

YARMOUTH MAINE



JULY 2023



Photo: Julie Dubovsky

Traffic Calming Toolbox

ACKNOWLEDGMENTS

COMPLETE STREETS ADVISORY COMMITTEE

Director of Planning and Development
Erin Zwirko

Director of Yarmouth Community Services
Karyn MacNeill

Town Engineer
Steven S. Johnson

Town Police Chief
Daniel A. Gallant

Town Fire Chief
Michael S. Robitaille

Director of Public Works
Erik S. Street

Bike and Pedestrian Committee Representative
Mike Tremblay

Special thanks to:

Nat Tupper, Town Manager

Dan Ostrye, Emeritus Bike and Pedestrian
Committee Member and West Side Trail
coordinator

Scott LaFlamme, Director of Economic
Development

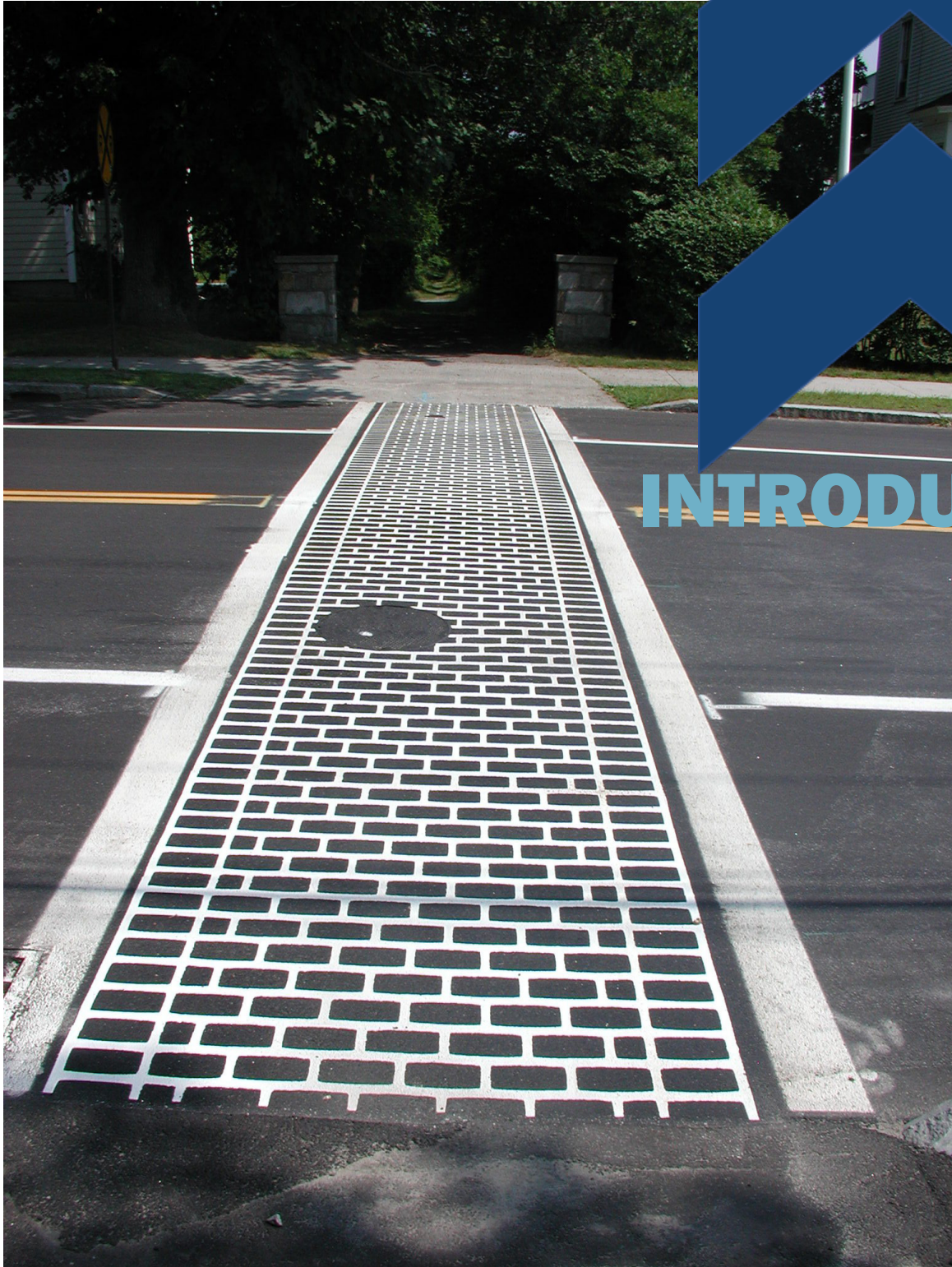
Julie Dubovsky, Assistant Planner

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INTRODUCTION

Photo: Molly Haley

ACRONYMS & DEFINITIONS

[AASHTO](#) – The American Association of State Highway and Transportation Officials is a nonprofit, nonpartisan association representing highway and transportation departments representing all transportation modes.

[AARP](#) – The American Association of Retired Persons identified key elements to measure for livability, including safe streets for people walking, biking and driving.

[APBP](#) – The Association of Pedestrian and Bicycle Professionals is a community of practitioners working to create more walkable, bikeable places.

[BCM](#) – The Bicycle Coalition of Maine works to make Maine a better and safer place to bike and walk.

CSAC - Yarmouth's Complete Streets Advisory Committee

CSP - A [Complete Streets Policy](#) specifies how a community will plan, design, and maintain streets so they are safe for all users of all ages and abilities. They are set at state, regional, and local levels.

[FHWA](#) – The Federal Highway Administration supports State and local governments in the design, construction, and maintenance of the Nation's highway system and various federally and tribal owned lands.

[GPCOG](#) – The Greater Portland Council of Governments is the federally mandated Regional Planning Organization,

Metropolitan Planning Organization and an Economic Development District for the region.

HCL - High Crash Locations are highway or road segments that are susceptible to an inordinate number of crashes. Identification of HCLs in Maine can be found on [MaineDOT's Public Crash Query Tool](#).

PD - Yarmouth's Police Department

[MaineDOT](#) – The Maine Department of Transportation has responsibility for statewide transportation by all modes of travel.

MPH - Miles per hour

[MUTCD](#) – The Manual on Uniform Traffic Control Devices sets minimum standards for all Traffic Control Devices (TCD) used on U.S. roads and highways.

[NACTO](#) – The National Association of City Transportation Officials is an association of 89 major North American cities and transit agencies formed to exchange transportation ideas, insights, and practices on national transportation issues.

[NEITE](#) – The New England Section of the Institute of Transportation Engineers provides educational and networking opportunities for its members in the region.

[TRB](#) - As part of the National Academies of Sciences, Engineering, and Medicine, the Transportation Research Board (TRB)

ACRONYMS & DEFINITIONS (continued)

provides leadership in transportation improvements and innovation through trusted, timely, impartial, and evidence-based information exchange, research, and advice regarding all modes of transportation.

[USDOT](#) – The U.S. Department of Transportation’s mission is to deliver the world’s leading transportation system, serving the American people and economy through the safe, efficient, sustainable, and equitable movement of people and goods. Traffic calming is included as a key strategy in improving public health through transportation planning and policy in their Transportation and Public Health Tool.

BACKGROUND

In 2015, pursuant to goals set out in the Town’s 2010 Comprehensive Plan, Yarmouth adopted a Complete Streets Policy (CSP), intended to provide a transportation network that is safe, efficient, interconnected, and sustainable for all modes of travel. Although the policy is aspirational, it enables a Complete Streets Advisory Committee (CSAC) to view every public project and phase related to transportation as an opportunity to improve the street network for all users.

