CITY OF WESTMINSTER TRAFFIC CALMING POLICY

2024

WESTMINSTER
COLORADO

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Exhibits

PART I – INTRODUCTION

What Is Traffic Calming?

The Institute of Transportation Engineers (ITE) defines traffic calming as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for nonmotorized street users." In response to residents' concerns for safety and livability, the City of Westminster has created this policy to guide the implementation of traffic calming projects.

The impact of motor vehicle traffic on the quality of residential environments remains a pressing issue for both residents and local transportation officials. Many municipalities are under pressure to decrease traffic speed and volume on streets to address safety and quality of life concerns. The City of Westminster typically receives over 1,000 requests for traffic calming measures annually. However, local governments also face funding constraints, as well as valid worries about potential litigation, equity issues, and the ability of emergency services to respond promptly.

This section of the policy introduces the concept of traffic calming, outlines the goals and objectives of Westminster's Traffic Calming Policy, and provides guidance on how residents can apply for and identify suitable traffic calming measures across the City. It also explains how Engineering staff will evaluate various traffic issues, such as speeding, details the types of streets included in the traffic calming policy, and outlines the processes for identifying, selecting, and prioritizing traffic calming projects.

Traffic Calming Background

Residential traffic concerns can take a variety of forms and generally fall into the following categories:

- **Traffic safety:** The occurrence/frequency of crashes and/or the fear that crashes might occur.
- **Traffic speed:** Both excessive speed and non-uniformity of vehicle speeds.
- **Traffic volumes:** The total number of vehicles on a road at a given time, often peaking during rush hour periods.
- **Traffic source: "**Cut-through" movements are vehicles who use residential streets to bypass areas of congestion but whose destination is outside of the residential neighborhood.
- **Traffic composition, noise, vibration, and air pollution:** Certain types of vehicles, especially trucks, buses, and motorcycles, create more noise, vibrations, and emissions than passenger cars.

In many cases, a successful traffic calming program is dependent more on public participation and consensus building than on the specific technique(s) used. Although streets are typically public property and thus belong to everyone, most residents believe in ownership of their streets and take vocal exception to outside and discourteous drivers. Traffic calming strategies to address residential traffic concerns generally can be assigned to the following four basic categories:

- **Educating residents** to better understand the causes of traffic problems, potential solutions to those problems, and the advantages/disadvantages of implementing these solutions. It is also important to distinguish between the perceived severity of traffic issues and the real, objectively measured data, which often leads to overestimation of underestimation of the real traffic problems. This strategy should be pursued any time concerns are being addressed.

- **Developing an equitable, clear, well-defined, and legally defensible traffic calming policy** to help address equity, consistency, and disputes. Having a policy that is understandable and uses best practices can reduce liability issues and address residents' concerns.

- **Installing traffic control devices** that provide specific regulatory, warning, or guide messages to motorists are a part of traffic calming. These should be used only in conformance with the latest version of the *Manual on Uniform Traffic Control Devices* (*MUTCD*). However, traffic calming measures should not be confused with traffic control devices.

- **Establishing and enforcing traffic laws and ordinances** pertaining to speed limits, intersection control, and parking regulations. This strategy historically was the first attempt at addressing evolving traffic concerns; however, resources toward this task and equity issues have more recently raised questions regarding its sustainability.

What Are the Policy's Goals and Objectives?

The goals and objectives of the City of Westminster's Traffic Calming Policy are to address traffic safety, preserve neighborhood character and livability, and engage residents through public involvement.

How Is This Policy Used?

This policy was developed as a guide for City staff and to inform residents about the processes and procedures for implementing traffic calming measures. The policy includes a summary of the City's goals and objectives, as well as a defined process for implementation and a toolbox of traffic calming measures.

The procedures to implement traffic calming measures are described in Section II – Implementation Process. Public participation is highly encouraged, as is substantial neighborhood involvement. Available funding will be targeted to projects that receive a higher priority ranking through the process outlined in this policy. Projects will be prioritized based on identified safety needs and available funding.

How Are Traffic Problems Evaluated?

