional development and training on non-motorized transportation issues through attending conferences, classes, seminars, and workshops.
4. City staff shall identify current and potential future sources of funding for street improvements and recommend improvements to the project selection criteria to support Complete Streets projects.
5. The City shall promote project coordination among City departments and agencies with an interest in the activities that occur within the public right-of-way in order to better use fiscal resources.
6. The Planning Department shall make an annual report to the City Council showing progress made in implementing this policy.

This policy shall take effect upon the passage by the City Council.

Adopted by the Portsmouth City Council on: October 7, 2013.


Kelli L. Barnaby, CMC/CNHMC
City Clerk

CITY OF PORTSMOUTH
CITY COUNCIL POLICY No. 01-2017

COMPLETE STREET DEMONSTRATION PROJECT POLICY

WHEREAS, a core commitment of the City's Complete Street Policy is to incorporate Complete Street principles into the City's Master Plan, area plans, transportation plans, the Zoning Ordinance and Site Plan Review Regulations, standards and specifications documents, and other plans, manuals, rules, regulations and programs as appropriate.

WHEREAS, City staff have been working with the Parking & Traffic Safety Committee to develop a Neighborhood Traffic Calming Program that provides a process and guidance for considering and implementing a variety of traffic calming measures in response to neighborhood concerns and requests.

WHEREAS, the City Council recognizes that it will be beneficial to enable non-municipal groups and organizations, hereby known as Project Sponsors, to undertake demonstration projects in public rights-of-way;

NOW THEREFORE, the City Council adopts the following policy:

I. DEFINITIONS

Demonstration Project

A demonstration project is a short-term street or sidewalk design project that is designed in accordance with the City's Complete Street Policy and/or Walk and Bicycle Friendly Community Policies.

Project Sponsor

A project sponsor is the entity applying for permission to implement a demonstration project. A project sponsor may be an individual, group, or business entity that has the ability to satisfy the requirements included herein.

II. SITE REQUIREMENTS, CLEARANCE AND ACCESS

- (1) Demonstration projects may only be located in the public right-of-way on roads under City jurisdiction.
- (2) Project shall be located on a road with a speed limit that is 30 MPH or less.
- (3) Projects shall be designed to minimize interference with access to and service of public utilities, utility covers, valves, building standpipes, fire hydrants, and other services and operations located within or accessed from the public right-of-way.
- (4) Projects should not block or limit driveway access, unless the driveway owner specifically permits use of their driveway for the demonstration. Such permission must be illustrated by a letter of support.
- (5) Demonstration Projects shall maintain or improve the existing level of accessibility to individuals with disabilities per the Americans with Disabilities Act Accessibility Guidelines (ADAAG).

(6) Demonstration projects shall not be located in proximity to ongoing construction projects within the public right-of-way.

(7) No street or public right-of-way shall be blocked for project installation unless specifically allowed by the Portsmouth Department of Public Works (DPW).

III. FUNDING

(1) The Project Sponsor shall be responsible for all related project materials and elements. In some scenarios, the City of Portsmouth may provide funding or in-kind support to benefit the project, but financial support from the City is not guaranteed or required.

IV. COMMUNITY SUPPORT

(1) Demonstration projects must demonstrate community support from property owners/businesses in the impacted area adjacent to the project site. Support must be demonstrated through individual letters or petition.

(2) The Project Sponsor must provide individual letter(s) of support from any property owners/businesses whose property access will be impacted by the demonstration.

V. PERMITTING AND NOTIFICATION

(1) Initial Project Request: Project Sponsor shall submit initial project request at least 3 months from the desired implementation date. DPW will review the proposal and confirm compliance with applicable laws/regulations. DPW will also review to determine that the Demonstration Project will have minimal impact on access to and service of public utilities, utility covers, valves, building standpipes, fire hydrants, and other services and operations located within or accessed from the public right-of-way. Once receiving initial approval from the DPW, the Project Sponsor shall revise materials in response to DPW feedback and submit a demonstration project application.

(2) Project Application: The Project Sponsor shall submit a complete permit application to DPW a minimum of 2 months before desired implementation date. If DPW determines the application to be complete, the Public Works Director shall review the application and make a recommendation for approval or denial to the City Manager.

(3) Project Approval: Once receiving a recommendation, the City Manager may grant or deny the project permit or refer the application to the City Council. At any time during the project application and approval process, the project may be referred to the Parking & Traffic Safety Committee for input.

(4) Upon receiving permit approval, the Project Sponsor shall notify all households and businesses within 300' of the proposed project location at least 7 days before the planned installation date, via a flyer or letter.

(5) Any temporary changes to on-street parking will be subject to review and approval by the Department of Public Works Parking Division.

(6) The Project Sponsor shall post a project information sign at the project site for the duration of the project. The sign shall be reviewed and approved by DPW.

VI. STEWARDSHIP

(1) The Project Sponsor shall comply with all applicable traffic laws or other relevant city or state laws or ordinances. DPW will identify any concerns related to compliance with applicable laws and ordinances when reviewing the Project Sponsor's initial project request.

(2) The Project Sponsor shall designate a primary contact person who can be reached by the City 24/7 for the duration of the project in case of emergencies or unexpected issues/concerns. This person must be available for a site inspection once the project has been installed, and must be willing and able to troubleshoot should adjustments be necessary.

(3) The Project Sponsor is responsible for any property damage that occurs as a direct result of the demonstration project.

(4) The Project Sponsor is required to submit a certificate of insurance that meets city insurance requirements and that names the city as certificate holder as well as an additional insured for the duration of the event. In cases where the City is a co-sponsor of the proposed project, the City may waive the insurance requirement.

(5) The Project Sponsor shall remove all elements/features of the Demonstration Project and restore the project site to its original conditions by the end of the permit period. If the Project Sponsor fails to remove the project and its various elements within the agreed time frame, the City will do so at the expense of the Project Sponsor, and Partner may be considered ineligible to lead future Demonstration Projects. If an emergency situation requires the City to remove or damage parts of the project before the end of the permit period, the City will not be held liable for damages to the project elements.

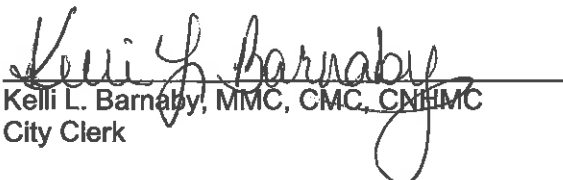
(6) The Project Sponsor shall communicate with affected neighbors and attempt to resolve any concerns that may arise during the project's duration. The Project Sponsor shall notify DPW about any concerns raised during the project's duration.

(7) The Demonstration Project permit shall be revocable by the Public Works Director if the project no longer meets the intent of the approved Demonstration Project proposal.

(8) All Project Sponsors shall collect data and monitor use of the demonstration project using methods approved by DPW in advance of the project's implementation. A report, including a summary of the data collected, the raw data collected, and an evaluation of the effectiveness of the project, shall be provided to the DPW at the conclusion of the project.

This policy shall take effect upon the passage by the City Council.

Adopted by the Portsmouth City Council on: May 1, 2017


Kelli L. Barnaby, MMC, CMC, CNEIMC
City Clerk

CITY OF PORTSMOUTH

CITY COUNCIL POLICY No. 2013 – 02

BICYCLE FRIENDLY COMMUNITY POLICY

WHEREAS, a goal of the City of Portsmouth’s 2005 Master Plan is to “provide for safe and convenient bicycle and pedestrian circulation throughout the City;” and

WHEREAS, in support of that goal, an objective of the Master Plan is to “incorporate and formalize bicycle/pedestrian needs into city transportation planning, policies and ordinances;” and

WHEREAS, the City Council recognizes that increasing bicycle use can:

- Improve the environment by reducing the impact on residents of pollution and noise, limiting greenhouse gases, and improving the quality of public spaces.
- Reduce traffic congestion by shifting short trips out of single occupancy motor vehicles. This will also make our City more accessible for public transport, walking, essential car travel, emergency services, and deliveries.
- Save lives by creating safer conditions for bicyclists and as a direct consequence improve the safety of all other road users.
- Increase opportunities for residents of all ages to participate socially and economically in the community, regardless of income or ability.
- Boost the economy by creating a community that is an attractive destination for residents, tourists and businesses.
- Enhance recreational opportunities, especially for children, and further contribute to the quality of life in the community.
- Improve the health and well being of the population by promoting routine physical activity.

NOW THEREFORE, the City Council adopts the following policy:

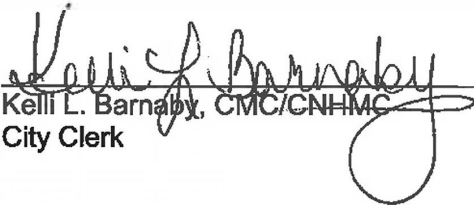
Accommodating bicycles and improving safe bicycle travel shall be integrated into municipal decision-making, practices and processes in order to:

1. Provide safe and convenient bicycle access to all parts of the community through a network of on-and off-street facilities, low-speed streets, and secure parking.
2. Establish information programs to promote bicycling for all purposes and to communicate the many benefits of bicycling to residents and businesses.

3. Make the City a model employer by encouraging bicycle use among its employees.
4. Ensure all city policies, plans, codes, and programs are updated and implemented to take advantage of every opportunity to create a more bicycle-friendly community.
5. Educate all road users to share the road and interact safely.
6. Enforce traffic laws to improve the safety and comfort of all road users, with a particular focus on behaviors and attitudes that cause motor vehicle/bicycle crashes.
7. Promote intermodal travel between public transport and bicycles.

This policy shall take effect upon the passage by the City Council.

Adopted by the Portsmouth City Council on: October 7, 2013.


Kelli L. Barnaby, CMC/CNHMC
City Clerk

CITY OF PORTSMOUTH

CITY COUNCIL POLICY No. 2013 – 03

WALK FRIENDLY COMMUNITY POLICY

WHEREAS, the City Council recognizes the benefits of walking as a key element of a healthy, efficient, socially inclusive and sustainable community, and

WHEREAS, all people should be able to walk safely and to enjoy high quality public spaces in the City of Portsmouth anywhere and at anytime; and

WHEREAS, the City Council is committed to reducing the physical, social and institutional barriers that limit walking activity;

NOW THEREFORE, the City Council adopts the following policy:

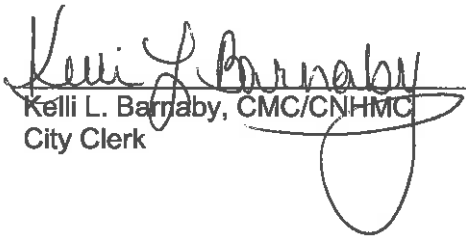
Municipal decision-making, practices and processes shall be carried out in order to further the following objectives:

- Provide clean, well-lit sidewalks free from obstruction, and with sufficient opportunities to cross roads safely and directly;
- Ensure seating is provided in outdoor public spaces in quantities and locations that meet the needs of all users;
- Provide protection for pedestrians from weather and climate elements with landscaping and facilities as appropriate (for example shade or shelter);
- Provide coherent and consistent information and signage systems to support exploration and discovery on foot;
- Build and maintain high-quality networks of connected, functional and safe walking routes between residential areas and local destinations;
- Provide an integrated, extensive and well-equipped public transportation service with vehicles which are fully accessible to all potential users and public transport stops and interchanges with easy, safe and convenient pedestrian access and supportive information;
- Encourage a pedestrian-friendly driving culture with targeted campaigns and enforcement of road traffic laws;
- Maintain reduced motor vehicle traffic speeds in residential areas, shopping areas, around schools, and in other areas with a high frequency of pedestrian traffic;

- Reduce the impact of busy roads by installing sufficient safe crossing points, ensuring minimal waiting times and enough time to cross for the slowest pedestrians;
- Ensure that facilities designed for cyclists and other non-motorized modes do not compromise pedestrian safety or convenience;
- Involve all relevant agencies at all levels to recognize the importance of supporting and encouraging walking and to encourage complementary policies and actions;
- Actively encourage all members of the community to walk whenever and wherever they can as a part of their daily lives.

This policy shall take effect upon the passage by the City Council.

Adopted by the Portsmouth City Council on: October 7, 2013.


Kelli L. Barraby, CMC/CNHMC
City Clerk

BLUE RIBBON COMMITTEE ON TRANSPORTATION POLICY

REPORT TO THE CITY COUNCIL



Blue Ribbon Committee on Transportation Policy

Kenneth E. Smith, City Council, Chair

Brad Lown, City Council

Paige Roberts, Planning Board

Eric Gregg, Economic Development Commission

Cliff Sinnott, Rockingham Planning Commission

Bill Lyons, Transportation Professional

Rick Chellman, Transportation Professional

April 10, 2013

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BACKGROUND AND COMMITTEE CHARGE

The Blue Ribbon Committee on Transportation Policy was re-established by Mayor Spear in August 2012 with a sunset date of April 15, 2013. At that time, the Committee was charged to develop policies, principles and positions for the City's approach to transportation, including but not limited to:

- Public transportation options
- Access for bicycle and pedestrian travel
- Parking availability and access
- Control/management of traffic
- Travel routes through the City
- "Complete Streets" / Sustainable Design

The committee was comprised of the following members: Councilor Ken Smith (Chair), Councilor Brad Lown, Bill Lyons, Rick Chellman, Paige Roberts, Cliff Sinnott and Eric Gregg.

The Committee held its first meeting in September 2012 and met monthly through April 2013.

KEY TOPICS DISCUSSED

Over the course of six meetings, the Committee heard presentations from staff and others on the following topics, and discussed how these topics might be included in transportation policies for the City of Portsmouth:

- Transportation policies and strategies contained in the 2005 Master Plan, and considerations for the 2015 Master Plan (in progress)
- "Complete Streets" policies
- Planning for bicyclists and pedestrians
- Sustainable transportation
- Street classifications and design standards
- "Green Streets" and Low Impact Development (LID)
- Traffic calming
- The interaction between land use policies and transportation
- Public transportation
- Regional coordination in transportation planning and funding

The following sections summarize the information presented and discussed, and identify the related policy recommendations presented later in this report.

MASTER PLAN TRANSPORTATION POLICIES AND STRATEGIES¹

Under NH state law, the Planning Board is required to prepare and periodically amend and update a Master Plan – a set of goals, objectives and strategies that together guide development in the City. The City updates its Master Plan every 10 years, and the Planning Board and City Council adopted the last Master Plan update in 2005. In February 2013 the Planning Department began the process of developing the next update, which will be under way for the next two years. The City’s Master Planning process begins with the completion of an Existing Conditions and Trends report that compiles current available data on the topics covered in the Master Plan; presents growth projections; and identifies key issues that the City should address in the coming decade. The Master Plan then presents a Vision statement, Goals and Objectives, and an Implementation Program. The Plan is organized around topical areas that include: Land Use, Housing, Economic Development, Transportation, Community Facilities and Services, Natural Resources and Open Space, Natural Hazards and Emergency Management, Recreation, and Cultural and Historic Resources. As with the rest of the Master Plan, the Transportation goals, objectives, and strategies overlap with other topical areas. The Master Plan demonstrates how transportation systems both shape and are shaped by the City’s historical and future growth and development.

Transportation priorities identified in the 2005 Plan focused on increasing walkability, providing a range of transportation options, and resolving parking issues. Transportation-related policies and strategies addressed four key areas: infrastructure, regulations and standards, public transit, bicycle and pedestrian systems, and parking.

The Committee reviewed the 2005 Master Plan Implementation Program, which included 56 transportation-related strategies, and discussed the status or progress made on each strategy. The Committee discussed how the Committee’s recommendations can support and inform the Master Plan update. The Committee also considered whether priorities have shifted since 2005 and discussed the benefits of providing performance measures or other indicators to gauge whether a strategy has been successfully implemented.

Many of the topics covered in subsequent meetings of the Committee were included in the 2005 Master Plan recommendations.

Related Recommendations (see Committee Recommendations section)

1. Integrate transportation goals into land use planning and management by updating the Master Plan, which will include an update of transportation data and baseline information and a revision of transportation goals, objectives, and strategies.
8. Track progress and measure effectiveness of strategies to support transportation goals.

¹ Appendix C: Item 1

COMPLETE STREETS²

Complete Streets are streets that are safe, comfortable, and convenient for travel for everyone – motorists, pedestrians, bicyclists, and public transportation riders. They incorporate safe and accessible pathways. They are designed to be context appropriate.

The transportation-related objectives in the 2005 Master Plan included a Complete Streets statement, and the Planning Board’s site plan review regulations were revised in January 2012 to incorporate a Complete Streets policy statement.

The Committee discussed Complete Streets concepts and principles and considered the relationship to other transportation policies, such as improving bicycle and pedestrian accommodations, calming traffic, implementing street design standards, and supporting sustainability.

The Committee reviewed a Complete Streets Policy drafted by the Planning Department for the City. In adopting this policy, the City would commit to following nationally recognized street design standards and reference best practices in street management.

Related Recommendation (see Committee Recommendations section)

2. Support creation of Complete Streets through adoption of a Complete Streets Policy.

BICYCLE/PEDESTRIAN PLANNING³

In addition to the Master Plan, bicycle and pedestrian recommendations are included in the City’s Safe Routes to School Action Plan (2010), which focuses on strategies to encourage students in grades K through 8 to walk or bicycle to school. Bicycle and pedestrian planning is also supported in the Transportation Vision report produced by Sustainable Portsmouth in 2011.

The Committee considered the benefits of completing a Bicycle/Pedestrian Master Plan which would:

- Take a comprehensive inventory of all of the City’s bicycle and pedestrian accommodations;
- Evaluate how well the City is serving bicyclist and pedestrian needs;
- Prioritize and schedule improvements on a system-wide basis.

A Bicycle/Pedestrian Master Plan can help to guide capital investments and identify additional funding options. The Plan would be a tool for coordinating city-wide projects, policies, and programs related to active transportation. This Plan would also provide a way for the City to evaluate and measure progress towards improving bicycle/pedestrian amenities.

Related Recommendation (see Committee Recommendations section)

3. Improve the City’s walkability and bikability and expand bicycling and pedestrian infrastructure connections throughout the City and the region by creating a bicycle/pedestrian master plan, ongoing participation in Safe Routes to School programs, Bicycle Friendly and Walk Friendly Community Designations.

² Appendix C: Item 2

³ Appendix C: Item 3

SUSTAINABLE TRANSPORTATION⁴

The grassroots Sustainable Portsmouth group has produced a five-year plan that outlines strategies to help the City achieve sustainability goals (balancing economy, environment, and equity) by supporting sustainable transportation policies and positions. The plan acknowledges that achieving sustainable transportation requires partnerships with the public sector that plans and invests in transportation as well as private sector businesses either operating transportation or directly involved in transportation. The plan envisions a future where public transit, walking, and biking play significant roles in the Portsmouth's transportation system.

Sustainable transportation was also the focus of the report, *Bridging Our Communities*, which was produced as an outcome of the Regional Transportation Dialogue in 2012 organized by Portsmouth Listens and Sustainable Portsmouth.

Adopting a system-based approach to transportation is a way to incorporate sustainable principles into transportation planning and management. A systems-approach envisions individual transportation components as part of a regional, inter-connected, and balanced system that includes facilities for driving, public transit, walking, biking, and parking.

The Committee discussed the use of indicators and baseline measurements presented in the plans as a means of gauging whether or not specific actions are effective and have the desired impact. The Committee also discussed the importance of regional collaboration to achieve shared transportation goals.

Related Recommendations (see Committee Recommendations section)

2. Support creation of Complete Streets that are designed to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a street.
3. Improve the City's walkability and bikability and expand bicycling and pedestrian infrastructure connections throughout the City and the region.
5. Improve the efficiency, convenience, and affordability of regional public transportation facilities and services.
7. Provide sufficient parking to support a balanced multi-modal transportation system.
8. Track progress and measure effectiveness of strategies to support transportation goals.

STREET CLASSIFICATIONS AND DESIGN STANDARDS⁵

Functional street classification systems use a hierarchy based on vehicle movement and property access. These systems are used to design roads that support different speeds, volumes, and types of traffic. Roads are classified as urban or rural first and then by whether they are a collector, arterial, or local. In addition, arterials are classified as minor or principal arterials. Arterial roads are those with highest speeds, longer trips and accommodate the greatest number of trips and all types of motorized vehicles. Collector roads provide a balance between access and mobility – speeds are a little slower, trips are a little shorter, and there are a moderate number of access points (side roads or driveways). Local streets provide easy access to individual properties (high number of access points) and generally have slow speeds and shorter travel distances.

⁴ Appendix C: Items 4-6

⁵ Appendix C: Item 7

In conventional classification systems, the functional street classes are used to recommend values for lane width, posted speeds, geometric design, and intersection design.

Currently, the City does not have a city-specific functional classification for its streets, other than what is defined by the New Hampshire Department of Transportation using the conventional (federal) system of classifying roads as arterials, collectors and local streets. As an example, Woodbury Avenue is classified as a minor arterial. Woodbury Avenue is interconnected with and provides access to principal arterials.

Within the local street network there is great variety of design due to historical development patterns. The Portsmouth Subdivision Regulations provide minimum standards for new streets based on land uses (residential, commercial, industrial).

The Committee discussed some of the shortcomings of the current street standards:

- Apply only to new streets;
- Provide no guidance for retrofits of existing streets and related improvements (e.g. street trees, street furniture, traffic controls, bike and pedestrian facilities);
- May not reflect current related City practices such as the Public Works Department's roadway and sidewalk construction design standards and the City Council's policy related to sidewalk materials.

“Complete Streets” standards add additional criteria beyond the traditional classifications, considering the character of the street and street frontage, accommodations for all types of users (both vehicular and non-vehicular), in addition to adjacent land uses and traffic volumes (see section on Traffic Calming below).

Various cities including Charlotte, San Francisco, Seattle and New York City, have adopted their own local street design standards. Some of the standards give guidelines on movement, context and land use. Others stress right-of-way improvements and travel-way guidance.

The Committee discussed the benefits of providing street design standards that are appropriate to the local context and that incorporate traffic calming (see section on Traffic Calming below).

Related Recommendations (see Committee Recommendations section)

2. Support creation of Complete Streets that are designed to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a street.
4. Provide context-sensitive guidance on street design and management including development of a local street classification system and updating of street design standards.

GREEN STREETS⁶

“Green Streets” is an approach to street design that serves environmental sustainability goals. It often refers to Low Impact Design (LID) techniques which address drainage and stormwater runoff issues.

Optimal stormwater management looks beyond simply removing rainfall as quickly as possible (which risks negative environmental impacts associated with both stormwater quality and quantity). Instead it focuses on efforts to retain and treat – or even eliminate – runoff at the source through cost-effective green infrastructure.

Sustainable features of Green Street design include reducing the amount of pavement by narrowing the road width or incorporating pervious surfaces, maximizing pavement reflectivity, incorporating landscaping that helps treat stormwater at the source, accommodating low-emission travel modes.

The Committee discussed recent and existing development projects and recent street improvement projects in the City that have incorporated low impact design techniques and that this can also have the added benefit of reducing infrastructure costs in some cases.

Related Recommendation (see Committee Recommendations section)

4. Provide context-sensitive guidance on design of streets that consider environmental impacts and include standards for landscaping and managing stormwater quality and quantity.

TRAFFIC CALMING⁷

As defined by the Institute of Transportation Engineers, “traffic calming” involves implementing physical measures to control traffic speeds or volumes. It does not include non-structural measures such as speed limits, enforcement, and driver education.

Different types of traffic calming address volume control and speed control. Volume control is primarily related to restricting access such as with full street or partial (or one-way) closures, by constructing median barriers or forced-turn islands that prevent traffic from certain movements when approaching an intersection. Speed control may involve vertical deflection (e.g. speed humps), textured pavements, and horizontal deflection (e.g. roundabouts), and road or lane narrowing.

The Committee discussed the advantages and disadvantages of these different types of controls for pedestrians and bicyclists and the added challenges for street maintenance that some of these measures present. The Committee also considered the benefits of using these types of controls as opposed to relying on stricter traffic enforcement. The Committee also discussed the possibility of converting existing one-way streets in certain areas of the downtown and whether that had potential to improve circulation and calm traffic.

⁶ Appendix C: Item 8

⁷ Appendix C: Item 9

Related Recommendations (see Committee Recommendations section)

2. Support creation of Complete Streets that are designed to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a street.
4. Provide context-sensitive guidance on street design and management including development of a local street classification system and updating of street design standards.

LAND USE POLICIES⁸

Areas where land use and transportation interact include the road network and the area along the roadway. The adjacent land uses will influence the type of vehicle and non-vehicle travel and the design of the roadway. The manner and degree of pedestrian accommodations will be influenced by the types of adjacent land uses and the dimensional characteristics of the built environment. The manner and degree to which bicycle are accommodated are influenced by the type and capacity of the road network. The location and routing of public transit is influenced by the context of the land uses and populations they are intended to serve.

The Committee discussed how land use policies can influence which transportation modes people choose. For example, the proximity of employment centers to transportation networks will influence mode choice and demand. The design and siting of buildings can determine how pedestrians and/or bikes are accommodated. Parking requirements can influence how buildings are sited and where different types of land uses are located. In addition, the committee discussed how parking supply and demand is impacted by land uses and can also be a factor in transportation mode choices.

Related Recommendation (see Committee Recommendations section)

1. Integrate transportation goals into land use planning and management.
7. Provide sufficient parking in the downtown to support a balanced multi-modal transportation system.

TRANSPORTATION DATA / INDICATORS⁹

Transportation data includes information on transportation mode choices, traffic counts, accident locations, and planned infrastructure improvements. This data comes from a variety of local, state, and federal agencies as well as private sources.

The Committee discussed the challenges of gathering reliable and up-to-date data regarding transportation mode choices and preferences. Tracking data on a consistent and regular basis is important for determining the impact of transportation policies and projects.

Related Recommendation (see Committee Recommendations section)

8. Track progress and measure effectiveness of strategies to support transportation goals.

⁸ Appendix C: Item 10

⁹ Appendix C: Item 11

PUBLIC TRANSPORTATION¹⁰

Public transportation available in Portsmouth consists primarily of bus service. Bus routes include COAST and Wildcat regional fixed routes, COAST's seasonal downtown service, intercity service from C&J Trailways and Greyhound, senior/paratransit transportation provided by COAST, and a City partnership with the Mark Wentworth Home.