The CSP prioritizes a network approach that seeks to improve the overall network and connect fragmented portions of the town. A set of potential traffic calming measures can guide major developments, roadway projects, capital improvement projects, and recommendations for improvements in the street network.

The goal of this toolbox is to provide examples of traffic calming measures that can be applied in a contextually sensitive manner in Yarmouth. Stop signs and traffic signals are not traffic calming tools. They have a common purpose to traffic calming elements, but they communicate (regulate, warn and guide) drivers. Traffic calming measures are physical alterations of the roadway design that reduce vehicle speeds and/or decrease cut-through vehicular traffic volumes.

The town’s roads range from small town “urban compact zone” to rural settings, and each of these tools are appropriate for different contexts based on adjacent land use, road speeds, and user volumes. This document does not intend to recommend a particular traffic calming design, as engineering judgment is required in all cases. It simply offers these potential design treatments that have been utilized by transportation engineers and planning professionals throughout the country.

Furthermore, the MaineDOT has requirements and procedures for implementing temporary and permanent traffic calming measures, which are outlined in the toolbox and provided in the Appendix. A variety of state, regional, and national resources on the research of traffic calming measures are included for further information.

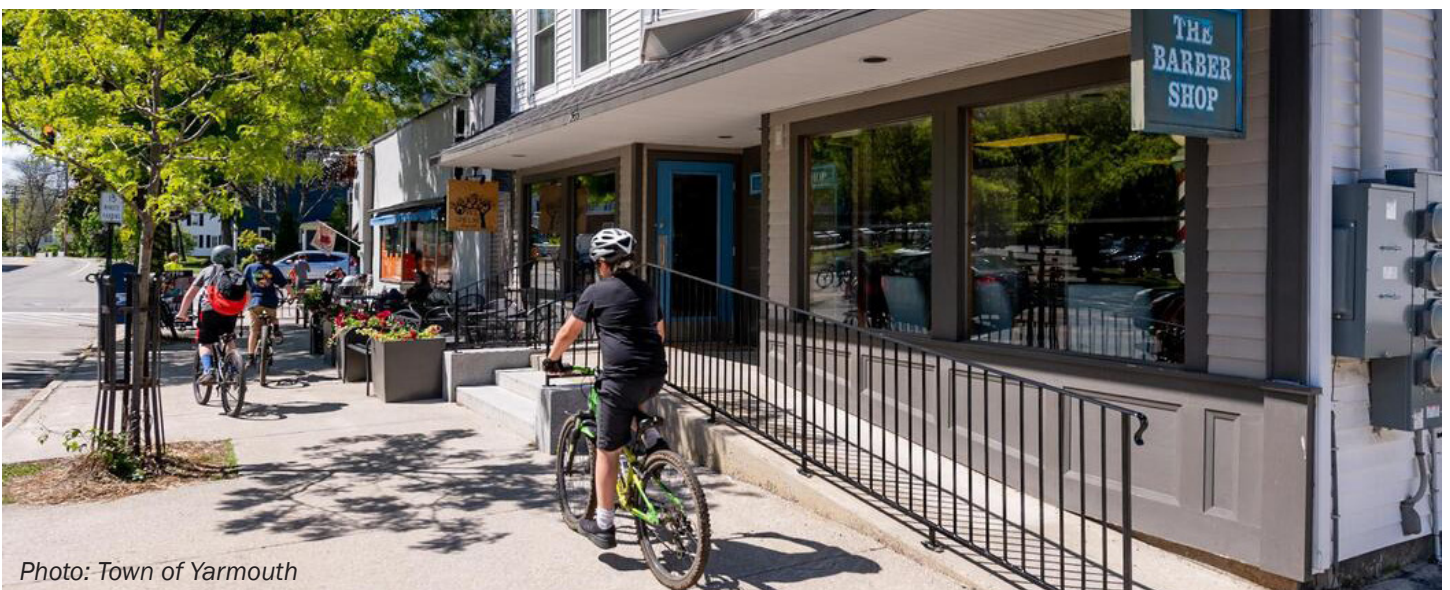


Photo: Town of Yarmouth

TRAFFIC CALMING ASSESSMENT

The following outlines the recommended steps that Town Departments should look to in order to address and assess traffic calming interventions that originate from either Town staff or the general public.

I. Intent

The purpose is to:

- Guide and encourage implementation of the Town's CSP to provide a transportation network that is safe, efficient, interconnected and sustainable for all modes of travel;
- Outline a recommended procedure to be followed when evaluating a traffic safety or street use concern and developing recommendations to address it;
- Ensure that residents of an affected street segment or intersection are afforded an opportunity to participate in discussing the problem and its potential solutions; and,
- Outline the procedures and options for funding and implementing traffic calming recommendations.

II. Criteria for Evaluation

Traffic calming devices should be carefully evaluated and selected with special consideration given to the potential impact to users. The necessity of traffic calming devices should be based on criteria and warrants, and follow current regional, MaineDOT, and Federal policy, and Federal functional classifications of the roads system. The basic criteria and warrants for the necessity of traffic calming shall be based on the following:

1. Road Conditions: In order for a street segment or intersection to be considered for traffic calming, the following minimum conditions must be met:

- The street may NOT be a designated State or Federal highway
- No more than two travel lanes in each direction
- Road must be posted 40MPH or less

2. Warrants: When any ONE of these warrants are met, the street segment or intersection would be deemed a viable candidate for traffic calming. An engineering study should be conducted to evaluate the most appropriate method of traffic calming.

- The 85th percentile speed is above the posted speed limit; or
- There are High Crash Locations (HCL) on the route, which can be corrected or mitigated by traffic calming; or
- There are documented issues regarding the safety of people walking, driving, or bicycling along or across the roadway.

III. Evaluation Procedures

1. To initiate a request for traffic calming, a constituent should be asked to submit a written request to evaluate a street segment or intersection for traffic calming. The request should include:

- The constituent's name and contact information.
- The street segment or intersection.
- Support from households or businesses in the affected area to address the traffic calming concern.
- A description of the traffic safety issues, including photographic documentation of the problem or driver behavior occurring .
- Identification of any public generators are nearby, such as a school or a public facility, that generates a significant number of users in the street or lacks continuous sidewalk on at least one side of the street, or safe crossing facilities.

2. The Police Department (PD) should conduct a field assessment of traffic conditions, including a speed and vehicle volume study, and review of crash reports.

3. When PD's initial assessment is completed, the applicant is notified and if the location meets the criteria, it is then referred to the CSAC for review and evaluation of possible traffic calming measures.

4. If the location does not meet any of the criteria, CSAC will work with the applicant to identify additional or alternative actions that can be taken, such as education on public safety culture.

5. CSAC will review the location for:

- Roadway classification and function criteria
- Stormwater and utility conflicts
- Engineering, MEDOT and MUTCD compliance
- Potential for interim pilots, in-house or capital projects, and routine maintenance
- Education and enforcement actions
- Budgetary implications

MaineDOT Equipment Loan Program for Towns: The Traffic Engineering Division has a limited number of traffic counters available for free loan to Maine towns and cities. A town may borrow equipment for up to 2 weeks. All counts must be done on weekdays for a minimum of 24 consecutive hours. After the data is collected, the MaineDOT office will process the data and send "annual average daily traffic" counts (AADTs) in an Excel spreadsheet to the municipality.