City of Westminster staff will collect and evaluate traffic data, identify system needs, and, using the guidelines in this policy, identify a range of appropriate solutions based on data and engineering judgment. The most widely used criteria for determining the need for traffic calming on residential streets include:

- Motor vehicle crash frequency
- Measured 85th percentile speeds
- Traffic volumes and vehicle classification
- Community/neighborhood input and support
- Bicycle and pedestrian activity
- Established and planned public transportation routes
- Surrounding land uses (i.e. – residential, schools, parks, etc.)

Motor vehicle crashes will serve as the primary evaluation criteria since safety is the most important aspect of traffic calming. The number of reported "correctable traffic accidents" is used to assess a potential project's need for safety-related traffic calming measures. "Correctable traffic accidents" are defined as crashes where police reported speed as a primary or contributing factor.

Traffic issues such as speeding and daily volume will serve as secondary criteria.

What Types of Streets Are Appropriate for Traffic Calming?

This Policy has been created for residential streets that are functionally classified as either local or collector roadways. The traffic calming measures presented in this policy are not typically suitable for streets with higher functional classifications, such as major or minor arterial roadways.

How Will Projects Be Ranked?

After a submitted application has been reviewed and compared successfully against the evaluation criteria, it will be considered for implementation. Based on the process defined in Part II of this policy, requests for traffic calming measures will be ranked City-wide based on a point score system. The project applicants will be notified of the resulting project rank after the evaluation.

How Will Projects Be Prioritized and Funded?

The highest-ranking projects will be included in the City's annual budget and will be implemented as funding is available. Each year, the number of implemented projects will depend on City of Westminster's fiscal resources. Previously qualifying projects that were not implemented as part of the current funding cycle will remain on the annual priority list for up to 5 years. This time condition has been set to ensure that projects do not become outdated due to changes in resident concerns and/or traffic conditions.

How Will Projects Be Maintained?

Improvements implemented within the City's Right of Way (ROW) will be the responsibility of the City to maintain. Many traffic calming measures are unique in that more frequent maintenance may be required to maintain effectiveness. As an example, because of wear caused by vehicles and occasional snow and ice removal equipment, high-visibility crosswalks have proven to require regular maintenance. The maintenance requirements of traffic calming measures will be considered as a part of the selection process.

How Will the Effectiveness of Projects Be Measured?

Once projects have been constructed and operational for at least 6 months, City Engineering staff will conduct a post-implementation evaluation, which will consist of a technical memorandum that determines whether or not the traffic calming measures or devices have been effective, if any changes or additional measures are required, or whether, due to ineffectiveness or other undesirable effects, devices should be removed. This process will answer the following questions:

- Has the traffic calming measure been effective?
- Has it created undesirable adverse effects?
- If implemented on a trial basis, should a more permanent traffic calming measure be constructed?
- Are additional measures needed to enhance effectiveness?

Who Should Residents Contact?

If a resident or neighborhood group believes they have traffic issues that may be addressed through traffic calming, they are encouraged to submit a completed application to the City of Westminster Engineering Division through one of the methods below. Applications are available online.

Mailing Address:
Traffic Calming Request
6575 W. 88th Ave.
Westminster, CO 80031

Attn: City of Westminster Engineering Division

Email Address: traffic@westminsterco.gov

Phone Number: 303-658-2120

This application can also be found at the end of this document under **Traffic Calming Request Form**.

PART II – TRAFFIC CALMING STRATEGIES

This section of the Traffic Calming Policy describes the strategies and intent of typical traffic control devices and the different levels of traffic calming measures used by the City. This section explains the use of signage and pavement markings and discusses the potential removal of unwarranted traffic control devices. For traffic calming measures addressing speed and traffic volumes, an explanation of the expected effectiveness and performance measures is discussed. There are two primary types of traffic calming strategies: non-physical and physical measures.

Non-Physical Traffic Calming Strategies

Non-physical strategies provide a non-invasive form of calming traffic that is inexpensive, can be easy to implement, and can also be easily removed if the measure is unsuccessful. They do not change the physical design or construction of the roadway. For these reasons, non-physical measures will be applied prior to implementing any physical traffic calming measures. Non-physical traffic calming strategies can take multiple forms. A discussion of some of the most common non-physical strategies is provided below.