COAST (Cooperative Alliance for Seacoast Transportation) was established and incorporated as a non-profit in 1981 and was established as an independent public agency by the NH legislature in 1985. COAST is overseen by a Board of Directors that includes representatives from the City of Portsmouth and other communities in the service region. COAST services are funded through federal and local public funds as well as through farebox and advertising revenues.

Fixed-route service in Portsmouth includes COAST's regional Routes 2 and 7, COAST's local "trolley" service (Routes 40/41), and Wildcat Transit's regional Route 4. COAST Route 2 provides service between Portsmouth and Rochester and has an annual ridership of 169,000. COAST Route 7 provides service between the Portsmouth Transportation Center, the Fox Run Mall and Greenland, Newmarket, Stratham, and Exeter and has an annual ridership of about 9,000. COAST Routes 40 and 41 operate within Portsmouth city limits and provide service between the downtown, Pease Tradeport, and along Lafayette Road, with a combined annual ridership of about 121,900.

COAST recently started a pilot project (the Clipper Connection) that provides express service for the commuter population heading to and from the Portsmouth Naval Shipyard and the businesses of Pease Tradeport. These routes operate only during morning and afternoon peak hours.

Paratransit (ADA) services provided by COAST include a reduced fare on fixed routes as well as reservation-based service for eligible riders within $\frac{3}{4}$ a mile of a fixed bus route.

Senior transportation is provided through a City partnership with the Mark Wentworth Home. The service is reservation based and operates 4 days a week.

Wildcat Transit's Route 4 connects from downtown Portsmouth to UNH and is free for students and faculty.

The communities served by COAST provide a local annual funding contribution that helps to support the fixed route and paratransit services. Each community's share of local funding is calculated using a blended average of four factors: population residing within one-half mile of bus routes, employment within one-half mile of bus routes, weekly service miles provided within the community, and number of riders boarding within the community.

In addition to the local match for the regional fixed route and paratransit services, Portsmouth also shares the costs for the Downtown Trolley (which operates in the summer months) as well as the Vintage Christmas Trolley (which operates during the month of December). The cost of Routes 40 and 41 are shared between the City and the Pease Development Authority.

¹⁰ Appendix C: Item 12

The Portsmouth Transportation Center is owned by the NHDOT and operated by C&J Trailways. COAST buses stop at this location as well. Greyhound provides intercity service out of downtown Portsmouth with a stop at the High Hanover Parking Garage.

The Committee discussed the rising costs of public transportation as well as the opportunities for increasing revenues and ridership. It is important for the City and regional transportation providers to continue to collaborate to provide multi-modal transportation alternatives. The Committee also considered how public transportation facilities are integral components of a sustainable transportation system, which also includes parking, bicycle lanes and paths, pedestrian areas, rail, as well as bridges and roads.

Related Recommendations (see Committee Recommendations section)

- | |
|---|
| <ol style="list-style-type: none">5. Provide efficient, convenient, affordable, and accessible local and regional public transportation facilities and services.6. Provide leadership for regional collaboration to improve connections between local and regional transportation systems. |
|---|

REGIONAL COORDINATION¹¹

Regional transportation infrastructure includes the federal and state highway systems, rail, and airports. Within Portsmouth at present, active rail is exclusively used for freight and there are no immediate plans to add passenger rail service. Amtrak provides passenger service out of Dover and Exeter, and C&J Trailways buses provide connections from Portsmouth to those locations. Passenger airlines do not currently operate out of Portsmouth, although the Pease Airport terminal is equipped for passenger service.

Portsmouth is part of an Urbanized Area (UZA) as defined by the Census Bureau following the conclusion of each decennial census. UZAs are Census-designated areas consisting of a central core and adjacent densely settled territory that together contain at least 50,000 residents. Within UZAs, transportation projects that utilize federal funding are coordinated through a “metropolitan transportation planning” process that involves participation from the community level to the state level to determine transportation priorities. Designated Metropolitan Planning Organizations (MPOs) carry out the metropolitan planning process. The Portsmouth region’s designated MPO is the Rockingham Planning Commission. Key elements of the region’s metropolitan planning process include development of a Long Range Transportation Plan (LRTP), updating of a Unified Planning Work Program (UPWP), implementation of the Transportation Improvement Program (TIP), planning for congestion management, monitoring of air quality, and Travel Demand Modeling.

The criteria currently used by the MPO to evaluate regional transportation priorities consist of:

- | | |
|-------------------------------------|--------------------------------|
| Project Feasibility & Readiness | Mobility (multimodal) |
| Accessibility (multimodal) | Congestion |
| Safety | Preservation of Infrastructure |
| Land Use/Transportation Integration | |

¹¹ Appendix C: Item 13

The Committee discussed the importance for ongoing regional collaboration as well as the challenges presented by decreasing state and federal funding for transportation infrastructure.

Related Recommendation (see Committee Recommendations section)

- | |
|--|
| 6. Provide leadership for regional collaboration to improve connections between local and regional transportation systems. |
|--|

COMMITTEE RECOMMENDATIONS

GOALS

- Provide a transportation network that is safe and accessible for all people and all transportation modes.
- Design transportation infrastructure that supports economic vitality and is sensitive to community and environmental context.
- Provide affordable and convenient options for all transportation modes.

GUIDING PRINCIPLES AND STRATEGIES

1. Integrate transportation goals into land use planning and management.

Strategies

- Incorporate the recommendations of this report into city-wide land use planning in order to maximize the opportunities presented by redevelopment to achieve the City's transportation goals
- Update the Master Plan to address the recommendations of this report:
 - Update transportation data and baseline information to address issues identified in this report.
 - Revise transportation goals, objectives, and strategies to reflect relevant recommendations of this report.
- Revise site plan review and subdivision regulations to implement relevant recommendations of this report including improvements to access management, connectivity and circulation.

2. Support creation of Complete Streets that are designed to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a street.

Strategies

- Adopt a Complete Streets policy (see recommended resolution in Appendix A, item 1).
- Ensure that the design of transportation projects on public streets within the City, including those funded and managed by NHDOT and private parties as well as by the City, are consistent with the Complete Streets policy.
- Consider designation of key transportation corridors leading into the downtown in which to focus investments in pedestrian, bicycle, and transit components.
- Evaluate the feasibility, potential benefits, and cost implications of converting one-way streets in the downtown core to two-way traffic.

3. Improve the City's walkability and bikability and expand bicycling and pedestrian infrastructure connections throughout the City and the region.

Strategies

- Develop a city-wide bicycle and pedestrian plan:
 - Identify bicycle and pedestrian needs and deficiencies;

- Identify and prioritize bicycle and pedestrian facility improvements, including sidewalks, crosswalks, on-road bike lanes, shared use paths and bicycle parking;
 - Develop standards and guidelines for bicycle and pedestrian facilities, including bicycle parking;
 - Develop standards for bicycle signage on roadways, such as Share the Road;
 - Estimate implementation costs and identify funding sources, responsibilities and phasing.
- Pursue designation as a Bicycle Friendly Community
 - Adopt a Bicycle Friendly Communities Action Plan (see Appendix A, item 2).
 - Submit application for Bicycle Friendly Communities Designation in 2014.
 - Pursue designation as a Walk Friendly Community
 - Adopt a Walk Friendly Communities Action Plan (see Appendix A, item 3).
 - Submit application for Walk Friendly Communities designation in 2014.
 - Continue active participation in Safe Routes to School Program to encourage and facilitate students to walk or bike to and from school.
 - Work with Rockingham Planning Commission / Metropolitan Planning Organization to develop appropriate connections between bicycle routes in the City and regional bicycle and recreational trail routes, including the New Hampshire Seacoast Greenway and future Hampton Branch rail-to-trail.
4. Provide context-sensitive guidance on design of streets that considers abutting land uses, neighborhood character, and environmental impacts.

Strategies

- Develop a local classification system for City streets.
 - Develop design standards for each street class including street and travel lane widths, accommodations for bicycles and transit, sidewalks, intersections and landscaping.
 - Continue to develop and implement innovative standards for managing stormwater quality and quantity.
5. Provide efficient, convenient, and affordable regional public transportation facilities and services.

Strategies

- Work with public transit providers to eliminate service redundancies and increase efficiencies, increase public transit ridership, and improve public transit infrastructure.
- Continue ongoing collaboration with COAST including exploring opportunities for new services.
- Work with COAST to ensure acceptable access to and from transit stops and the adjacent sidewalk networks for passengers that are mobility impaired.

6. Provide leadership for regional collaboration to improve connections between local and regional transportation systems.

Strategies

- Continue active representation and participation in Rockingham Planning Commission metropolitan transportation planning process including priority-setting for State and Federal investments in the regional transportation system.
- Continue active representation and participation in inter-community and inter-state transportation projects.
- Provide opportunities to inform and engage community members in planning for regional transportation projects.

7. Provide sufficient parking in the downtown area to support a balanced multi-modal transportation system.

Strategies

- Ensure that development and redevelopment projects implemented in the Central Business District are consistent with the City Council's Guiding Principles for Parking in the CBD (see Appendix A, item 4).
- Identify opportunities for building and/or expanding public parking structures in the downtown core.

8. Track progress and measure effectiveness of strategies to support transportation goals.

Strategies

- Work with regional and state partners including Rockingham Planning Commission, Seacoast Commuter Options Transportation Management Association, NHDOT, COAST and Commute Green NH to collect and analysis data on transportation choices and practices.
- Develop a set of indicators related to transportation initiatives to measure success.

GUIDING PARKING PRINCIPLES FOR CENTRAL BUSINESS DISTRICTS

(Approved by the Portsmouth City Council on March 19, 2012)

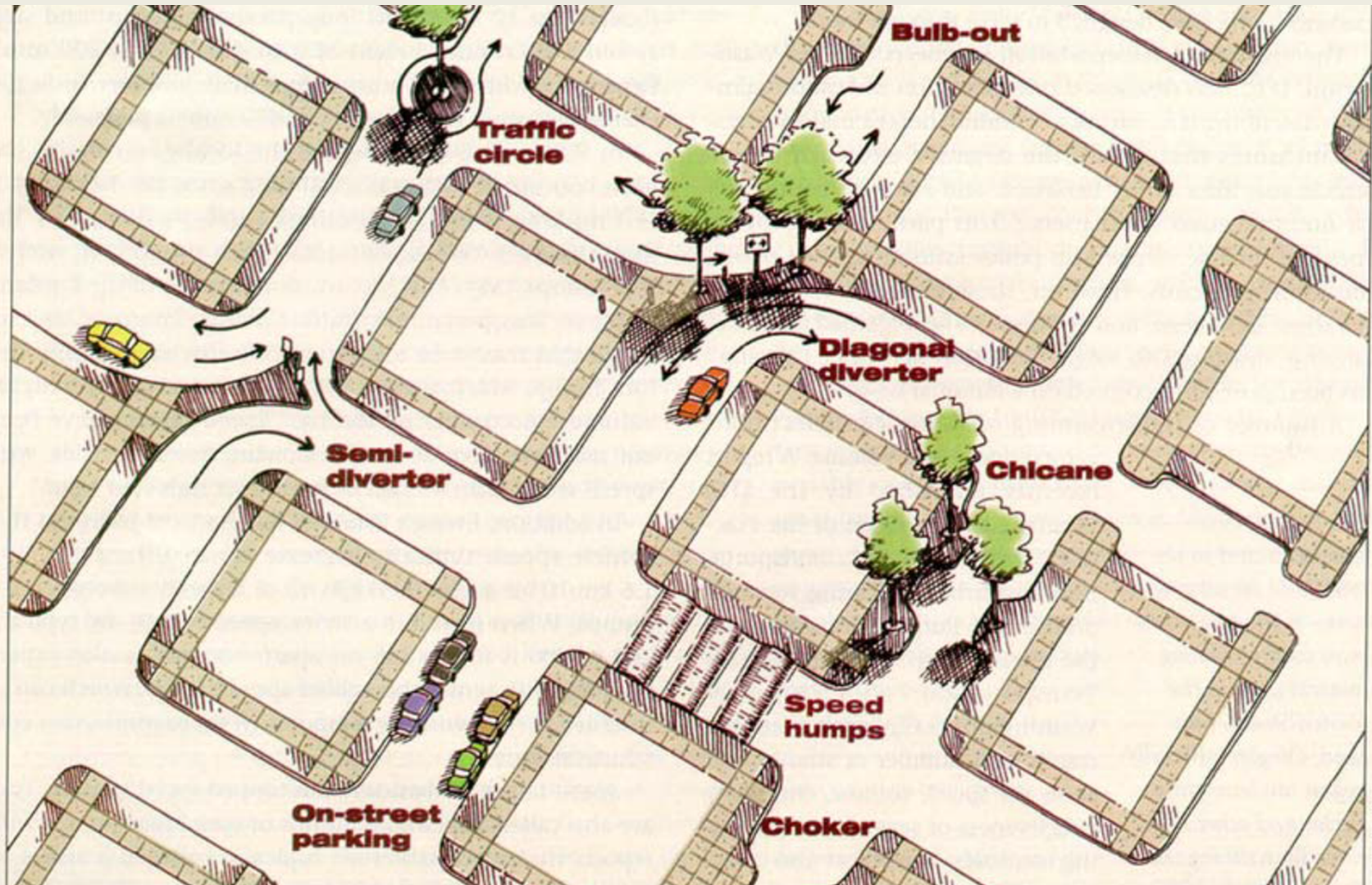
Overall Principles: A balanced mix of retail/restaurant, office, and residential uses is key to downtown vitality.

A downtown parking supply that is convenient, viable and central to downtown destinations is key to the short-term and long-term health of the City's retail, restaurant and office economy.

1. Insuring an adequate supply of parking for retail/restaurant and office users in the downtown is primarily a City responsibility.
2. Parking for new downtown residential development is primarily a private responsibility with residents wanting convenient parking right where they live.
3. We need to plan for future reuse, redevelopment and full occupancy of buildings in the Central Business Districts. If it is too difficult, expensive or unpleasant to find parking, retail/restaurant/cultural destination customers may prefer to visit elsewhere and offices may prefer to locate elsewhere.
4. The City should strive to play a lead role in developing and managing parking facilities:
 - Parking management and supply decisions are interconnected and a comprehensive, unified approach to decision-making is needed.
 - The value of private parking facilities should be recognized as a resource. These resources are not part of the public parking supply under the City's long-term control and opportunities to manage private lots are limited.
5. Address peak parking demand needs in order to avoid perfect Friday/Saturday night storm when residents/customers can't find parking:
 - Manage parking at the garage (for example, flat rate pricing for special events).
 - Increase the supply of convenient parking.
6. Parking should support economic development including businesses (office, retail, restaurant) and visitors/customers.
7. The parking garage should be priced and managed so that it has high occupancy more frequently (improve utilization of what we've got).
8. The primary reason for parking revenues is to be able to provide an adequate supply of safe, convenient parking. Pricing structures should be simple and easy for customers to understand.
9. Parking management strategies should recognize that there is a difference between the needs of long-term parkers who may be more likely to use the garage or use parking immediately adjacent to downtown, and short-term parkers running a quick errand.
10. Price and manage more desirable on street parking spaces to favor users who are highly motivated to use them. Give customers and residents the option to stay and pay.

11. Information on parking options should be easily accessible to parking users, including through technology options.
12. Parking planning should take a comprehensive, sustainable and big picture approach by taking a broad range of costs and benefits into account when making decisions.
13. All parking resources should place value on aesthetics, security, accessibility and user information.
14. Consider ways to incentivize use of “remote parking”.
15. Surface parking lots should be located at the periphery of the downtown and should not be allowed to create a “dead zone” barrier to comfortable pedestrian movement.
16. Parking management programs should take into consideration hospitality industry workers.
17. Incentives for residents should be provided at the parking garage, but shouldn’t compromise best practices.
18. Parking resources should be provided to support downtown activity (streets are for people as well as cars) and should therefore be designed and located in such a manner that recognizes the following:
 - Parking resources should enhance – not detract from – downtown vitality, walkability and the pedestrian experience;
 - Parking resources should accommodate pedestrians (bump-outs, plazas), bicycles (bike parking) and transit (space to pull over);
 - Parking structures should be incorporated into the commercial streetscape; and
 - The needs of an aging population should be taken into account when it comes to parking.
19. Parking strategies should be revenue neutral.
20. Parking management plans should recognize the short-term parking needs of retail and hospitality industry for loading zones.
21. Encourage public transit and other transportation modes, but recognize strong customer/resident preference for personal vehicle use as well as very limited regional public transit infrastructure.

Neighborhood Traffic Calming



Parking & Traffic Safety Committee

Proposed Neighborhood Traffic Calming Process

- ❖ Phase 1 -- Preliminary assessment
 - Speed monitoring
 - Traffic Counts
 - Traffic study

Proposed Neighborhood Traffic Calming Process

- ❖ Phase 2
 - Physical Traffic Calming Measures
 - Short-term / interim – “pilot”
 - Long-term – Capital Improvement Program
 - Non-infrastructure Traffic Calming Measures

Types of Non-Infrastructure Traffic Calming Measures

- ❖ Street Signs / Pavement Markings (MUTCD compliance required)
- ❖ Speed Trailer
- ❖ Enforcement
- ❖ Parking Management

Types of Physical Neighborhood Traffic Calming Measures

❖ Vertical Deflections

- Speed hump
- Speed table
- Speed cushion
- Raised crosswalk
- Raised intersection

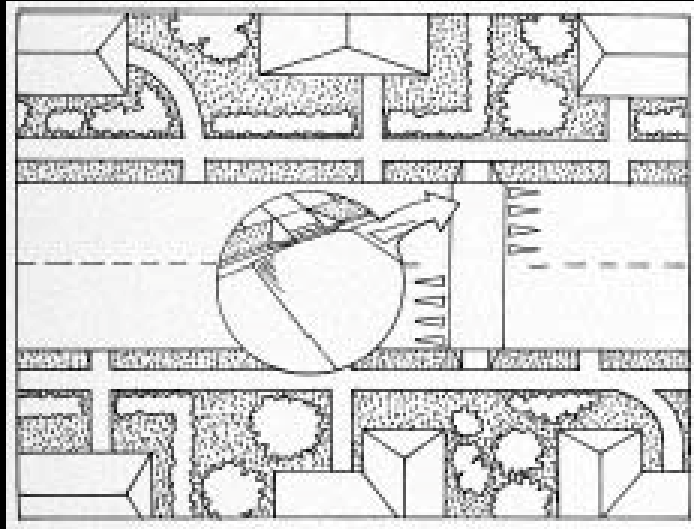
❖ Horizontal Deflections

- Neighborhood Traffic circle
- Curb extension / bulb out
- Chicane
- Median Island

❖ Physical Obstructions

- Semi-diverter
- Diagonal diverter
- Street closures
- Median island

Vertical Deflection – Speed Hump



Pros	Cons
Effective in slowing traffic on low speed / low volume roads	Inappropriate for emergency response routes and transit routes
Moderate cost for installation and maintenance	Additional training required for snow removal operators
Minimal impact on bicyclists and motorcyclists, except at high speeds	May impact road drainage

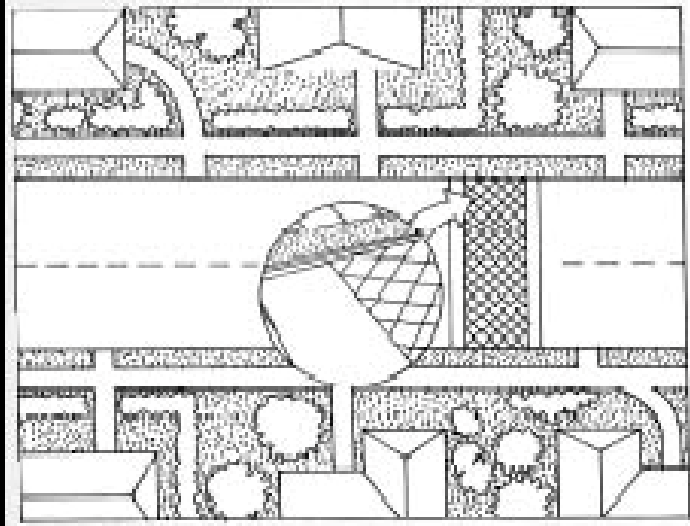
Vertical Deflection – Speed Cushion



Pros	Cons
Effective in reducing traffic speeds and volumes on local streets	Presents challenge for snow removal operations
Minimal impact on emergency response times	
Low cost to implement	

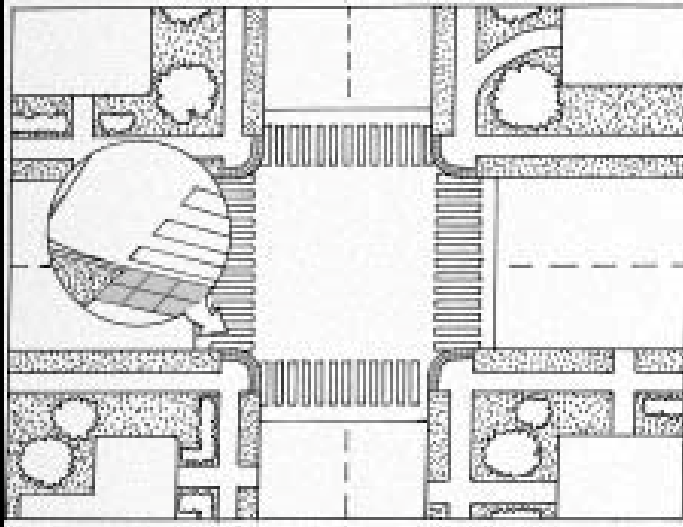
Vertical Deflection – Speed Table

Speed Table / Raised Crosswalk



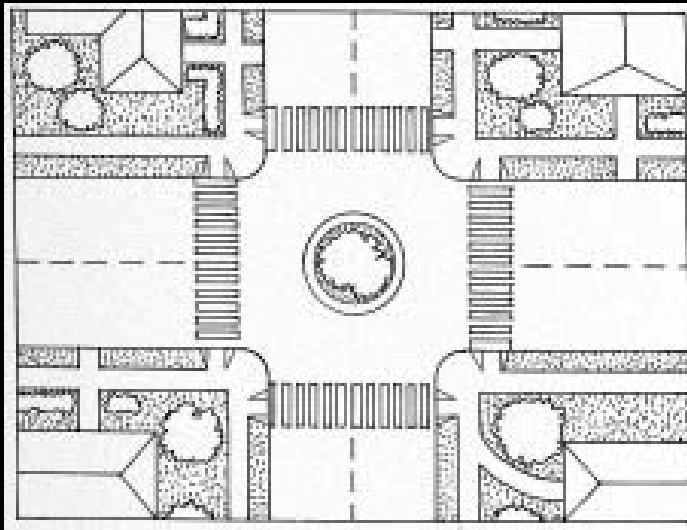
Pros	Cons
Effective in slowing traffic speeds on local and collector roads	Not ideal for major emergency response routes and transit routes
Moderate cost for installation and maintenance	Additional training required for snow removal operators
Minimal impact on bicyclists and motorcyclists, except at high speeds	May impact road drainage

Vertical Deflection – Raised Intersection



Pros	Cons
Reduce vehicle-ped conflicts by improving visibility for pedestrians	Higher cost to construct and maintain
Minor reduction in travel speeds from all approaches	May delay emergency response
Suitable for local streets with high pedestrian volumes	

Horizontal Deflection Neighborhood Traffic Circle

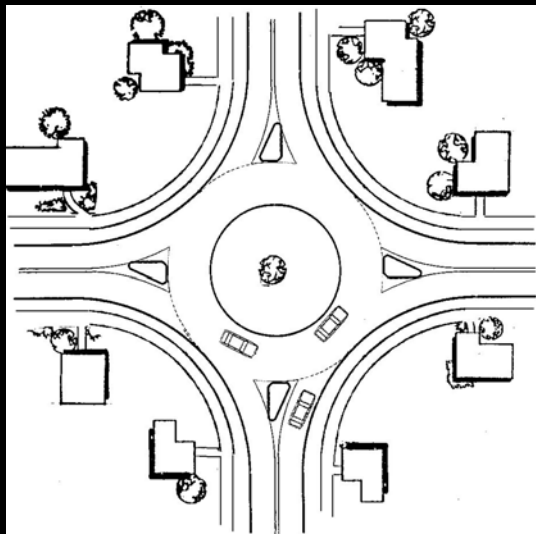


Pros	Cons
Reduces speeds	May be challenging for emergency vehicles and large trucks turning left
Reduces the number of conflict points at an intersection	May require removal of on-street parking in vicinity of intersection
Can enhance the neighborhood	Moderate cost to construct and maintain

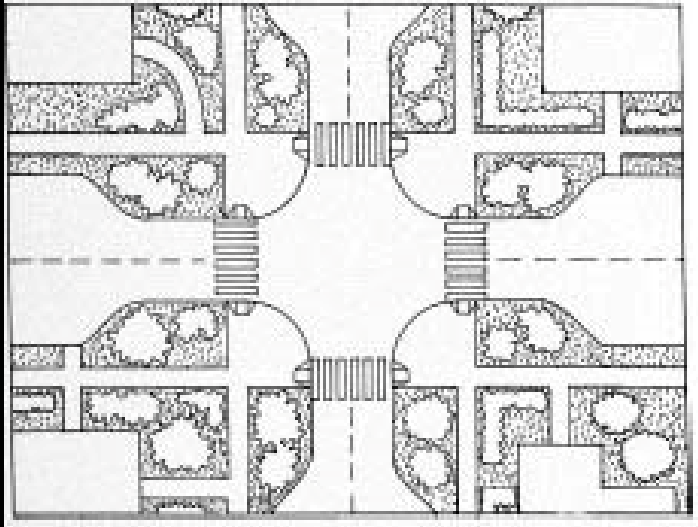
Neighborhood Traffic Circle



Roundabout



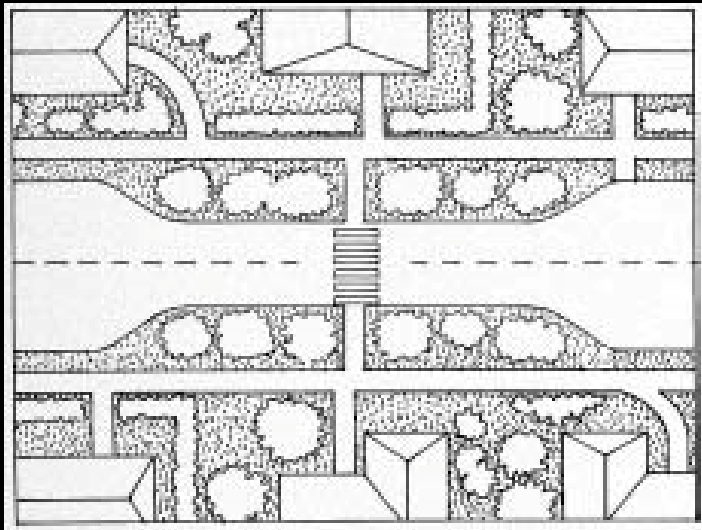
Horizontal Deflection Curb Extension / Bulb Out