Contact the MaineDOT Traffic Monitoring unit at 207-624-3606

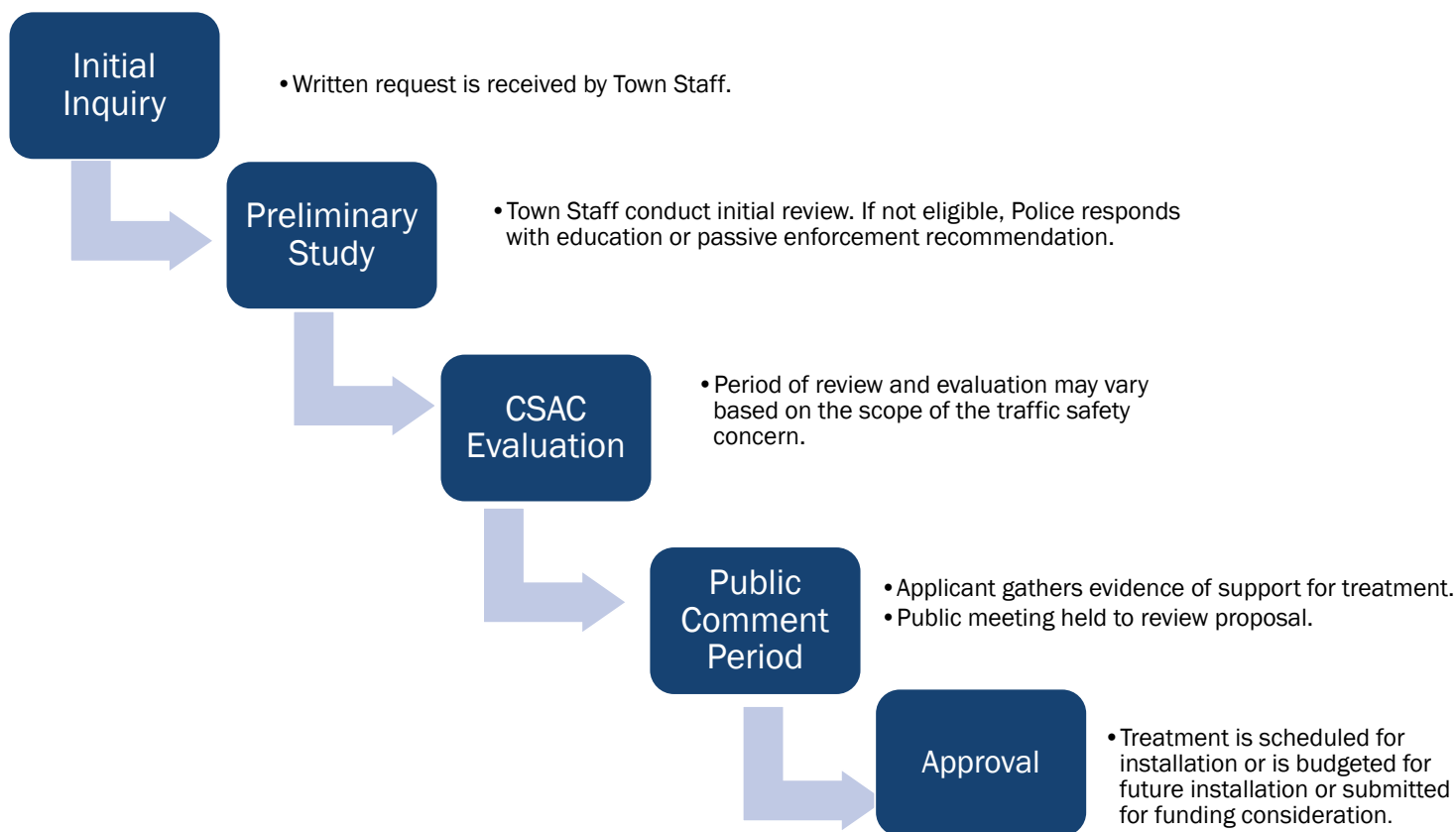
Webpage: https://www.maine.gov/mdot/mlrc/technical/trafficissues/#main_r_tabs6

6. If a permanent, physical intervention is proposed, the applicant should show evidence of support for the proposed traffic calming measures from the affected area. The CSAC will be responsible for defining the affected area, depending on if it is an intersection or street segment traffic safety concern.

7. The applicant's materials of support will be submitted to CSAC and reviewed by the committee. The period of review and evaluation may vary based on the scope of the traffic safety concern.

8. The results of the preliminary traffic study, CSAC evaluation, the proposal and public responses to the proposal shall be publicly available on the Town website for comment prior to installation or the project is submitted for funding consideration. A public meeting would be held to hear comments on the proposed traffic calming treatment. Residents, property and business owners in the affected area would be notified prior to installation.

Figure 1. Evaluation Process



IV. Funding and Implementation

If implementation actions are recommended by the CSAC and such actions involve expenditures which can be absorbed by the Town's current operating budget, then CSAC may recommend that such changes be made to the Director of Public Works.

If the CSAC recommends that the project(s) be implemented immediately and has identified a funding mechanism, the CSAC's recommendation shall be forwarded to the Director of Public Works and Town Manager for consideration and funding.

If the CSAC recommends that the project(s) be considered for funding in a future annual budget process or other sources, staff shall include a request for funding in the next available funding opportunity.

V. Terms of Use

The recommendations of the CSAC will include the type of traffic calming measures to be deployed and the anticipated duration of use. On occasion the Town may opt to employ "temporary devices" as a pilot to a more permanent traffic calming solution, though the warrant and need for traffic calming measures are generally most effective on a permanent basis.

Any traffic calming devices proposed for use in the Town of Yarmouth should be compliant with the latest recommendations of the MaineDOT Guidelines for Traffic Calming, Institute of Transportation Engineers (ITE), Federal Highway Administration (FHWA) and the Manual of Uniform Traffic Control Devices (MUTCD).

Education efforts will vary depending on the nature of the behavior and consideration and emphasis will be placed on new uses (start of the school year, beginning and end of summer season, e.g.). The CSAC will be responsible for disseminating information as part of the education effort, and may be assisted by the Bike & Pedestrian Committee. The timeline for education efforts are generally short term and short duration.

Enforcement efforts fall under the jurisdiction of the Police Department, and they will have the sole discretion to determine how and when enforcement efforts will be undertaken. Availability of resources will be a primary consideration in determining the level of enforcement.

Engineering efforts generally are more formal and permanent in nature and usually require a more detailed assessment of field conditions. The engineering efforts may require formal design, budget appropriation, construction and review by a third-party transportation engineer. The timeline for implementation of engineering related improvements is more long term and permanent in nature.



TOOLBOX

Photo: Molly Haley

TOOLBOX USE GUIDANCE

There are four sections of traffic calming treatments introduced in this section:

- Vertical deflection
- Horizontal deflection
- Street width reduction
- Routing restrictions

Although they are not physical measures that change vehicle movements, sections on visual and auditory feedback, and multi-modal facilities were also included as research has shown that they can still be effective tools for slowing drivers' speeds.

Each treatment has a brief definition and user guidance, although more details can be found on each element on the FHWA and NACTO websites. For small towns, consideration must also be given to transitions from rural areas to denser, compact zones of the community. This toolbox focuses on physical measures, although education and enforcement efforts are also useful combined strategies. Some treatments were not included in this primer because:

- They are standard traffic control devices, such as stop signs.
- They require police enforcement to be applicable, such as vehicle restriction signage on streets.
- The measure is only temporary or a short-lived benefit when activated, such as the Rectangular Rapid-Flashing Beacon below.