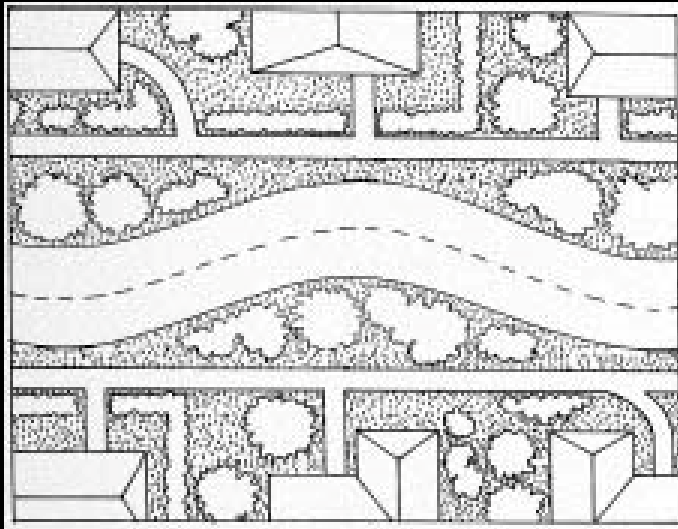
Pros	Cons
Improves pedestrian visibility and reduces crossing distance	Additional training required for snow removal operators
May reduce travel speeds	May require removal of on-street parking in vicinity of intersection
Slows right-turning vehicles	Difficult to accommodate bicycle lanes
Moderate costs to implement and maintain	

Horizontal Deflection Curb Extension/Bulb Out

Choker

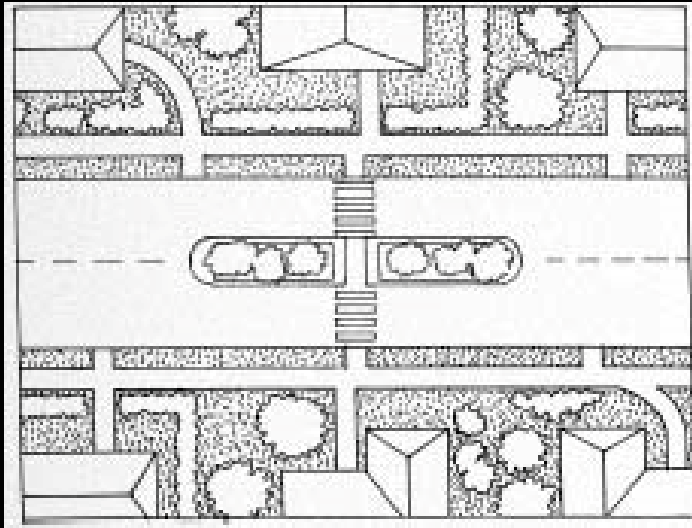


Horizontal Deflection -- Chicane



Pros	Cons
Reduce vehicle speeds and may reduce traffic volumes	Will result in loss of on-street parking
Provide opportunities for streetscaping	Additional training required for snow removal operators
	Not suited for high truck traffic routes

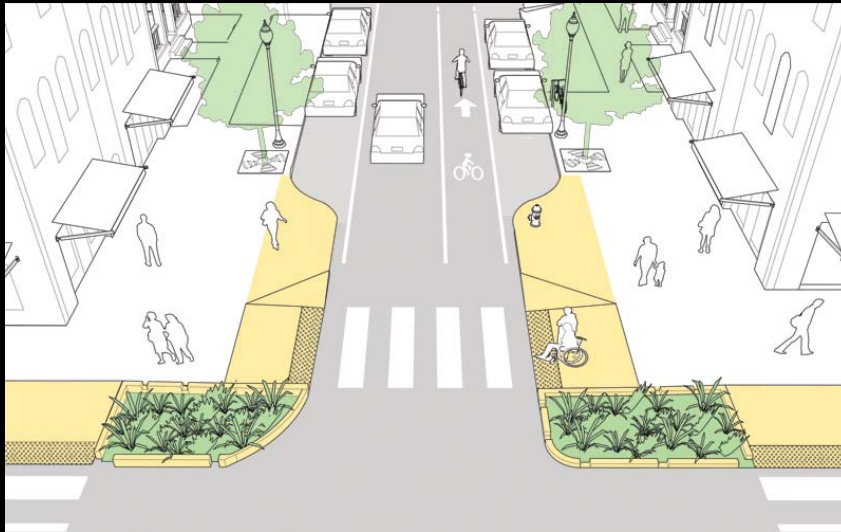
Horizontal Deflection – Median Islands



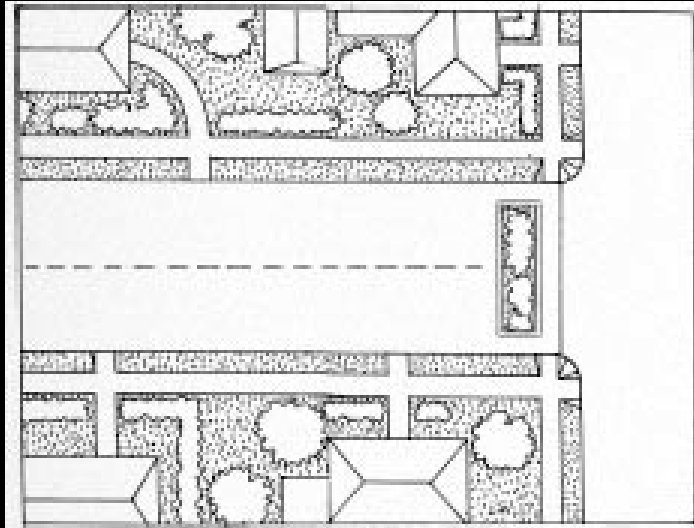
Pros	Cons
May reduce vehicle speeds if lanes are narrowed	May result in loss of on-street parking in vicinity of island
Provide opportunities for streetscaping	
Can reduce pedestrian crossing distance for wider roads	

Horizontal Deflection

Gateway

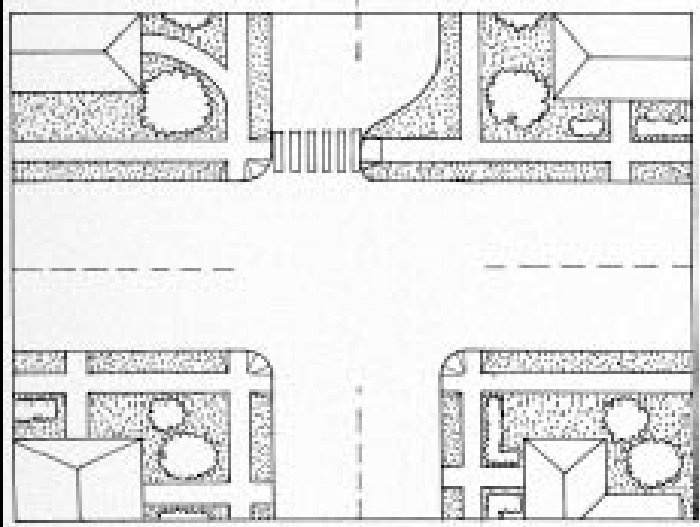


Physical Obstructions -- Full Closure



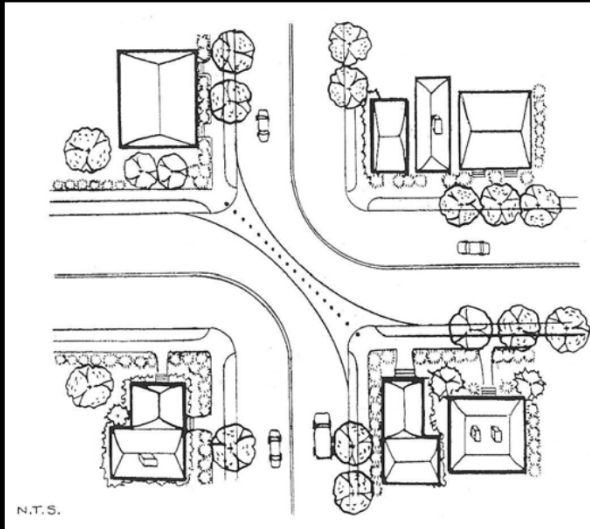
Pros	Cons
Reduce cut-through traffic without impacting bike and ped access	Obstructs emergency access, unless designed with mountable barriers
May reduce speeds	Restricts access for residents
Provide opportunities for streetscaping	May shift traffic to other nearby streets

Physical Obstructions – Half Closure



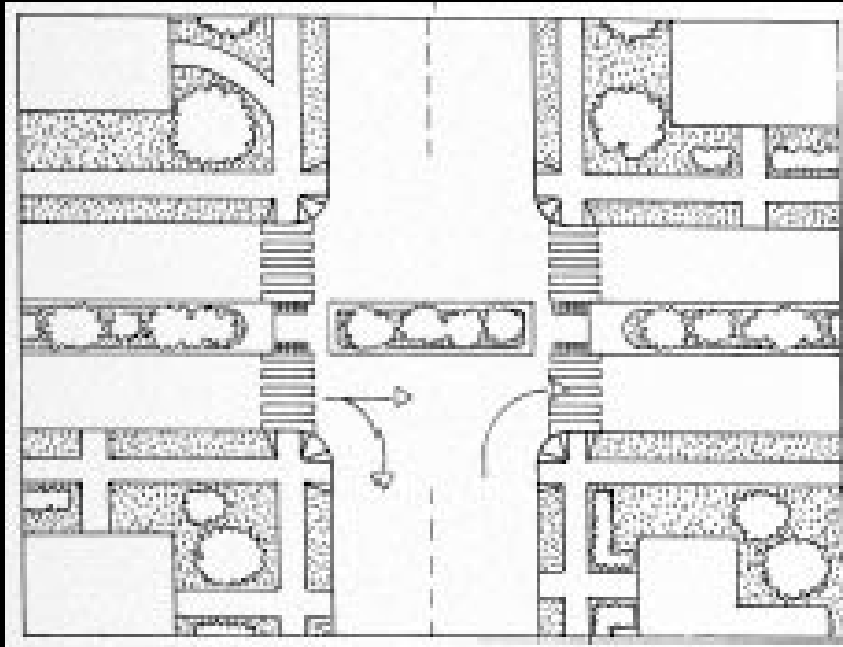
Pros	Cons
Reduce cut-through traffic without impacting bike and ped access	Can be difficult to control violations
May lower travel speeds	May require loss of on-street parking in vicinity of closure
Provision for emergency access	Reduces access for neighborhood residents
Provide opportunities for streetscaping	May divert traffic to neighboring streets

Physical Obstructions – Diagonal Diverter



Pros	Cons
Reduce traffic volumes without impacting bike and ped access	May divert traffic to neighboring streets
Eliminates intersection conflict points	May inconvenience neighborhood residents
Provide opportunities for streetscaping	Delays emergency access
May reduce speeds	

Physical Obstructions – Median Barrier



Pros	Cons
Reduces cut through traffic volumes on local streets while still allowing bike and ped access	May divert traffic to other neighborhood streets
Reduces number of conflict points	May affect emergency access
Potential to add streetscaping	

Next Steps

- ❖ Develop a public request form
- ❖ Add guidance/program info on City website

The screenshot shows the Seattle.gov website header with the Mayor's name, a search bar, and a menu icon. Below the header is the Department of Transportation section, including the name of the director and navigation tabs for Services, Projects, Planning, Resources, Events, News, and Site Index. The main content area features a sidebar with a list of links and a main article titled "Neighborhood Traffic Operations: Traffic Calming Program". The article text describes a pilot program for 20 MPH zones in five areas of the city, mentioning that most people traveled under the speed limit when the street is 25 feet wide and there is parking on both sides. It also notes that SDOT focuses limited traffic calming dollars on streets where speeds are highest and there are no curbs, with other considerations for prioritization being streets near schools, parks, or other pedestrian generators. A "Share This" button is visible next to the article title.

Traffic Calming Request Form

What is traffic calming? The goal of traffic calming is to make streets safer for people to bike, walk and drive. Making physical changes to the roadway, such as horizontal shifts (curb extensions, chicanes) and vertical shifts (raised crosswalks and intersections), helps reduce speeding and enhances the quality of life by making the street more comfortable for all users. If you would like to get a copy of our Traffic Calming Brochure for a more detailed description of traffic calming and the various tools and techniques available, please call (617) 349- 4655 or email traffic-calming@cambridgema.gov. To see pictures of completed traffic calming projects, visit our website at www.cambridgema.gov/~envirotrans/trafcalm/index/html.

Traffic Calming Request Form Directions: Please fill out this form, then mail to the City of Cambridge Community Development Department (address on back). This form can also be filled out online by going to the traffic calming section of our website (see address above). By using this form you will help us assess the type of issues or concerns you are having with a street in your neighborhood. We will then gather additional data, such as crash records and speed studies. This information, together with any related roadway work schedules, will help us prioritize your request among others we've received.

- Name** _____ **Date** _____
Address _____
Email _____ **Phone (day)** _____ **(night)** _____
Best way to be reached during the day is: phone / email (circle one)
- Please list the street(s)/ location that concerns you most:** _____

- What time of day do the concerns you have seem most noticeable?** _____

- Please check each item that applies to the street(s) listed above:**
 Speeding Difficult to cross street Lack of courtesy to cyclists
 Cars parked too close to corner Difficult to bike Drivers not yielding to pedestrians
 Other (please describe): _____

- Are you aware of others who live on the street who share your concerns?**

Update on Related Requests

- ❖ Elwyn Road Sidewalk Request
- ❖ Aldrich Road Traffic Speeds and Volume
- ❖ Radar Speed Signs
- ❖ Eliminating Center Lines on selected roads

CITY OF PORTSMOUTH

COMPLETE STREETS DESIGN GUIDELINES



WHAT ARE COMPLETE STREETS?

“Streets and roadways in the City of Portsmouth will be convenient, safe and accessible for all transportation users, including pedestrians, bicyclists, transit vehicles and riders, children, the elderly, and people with disabilities.”

- City of Portsmouth Complete Streets Policy (2013)

Introduction

“Complete Streets” means streets that are designed and operated to enable safe access for all users, so that pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across all public streets.

These guidelines are intended for use by the City of Portsmouth, private developers and residents as a reference for how to accommodate all users on existing and future city streets. Each street in the city is categorized along a spectrum of complete street classes, each with its own user priorities, specifications, and design options.

The application of complete streets won't happen on all streets immediately. Complete streets principles will be applied on all new City projects and privately funded developments, and incrementally on existing streets through a series of small improvements and activities over time.

POLICY BACKGROUND

A **City of Portsmouth 2005 Master Plan** objective is to “ensure that all transportation projects in Portsmouth provide for full consideration of all modes (automobile, truck, bicycle, pedestrian, transit) in their design, as appropriate.”

In 2013, the City of Portsmouth advanced this objective, by adopting a **Complete Streets Policy** (Resolution 2013-01), with the bold vision: “Streets and roadways in the City of Portsmouth will be convenient, safe and accessible for all transportation users, including pedestrians, bicyclists, transit vehicles and riders, children, the elderly, and people with disabilities.”

The **2014 Portsmouth Bicycle and Pedestrian Plan** built upon this vision, mapping pedestrian and bicycle priority network connections, and included a toolkit of design solutions to provide accommodations for all users.

These **2017 Complete Streets Guidelines** take the vision further, formalizing a classification scheme, identification of design options, and articulation of user needs for every street in the City of Portsmouth.

How to Use This Guide

The City of Portsmouth Complete Street Guidelines present the fundamental design elements and dimensions for creating a complete street. Each street classification is presented in a standard layout, for easy access to critical information. Refer to the annotated pages below to understand what details are provided.

Street Classification and Description

A photo and description of how the street fits into the City of Portsmouth transportation and land use context.



Street Classification Map

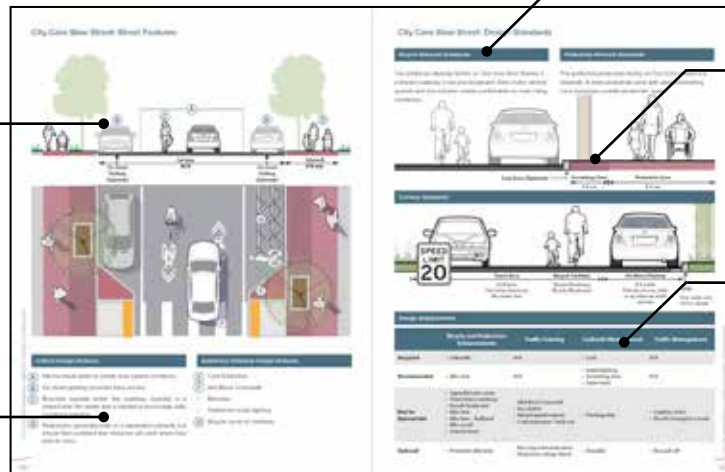
A mapped identification of which streets in the city fit the classification.

Typical Application

Key attributes of where the street classification is most appropriate

Typical Cross Section

A graphic representation of a potential version of the street type. Even within classifications, street layouts may vary.



Pedestrian/Bicycle Network

Standards related to meeting bicycle and pedestrian travel needs.

Cartway Standards

Standards related to the paved cartway, including recommended operating speed.

Street Features

Specific street features which may be required for a certain street type, a high priority, appropriate in limited circumstances, not required, or not at all appropriate for each street classification/typology.

Design Features

A list of design features applied on this street class, some of which are identified on the illustration above.

Terminology and Street Elements

The City of Portsmouth Complete Street Guidelines are built on local and national guidelines, and apply standard traffic engineering tools and designs. Key street features recommended in these guidelines are described below. For more specific details about the tools, facilities and design elements referred within, refer to the **2014 Portsmouth Bicycle and Pedestrian Plan**, the **2012 AASHTO Guide for the Development of Bicycle Facilities**, the **2004 AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities**, and the **2012 NACTO Urban Bikeway Design Guide**.

Design Element	Description
Bicycle Boulevard	A low-speed, low volume roadway intended for use by bicyclists. These streets may include traffic calming and access restrictions to maintain a bicycle compatible environment.
Bicycle Corral	An array of bicycle racks, located within an on-street parking space.
Bicycle Rack	A durable, secured fixture, used to lock bicycles to for short-term parking
Bike Lane	A painted travel lane for the exclusive use of bicyclists.
Buffered Bike Lane	A bike lane with an adjacent painted buffer, providing additional space between bicyclists and motor vehicles.
Bus pull-off	A bus stop located to allow transit vehicles to fully exit moving travel lanes when loading and unloading passengers.
Cartway	The paved roadway surface, from roadway edge or curb to the opposite roadway edge or curb.
Chicanes	A series of curb extensions which creates horizontal deflection of motor vehicles to encourage motorists to maintain a desired slow speed.
Curb extension / bulb out	An extension of the sidewalk into an on-street parking lane, intended to expand pedestrian space, reduce crossing distances, and improve visibility of pedestrians.
Mid-Block Crosswalk	A marked crosswalk located away from an intersection.
Pedestrian Refuge Island	A median island in the center of the roadway to offer pedestrians a place to stop. These reduce crossing distances for pedestrians by allowing them to cross each travel direction independently.
Raised speed reducer	A device that creates vertical deflection of motor vehicles to encourage motorists to maintain a desired slow speed.
Separated Bike Lane	A wide bike lane, physically separated from motor vehicles with a vertical element such as a curb.
Shared Lane Markings	A roadway marking used on roads without bike lanes to indicate the presence and desired use by bicyclists.
Shared Street	A low-speed, low volume street where bicyclists, pedestrians and motorists all operate within the cartway, with no separate bike lanes or sidewalks.
Sidepath	A shared use path traveling adjacent to a roadway for use by bicyclists and pedestrians.
Sidewalk Furnishing Zone	The space between the cartway and where pedestrians walk. Signs, utilities and mailboxes are placed in the furnishing zone. The furnishing zone may be landscaped with plantings or paved in areas with increased pedestrian activity.
Yield Street	A low-speed, low-volume street where the cartway is too narrow for approaching motor vehicles to pass each other without slowing or yielding.



CITY OF PORTSMOUTH

COMPLETE STREET TYPES

The City of Portsmouth streets are grouped into seven distinct street classifications. Each street class prioritizes different street users to different degrees, reflecting the surrounding land use context.

Portsmouth's Seven Complete Streets Classifications:

Neighborhood Slow Street

City Core Slow Street

Neighborhood Connector

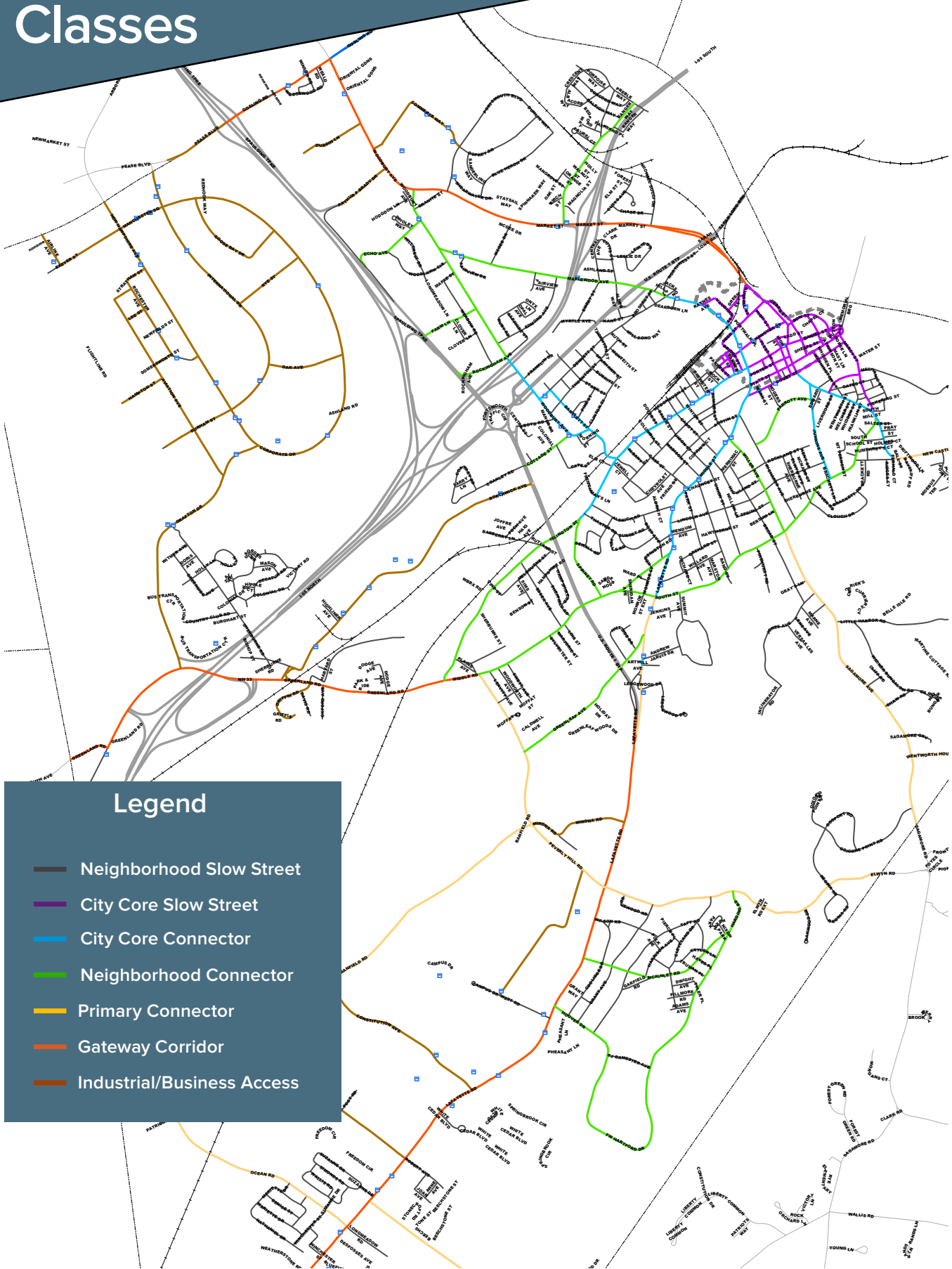
City Core Connector

Primary Connector

Gateway Corridor

Industrial/Business Access

Complete Street Classes



Legend

- Neighborhood Slow Street
- City Core Slow Street
- City Core Connector
- Neighborhood Connector
- Primary Connector
- Gateway Corridor
- Industrial/Business Access

Street Class:

Neighborhood Slow Street

Neighborhood Slow Streets provide access to residential houses. They are used for short distance, low speed trips in and out of neighborhoods. Motorists on these streets tend to be residents or visitors, and the street design encourages slow speed interactions with bicyclists and crossing pedestrians. On-street parking provides convenient access, and further slows driving speeds.

These streets provide one or two travel lanes, depending on width. Streets with one travel lane can facilitate either one-way traffic or be designated as a two-way “yield street” where opposite direction vehicles share the same lane and negotiate space while crossing opposing vehicle paths. Neighborhood slow streets are not intended for through-traffic, and may make use of traffic calming measures to discourage through motor vehicle traffic and reduce speeds to create a comfortable environment for walking and bicycling.



Typical Application

- Local streets in residential neighborhoods.
- Prioritizes pedestrian and bicyclist users.
- Sensitive to historic, or unique local characteristics.

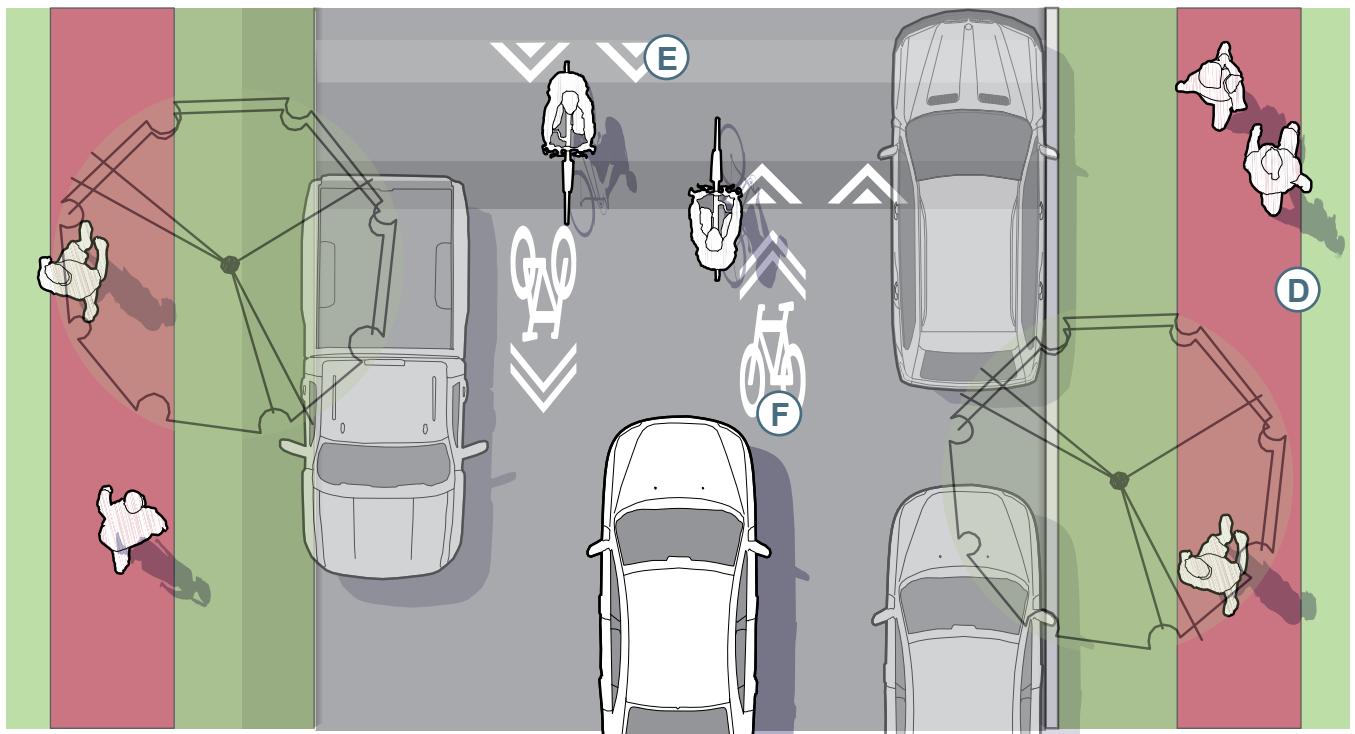
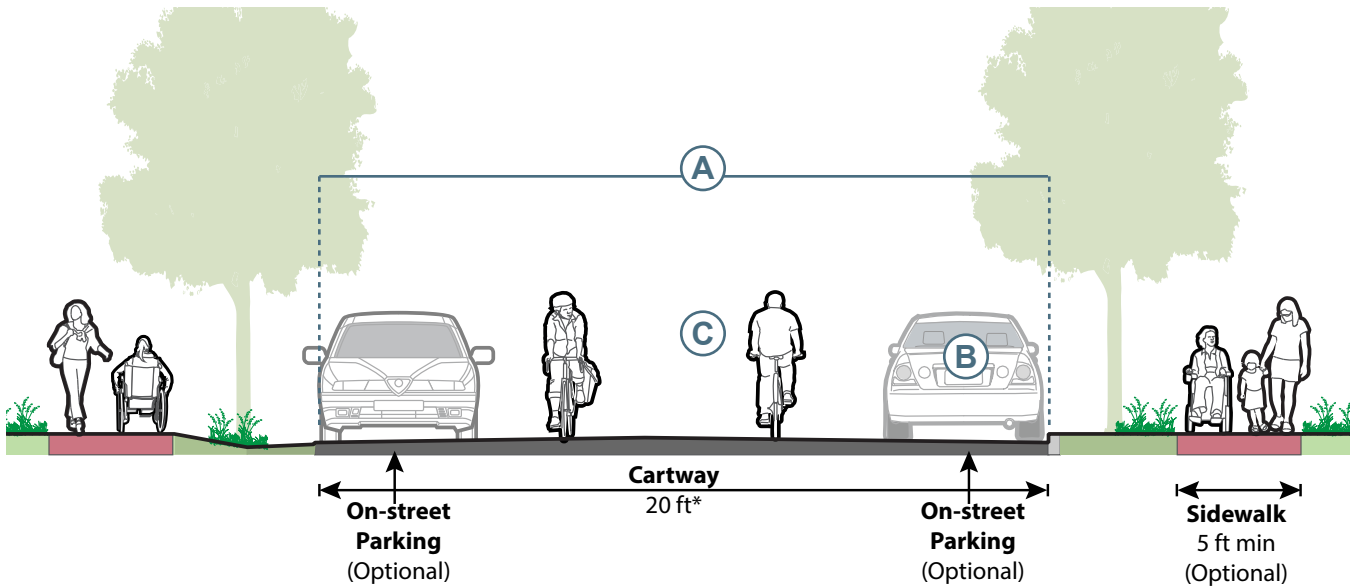


When neighborhood slow streets are a part of a connected walking or bicycling network, street crossings must be enhanced for comfort and safety.

Neighborhood Slow Street



Neighborhood Slow Street: Typical Street Features



Critical Design Features

- A** Intentionally constrained travel area width, potentially narrower than two lanes, to create slow-speed conditions.
- B** On-street parking provides easy access.
- C** Bicyclists operate within the roadway. No center line is marked to encourage safe, courteous passing.

Additional Potential Design Features

- D** Pedestrians generally walk on a separated sidewalk, but should feel confident that motorists will yield when they wish to cross.
- E** Raised speed reducer if needed to manage speeds.
- F** Shared lane markings can provide additional guidance for users.

* Some Neighborhood Slow Streets may have an additional 2 ft of flexible space in their cross-section R.O.W's.

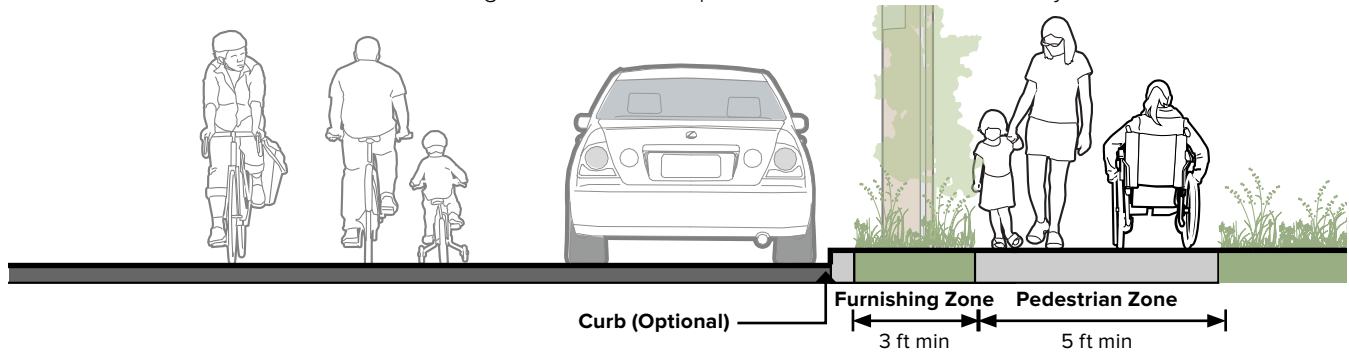
Neighborhood Slow Street: Design Guidelines

Bicycle Network

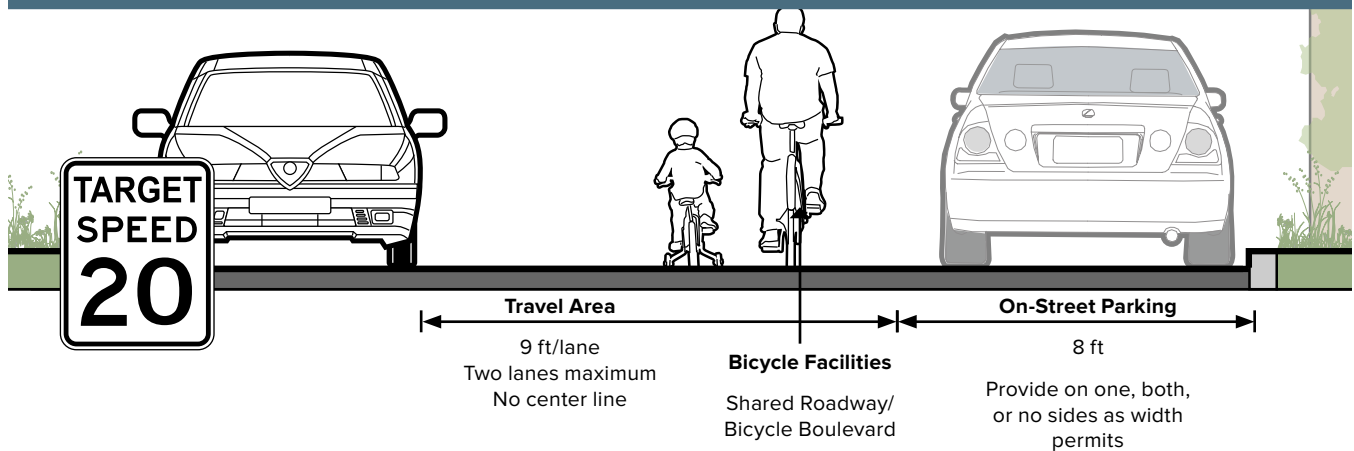
The recommended bikeway on Neighborhood Slow Streets is a **bicycle boulevard, shared street, or signed bike route**. Slow motor vehicle speeds and low volumes create comfortable on-road riding conditions.

Pedestrian Network

The preferred pedestrian facility on Neighborhood Slow Streets is a **sidewalk**. In some cases, streets may lack sidewalks, creating a **shared street** where pedestrians walk in the cartway.



Cartway



Neighborhood Slow Street: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	N/A	N/A	N/A	N/A
High Priority	N/A	<ul style="list-style-type: none"> Yield street 	<ul style="list-style-type: none"> On-street parking Street lighting Street trees 	N/A
Appropriate in Limited Circumstances	<ul style="list-style-type: none"> Signed bicycle route Shared lane markings Bicycle boulevard Shared street Sidewalks 	<ul style="list-style-type: none"> Curb extension / bulb out Raised speed reducer Chicanes 	<ul style="list-style-type: none"> Curb Planting strip Furnishing zone 	N/A
Not Required	<ul style="list-style-type: none"> Sidepath Buffered bike lane Separated bike lane Bike racks Bike corral 	<ul style="list-style-type: none"> Mid-block crosswalk Bus pull-off Bus shelter Pedestrian refuge island 	<ul style="list-style-type: none"> Shoulder 	<ul style="list-style-type: none"> Loading zones
Not Appropriate	N/A	N/A	<ul style="list-style-type: none"> Median Planting Strip 	<ul style="list-style-type: none"> Priority Emergency Route Truck Route Center line striping (double yellow)

Street Class:

City Core Slow Street

City Core Slow Streets provide for short distance, low speed trips within the Downtown commercial business district. Motorists on these streets are occasionally downtown residents but more typically visitors. In consequence the street design encourages slow speed interactions with bicyclists and crossing pedestrians.

These streets provide on-street parking to allow for convenient access to businesses, and to help mitigate driving speeds. City Core Slow Streets prioritize bicyclists and crossing pedestrians.



Image Source: David Wilson via Flickr (CC BY 2.0)

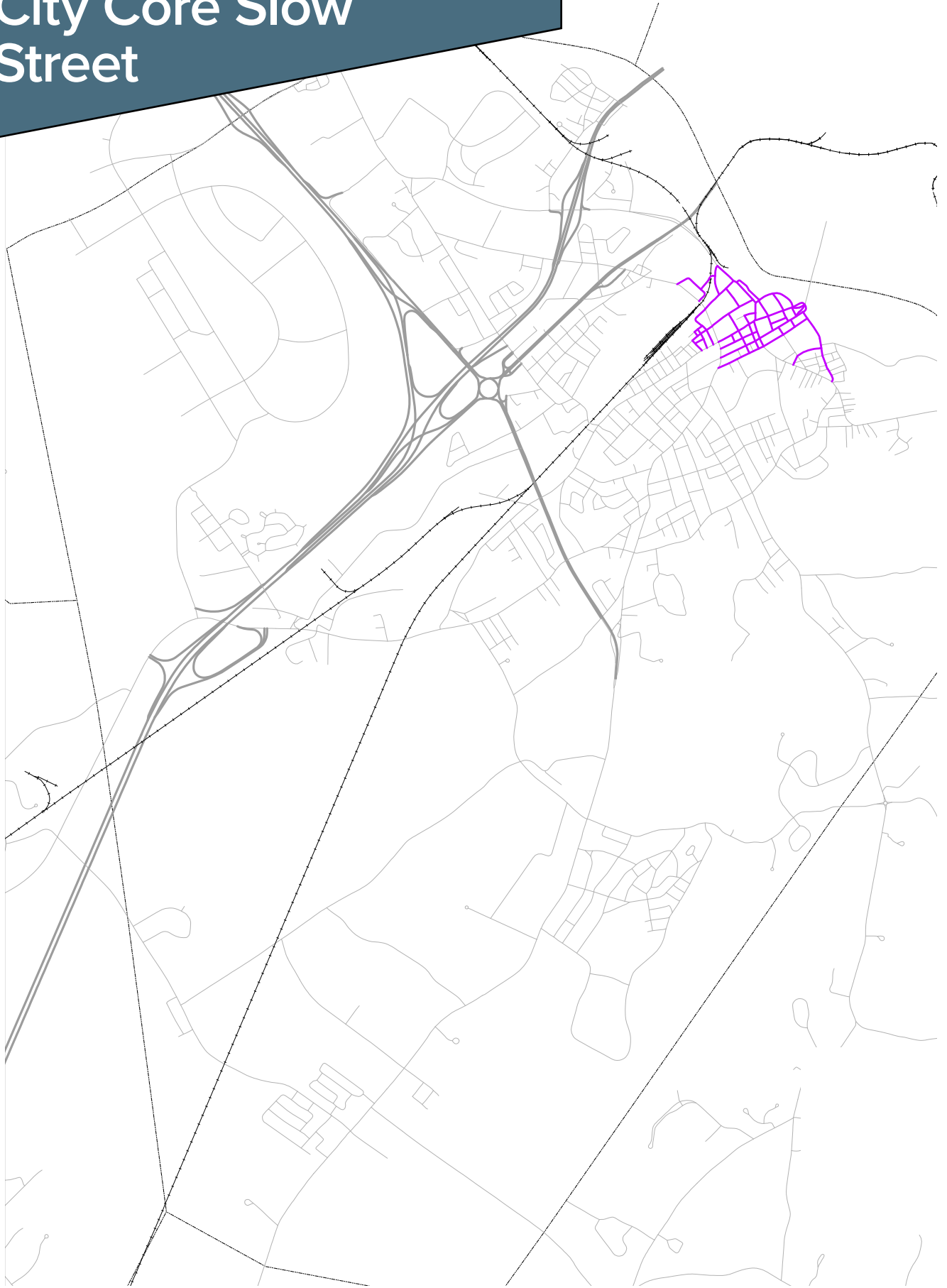
Typical Application

- Local streets in the downtown district.
- Prioritizes pedestrian and bicyclist users and motor vehicle parking over motor vehicle traffic.
- Designs vary widely, based on one-way operation, parking configuration, and adjacent commercial land uses.

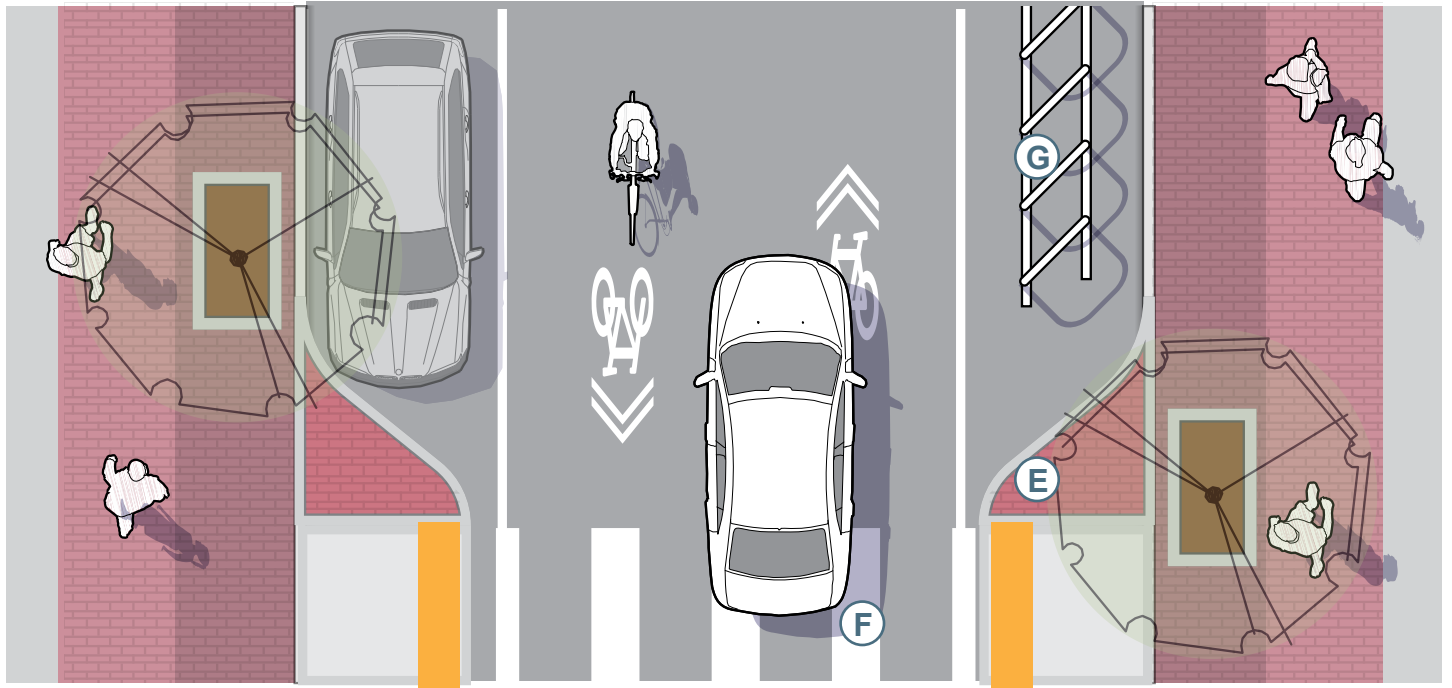
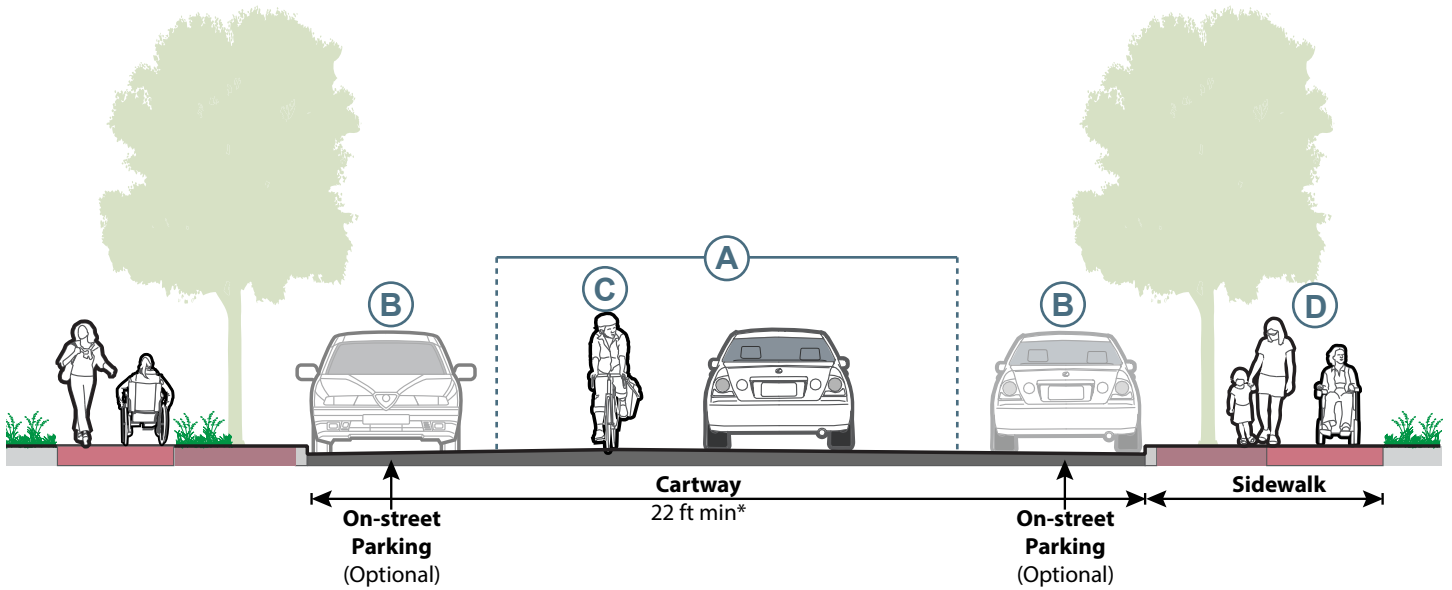


A bike corral provides a large number of bicycle parking spaces without impacting usable sidewalk space.

City Core Slow Street



City Core Slow Street: Common Street Features



Critical Design Features

- A** Narrow travel lanes to create slow-speed conditions.
- B** On-street parking provides easy access.
- C** Bicyclists operate within the roadway, typically in a shared lane. No center line is marked to encourage safe, courteous passing.
- D** Pedestrians generally walk on a separated sidewalk, but should feel confident that motorists will yield when they wish to cross.

Additional Potential Design Features

- E** Curb Extension
- F** Mid-Block Crosswalk
 - Benches
 - Pedestrian scale lighting
- G** Bike corral on roadway

* Some City Core Slow Streets may have an additional 2 ft of flexible space in their cross-section R.O.W's.

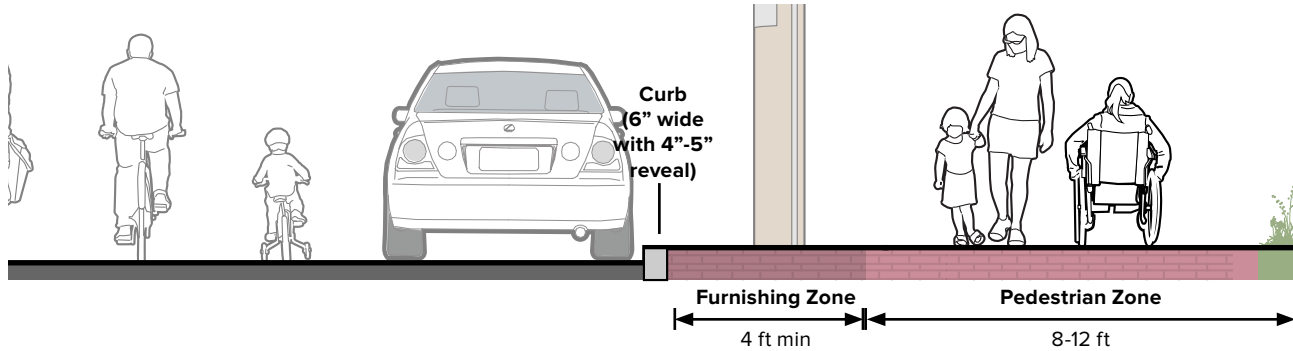
City Core Slow Street: Design Guidelines

Bicycle Network

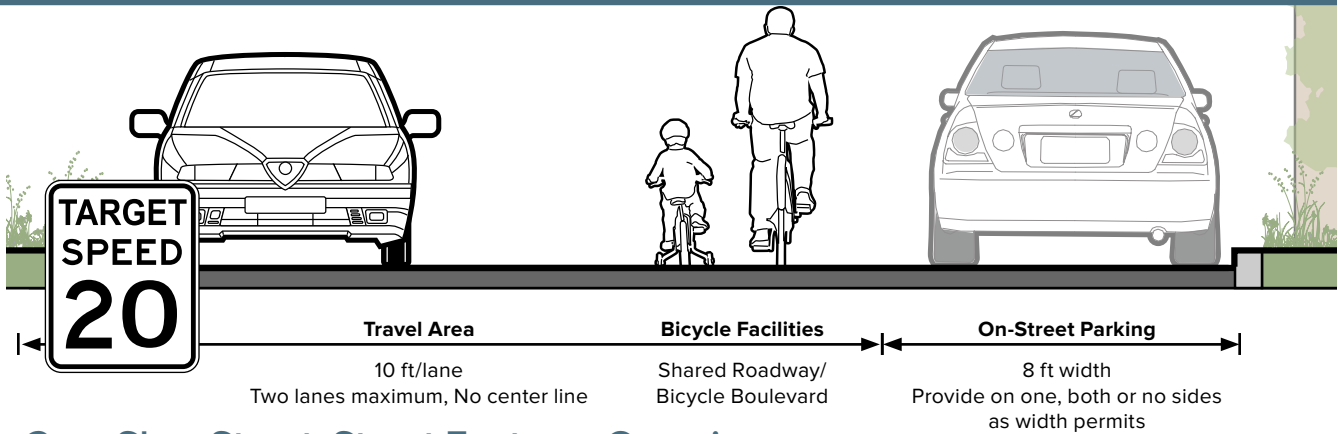
The recommended bikeway on City Core Slow Streets include **shared lane markings** or a **bicycle boulevard**. Slow motor vehicle speeds and low volumes create comfortable on-road riding conditions. In rare contexts, **buffered** or regular **bike lanes** may be appropriate.

Pedestrian Network

Sidewalks are required on City Core Slow Streets. A wide pedestrian zone with paved furnishing zone maximizes usable pedestrian space. In some cases, where streets may lack sidewalks, create a **shared street** where pedestrians walk in the cartway.