Photo: Julie Dubovsky

Figure 2. Use Guidance

<p>COSTS</p>	<p>Approximate implementation costs (design, materials, construction) do not include right-of-way costs nor are they inflation adjusted.</p> <p style="text-align: center;">Low <\$6K</p> <p style="text-align: center;">Moderate (\$6K - \$15K)</p> <p style="text-align: center;">High (>\$15K)</p> <p>(Source: FHWA Traffic Calming ePrimer, Section 3.2)</p>
<p>MAINTENANCE</p>	<p>Likely affects surface drainage on the roadway and snowplows. Municipal or volunteer maintenance required. Long-term operations costs (time and staffing needs) should be considered.</p>
<p>CONSTRUCTION NEEDED</p>	<p>Installation of treatment impacted by drainage needs and existence of underground utilities. Capital construction likely needed for installation.</p>
<p>EFFICACY</p>	<p>Shown to reduce speeds or vehicle volumes, and pedestrian safety improved. Depends on where it is applied, such as a wide rural road or an intersection in the village.</p>
<p>TEMPORARY OPTIONS</p>	<p>Feasible to do a short-term pilot with traffic cones or paint, that still creates desired driver behavior and enables time for assessment.</p>
<p>CONS</p>	<p>Potential for neighborhood issues like noise or light pollution, enforcement or monitoring needed for treatment to be effective.</p>

Traffic Calming Measure

Vertical Deflection

These treatments use raised elements that draw the driver's attention and reduce the driver's speed. These speed control treatments are best suited for lower speed, lower volume roads.



Photo: Molly Haley

Raised Crosswalk

A raised crosswalk is a flat-topped speed hump or speed table that functions as a crosswalk and extends from curb to curb with ADA compliant ramps. It must be marked and signed as a pedestrian crossing. It can be used for street segment or intersection, residential or a local collector road, one-way or two-way streets.

Raised Intersection

A raised intersection is a flat area covering the intersection of two or more streets, generally raised to an intermediate or sidewalk level with pedestrian ramps on all approaches. It can be used for street intersections, and on residential or a local collector roads.

Raised Crosswalk Use Guidance:

- Very effective at decreasing driver speeds
- May impact street drainage
- May be challenging for snow removal
- May produce noise complaints
- Moderate costs to construct depending on materials used; concrete and landscaping (as shown) has higher costs



*Deering Ave & Falmouth St, Portland
Photo: Julie Dubovsky*

Raised Intersection Use Guidance:

- Expensive to construct depending on materials used, size of intersection and drainage requirements
- Maintenance of road markings and materials, such as bricks below, likely
- May be challenging for snow removal
- May produce noise complaints
- Very effective at decreasing driver speeds, best suited where lower speeds already used like a village center



Speed Bump

A speed bump or hump is a rounded raised mound of pavement, typically 4 inches high and 12 feet wide, placed across a street. It can be used for a street segment, and on a residential or a local collector road. An umbrella term may also include a speed table, which has a width of up to 20 feet.

Speed Bump Use Guidance:

- Low costs to install and temporary or pilot options available
- Maintenance of speed bump markings may be needed regularly, as shown below
- Careful siting and design needed due to drainage impacts
- May produce noise complaints
- Very effective at decreasing driver speeds



Portland St & Yarmouth High School, Yarmouth
Photo: Julie Dubovsky

Speed Cushion

A speed pillow or cushion is used in locations for the effects of a speed bump without slowing the speed of emergency vehicles or adversely affecting drainage and bicycling. It is commonly made of prefabricated rubber shapes and bolted into place - leaving gaps for the tires of wide vehicles by evenly spacing them three or four across a street.

Speed Cushion Use Guidance:

- Low cost to install and temporary pilot options available
- Maintenance needed as rubber may wear due to snow removal
- May produce noise complaints
- Very effective at decreasing driver speeds and can be used on emergency and transit routes, as shown below



Photo: NACTO

Speed Table

Speed tables are midblock traffic calming devices that raise the entire wheelbase of a vehicle to reduce its speed. They are longer than speed humps and flat-topped, with a height of 3–3.5 inches and can be used in conjunction with crosswalks (a raised crosswalk) and curb extensions.

Offset Speed Table

Similar to the speed cushion, the offset speed table has gaps to allow for emergency vehicle access. Unlike a speed table, that spans the whole roadway, an offset table covers one lane at a time and leaves several feet between.

Speed Table Use Guidance:

- Moderate costs to install
- Maintenance needed due to drainage and snowplow impacts
- May produce noise complaints
- Very effective at decreasing driver speeds
- Use on local roads, no wider than 50 feet wide
- Can be used for one-way or two-way streets



Stevens Ave & Concord St, Portland
Photo: Julie Dubovsky

Offset Speed Table Use Guidance:

- Moderate costs to construct
- Maintenance needed due to drainage and snowplow impacts
- May produce noise complaints
- Very effective at decreasing driver speeds
- Useful on emergency access and transit routes



Photo: Jeff Gulden, TAPCO

Traffic Calming Measure

Horizontal Deflection

These treatments use horizontal shifts in the roadway, painted or raised impediments, to cause the driver to make subtle swerves and reduce vehicle speeds.



Photo: Joseph Coulombe

Chicane

A chicane is a series of alternating curves or lane shifts that are located in a position to force a motorist to steer back and forth out of a straight travel path. The curvilinear path is intended to reduce the speed at which a motorist is comfortable travelling through the feature.

Lateral Shift

A lateral shift is a realignment of an otherwise straight street that causes travel lanes to shift in one direction. A typical lateral shift separates opposing traffic through the shift with the aid of a median island, but can also be done with markings and adjusting curb regulations. Without the island, a motorist could cross the centerline in order to drive the straightest path possible, thereby reducing the effectiveness.

Chicane Use Guidance:

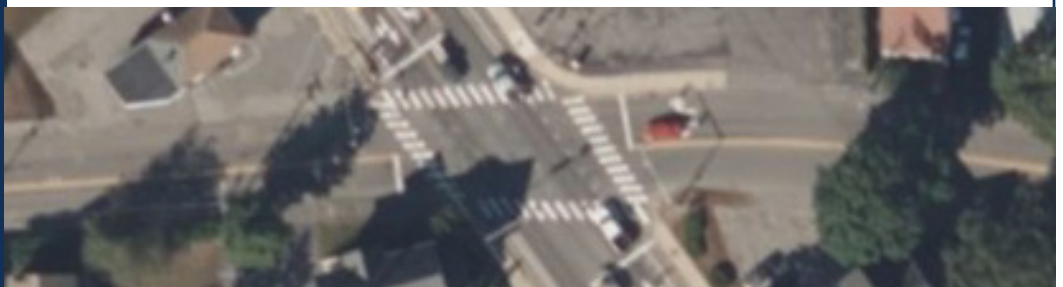
- Costs range from low to expensive
- Temporary options available
- Can be designed with cut-through or bypass lane for bicycles
- Very effective at decreasing driver speeds
- Not appropriate on emergency or transit routes



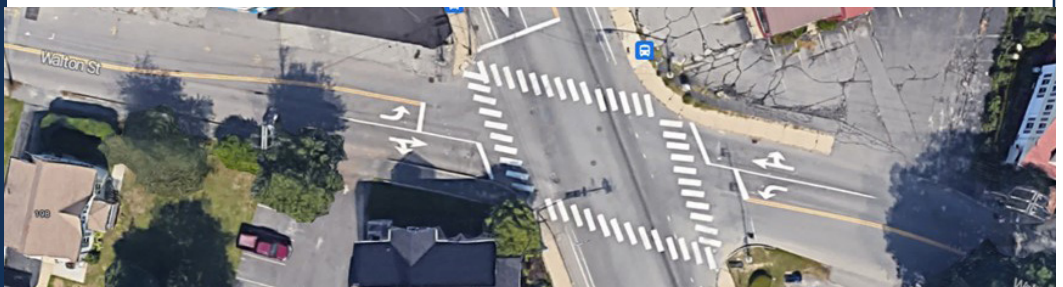
Photo: MinnPost by Bill Lindeke

Lateral Use Guidance:

- Low to moderate costs to construct
- No drainage or snow plow impacts if markings only
- Can be used mid-block or at an intersection
- Useful for varying road types and allows emergency access



Before: Forest Ave & Walton St, Portland



After: Forest Ave & Walton St, Portland

Mini/ Modern Roundabout

Mini-roundabouts generally have an inscribed circle that is small enough to stay within the existing right-of-way (or within the existing curb lines if adequate space is available). For a small, modern roundabout, the center island is not traversable and can be landscaped but a mini-roundabout is fully traversable.