Cartway



City Core Slow Street: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	<ul style="list-style-type: none"> Sidewalks 	N/A	<ul style="list-style-type: none"> Curb Street Lighting 	N/A
High Priority	<ul style="list-style-type: none"> Bike racks 	N/A	<ul style="list-style-type: none"> On-street parking Furnishing zone Street trees 	N/A
Appropriate in Limited Circumstances	<ul style="list-style-type: none"> Signed bicycle route Shared lane markings Bicycle boulevard Bike lane Buffered bike lane Bike corral Shared street 	<ul style="list-style-type: none"> Mid-Block Crosswalk Bus shelter Raised speed reducer Curb extension / bulb out 	<ul style="list-style-type: none"> Planting strip 	<ul style="list-style-type: none"> Loading zones Priority emergency route
Not Required	<ul style="list-style-type: none"> Sidewalk Separated bike lane 	<ul style="list-style-type: none"> Bus pull-off Pedestrian refuge island 	<ul style="list-style-type: none"> Shoulder 	N/A
Not Appropriate	N/A	<ul style="list-style-type: none"> Chicanes Yield street 	N/A	<ul style="list-style-type: none"> Truck Route Center line striping (double yellow)

Street Class:

City Core Connector

City Core Connector streets provide a transition from higher speed streets into the slower downtown and neighborhood context. Two travel lanes and on-street parking send subtle cues to road users of a change in character, and naturally result in slower speed operation. Traffic speeds and volumes create the need for striped bicycle lanes to accommodate cyclists. Where space is limited, shared lane markings may be necessary.



Typical Application

- Collector streets, leading people in and out of the downtown.
- Emphasizes connections from neighborhoods to downtown, and prioritizes user movement over user access.
- Should balance motor vehicle use with bicycle and pedestrian access.

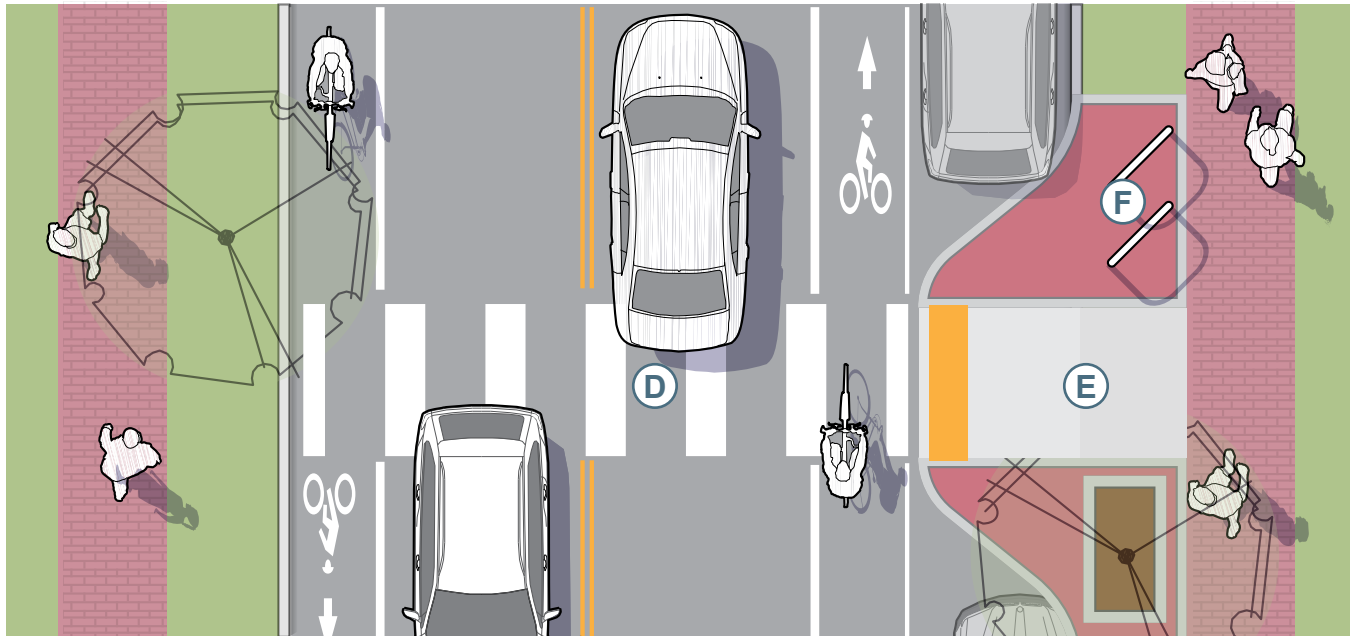
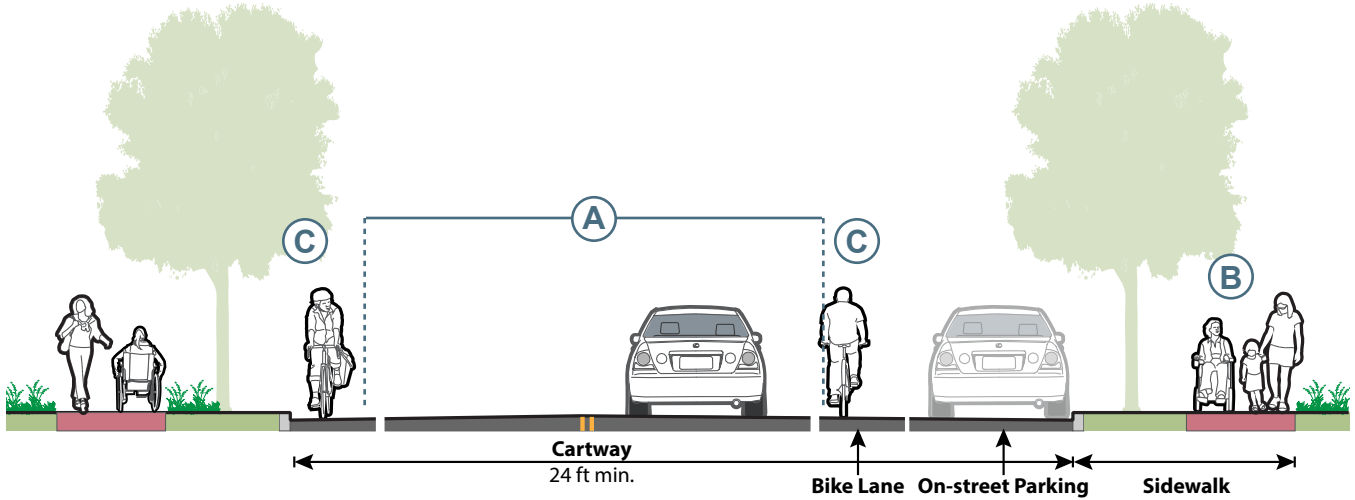


Complete Streets improvements will be coming to Middle Street in the near future.

City Core Connector



City Core Connector: Typical Street Features



Critical Design Features

- A** A maximum of two travel lanes.
- B** Pedestrians walk on a separated sidewalk.
- C** Striped bicycle lanes are a high priority.
 - On-street parking is a high priority.

Additional Potential Design Features

- D** Mid-block crosswalks allow pedestrians to reach destinations on both sides of the street.
- E** Curb extensions may enhance pedestrian crossings.
- F** Bike racks are beneficial in front of businesses.

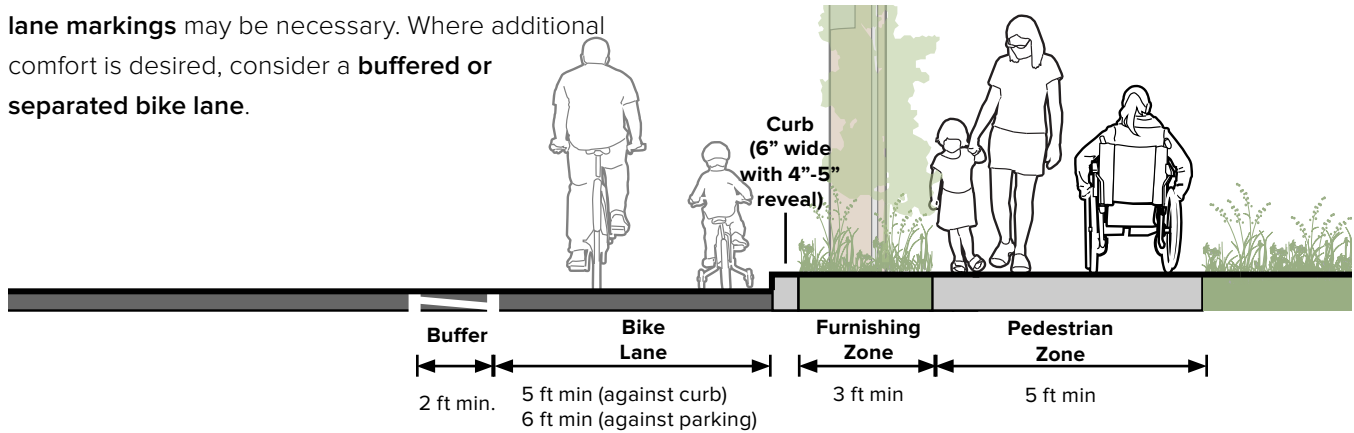
City Core Connector: Design Guidelines

Bicycle Network

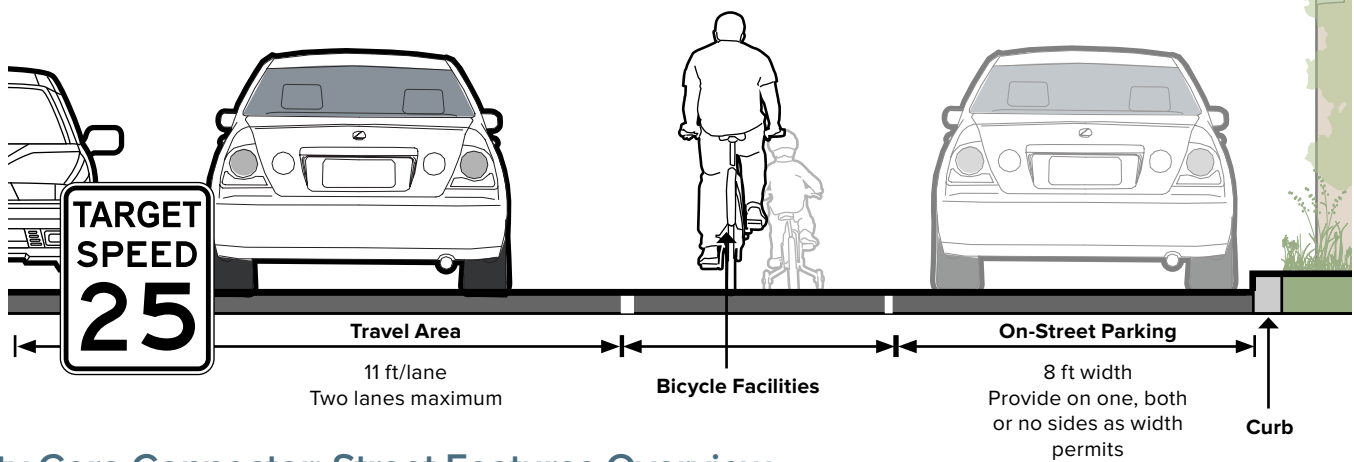
The recommended bikeway on City Core Connector streets is a **bike lane**. In constrained segments, **shared lane markings** may be necessary. Where additional comfort is desired, consider a **buffered or separated bike lane**.

Pedestrian Network

Sidewalks are required on City Core Connector streets.



Cartway



City Core Connector: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	<ul style="list-style-type: none"> Sidewalks 	N/A	<ul style="list-style-type: none"> Curb 	<ul style="list-style-type: none"> Center line striping (double yellow)
High Priority	<ul style="list-style-type: none"> Bike lanes 	N/A	<ul style="list-style-type: none"> On-street parking Planting strip Street lighting Street trees 	N/A
Appropriate in Limited Circumstances	<ul style="list-style-type: none"> Shared lane markings Bicycle boulevard Buffered bike lane Separated bike lane Bike racks 	<ul style="list-style-type: none"> Mid-block crosswalk Bus shelter Pedestrian refuge Island Curb extension / bulb out 	<ul style="list-style-type: none"> Shoulder Furnishing zone 	<ul style="list-style-type: none"> Loading zones Priority emergency route Truck route
Not Required	<ul style="list-style-type: none"> Sidepath 	<ul style="list-style-type: none"> Bus pull-off 	N/A	N/A
Not Appropriate	<ul style="list-style-type: none"> Signed bicycle route Bike corral Shared street 	<ul style="list-style-type: none"> Raised speed reducer Chicanes Yield street 	<ul style="list-style-type: none"> Median planting strip 	N/A

Street Class:

Neighborhood Connector

Neighborhood Connectors bring residents to and from their Neighborhood Slow Street to other parts of the city or region. They provide an opportunity for road users to transition between the higher-speed Primary Connector and Gateway Corridors to the low-speed character of the neighborhood.

The street design emphasizes smooth traffic flow and dedicated space for bicyclists.



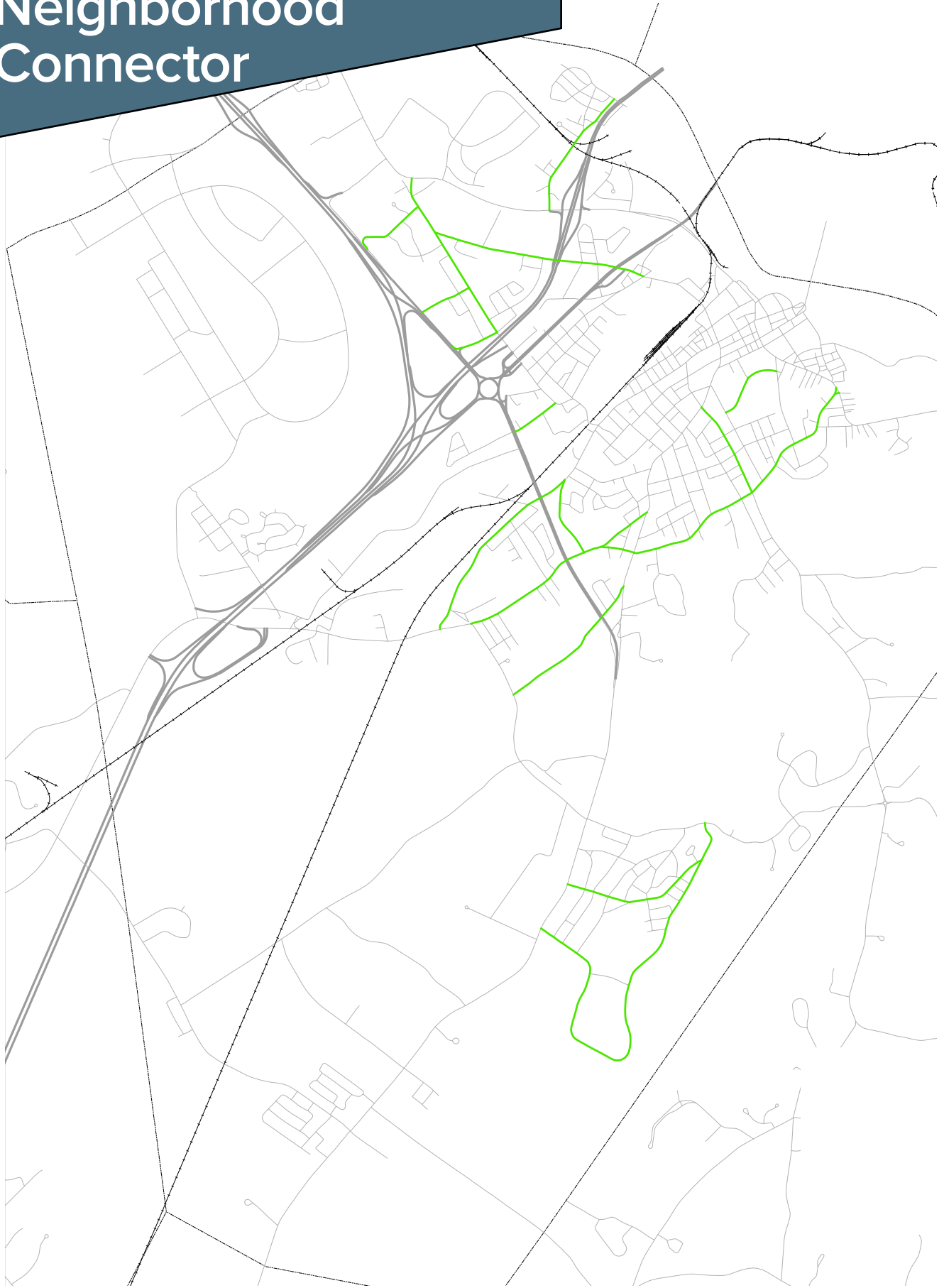
Typical Application

- Collector streets which link neighborhoods to each other and to arterial streets.
- Emphasizes motor vehicle movement, but may serve important bicycle and pedestrian connections where demand exists.

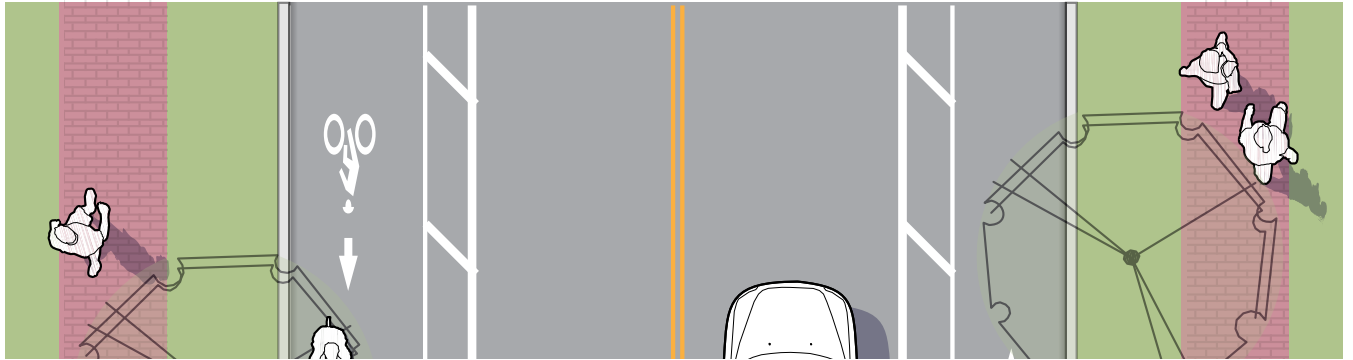
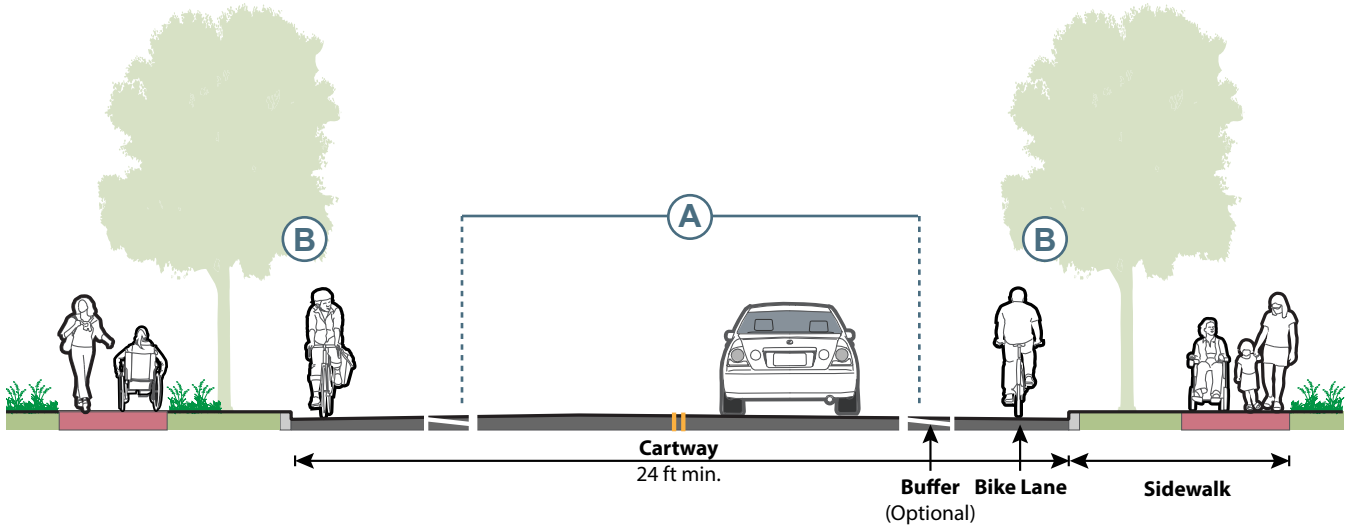


On street parking may be appropriate in areas with adjacent land uses.

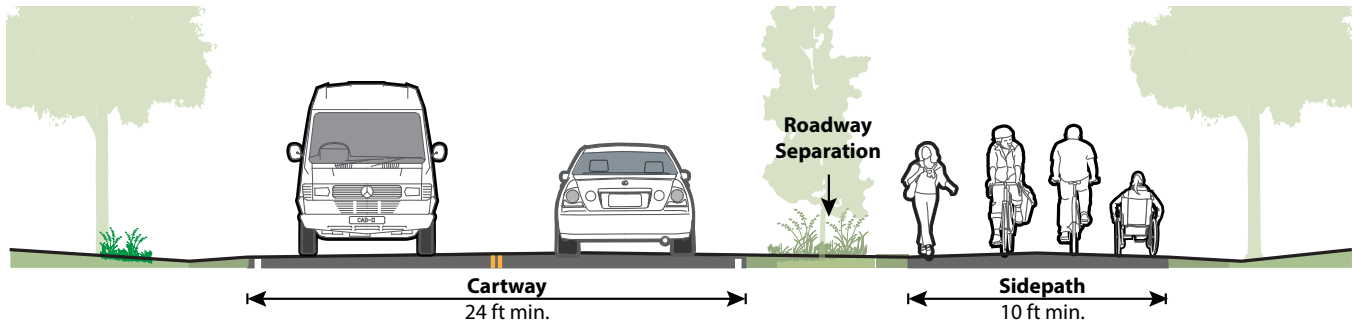
Neighborhood Connector



Neighborhood Connector: Typical Street Features



Neighborhood Connector: Sidepath Alternative



Critical Design Features

- A** Two travel lanes, marked with a center line marking.
- B** Bicycle facilities are preferred.
 - Pedestrians walk on a separated sidewalk.

Additional Potential Design Features

- A sidepath may replace on-street facilities and sidewalks.
- A planting strip to support street trees and landscaping in the furnishing zone is a high priority.

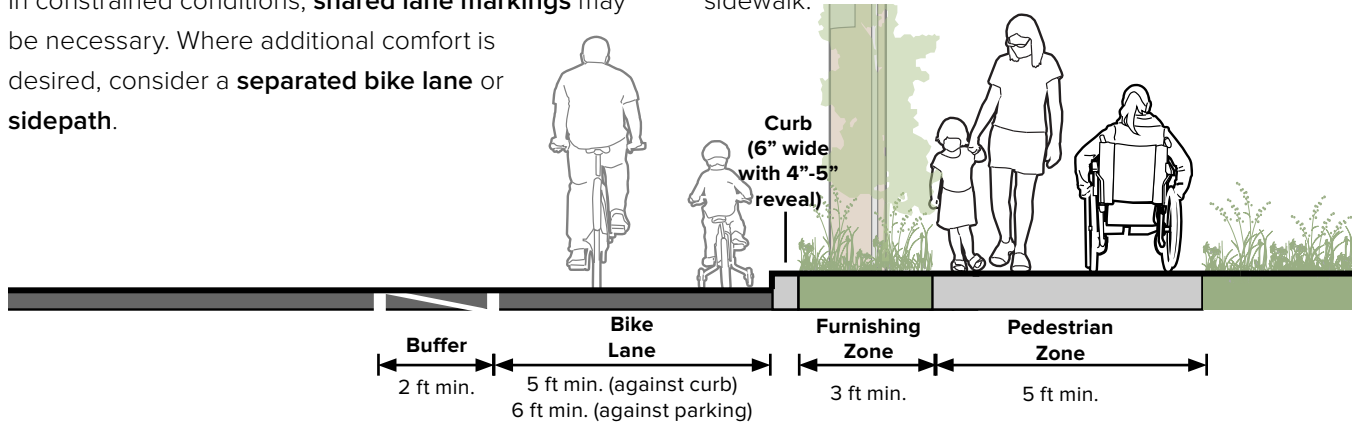
Neighborhood Connector: Design Guidelines

Bicycle Network

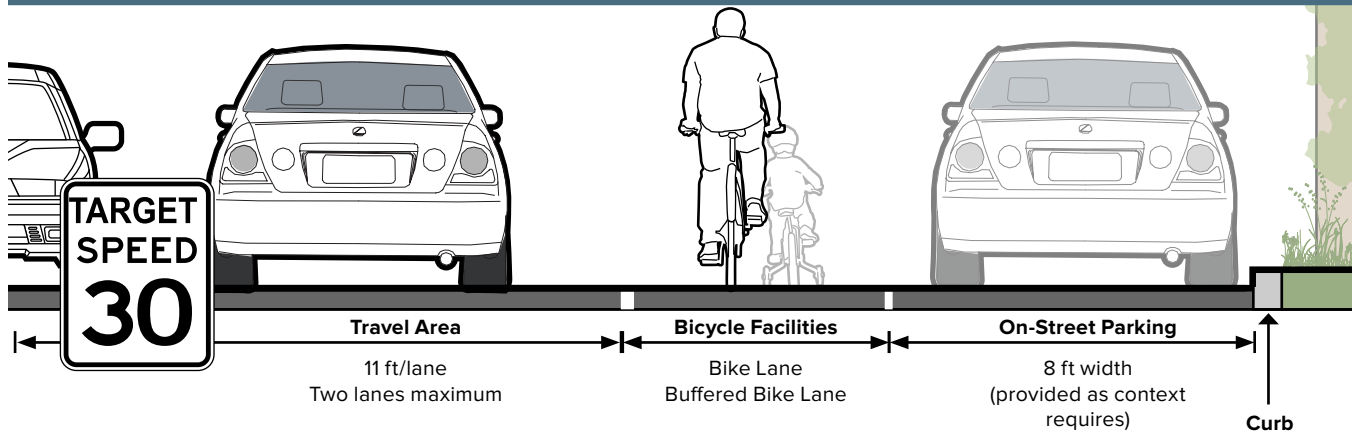
The recommended bikeway on a Neighborhood Connector street is a **bike lane** or **buffered bike lane**. In constrained conditions, **shared lane markings** may be necessary. Where additional comfort is desired, consider a **separated bike lane** or **sidepath**.

Pedestrian Network

Sidewalks are required on Neighborhood Connector streets. A **sidepath** may be provided in place of a sidewalk.



Cartway



Neighborhood Connector: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	<ul style="list-style-type: none"> Sidewalks 	N/A	<ul style="list-style-type: none"> Curb 	<ul style="list-style-type: none"> Center Line Striping (double yellow)
High Priority	<ul style="list-style-type: none"> Bike lane Buffered bike lane 	N/A	<ul style="list-style-type: none"> Planting strip Street lighting Street trees 	N/A
Appropriate in Limited Circumstances	<ul style="list-style-type: none"> Sidepath Shared lane markings Separated bike lane 	<ul style="list-style-type: none"> Mid-block crosswalk Bus shelter Raised speed reducer Pedestrian Refuge Island Curb extension / bulb out 	<ul style="list-style-type: none"> On-street parking Shoulder Furnishing zone 	<ul style="list-style-type: none"> Priority Emergency Route
Not Required	<ul style="list-style-type: none"> Bike racks Bike corral 	<ul style="list-style-type: none"> Bus pull-off 	N/A	N/A
Not Appropriate	<ul style="list-style-type: none"> Signed bicycle route Bicycle boulevard Shared street 	<ul style="list-style-type: none"> Chicanes Yield street 	<ul style="list-style-type: none"> Median planting strip 	<ul style="list-style-type: none"> Loading zones Truck route

Street Class:

Primary Connector

Primary Connectors emphasize efficient travel between other connector and corridor streets. Turn lanes may be provided at intersections to keep traffic flowing smoothly. Dedicated bicycle facilities are considered a high priority.



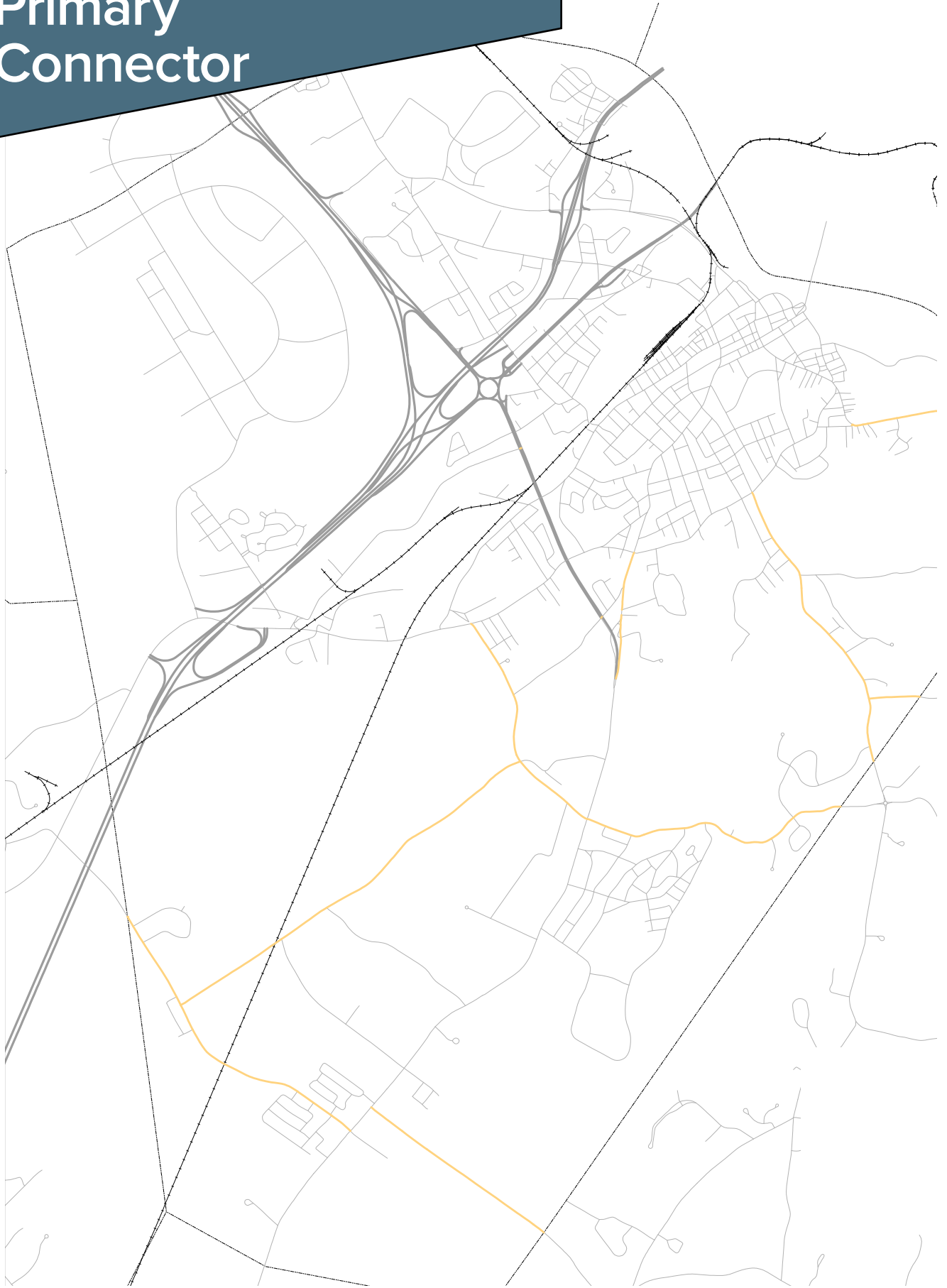
Typical Application

- Motor vehicle movement is prioritized, but bicycle facilities may be useful for providing multimodal access to job centers and other commercial destinations.

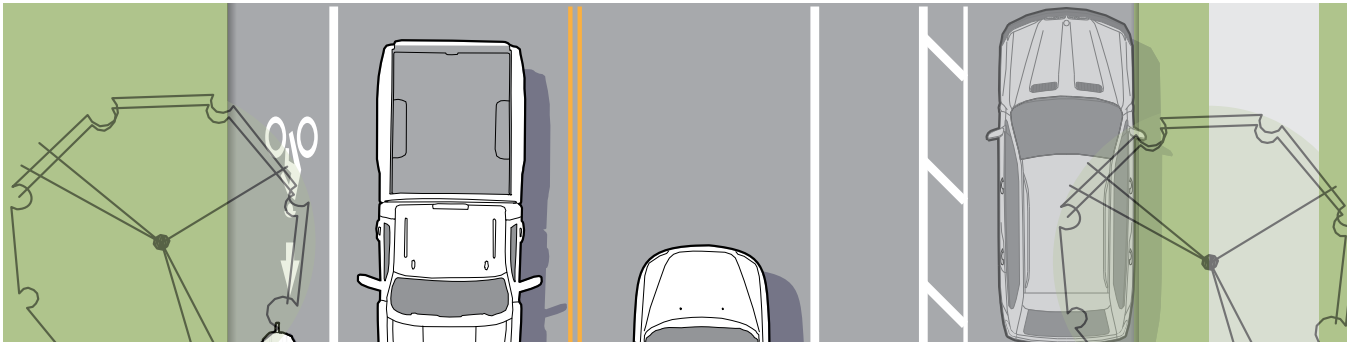
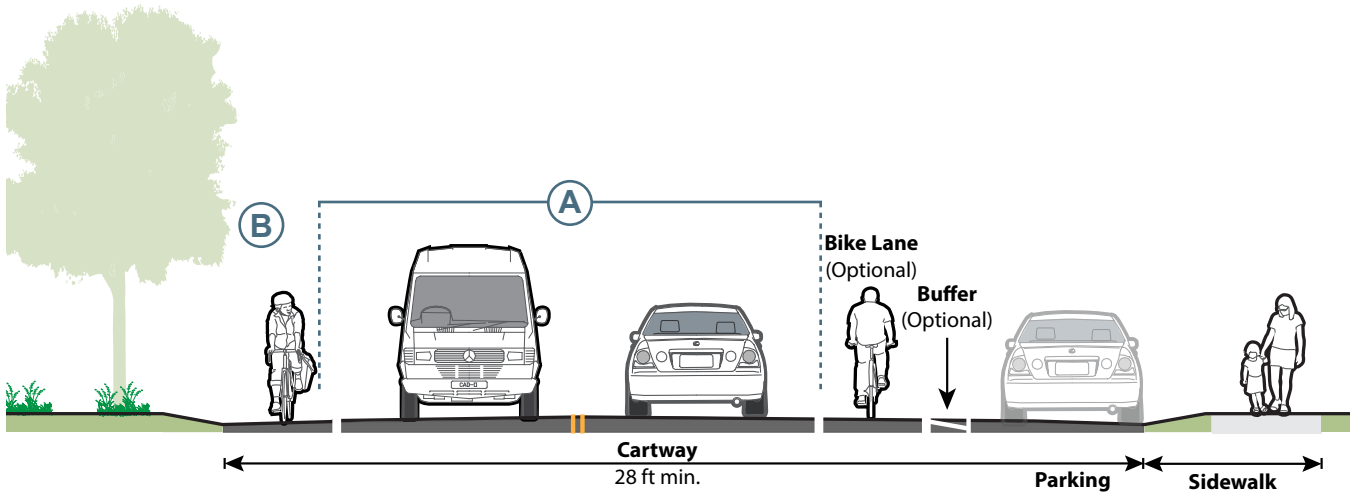


Despite higher speed and volumes, streets such as Elwyn Road can still accommodate a wide range of non-motorized users.

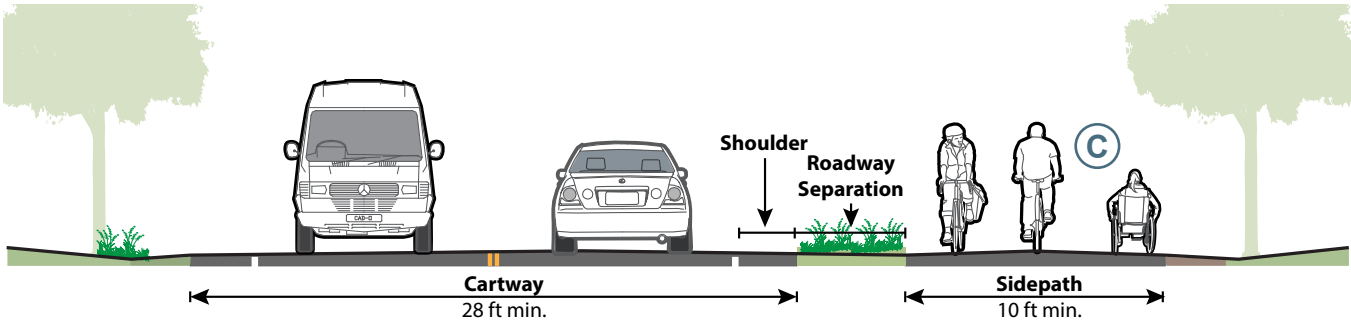
Primary Connector



Primary Connector: Typical Street Features



Primary Connector: Sidepath Alternative



Critical Design Features

- A** Two travel lanes.
- B** Bicycle facilities are preferred.

Additional Potential Design Features

- C** A sidepath may replace on-street facilities and sidewalks.
 - Turn lanes at intersections promote traffic flow.

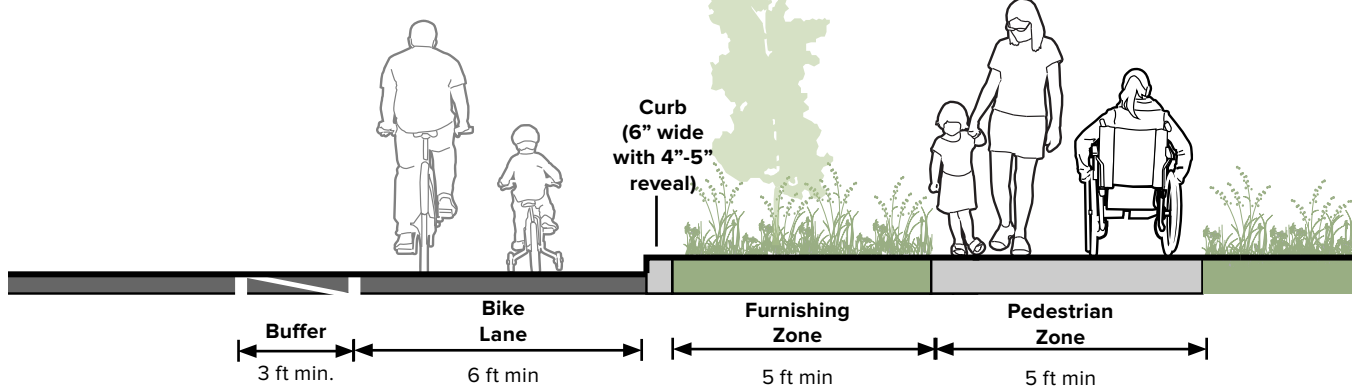
Primary Connector: Design Guidelines

Bicycle Network

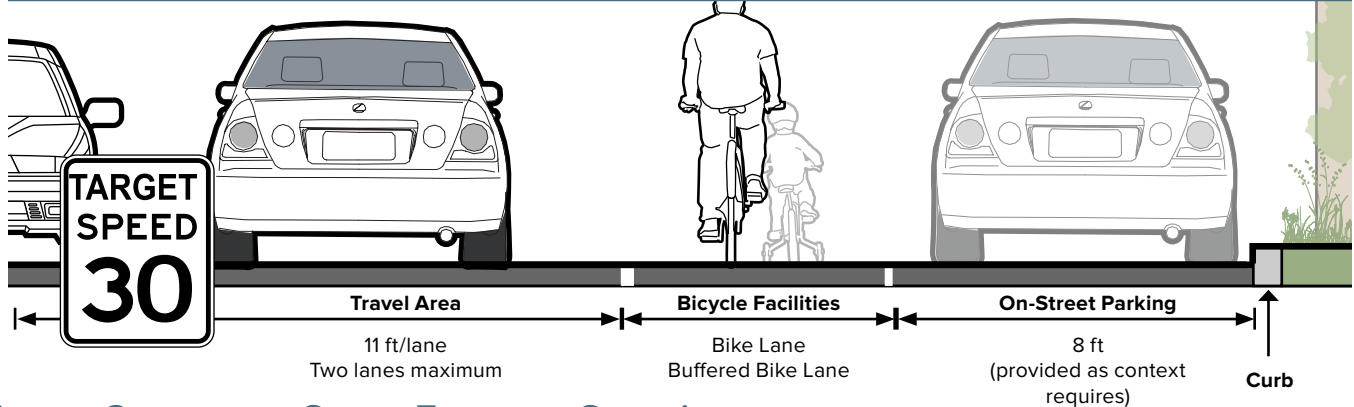
The recommended bikeway on a Primary Connector street is a **bike lane** or **buffered bike lane**. Where additional comfort is desired, consider a **separated bike lane** or **sidepath**.

Pedestrian Network

On Primary Connector streets, pedestrians will walk on **shoulders** in the absence of sidewalks. Provide **sidewalks** or a **sidepath** where pedestrian facilities are desired and/or appropriate.



Cartway



Primary Connector: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	N/A	N/A	• Shoulder	• Center Line Striping (double yellow)
High Priority	• Bike lane • Buffered bike lane	N/A	N/A	N/A
Appropriate in Limited Circumstances	• Sidepath • Separated bike lane • Sidewalks	• Mid-block crosswalk • Raised speed reducer • Pedestrian refuge island • Curb extension / bulb out	• On-street parking • Curb • Planting strip • Street lighting • Furnishing zone • Street trees	• Priority emergency route • Truck route
Not Required	• Bike racks	• Bus pull-off • Bus shelter	N/A	N/A
Not Appropriate	• Signed bicycle route • Shared lane markings • Bicycle boulevard • Bike corral • Shared street	• Chicanes • Yield street	• Median planting strip	• Loading zones

Street Class:

Gateway Corridor

Gateway Corridors are the higher-speed entrance/exit roadways to and from the City of Portsmouth. The street is configured with 2-4 lanes for traffic flow, as their primary function is the efficient movement of motor vehicles. Sufficient accommodations should be made for pedestrians, bicyclists and transit users along these routes where they are expected.



Typical Application

- To provide high speed and high volume connections to freeways.
- Serve as transitions between auto-only freeways, and multimodal connector streets.

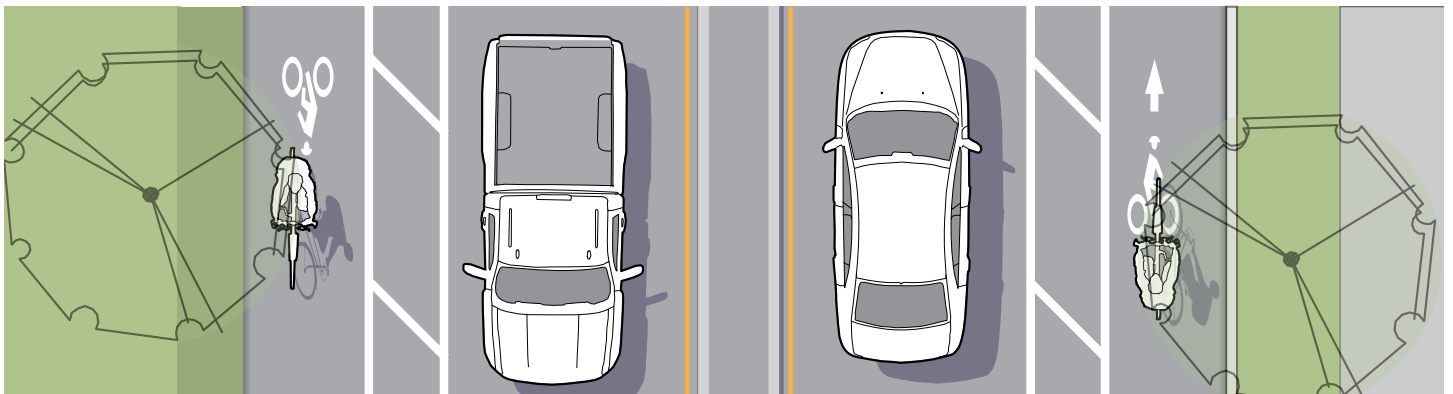
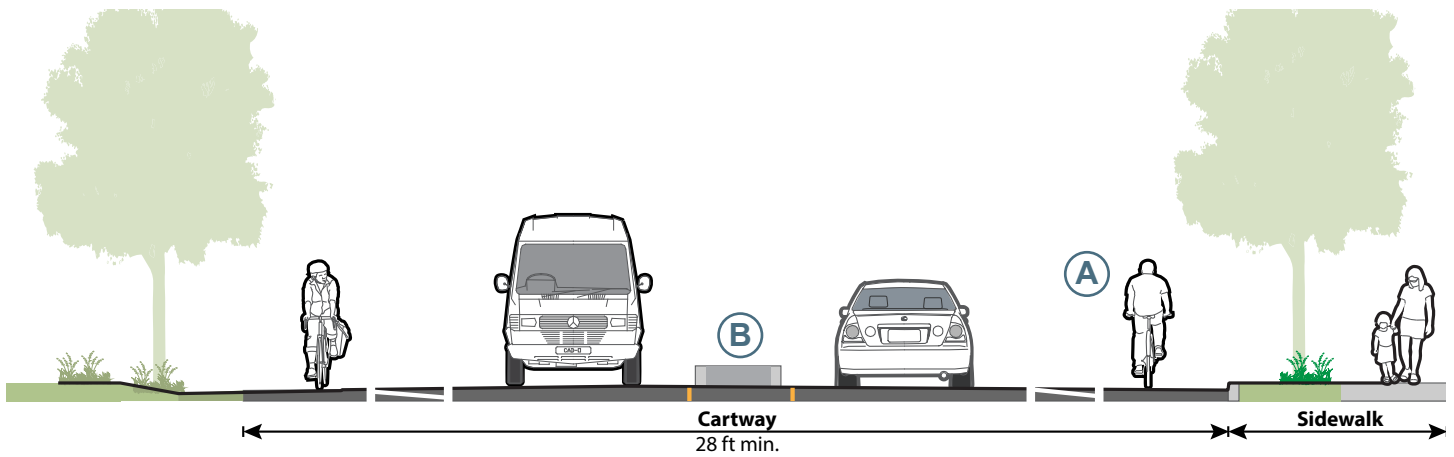


Medians can allow for enhanced pedestrian crossings.

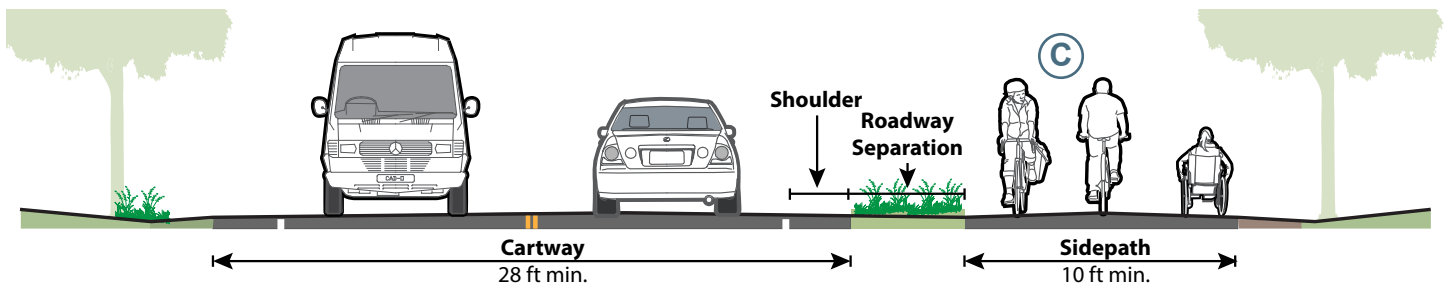
Gateway Corridor



Gateway Corridor: Typical Street Features



Gateway Corridor: Sidepath Alternative



Critical Design Features

- A** A separated bike facility, such as buffered bike lanes or a sidepath, is preferred.
- B** Medians (with a median planting strip where space is available).
 - No on-street parking.
 - Bus pull-outs and shelters.

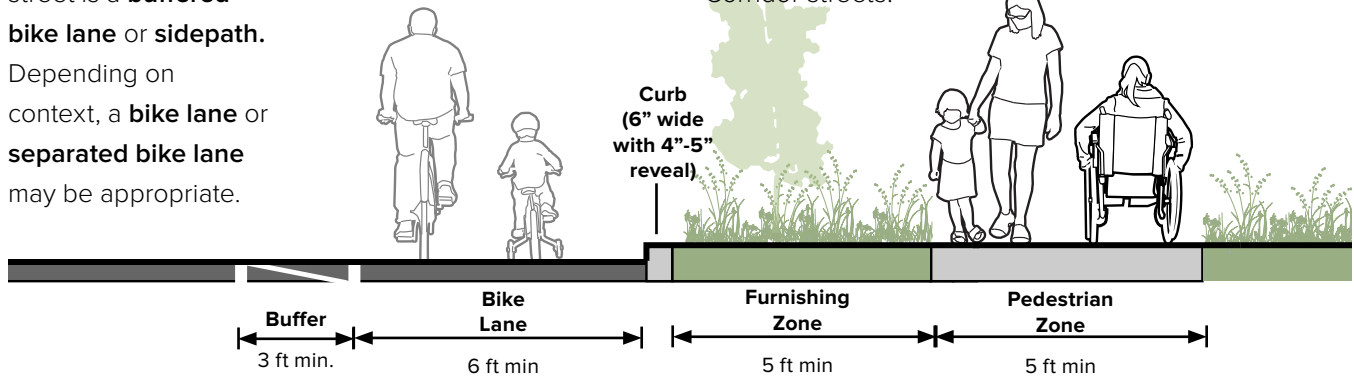
Additional Potential Design Features

- C** A sidepath may replace on-street facilities and sidewalks.
 - A median can enhance safety and aesthetics.
 - Turn lanes at intersections promote traffic flow.

Gateway Corridor: Design Guidelines

Bicycle Network

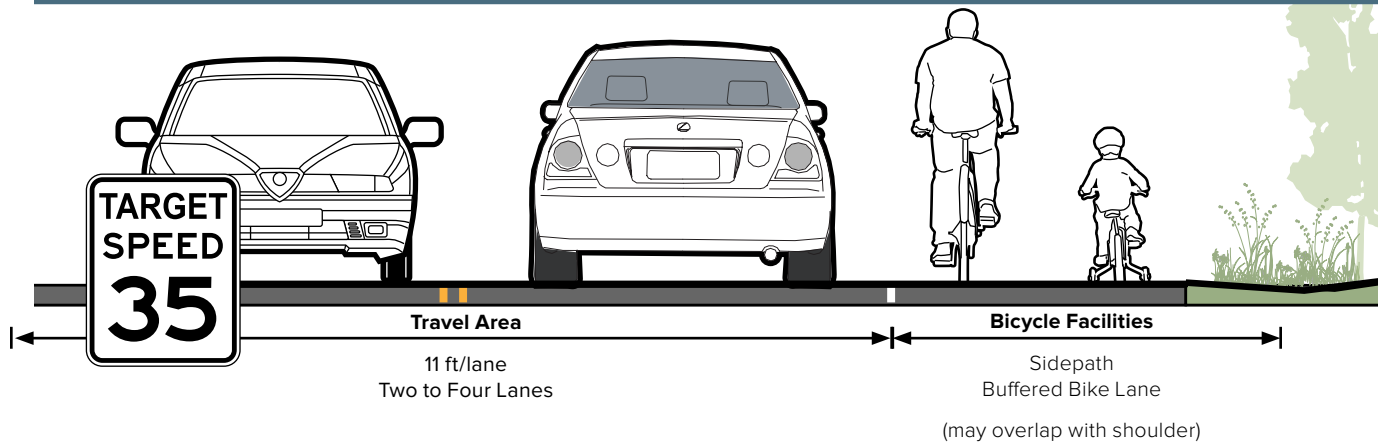
The recommended bikeway on a Gateway Corridor street is a **buffered bike lane** or **sidepath**. Depending on context, a **bike lane** or **separated bike lane** may be appropriate.



Pedestrian Network

Sidewalks or **Sidepaths** are recommended on Gateway Corridor streets.