Offset/ Realigned Intersection

A realigned intersection is the reconfiguration of an intersection with perpendicular angles to have skewed approaches or travel paths through the intersection.

Mini or Modern Roundabout Use Guidance:

- Best on local collector or residential collector roads
- Useful for uncontrolled intersections
- Moderate to install, FHWA testing pilots with markings and temporary tools
- Maintenance needed to ensure that plantings do not reduce visibility and snow cleared properly to provide clearance around



Photo: NACTO

Offset/Realigned Intersection Use Guidance:

- Best on local collector or residential collector roads
- Typically only used at a T-intersection
- Moderate to install
- Generally acceptable on transit or emergency routes if sufficient turning radii provided



Photo: FHWA

Roundabout

A roundabout includes a circular island and approach treatments located at the intersection of two or more higher volume streets that will assign right-of-way among competing traffic movements. Splitter islands at the approaches direct traffic entering and entering traffic yields to vehicles within roundabout.

Traffic Circle

Similar to a roundabout, it is a raised island placed within an unsignalized intersection around which traffic circulates that forces drivers to reduce speed when entering and passing through an intersection. Sometimes is called an “intersection island.” It is usually designed to fit within the travel lanes of an existing intersection.

Roundabout Use Guidance:

- Appropriate at intersections
- Best for thoroughfares or major arterials, may be used on emergency access and transit routes
- Expensive to construct
- Splitter islands must be ADA compliant
- Very effective at reducing speeds



Deering Corner Roundabout, Portland
Photo: Julie Dubovsky

Traffic Circle Use Guidance:

- Useful on small, local collector roads with horizontal clearance that is too small for a left turning truck, emergency vehicle or a bus to circulate around.
- Can be a pilot, as shown below from Nashville, but most effective when defined with a raised curb or landscaped.
- Moderate to expensive to construct



Photo: Civic Design Center

Traffic Calming Measure

Street Width Reduction

These treatments use physical impediments to narrow the roadway and control speed, turning movements, and vehicle volumes.



Photo: Julie Dubovsky

Curb Extension

Corner extensions or bulb-outs visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees. Curb extensions have multiple applications and may be segmented into various sub-categories, ranging from traffic calming to bus bulbs.

Choker

Also known as a mid-block narrowing or a pinchpoint, this is a narrowing of a street mid-block to reduce the width of the traveled way (to either two narrow lanes or a single lane) by construction of a sidewalk or landscape buffer.

Curb Extension Use Guidance:

- Temporary, pilot options available
- Useful for uncontrolled intersections, as shown below
- Low to expensive to install, depending on materials used
- Maintenance needed, whether refurbishing markings or ensuring snow removal
- Applicable for many road types



Midblock Narrowing Use Guidance:

- Appropriate for arterials, collectors, or local streets
- Can be used for one-lane, one-way or two-way and two lanes
- Very effective for reducing speeds and reducing crossing distances if a crosswalk is provided
- May force bicyclists to share a lane with cars
- May require coordination with utilities, especially if paired with green infrastructure, like the rain gardens shown below.



Gateway Treatment

This uses a combination of a vertical, raised element, and a horizontal shift. It is often used at the entrance to an area of slower speeds, like a residential neighborhood or a downtown. Combined with planters or street artwork, it can be a placemarking or community development strategy too.

Lane Narrowing

This includes modifying the available number of lanes, lane widths, or separation between travel directions with painted flush channelization, adding on-street parking or medians to narrow the travel lane.

Gateway Use Guidance:

- Appropriate at intersections and at transition zones from a rural area and in a compact zone of denser residential areas
- Temporary options, like painted curb extensions or flexible bollards, for a horizontal shift, and rubber speed bumps for the vertical shift
- Moderate to expensive to install, depending on materials used
- May generate complaints if parking spaces are removed



Lane Narrowing Use Guidance:

- Moderate to expensive to construct if more than markings are used
- Applicable on many road types, but best suited for arterials or collectors
- Applied on roadway segments
- Most common on a four lane road, but can be applied on wide two-lane stretches, like Route One in Yarmouth below
- Can be used on emergency and transit routes



Median Island

Pedestrian refuge or median islands are on the centerline and can serve as a refuge island when it has a cut through and a marked crosswalk. It can be a painted area, but it is most effective when it is defined by a raised curb and landscaped to further reduce the open feel of a street.

Road Diet

A typical road diet technique is to reduce the number of lanes on a roadway cross-section. One of the most common applications of a road diet is to provide space for other modes of travel, like a bike or Bus Rapid Transit lane. Generally includes pavement markings, signs and possible signal reconfiguration.

Median Island Use Guidance:

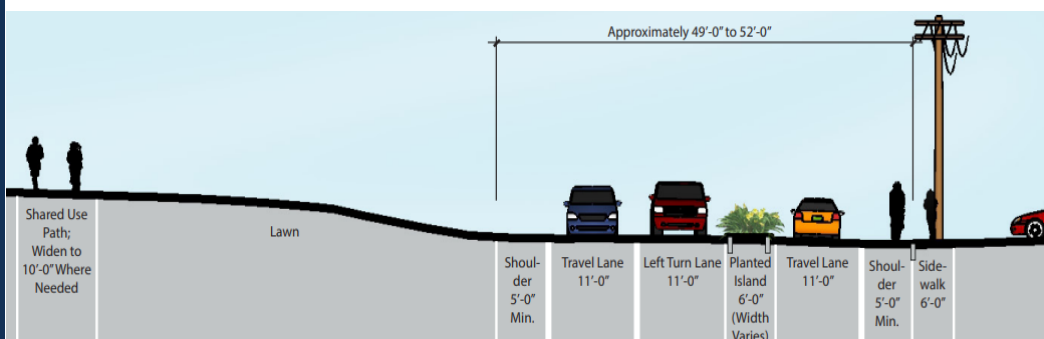
- Useful on two-way, bi-directional streets on any road type, but can impact snow removal
- Low to moderate costs to install, use with high visibility tools on rural roads
- Can be done with temporary tools, like R1-6 “Yield to Peds” signs and flexible bollards (see BCM “Imagine People Here” campaign)
- Effective at reducing speeds and improving yielding rates



Deering Corner Roundabout, Portland
Photo: Julie Dubovsky

Road Diet Use Guidance:

- Low to moderate to install if only pavement markings and signs
- Appropriate for road segments and multiple intersections on a corridor, such as the Route One Complete Streets Corridor Plan shown below
- Useful on major arterials and local roads, and for emergency and transit routes



Section - Yarmouth Route 1 at Clayton's Cafe, Looking North

Not to Scale

Rendering: North of Portland Route One Complete Streets Corridor Plan

Traffic Calming Measure

Vehicle Use & Routing Restriction

These traffic calming measures can include physical impediments and signage to regulate vehicle use, reduce cut-through traffic, and control turning movements. Signage alone is not a traffic calming treatment.



Photo: Molly Haley

Diagonal Diverter

A diagonal diverter is a barrier placed between opposite corners of an intersection, prohibiting through traffic. It also may be called a full diverter or diagonal road closure.

Diagonal Diverter Use Guidance:

- Appropriate at intersections
- Useful on local or residential roads, but use with caution
- Low to moderate costs, varies due to materials, size, drainage, and design
- Without a significant physical impediment, it is difficult to enforce



Semi Diverter/ Half Closure

A semi diverter or a half closure is a physical barrier which prohibits one or more traffic movements at an intersection or on a street, while not completely closing the street.

Semi Diverter/Half Closure Use Guidance:

- Appropriate at intersections or midblock (full closure only), use with caution
- Useful on local or residential roads, but use with caution
- May impact snow removal
- Low to expensive to install, varies due to materials, size, landscape and drainage considerations



Full Closure

A full closure is a street closure that includes the construction of a turn-around area. A “play street” is a form of a full closure and a “slow street” that is temporary or only allows local traffic is a half closure.

Forced Turn Island

Also called a median barrier, a right-turn island or island diverter, these are raised islands that restrict movements at an intersection in shape and signage. They are placed along the centerline of a street, typically at the mouth of an intersection, and block a left-turn movement. It can be paired with a cut-through for pedestrians or bicyclists.

Full Closure Use Guidance:

- May be appropriate for collector or local residential roads, use with caution
- Moderate to expensive to install, varies due to materials, size, and drainage considerations
- Not ideal for emergency access or on transit routes
- Temporary design options feasible, as were used in places around the country during COVID. The example below is from downtown Portland.



Photo: Portland Press Herald

Forced Turn Island Use Guidance:

- Appropriate at intersections
- Useful on local or collectors or local residential roads
- Low to expensive to install, varies due to materials, size, and landscaping
- Can be controversial due to potential impact on traffic patterns
- May impact snow removal



School St & Route One, Yarmouth
Photo: Julie Dubovsky

Additional Tools

Multi-Modal Facilities with Traffic Calming Benefits



*Bowdoin St, Yarmouth
Photo: Colin Durrant*

Mixed Traffic Facilities

The addition of multimodal facilities for people walking and bicycling can be used to improve transportation choices and accessibility in rural areas, and calm speeding on rural roadways. Mixed traffic facilities are best for roads with low vehicle volumes and low speeds (below 30mph). These are best used on local residential roadways and not for through motor vehicle travel.

While the bicycle boulevard and yield roadways are best suited for use within developed areas, like the village or medium density zones, advisory shoulders can be applied to collector roads of moderate volumes and speed, and outside of the compact zone. Advisory Lanes/Shoulders are also called “dashed bicycle lanes.”

Uses vertical and horizontal deflection to manage speeds

Route signs clearly identify users along the bikeway

Bicycle Boulevard

Bicycle and pedestrian priority

Shared roadway

Route pavement markings

Yield Roadway

All users share the slow-speed, low-volume space

Low residential volumes

Gravel or dirt shoulders

Narrow two-way street with no centerline

Multi-purpose roadway

Advisory Lanes

Prioritizes shared space for bicyclists and pedestrians

Drivers yield to bicycles and pedestrians

Two-way travel lane, no centerline markings

Contrasting pavement materials differentiate further

Source: *Alta Planning + Design, Small Town and Rural Design Guide*

Visually Separated Facilities

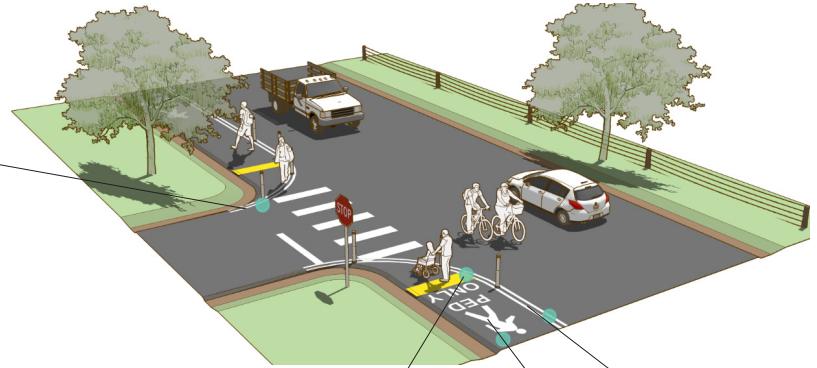
Visually separated facilities are most appropriate on roads with low to moderate volumes of traffic operating at moderate speeds. These facilities use markings and buffer striping to increase the distance between motorists and people walking or bicycling.

A pedestrian lane may be a temporary treatment before a permanent, physically separated facility is constructed.

Paved shoulders on rural, low-density roads that serve long-distance travel between small towns can be bolstered with elements that provide space for bicyclists and pedestrians and narrow the roadway.

Pedestrian Lane

Lane markings identify pedestrian space



Detectable warning strips

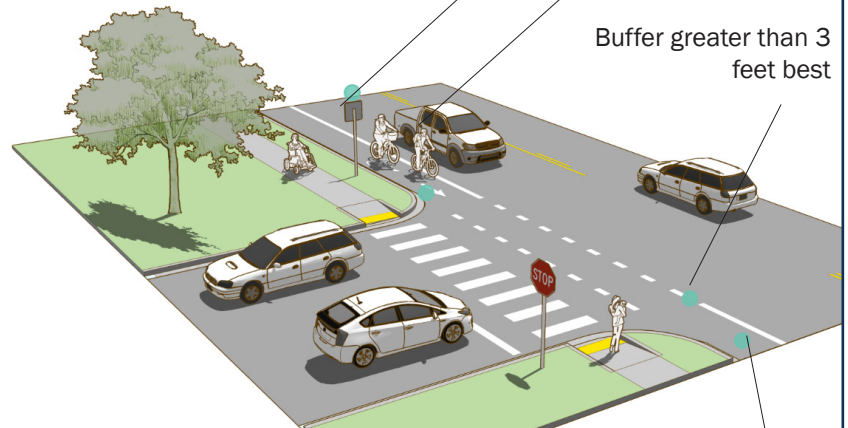
Route pavement markings

Flexible bollards

Bicycle Lane

Bike markings and signage along the route

Buffer greater than 3 feet best

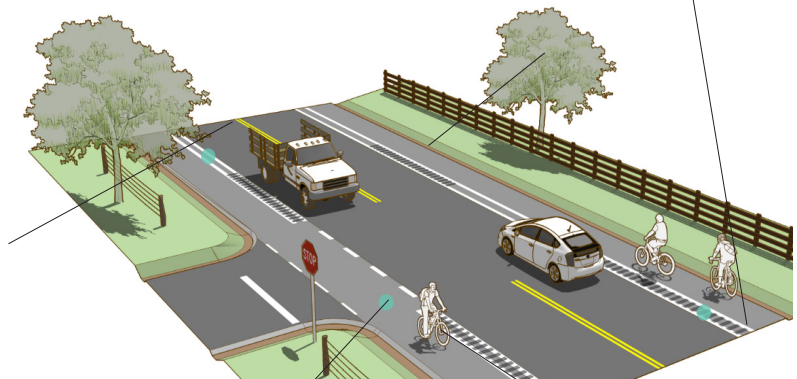


Exclusive bike travel lane, preferably with a wide buffer

Paved Shoulder

Edge line rumble strips notify drivers

High visibility lane markings and wide buffer



Contrasting pavement helps to differentiate

Source: [Alta Planning + Design, Small Town and Rural Design Guide](#)

Physically Separated Facilities

These facilities are best suited for streets with higher volumes and speeds of vehicle traffic, such as arterials. The use of physical barriers, including esplanades of trees, increase the comfort and safety of non-motorized users.