Cartway



Gateway Corridor: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	N/A	N/A	<ul style="list-style-type: none"> Shoulder 	<ul style="list-style-type: none"> Center Line Striping (double yellow)
High Priority	<ul style="list-style-type: none"> Sidepath Buffered bike lane Sidewalks 	<ul style="list-style-type: none"> Bus pull-off Bus shelter Pedestrian refuge island 	<ul style="list-style-type: none"> Planting strip Street lighting Street trees Median Planting Strip 	<ul style="list-style-type: none"> Priority emergency route Truck route
Appropriate in Limited Circumstances	<ul style="list-style-type: none"> Bike lane Separated bike lane 	N/A	<ul style="list-style-type: none"> Curb Furnishing zone 	N/A
Not Required	<ul style="list-style-type: none"> Bike racks 	<ul style="list-style-type: none"> Curb extension / bulb out 	N/A	N/A
Not Appropriate	<ul style="list-style-type: none"> Signed bicycle route Shared lane markings Bicycle boulevard Bike corral Shared street 	<ul style="list-style-type: none"> Mid-block crosswalk Raised speed reducer Chicanes Yield street 	<ul style="list-style-type: none"> On-street parking 	<ul style="list-style-type: none"> Loading zones

Street Class:

Industry/Business Park Access

Industry/Business Park Corridors provide access to major employment centers. These streets have a significant transportation connectivity function and serve as a destination for commercial activity. Roadway priorities should be balanced among motor vehicles, transit, bicyclists and pedestrians. The accommodation of large trucks should be a design consideration in primarily industrial areas.

These streets tend to be auto-oriented, and separated bicycle and pedestrian facilities are necessary to create a comfortable walking and bicycling environment.



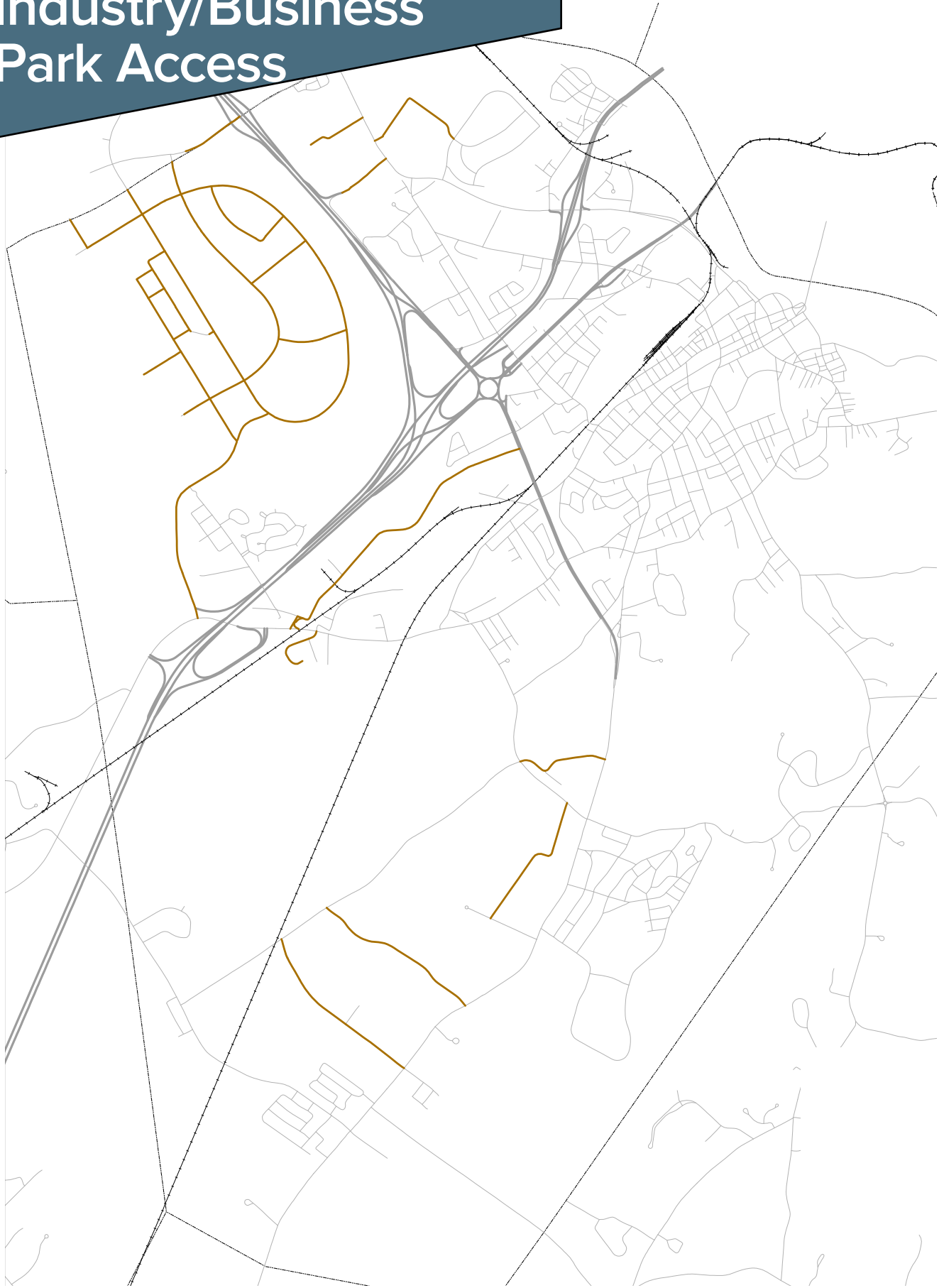
Typical Application

- Serves freight and commercial vehicle activity areas.
- May serve pedestrian and bicycle activity where businesses are in close proximity and adequate facilities are provided.

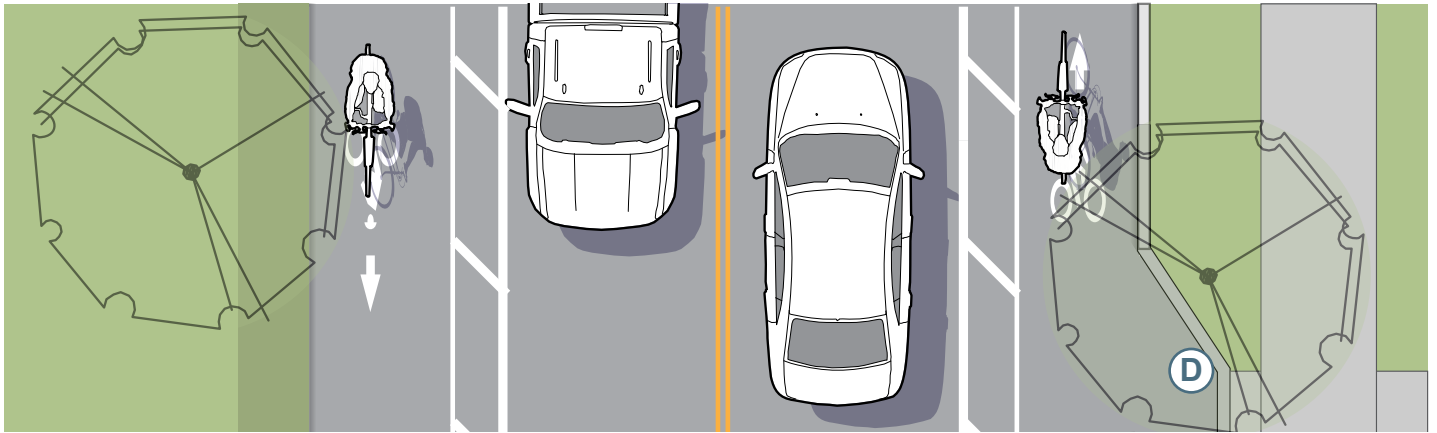
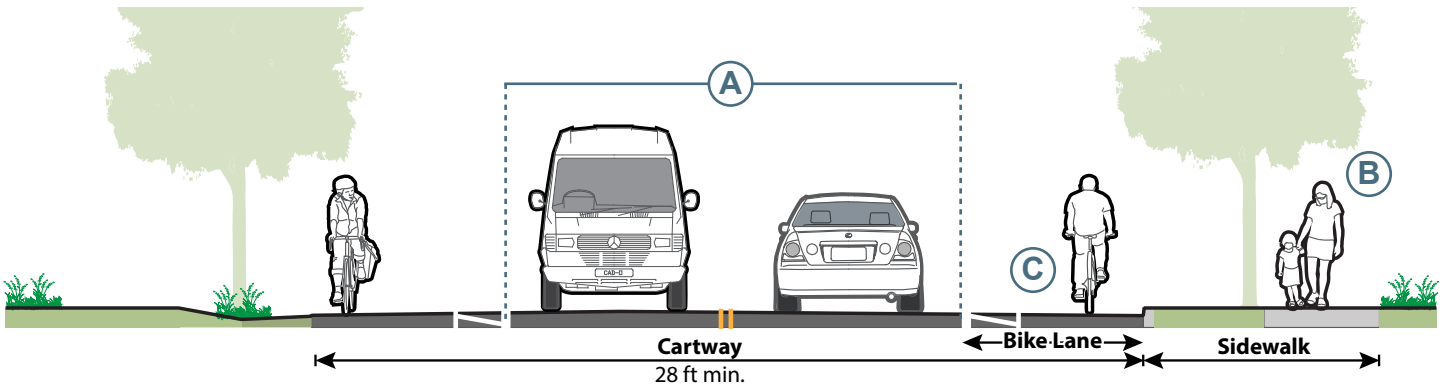


Heritage Ave is a typical example of this roadway typology in Portsmouth.

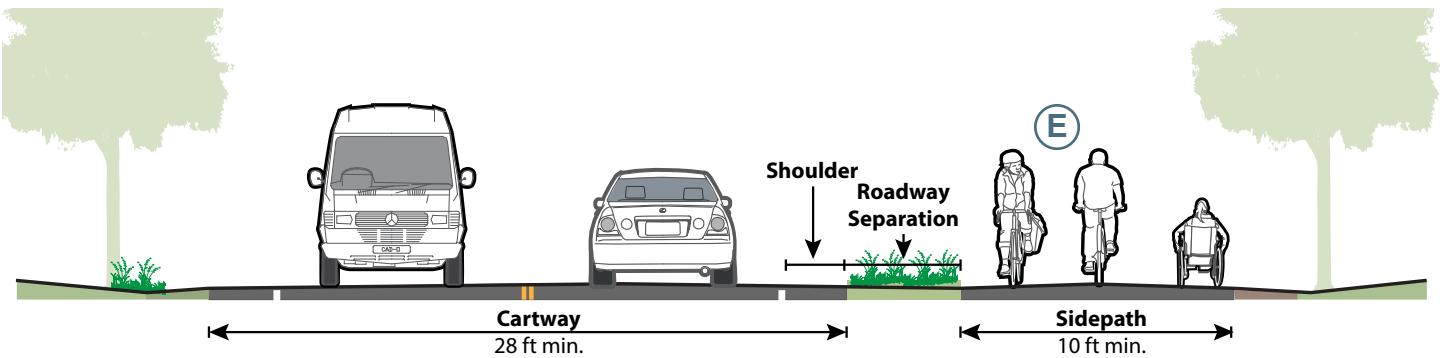
Industry/Business Park Access



Industry/Business Park: Typical Street Features



Industry/Business Park: Sidepath Alternative



Critical Design Features

- (A)** Appropriate roadway design for designated truck routes.
- (B)** Sidewalk should be provided in the vicinity of business park clusters to connect to transit and other businesses.
- (C)** Buffered or separated bike lanes are preferred.
- (D)** Bus pull-outs and shelter.

Additional Potential Design Features

- (E)** A sidepath may replace on-street facilities and sidewalks.
 - A median can enhance safety and aesthetics.
 - Turn lanes at intersections promote traffic flow.

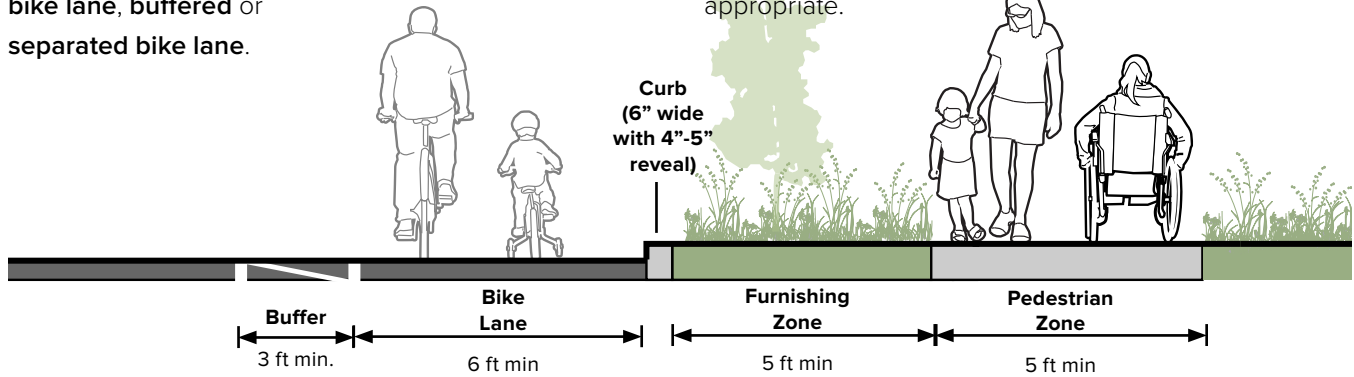
Industry/Business Park: Design Guidelines

Bicycle Network

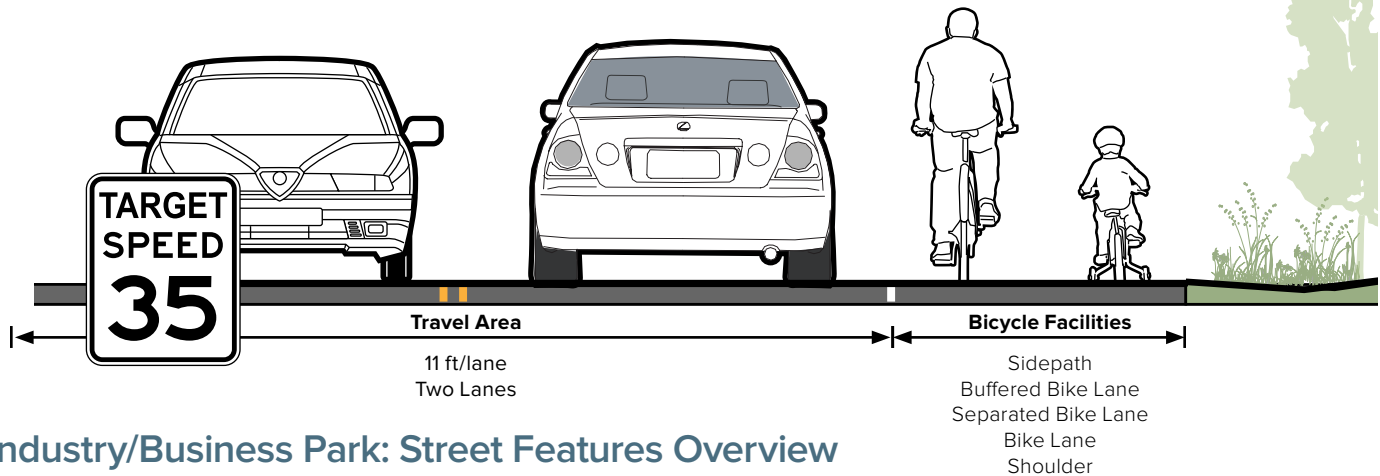
No bikeway is required on Industry/Business Park Access streets. Where appropriate, consider **sidepath**, **bike lane**, **buffered** or **separated bike lane**.

Pedestrian Network

Sidewalks are recommended on Gateway Corridor streets. A **sidepath** may also serve pedestrians where appropriate.



Cartway



Industry/Business Park: Street Features Overview

	Bicycle and Pedestrian Enhancements	Traffic Calming	Curbside Management	Traffic Management
Required	N/A	N/A	• Shoulder	• Center Line Striping (double yellow)
High Priority	• Sidewalks	• Bus pull-off • Bus shelter	N/A	• Priority emergency route • Truck route
Appropriate in Limited Circumstances	• Sidepath • Bike lane • Buffered bike lane • Separated bike lane	• Mid-block crosswalk • Pedestrian refuge island	• Curb • Planting strip • Street lighting • Furnishing zone • Street trees • Median planting strip	N/A
Not Required	• Bike racks	• Curb extension / bulb out	N/A	N/A
Not Appropriate	• Signed bicycle route • Shared lane markings • Bicycle boulevard • Bike corral • Shared street	• Raised speed reducer • Chicanes • Yield street	• On-street parking	• Loading zones



U.S. Department of Transportation
Federal Highway Administration

ROAD BUSINESS



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Vol. 6 No. 1

March, 1991



Above: At first glance, Stark, New Hampshire looks like a typical small New England town with a historical covered bridge... From left to right are Joe Dennehy, Cindy Boivin, and Bob Fink.

On The Road In New Hampshire

High technology at a low price drives the small northern town of Stark

The town of Stark is a charming little town in the northern part of New Hampshire. It got its start in 1774 and last year they had five marriages and seven new babies born. At first glance an outsider might not think much more about Stark. However, if you were to look a little deeper you would find a degree of creativity and

ambition surpassing some of the best -- and they don't just work hard... they work smart.

For less than \$3,000 Stark automated their town. They use an \$80 program (Checks & Balances) to handle all of their vendor and payroll checks. The same program provides financial reports when needed and it includes a built in rolodex of vendors -- "One entry does it all!" They have a \$99 program (Form Finisher) to handle all of their titles and car registrations. They're able to manage all of their tax needs and respond quickly and easily to the State with necessary revenue and appropriation reports by using a program they developed themselves. Their general business needs such as letters and mailings are all handled with a word processing package (WordStar). And now, with minimum cost software available from the Technology Transfer Center, Stark is beginning to extend computer automation into their public works operation.

About three years ago one of Stark's selectman, Joe Dennehy, realized that the way the town was doing business was inefficient "both in terms of time and accuracy." His answer was to computerize some of their basic administrative activities. "I knew just enough about computers to know that anything was possible," said Joe. He new something else also, he new that a lot could be accomplished for only a small amount of capital.

After buying one small desk-top computer system and couple of software packages Stark was is business. "Some towns spend \$50,000 to \$100,000 and end up with a nightmare," mentioned Bob Fink, town tax collector. "A complete computer

continued on p. 3

Facts About Controlling Traffic

Some important considerations to make before making changes in signing

There seems to be a misconception among the general public that if there is a situation with which they are not pleased, the solution is a new regulation. This way of thinking even spills over into traffic control. More and more, local traffic authorities and government officials are faced with demands from the public to use signing to solve traffic situations that they perceive as problems. This article is directed to those who may be called upon to address such

continued on p. 2

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situations.

Listed below are five of the most common requests by the general public as ways to provide traffic control. The following information, compiled by the Traffic Improvement Association of Oakland County, Bloomfield Hills, Mich., should be considered before any changes in signaling are implemented.

A signal will cut accidents at our intersection, right?

Traffic signals do not always prevent injuries and can actually increase the number of accidents and severe injuries. When used incorrectly, there is a decrease in right angle collisions but an increase in total accidents, especially rear-end collisions. And with a signal installed, pedestrians may be lulled into a false sense of security.



In deciding whether or not a signal will be an asset or a liability, traffic engineers must consider the following:

1. Does the number of vehicles on intersecting streets create confusion or congestion?
2. Is the traffic on the main street so heavy that drivers on the side street try to cross when it is unsafe?
3. Does the number of pedestrians crossing a busy main street cause confusion, congestion or hazardous conditions?
4. Does the number of school children crossing the street require special controls for their protection? If so, is a traffic signal the best solution?
5. Will the installation of a signal allow for continuous, uniform traffic flow with a minimum number of vehicle stops?
6. Does the intersection's accident history indicate that a signal will reduce the possibility of a collision?

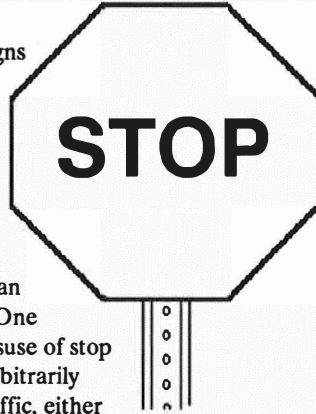
Traffic engineers compare the existing conditions against nationally accepted minimum standards established after many years of studies throughout the country. At intersections where standards have been

met, signals generally operate effectively with good compliance. Where not met, compliance is generally reduced resulting in additional hazards.

In a nut shell, a properly placed traffic signal improves the flow and decreases accidents. An unnecessary signal can be a source of danger and annoying to all who use the intersection.

Maybe a stop sign will slow traffic on our street!

Stop signs installed in the wrong place for the wrong reason usually create more problems than they solve. One common misuse of stop signs is to arbitrarily interrupt traffic, either by causing it to stop or by causing such an inconvenience that motorists will find an alternate route. Studies show that stop signs installed for use as speed breakers do slow traffic in the immediate vicinity of the stop sign but actually increase speed in the area between the stop signs.



At the right place and under the right conditions, a stop sign tells drivers and pedestrians who has the right of way. Nationally recognized standards have been established to determine when stop signs should be used. These standards take into consideration, among other things, traffic speed and volume, sight distance, and the frequency of traffic "gaps" that allow safe vehicle entry or pedestrian crossing. Most drivers are reasonable and prudent. But, when confronted with unreasonable restrictions, they frequently violate them and develop a general contempt for all traffic controls - often with tragic results.

Why not lower speed limits to reduce hazards in our area?

An unrealistically low speed limit can actually lead to accidents. Here's why:

1. Many studies conducted over several all parts of have shown driver's fluenced appearance roadway vailing



decades in the country that a speed is in-more by the of the and the pre-traffic con-

ditions than it is by the posted speed limit.

2. Some drivers will obey the lower posted speed while others will feel it is unreasonable and simply ignore it. This disrupts the uniform flow of traffic and increases accident potential between the faster and slower drivers.

3. When traffic is traveling at different speeds, the number of breaks in traffic to permit safe crossing is reduced. Pedestrians also have a greater difficulty in judging the speed of approaching vehicles.

Speed limits should always be based on traffic engineering surveys, which include analysis of roadway conditions, accident records and the prevailing speed of prudent drivers.

Won't a "Children at Play" sign help protect our kids?

At first consideration, it might seem that this sign would provide protection for youngsters playing in a neighborhood. It doesn't.



Studies done in cities where such signs were widely posted in residential areas show no evidence of having reduced pedestrian accidents, vehicle speed or legal liability. In fact, many types of signs installed to warn of normal conditions in residential areas failed to achieve the desired safety benefits.

Further, if signs encourage parents with children to believe they have an added degree of protection -- which signs do not and can not provide -- a great disservice results.

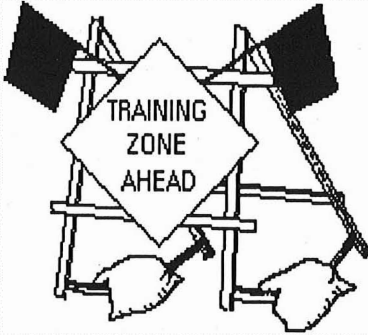
Obviously, children should not be encouraged to play in the roadway. The "children at play" sign is a direct and open suggestion that it is acceptable to do so. Federal standards discourage the use of "children at play" signs.

Specific warnings for schools, playgrounds, parks and other recreational facilities are available for use where clearly justified.

Did You Know?

Training is a MUTCD standard

Everyone should be familiar with the Manual on Uniform Traffic Control Devices (MUTCD) – if by chance you're not familiar with this publication give us a call and we'll assist you in getting a copy. As you know, the MUTCD has been adopted by the state of New Hampshire – please note that the state has printed an addendum to the MUTCD which supersedes specific standards (i.e. the size of a stop sign)... we can help you get a copy of this book also.



Complying with MUTCD standards is your best defense in a liability case. Likewise, non-compliance just about assures that you will experience an unfavorable verdict. When reading your manual keep in mind the words SHALL, SHOULD, and MAY.

- **SHALL** – indicates a *mandatory condition*. Where certain requirements in the design or application of the device are described with a “shall” stipulation, it is mandatory when an installation is made that these requirements be met.
- **SHOULD** – indicates an *advisory condition*. Where the word “Should” is used, it is considered to be advisable usage, recommended but not mandatory (i.e. you better have a pretty good reason for not doing it).
- **MAY** – indicates a *permissive condition*. No requirement for design or application is intended.

In Part VI, Construction and Maintenance, under 6A-6 Training, the MUTCD states the following:

Each person whose actions affect maintenance, construction, utility, and incident management zone safety – from the upper-level management personnel

*Controlling Traffic...
continued from p. 2*

Some Communities use speed bumps, why can't we?

The speed bump is an increased hazard to the unwary, a challenge to the dare devil, a disruption of the movement of emergency vehicles, the cause of an undesirable increase in noise, and a real problem to snow removal.

In Michigan, courts have held public agencies liable for personal injuries resulting from faulty design. Because of this, speed bumps have been rejected as a standard traffic control device on public streets in Michigan.

Also, testing of various designs have demonstrated the physical inability of a speed bump to control all types of light-weight and heavy-weight vehicles. The driver of a softsprung sedan is actually encouraged to increase speed over a bump that may cause other motorists to lose control.

The control of speeding in residential neighborhoods is a widespread concern that requires persistent law enforcement efforts, not speed bumps.

The above article came from the KS T² Center's, KUTC Newsletter, Vol.12, No.4, 11/90. For more information on signing and standards in New Hampshire consult your MUTCD or call the New Hampshire Technology Transfer Center at 1-800-423-0060. ●

through field personnel – **SHOULD** receive training appropriate to the job decisions each individual is required to make. Only those individuals who are qualified by means of adequate training in state traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the MUTCD, should supervise the selection, placement, and maintenance of traffic control devices in work and incident management areas.

Keep your eyes open for T² training on work zone safety. We are developing a course in cooperation with NHMA-PLIT. The course will expose you not only to the different traffic control devices required in a work zone but to the everyday management and on-the-job decisions you may have to face. Even if you attended our last work zone seminar/workshop this one will be worth your while. ●

Quick and Easy Pothole Repair

Using fabric to keep a patch in place



Jerry Erickson of Oregon Highway's Region 2 District 3 (Newberg) has been using special types of fabrics such as Petrotac and Polyguard in temporary patching of potholes. To Jerry, a temporary patch is anything lasting up to two years.

He has had excellent results with this simple four-step procedure:

- (1) Fill the pothole as completely as possible with standard premix.
- (2) Wheel roll the premix to compact.
- (3) Cover the premix filled area with a layer of fabric extending about 3" beyond the edges of the patched area.
- (4) Wheel roll fabric.