A **separated bike lane** is a facility exclusively for bicyclists adjacent to the roadway, like a sidewalk for pedestrians, and usually has a vertical element of separation.

A **shared use path** is a facility for bi-directional, non-motorized users of all modes. It may be a network alternative to the street network, like the West Side Trail.

A **sidepath** is a bidirectional path immediately adjacent and parallel to a roadway, like the Beth Condon Pathway.



Photo: News Center Maine



Photo: Dan Ostrye



Photo: Town of Yarmouth

Source: [Alta Planning + Design, Small Town and Rural Design Guide](#)

Additional Tools

Visual & Auditory Feedback

These treatments use pavement markings or textures as visual and auditory cues to alert drivers to reduce speeds. Research is mixed as to whether they have measurable effects on vehicle speed and safety of road users.



Photo: Molly Haley

Transverse Markings

These can be used to provide a visual reduction in the width of a travel lane. Optical speed bars can be effective on rural roads with horizontal curve speed reduction. Experimentation in rural communities showed moderate reduction in speeding (Midwest Transportation Consortium, 2013).

Pavement Colors

Pavement colors can be used for crosswalks or painted curb extensions. Research has shown that it can be effective at community entrances in rural applications. The FHWA allows under the Experimentation Waiver. At this time, the Town will not consider asphalt art as a measure, but it is included here for informational purposes.

Transverse Markings Use Guidance:

- Appropriate on street segments
- Best on local collectors or residential collector roads
- Can be used on emergency and transit routes



Pavement Colors Use Guidance:

- Appropriate for segments or intersections
- Applicable for many types of roads
- Can be paired with pavement textures to alert drivers
- Fades quickly due to snow plowing and regular wear, so can be temporary or needs to be maintained regularly, as shown in the photo below in Portland



Rumble Strip

Rumble strips are used as a counter measure for reducing the number and severity of roadway departure crashes, and alerting drivers to reduce speeds along a route or before an intersection. They can be milled or raised patterns on the roadway pavement and produce audible and vibratory warning to drivers.

Speed (Driver) Feedback Signs

Radar speed signs tell the speed of approaching vehicles. They can capture data, which can be used to do selective speed enforcement on certain days or times of day.

Rumble Strip Use Guidance:

- Applied on centerline or road shoulder
- Applicable for any road type
- Moderate to install, depending on miles of application
- May cause noise complaints from abutters



Photo: Portland Press Herald

Feedback Signs Use Guidance:

- Applicable for any road type
- Can be permanent, solar powered devices or temporary and mobile
- Most effective when paired with police enforcement and education
- Requires training and knowledge of operating a unit



Photo: News Center Maine

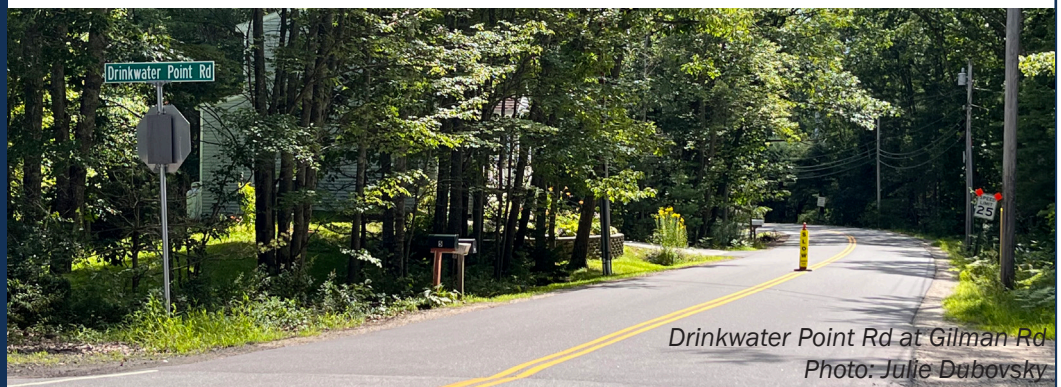
Removable Centerline Traffic Control Devices

The Town has placed double-sided centerline signs to remind drivers to slow down at transition zones and uncontrolled pedestrian crossings. These in-street regulatory signs remind drivers that they're entering a slower speed zone and to yield to people walking or biking. The perceived narrowing of the road is also a factor in influencing efficacy of this treatment.

To the right are local examples of centerline signage and a Gateway Treatment from BCM's community demonstration project in Portland. See Appendix for additional use guidance from MaineDOT.

Centerline Sign Guidance:

- Applied on centerline of two-way roads at the start of transition zones, such as from a 35MPH to a 25MPH zone, or at intersections or midblock crossings at the crosswalk location, as shown below.
- Applicable for uncontrolled, marked pedestrian crossings
- Frequently used as temporary or seasonal installations with a flush mounted base, flexible delineators, or removable curb base.
- Well-suited for lower speed roads with people frequently crossing or biking along, and where driver yielding behavior needs reinforcement
- Road width and geometry must be evaluated for in-street regulatory signs





APPENDIX

Photo: Julie Dubovsky

ONLINE RESOURCES

Local Resources

Yarmouth Complete Streets Advisory Committee and Complete Streets Policy
<https://www.yarmouth.me.us/csac>

Regional Resources

GPCOG Vision Zero Action Plan
<https://www.visionzerogreaterportland.org/>

GPCOG PACTS Policy Board - Vision Zero Action Plan Approval (May 2023)
<https://www.gpcog.org/documentcenter>

PACTS Regional Complete Streets Policy
<https://gpcog.org/561/Complete-Streets-Policy>

State Resources

Bicycle Coalition of Maine
<https://www.bikemaine.org/>

Build Maine Tactical Urbanism Lightning Grant
<http://www.build-maine.com/lightninggrant>

MEDOT Bicycle and Pedestrian Safety
<https://www.maine.gov/mdot/bikeped/bikepedsafety/>

MEDOT Engineering Practices and Procedures
<https://www.maine.gov/mdot/engineering/practices-procedures/>

MEDOT Local Roads Center, Technical Subjects & Traffic Issues
<https://www.maine.gov/mdot/mlrc/technical/trafficissues/>

Federal Websites

FHWA Highway Safety Programs

<https://highways.dot.gov/safety>

FHWA Traffic Calming ePrimer
<https://highways.dot.gov/safety/speed-management/traffic-calming-eprimer>

FHWA Low-Cost Treatments for Horizontal Curve Safety 2016
https://safety.fhwa.dot.gov/roadway_dept/countermeasures/horicurves/fhwasa15084/

National Highway Traffic Safety Administration
<https://www.nhtsa.gov/road-safety/pedestrian-safety>

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

Design Guides

Institute of Transportation Engineers Traffic Calming Measures
<https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures/>

New England ITE Traffic Calming Guidelines
<https://neite.org/2016/10/ites-new-traffic-calming-guidelines/>

Global Designing Cities Initiative
<https://globaldesigningcities.org/publication/global-street-design-guide/designing-streets-people/designing-for-motorists/traffic-calming-strategies/>

Slow Streets Guide
<https://nacto.org/publication/streets-for-pandemic-response-recovery/emerging-street-strategies/slow-streets/>

ONLINE RESOURCES (continued)

National Center for Rural Road Safety

<https://ruralsafetycenter.org/>

Small Town and Rural Design Guide

<https://ruraldesignguide.com/>

Smart Growth America National Complete Streets Coalition

<https://smartgrowthamerica.org/what-are-complete-streets/>

Traffic Calming 101

<https://www.pps.org/article/livememtraffic>

US Traffic Calming Manual (Presentation)

<https://nacto.org/references/u-s-traffic-calming-manual-1999/>

Research

AASHTO Innovation Initiative - Pedestrian Gateway Treatment

<https://aii.transportation.org/Pages/Pedestrian-Gateway-Treatment.aspx>

Alta Planning + Design White Paper: Advisory Bike Lanes in North America

<https://altago.com/resources/advisory-bike-lanes-north-america/>

Colored Entrance Treatments for Rural Traffic Calming

http://publications.iowa.gov/14943/4/IA_DOT_TR-630_InTrans_colored_pvmt_tech_brief.pdf

Evaluation of Low Cost Traffic Calming for Rural Communities - Phase II, Midwest Transportation Consortium (2013)

<https://publications.iowa.gov/15269/>

Speed Management Toolbox for Rural Communities

<https://dr.lib.iastate.edu/entities/publication/da86496b-27d3-4ff3-803e-bec09ab9ffa6>

MaineDOT POLICIES ON TRAFFIC CALMING

The [Maine Department of Transportation \(MaineDOT\)](https://www.maine.gov/mdot/) has specific policies and processes that apply to using traffic calming measures on Maine’s roads. They also vary for temporary or permanent installations. DOT Engineering Practices and Procedures can be found here: <https://www.maine.gov/mdot/engineering/practices-procedures/>

1. Guidelines for the Use of Traffic Calming Devices

The document outlines the state preferred treatments, and the limits of their acceptance and application on Maine Roadways. MaineDOT also recommends a community develops a municipality-wide or regionally- based traffic calming plan that documents the needs and specific places where traffic calming may be appropriate. Proposals for corridors must include a transportation analysis for MaineDOT to review.

Link: <https://www.maine.gov/mdot/completestreets/docs/Guidelinesfortrafficcalmingupdated9711.pdf>

2. Policy on Demonstration Projects

Applicants to MaineDOT must follow guidelines and implementation requirements to experiment with low-cost measures to implement complete streets concepts and temporary traffic calming features. This applies to all state and state-aid roads. Funding for “small spot improvements” from the federal infrastructure bill could go towards this type of project.

Link: <https://www.maine.gov/mdot/engineering/docs/policies/2021/Procedure%20for%20Implementing%20Demonstration%20Project%20and%20Non-project%20Related%20Roadway%20Changes.pdf>

3. Policy on Speed Reduction

Maine law also states that any town must receive approval of the MaineDOT and the Maine State Police before any speed limit is enacted or altered. Only “qualifying municipalities” have this authority and must follow specific requirements. A “qualifying municipality” is one that (1) has a population over 2,500 as measured by the last US Census, or (2) employs a professional engineer (PE) licensed in Maine. This state policy on speed limits is over 20 years old; federal policy and national research since then has shown that lowering speed limits to slow drivers down is an effective strategy in reducing traffic violence

Link: https://www.maine.gov/mdot/mlrc/technical/trafficissues/#main_r_tabs1

MaineDOT POLICIES ON TRAFFIC CALMING

(continued)

4. Guidelines for a Road Diet

Municipalities may petition MaineDOT to make physical changes to a state roadway for traffic calming, like a road diet, and must follow the steps outlined in the policy.

Link: <https://www.maine.gov/mdot/engineering/docs/practices/2018/Road-Diet-Guideline.pdf>

5. Federal Functional Classification of Highways

In addition to using the MaineDOT Public Map viewer, this document is useful in understanding the different road typologies and which traffic calming treatments are most appropriate.

Link: [https://www.maine.gov/mdot/csd/docs/roadwayinfo/FederalFunctionalClassificationofHighways.pdf`](https://www.maine.gov/mdot/csd/docs/roadwayinfo/FederalFunctionalClassificationofHighways.pdf)

6. Gateway Treatment Options

As part of MaineDOT's Village Program, this document provides a number of options for municipalities to explore potential roadway improvements in a village type area.

Links: Village Partnership Initiative: <https://www.maine.gov/mdot/pgc/cbi/village/index.shtml>

Gateway Treatment Options: <https://www1.maine.gov/mdot/publications/docs/2022/Village%20Gateway%20Treatment.pdf>

*Additional user guides for the Pedestrian Gateway Treatment can be found from AASHTO at: <https://aia.transportation.org/Pages/Pedestrian-Gateway-Treatment.aspx>



Photo: Julie Dubovsky

POTENTIAL FUNDING SOURCES

BIPARTISAN INFRASTRUCTURE LAW (BIL): MaineDOT is coordinating with multiple state agencies to use BIL funding to support important investments in Maine's transportation system to support economic opportunity and improve quality of life. This includes funding opportunities for [Safe Streets and Roads for All](#), a new program of competitive grants to support local initiatives to prevent death and serious injury on roads and streets. Learn more at: <https://www.maine.gov/bil/home>

Additional funding may also be available in the future through the recent development of [MaineDOT's Family of Plans](#), a set of multi-modal and modal transportation planning documents that lay out the agency's vision for Maine's transportation system, present recommendations for how to achieve the vision, and lay out paths to implement them. Learn more at: <https://www.maine.gov/mdot/>

Matrix on Traffic Calming Treatments by Efficacy, Applicability and Cost

		FHWA Functional Classification			Street Function		Cost Low<\$6K Medium=\$6K-\$15K High>\$15K	Efficacy
		1 = measure is likely inappropriate, 3 = use with caution, 5 = measure may be appropriate						
Traffic Calming Measure	Applicability segment or intersection	Thoroughfare or Major	Collector or Residential Collector	Local or Local Residential	Emergency Access	Transit Route	Apprx costs for design, materials, and construction; does not include ROW costs or inflation adjusted. See FHWA ePrimer Module 3 for details.	Research shows minimal, moderate or dramatic effects on speeding. See FHWA ePrimer Modules 3 & 4 for details.
Vertical Deflection								
Raised Crosswalk	Both	3	5	5	1	3	Medium	Medium - High
Raised Intersection	Intersection	3	5	5	3	3	High	Medium - High
Speed Bump/Hump	Segment	1	5	5	1	3	Low	Medium - High
Speed Cushion	Segment	1	5	5	5	5	Low	Medium - High
Speed Table	Segment	3	5	5	1	3	Medium	Medium - High
Offset Speed Table	Segment	3	5	5	5	3	Medium	Low - Medium
Horizontal Deflection								
Chicane	Segment	1	5	5	3	3	Medium	Low - Medium
Lateral Shift	Segment	3	5	5	5	5	Medium	Low - Medium
Small Modern & Mini Roundabout	Intersection	3	3	5	5	5	Medium - High	Medium - High
Offset/Realigned Intersection	Intersection	1	5	5	5	5	Medium	Low - Medium
Roundabout	Intersection	5	3	1	5	5	Medium - High	Medium - High
Traffic Circle	Intersection	1	3	5	3	3	Medium	Medium - High
Street Width Reduction								
Curb Extension	Intersection	5	5	5	5	5	Medium - High	Medium - High
Choker	Segment	5	5	5	5	5	Medium - High	Medium - High
Gateway Treatment	Intersection	3	5	5	1	1	Medium - High	Medium - High
Lane Narrowing	Segment	5	5	5	5	5	Low - Medium	Low - Medium
Median Island	Both	5	5	5	5	5	Medium - High	Low - Medium
Road Diet	Both	5	5	3	5	5	Low	Medium - High
Vehicle Use & Routing Restrictions								
Diagonal Diverter	Intersection	1	3	3	1	3	Low - Medium	Medium - High
Semi Diverter/Half Closure	Intersection	1	5	5	3	3	Low - Medium - High	Medium - High
Full Closure	Both	1	3	3	1	1	Medium - High	N/A
Forced Turn Island	Intersection	3	5	5	3	3	Low - Medium - High	Low - Medium