A 2-1/2" deep pothole repaired this way eight months ago in an area of high traffic volume (30,000 ADT) has not required attention. Jerry is enjoying similar success at a dozen other locations and is looking at other uses for the fabrics.

Sometimes Jerry gets a chance to go back and make a more permanent patch. All he has to do is pave right over the temporary patch made with the fabric. The real advantage of using these types of fabric when patching is that they help to keep the patch material in the hole and prevent moisture from entering.

Jerry is now looking at other uses for these fabrics. Six months ago, he placed fabric over a badly alligatored area. The Fabric-covered area held together while adjacent areas continued to deteriorate.

The above article was edited from, Oregon Roads, Oregon Technology Transfer Center Newsletter, Winter 1988. ●

Where to Place Marked Crosswalks? It Depends!

Crossing roads is dangerous. Motorists must slow or stop to enable safe pedestrian traffic. Marked crosswalks are one way to provide pedestrians the right of way. Improperly placed, however, they can put pedestrians at great risk.

MUTCD Section 3B.17 has specific standards and recommendations for marking crosswalks. (See page 11 to obtain a copy of the MUTCD.) Less clear is where to place them. This article will discuss the factors to consider in these decisions. It draws from a recent FHWA report of pedestrian injuries at intersection and midblock locations.

What is a Marked Crosswalk?

A "marked" crosswalk has lines of paint, thermoplastic, tape, or other material. The lines themselves legally define a crosswalk. At intersections, laws define a crosswalk whether or not marked. A crosswalk is that part of an intersection that connects sidewalks on opposite ends of a road. If there is a sidewalk on only one side, the crosswalk is in line with it to the other side.

Principally markings, but also other devices, help pedestrians and motorists define where crosswalks exist. Motorists expect to drive at the posted speed between intersections. They look for cars more than pedestrians at intersections. The MUTCD and state rules require marking other traffic control devices to alert drivers of crosswalks. (See *Road Business*, Fall 2001, p.1-2.) Whether or not they are marked, motorists are legally compelled to stop at intersection crosswalks. Some pedestrians walk on unmarked crosswalks expecting motorists to abide by that definition. When motorists don't, pedestrians get hurt.

The FHWA study also shows that pedestrians are often hurt at marked crosswalks. They guide pedestrian to the best place to cross. They show motorists and pedestrians that a legal crosswalk exists at a particular location. Where to place them depends on many factors.

The Factors

As expected, researchers found that pedestrian injuries were fatal or more serious on roads above 35 mph than below it. Unexpected *Road Business*, Fall 2002, Vol. 17, No. 3

was the finding that speed limit was not a significant factor for crash frequency. The following factors did influence pedestrian crash rate.

Pedestrian and motorist differing definitions of a crosswalk.

Whether the crosswalk is marked or unmarked.

Vehicle traffic volume.

Pedestrian traffic volume.

Number of vehicle travel lanes.

Other treatments, such as curb extensions, raised crossing islands, traffic and pedestrian signals, roadway narrowing, enhanced overhead lighting, and traffic calming measures.

Recommendations for Marked Crosswalk

Agencies should use marked crosswalks with the "other treatments" described above. Cities and towns should consider marked crosswalks for the following conditions.

- Where vehicular traffic, when stopping for a stop sign or red light, might block pedestrian traffic. (Also note the location of the stop line; see *Road Business*, Summer 2002, p.6-7.)
- At non-signalized street crossing locations in designated school zones.

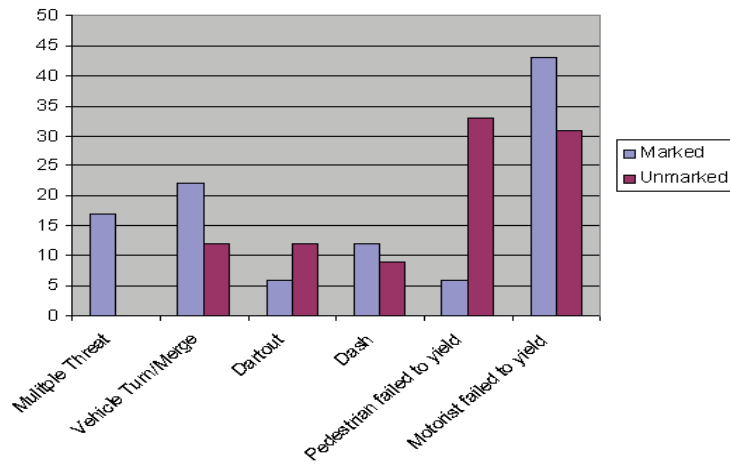
At other non-signalized locations, many of the above factors influence pedestrian crash frequency. Municipalities should, therefore, seek assistance of a traffic engineer. Properly placed, marked crosswalks increase pedestrian safety and mobility. Improperly placed, the municipality has placed pedestrians at risk of serious, at times fatal, risk.

Source:



Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines.
FHWA-RD-01-075, Federal Highway Administration, McLean VA
March 2002

Are Marked Crosswalks Safer?



- Two lane roads;
- Multi-lane roads without raised medians and average daily traffic volume below 12,000;
- Multi-lane roads with raised medians and average daily traffic volume below 15,000.

Surprisingly, there was a significant increase in crashes on roads with marked (versus unmarked) crossings under the following conditions:

- Multi-lane roads without raised medians and average daily traffic volume about 12,000;
- Multi-lane roads with raised medians and average daily traffic volume above 15,000.

Marked crosswalks are thought to increase visibility and therefore, pedestrian safety. But do they in every case? This article shares the results of a University of North Carolina study to determine how marked crosswalks affect pedestrian safety where there is not a signal or stop sign. These are called uncontrolled crossings.

Study Objective and Methods

The five year study, compared pedestrian crash data at marked crosswalks and unmarked crossing areas at uncontrolled intersections. Data were collected from 2,000 sites (half marked) in 30 cities. Marked crosswalks were compared with nearby unmarked crossing. Many of the marked and unmarked crosswalks were at opposite sides of the same intersection. Data were not collect at school crossing.

To compare safety between marked and unmarked crosswalks, data was collected on traffic volume, pedestrian exposure, number of lanes, median type, speed limit, and other variables. Crash causes were also examined (see above).

The Results

Results indicate no difference in pedestrian safety between marked and unmarked crosswalks at uncontrolled locations under the following conditions:

Speed, Lanes, Type of Marking

Speed was not found to be related to crash frequency although 93% of study sites had posted speeds 25 to 30 mph.

Multi-lane crossing had higher crash rates than two-lane crossing. For both marked and unmarked multi-lane crossing, those with raised medians or raised crossing islands had lower pedestrian crash rates than the multi-lane crossings without them.

Type of crosswalk marking pattern (parallel lines, zebra stripes, etc...) had no effect on pedestrian crash rate.

MUTCD Guidelines

The Manual of Uniform Traffic Control Devices (MUTCD) does not give specific guidelines for when marked crosswalks should be used at uncontrolled intersections. Instead, its guidance includes:

- Crosswalk width should not be less than 6 feet;
- Crosswalk marking should be provided at points of pedestrian concentration, such as at loading islands, mid block pedestrian islands, and/or where pedestrians need assistance in determining the proper place to cross the street.

According to the MUTCD, "Crosswalk lines should not be used indiscriminately. An engineering study should be performed before they are installed at locations away from traffic signals or STOP signs."



Study Conclusions

The report finds that "under no condition was the presence of a marked crosswalk alone at an uncontrolled location associated with a significantly lower pedestrian crash rate compared to unmarked crosswalks." It makes a strong argument for not spending funds to mark crosswalks to improve safety at uncontrolled intersections. However, marked crosswalks are appropriate in a few cases (e.g. selected low-speed, two-lane streets at downtown crossing locations).

The effectiveness of a marked crosswalk increases when coupled with islands. Therefore, measures such as installing pedestrian refuge islands and reducing street crossing distance should be considered instead of or along with crosswalk markings.

Source:

Are Marked Crosswalks Safer? Mass Interchange, Bay State Roads

Exercise helps you think better and faster

If your job requires good judgment and quick thinking, then exercise regularly.

Regular exercise, according to studies, increases brain function. Exercise also reduces anxiety and depression and helps to ward off the mental effects of aging.

A report published in the *Journal of Exercise Physiology* compared fitness scores to state-mandated test scores and found the fittest students had the highest scores on the academic test.

A study of the cognitive consequences of exercise published in the journal *Acta Psychologica* shows that exercise facilitates thinking, especially information processing.

Other research shows that exercise can make the brains of older people act younger. Magnetic resonance imaging before and after six months of aerobic exercise show that the brain activity of older people was similar to that of 20 year olds, according to the University of Illinois.



Technology Transfer Center
New Hampshire LTAP at UNH

Sick Time

Does a hacking and sneezing co-worker make you grimace? According to Ron Goetzel, the director of Cornell University's Institute for Health and Productivity, you probably should. Why? It's likely that person is going infect others as well.

Here are a few ways to stay healthy in the office, even when co-workers are not.

- Keep a clean desk, disinfect it every day.
- Clean your desktop tools: phone, mouse and pad, and other items touched regularly.
- Wash hands frequently, for 20 to 30 seconds with soapy water.
- Keep tissues on hand for sneezes and to muffle coughs.
- Stay in good general health. Get enough sleep, eat a healthy diet, and drink lots of liquids.
- Maintain a regimen of cleanliness at all times. People are more contagious before they show symptoms and after their symptoms are gone.



Source:

Cornell local Roads Program, Winter 2006, p. 2

<http://www.seroundtable.com/archives/sick-in-bed-green-small.gif> December 9, 2006

The STOP (R1-1) Sign and Supplemental Devices

Proper Placement, and Only When Necessary, Are Essential



Figure 1. A properly installed STOP(R1-1) sign stop line, and crosswalk.

Motorists must always stop at a STOP (R1-1) sign. Moreover, motorists and pedestrians expect them to stop. Proper placement is essential to inform road users and to preserve respect for the most important of traffic signs. User respect is also maintained by installing STOP signs only when necessary.

This article describes how municipalities should install STOP and supplemental signs and pavement markings. It also discusses using STOP signs to control speed.

First a note about the Manual on Uniform Traffic Control Devices (MUTCD). It governs traffic control devices with standard, guidance, and option statements of practice. In this article the words "shall" or "required" are used for standard statements, "should" or "recommend" for guidance, and "may" or "permitted" for option.

Sign and Marking Installation

Figure 1 shows one of three STOP signs at a T-intersection. It illustrates a properly installed set of traffic control devices.

The STOP sign has the required white on red retroreflective sheeting and standard letters. It is 30 by 30 inches, the required size for conventional roads. It is located on the right side of the traffic lane, and as close as practical to the intersection. The lateral offset (measured from the road or shoulder edge to the near edge of the sign) is 6 feet, the required minimum.

The almost 6 foot mounting height (measured from the pavement edge to the bottom of the sign) exceeds the required 5 foot minimum for "rural districts." The MUTCD requires 7 feet "where parking or pedestrian movements occur" to reduce the risk of pedestrians hitting the sign. In this instance, the sign height and distance off the sidewalk achieves this purpose.

The 3-Way (R1-3) supplemental plaque is required where STOP signs control all approaches. In Figure 1 it is in poor condition and should be replaced. It shall be 12 by 6 inches, white letters on a red background, and retroreflective. It may have a mounted height a foot less than the STOP sign.

The painted stop line is properly installed. It is the required solid white line extending across the approach lane. As recommended it is 12 to 24 inches wide with similar spacing, and is placed where the road user should stop. Being 4 feet in advance of the crosswalk, it conforms to the NHDOT Standard. (Without a marked crosswalk, the stop line should be placed at the desired stopping point, and between 4 and 30 feet from the nearest edge of the intersecting travel way.)

The crosswalk shown is the MUTCD Standard. The crosswalk lines are the required white stripes between 6 and 24 inches wide with similar spacing. They are the recommended 6 feet (at least) in length. (Two other layouts are permitted; see MUTCD Figure 3B-15.)

The crosswalk shown is the MUTCD Standard. The crosswalk lines are the required white stripes between 6 and 24 inches wide with similar spacing. They are the recommended 6 feet (at least) in length. (Two other layouts are permitted; see MUTCD Figure 3B-15.)

The Stop Ahead (W3-1a) sign is required where a STOP sign is not visible for a sufficient distance for motorists to respond. MUTCD Table 2C-4 provides recommended distances. For the 35 mph road in Figures 1 and 2, the recommendation is 150 feet. At that distance the illustrated STOP sign is visible, but the W1-3a is still permitted. With the foliage and unexpected need to stop, the



Figure 2. A properly installed Stop Ahead (W3-1a) sign.

Stop Ahead sign is probably a good idea. The Stop Ahead sign, at 160 foot from the STOP sign, exceeds the recommended warning to motorists.

The W3-1a sign in Figure 2 is of the required size (30 x 30 inches), color (yellow with black and red symbols) and offset (greater than 6 feet). Here too, the 6 foot mounting height is adequate. The MUTCD permits mounting on a utility pole.

This illustrates that more traffic control devices than the R1-1 are usually needed. All devices must be properly installed and maintained for motorist and pedestrian safety.

The STOP Sign as Speed Control

The MUTCD recommends STOP signs only when one of four conditions exists (Section 2B.05). It also states that “STOP signs should not be used for speed control.” The illustrated STOP sign, however, has that purpose. After a car struck a child, residents petitioned for a 20 mph speed zone. The Town Council was reluctant to set such a low speed limit. Instead, it directed the STOP sign be installed.

Municipal officials often face similar decisions. They must balance resident wishes against more effective, but also more expensive, ways to calm traffic. In the Figures 1 and 2 example, residents are generally happy with the STOP sign. Perhaps they don't appreciate that the road might not be significantly safer with it.

The Institute of Traffic Engineers (ITE) analyzed studies of speed before and after unwarranted STOP signs. They found that motorists

reduced speed only a short distance before such a STOP sign. Midblock speeds decreased slightly on average and in a few cases increase. Within several hundred feet past a STOP sign, many cars travel as fast as if no sign existed. Moreover, as motorists accelerated from the sign, they had reduced ability to stop for an emergency.

Vehicle acceleration also increases air pollution. In addition, overuse decreases motorist respect for this important sign. While the author took the Figures 1 and 2 pictures, 17 cars rolled through the STOP signs; one came to a complete stop. This is consistent with studies that show less than 10 percent of drivers actually stop for unwarranted STOP signs.

Speed humps, rounded raised areas placed across the road, can be effective speed control measures if properly designed and spaced. ITE has a recommended design for a 12-foot long speed hump, 3 to 4 inches high. The design speed is 15 to 20 miles per hour. Shorter humps act like speed bumps, which are no longer used due to many lost liability suits.

Speed hump spacing depends on the desired midpoint speed. For example, a 200 to 250 foot spacing is needed to have an average 20 mph midpoint speed. They cost from \$2000 to \$2500 each.

Speed tables, essentially long speed humps, are usually 22 foot long with a textured material on the flat section. Fire departments usually prefer them to speed humps. They slow the traffic less than speed humps.

Other speed control measures include narrowing parts of the road or deflecting traffic with chokers or islands. Some have been successful, and many have failed. One reason for failure is residential objection. These measures slow traffic by inconveniencing motorists. Residents, who drive the roads frequently, are most inconvenienced.

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Children at Play Signs

Seldom Effective, and Usually Unnecessary and Confusing

Warning signs call attention to unexpected conditions on or adjacent to a road. Conditions might require speed reduction or other actions in the interest of safety. Therefore, sign messages must be clear. *The Manual on Uniform Traffic Control Devices (MUTCD)* the standard for placing traffic signs ensures clear messages. It also emphasizes that drivers must respect traffic signs. This article will focus on Children at Play signs, which are often unclear and drivers tend to disrespect them.



Citizens often demand that Children at Play signs be installed on their street. They argue that the signs will reduce the risk of potentially tragic accidents. There is some merit to their concern. In a NCHRP study of pedestrian accidents, researchers found that over 40 percent of the accidents involved children. Almost two-thirds of those accidents occurred in residential areas other than intersections. The Children at Play sign, however, is rarely an effective solution.

The MUTCD requires that use of warning signs be based on an engineering study or on engineering judgment. Such a study could draw the following conclusions.

1. The Children at Play sign has little effect on driver behavior, which is seldom the cause of accidents. The NCHRP study reported that nearly 80 percent of the collisions involving children resulted from an unsafe or illegal act by the child. From that study, an ITE Traffic Control Devices Handbook author concluded that no traffic control device could be expected to protect a child.
2. Signs give parents and children a false sense of security. By relying on the sign, parents might monitor their children less closely. Children might interpret the sign to mean they can play in the

street. Thus, a Children at Play sign can contribute to the very accidents parents seek to avoid.

3. One Children at Play sign can lead to many such signs throughout a town. Nearly every block has children living on it. As stated in the MUTCD, "The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs."

4. Installing a Children at Play sign in response a citizen's request is based on political reasons rather than on sound engineering judgment.

5. Signs need to be maintained. They are expensive to purchase, install, and inspect.

Because they are confusing and fail to meet any recognized criteria for good signing, placing Children at Play signs can open a municipality to tort liability claims.

There are situations where road managers should consider signs to protect children. The MUTCD describes signs for school zones, pedestrian crossings, and playgrounds. It also contains signs for children with disabilities. The MUTCD signing for such areas conveys a clear message to drivers.

Children at Play signs, on the other hand, are usually ineffective, unnecessary, and confusing. For the reasons given above, they should not be used.

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Reducing Traffic Speeds

Speed Limits, Stop Signs, and Physical Road Alterations

Residents often complain that traffic speeds are too high. Lower speeds can reduce accidents, traffic noise, air pollution, and energy consumption. This article describes various ways to slow traffic on existing roads, and their affects.

Speed Limits

Lower Posted Speed Limits reduce traffic speeds only when accompanied by enforcement, speed watch programs, and/or portable speed display signs. Drivers generally ignore posted speed limits if, in their judgment, the speed is not reasonable.

Police Enforcement lowers traffic speeds when police consistently issue tickets. However, cities and towns must commit personnel for a long time. When enforcement ends, drivers will return to the prior speeds.

Residents support and encourage enforcement on “their” street. However, neighborhood speeders are usually the local residents. Community opinion can turn negative when police cite residents.

Speed Watch Programs rely on volunteers to use a radar unit, and record speeds. Some neighborhoods set maximum speeds. Police send letters to those whose speeds exceed these maximums.

Speeds typically go down during the watch, but rise when it ends. Residents often find that no significant problem exists. Even though speeders are usually local residents, they usually perceive these programs positively.

RSAs 262 and 263 restrict a governing body’s authority to set speed limits. Within those restrictions, a speed watch might be a low cost initial phase to slow speeders. Later phases can be the physical road alterations described below.

Portable Speed Display Boards show the speed limit and the driver’s travel speed. Studies show small speed decreases when the device is present. A few studies show increases as the device challenges some drivers to speed. Recorded data can help police target enforcement times.

STOP Signs

Some towns install STOP signs as an immediate, tangible, and inexpensive response to residents’ safety concerns. However, officials should note that STOP signs have some negative affects on safety. Speeds usually decrease only within about 100 feet before and after STOP signs. Drivers reach normal or higher speeds by midblock. While accelerating they take longer to stop for an emergency, such a child running into the street.

STOP Signs tell drivers where they must stop. Drivers tend to roll through “speed control” STOP signs. Many traffic engineers conclude that this disregard for STOP signs carries over to important STOP controlled locations.

For these and other reasons, the MUTCD recommends STOP signs only where engineering judgment indicates certain conditions. In Section 2B.05 it states “STOP signs should not be used for speed control.”

Community reaction is usually mixed. Some view STOP signs as a safety improvement. Others view them as limiting movement where they most frequently drive. In addition, air quality worsens, and fuel consumption and noise increase near STOP signs.

Physical Road Alterations

Street Narrowing is the real or apparent reduction of the pavement width. Towns can narrow a road in several ways.

- Removing pavement surface lowers speeds only where there is a large width reduction. In some areas, reducing widths to less than 28 feet has increased accidents.
- Chokers are curb bulbs or median islands that narrow a street. They lower speeds in their immediate area. After passing them, drivers accelerate to normal speeds. Chokers can increase snow removal costs.

- Pavement markings indicate narrower than actual travel lanes. They rarely reduce speeds. Where pavement marking better defines the travel way, speeds have increased

Pavement removal and chokers are costly.

Some towns include them in street beautification projects. Increased streetlights, landscaping, and activity also tend to slow motorists. Improved crossing point visibility and shorter street crossing time might improve pedestrian safety.

Speed Bumps, Humps, and Tables are raised areas in the roadway surface across the roadway. Speed bumps are 3 to 6 inches high with a length of 1 to 3 feet. Speed humps are 3 to 4 inches high and typically 12 feet long. Speed tables are essentially flat-topped speed humps, usually 22 feet long.

They all slow traffic. However, speed bumps can cause vehicle damage and loss of control. Traffic engineers strongly recommend AGAINST SPEED BUMPS.

Traffic engineers recommend speed humps only on streets where speed limits are 30 mph or less. Nationwide, agencies use speed tables on roads with less than 40 mph speed limits. In some places, fire departments have objected to speed humps, but found speed tables acceptable.

Both affect vehicle speeds along the road length when appropriately spaced. (See ITE, 1999, p. 63) If spacing is too far apart, speed decreases only in the immediate vicinity of the hump or table.

However, speed humps and tables often divert traffic, especially large trucks, to alternate routes. They can be uncomfortable for transit and school bus riders. Because humps and tables slow traffic, they reduce air quality impacts and energy use.

Most people living in the area initially favor speed humps and tables, but some tire of the inconvenience. Some cities require resident petitions and have a clear criterion for speed humps. (See Riverside CA. 1998., pp. 31-33)

Speed humps and tables are geometric design features. Officials should have engineers design their profile and spacing. Properly designed, they have

minimal affect on snowplowing and street sweeping.

Introducing Curves on previously straight alignment can take two different forms:

1. Reconstruct the street with a curved centerline alignment and a uniform roadway width;
2. Introduce chokers or barriers on alternate sides of the street to create a serpentine travel path. Speed changes little at curves if widths are uniform. There is some reduction near chokers and barriers. The closer the spacing the greater the speed reductions.

Engineers should design curves, chokers, and barriers. Vehicle flow and visibility issues can be complex. Pedestrian and bicycle traffic complicates design. Landscaping, often desired in such projects, can create visibility problems.

Speed Reduction and Costs

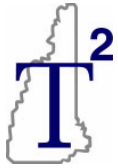
Police enforcement reduces traffic speeds, but can be expensive. Speed watch programs and display boards are relatively inexpensive but produce mixed and temporary speed reductions. STOP signs are cheap but reduce speeds only near the signs. The MUTCD and traffic engineers discourage their use for speed control.

Even though low cost, street narrowing by pavement marking is ineffective. Chokers and removing pavement surface have mixed effect on speeds. They have more affect when part of a street beautification project.

Properly designed speed humps and tables reduce speeds and have only initial significant cost. Introducing curves are usually even more expensive, and speed reduction depends on many factors.

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Figure 1. An improperly installed Speed Limit Sign (R2-1)

On the Road in New Hampshire

Setting and Posting Speed Limits

Federal and state laws require a technical study to set speed limits. However, in many cities and towns setting speed limits are often political decisions. Also, as shown in Figure 1, some municipalities improperly install speed limit signs. This article describes the rules and accepted process for setting and posting speed limits.

Speed Limit Determination

RSA 265:60 sets speed limits for certain areas. The road in Figure 1 is a “rural residence district” with a statutory speed limit of 35 mph. RSA 265:63 also gives municipalities the authority to modify the statutory speed zones. It and federal laws (MUTCD, 2B.11), however, limit that authority by requiring engineering and traffic studies. A municipality must hire a consultant

unless it has “sufficient staff” to conduct the investigation. That staff must have the time and expertise to consider the many factors in a speed limit study.

- Road characteristics, such as travel surface, shoulder condition, road alignment and sight distance, road and shoulder width, the number of lanes, and passing zones.
- Land use and numbers of driveways.
- The speeds of vehicles, and the “85th percentile speed” (85% of the traffic flows at or below the prevailing speed).
- Safe speed for curves and intersections.
- Parking practices and pedestrian activity.
- Vehicle volume, types, and characteristics.
- Weather and climate.
- Accident frequency and severity for the past 12 months.

Investigators must collect and analyze data for all the factors. The Vermont Local Roads Program’s *Setting Speed Limits* has worksheets for data collection and analysis. (See the UNH T² Center website to view this booklet, or page 9 to order it and applicable RSAs.)

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Investigators should also consider Advisory Speed Plaques (W13-1). They tell drivers that a lower speed might be necessary at curves, turns, intersections, and other local conditions. Although not enforceable, they add emphasis and information to other warning signs. The MUTCD requires that advisory speeds be determined by an engineering study.

A technically determined speed limit is usually the 85th percentile speed. Especially in modern residential developments, that speed might be dangerous to pedestrians and bicyclist. Lowering speed limits, however, are seldom the best solution. More than 15% of the drivers will then exceed speed limits. Many residents and pedestrians will have a false sense of security. Traffic calming techniques are usually a better solution. (See "Taming Traffic" in *Road Business*, Summer 2001)

Speed Limit Sign Installation

The Speed Limit Sign (R2-1) informs motorists of speeds required by law. The MUTCD requires a Speed Limit Sign be installed

- Where one speed limit changes to another,
- Beyond major intersections and where necessary to remind drivers of the lawful speed,
- At municipal boundaries, and
- Where easily seen by all motorists.

In Figure 1, even without the R2-1 sign, the Horizontal Alignment/Intersection Sign (W1-10) is too low. The bottom of a single sign must be at least 5 feet above the near edge of the pavement. The height must be 7 feet where parking or pedestrian movement occurs. For two signs, mounting height to the bottom of the secondary sign may be one foot less.

The Institute of Traffic Engineers (ITE) recommends that agencies normally erect signs on individual posts. Grouping is appropriate when one sign supplements another. Grouping, if it does not confuse motorists, can reduce roadside obstructions and to save money.

After the Figure 1 picture was taken, the Town decided that the W1-10/R2-1 grouping might be confusing. It replaced the speed limit sign with an Advisory Speed Plaque. It relocated the Speed Limit Sign past the intersection. This meets the general MUTCD standard for location: "Signs requiring different decisions by the road user shall be spaced sufficiently far apart for the required decisions to be made safely."

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