- **Safety Education and Community Involvement** involves efforts to make the public mindful of their own driving behavior and the impact it has on others. Policies are often centered on promoting safe and lawful driving habits and may include policies geared toward drivers, bicyclists, pedestrians, or safe interaction amongst all users. Public meetings can provide a means for communicating concerns to City staff while allowing residents to share views and form consensus.

- **Police Enforcement** involves the increased presence of police officers to monitor speeds and issue citations for law violations such as stop sign, speed limit, turn restriction, and other traffic law violations. Visible presence is highly effective while an officer is present. Police enforcement can be useful for implementation of a new traffic calming measure, as well as provide a visible reminder of existing measures.

- **Pavement Markings** include a variety of painted roadway guidance such as various forms of striping and painted markings. Pavement markings are used to reduce travel lane widths, making drivers feel more restricted and thereby reducing their speeds. Striping is also used to create higher visibility for pedestrians at crosswalks and separate bike traffic from vehicle traffic. Painted markings are associated with reminding drivers of regulations such as speed limits, appropriate turn movements, or shared-use facilities. Painted markings may also be used to provide added visibility. Pavement markings are relatively easy and low-cost to install and modify; however, more maintenance may be required to keep pavement markings visible. Markings can reduce speeds, prevent unwanted turn movements, and heighten driver awareness.

- **Signage** may be used for a variety of warnings, regulations, and restrictions. Regulatory signs, such as speed limit signs, are a useful way to remind drivers of the regulatory speed limit in an area. Signed turn restrictions may be installed to prohibit certain movements at an intersection at certain times of day in cases where cut-through traffic is common. Signage may also be added to restrict certain types of vehicles on neighborhood streets. Signage can reduce or restrict

unwanted traffic and provide clear definitions of legal speed limits or provide other warnings and reminders. Signage is not self-enforcing and may decrease the aesthetics of a neighborhood or increase traffic on unintended streets. **Note that stop signs are not included as a traffic calming strategy in this policy as they are not intended to be a traffic calming device.** Stop signs are intended to assign right-of-way at intersections.

Physical Traffic Calming Strategies

Physical strategies consist of physical changes in the roadway design for the purpose of reducing the average roadway speed (speed management) or daily traffic volume (volume management). Physical strategies may be considered in instances where non-physical strategies have first been implemented, evaluated, and found to be unsuccessful. Physical strategies are discussed below.

- **Speed Management** can be achieved through either horizontal or vertical measures. Horizontal speed management strategies include treatments that create physical horizontal deviations or deflections in the roadway with the purpose of influencing driver behavior by physically changing the driver's path. Examples of horizontal speed strategies include traffic circles, roundabouts, and lateral shifts. Vertical speed management strategies refer to physical treatments that involve vertical displacement to influence speed through ride discomfort. Examples of vertical speed strategies include speed humps and raised crosswalks. Physical speed management strategies offer the benefit of self-enforcing speed limits and enhancing pedestrian safety. Additionally, horizontal speed strategies can often be designed to add aesthetic value to roads. Some concerns of physical speed management strategies include the higher cost compared to non-physical measures, potential emergency service limitations, increased noise and air pollution for some strategies, additional maintenance required by City for some strategies, and difficulty of removal if they prove ineffective.

- **Traffic Volume** management strategies include treatments that are intended to reduce and redirect traffic movements but are unlikely to have a significant influence on operating speeds. Examples of traffic volume management strategies include closures, diagonal diverters, and forced turn islands. Traffic volume strategies are effective at reducing or eliminating cut-through traffic and can often reduce speeds as well. The main concerns of traffic volume management strategies are their cost, additional delays for emergency vehicles and local residents, and the potential for diverting cut-through traffic to adjacent streets.

- **Removal of an Unwarranted Traffic Control Device** is sometimes needed to improve traffic calming. MUTCD explicitly states that stops signs should not be used for speed control. This is because the overuse of traffic control devices, particularly stop signs, can desensitize drivers and lead to noncompliance. Unwarranted stop signs may lead to increased speeding as drivers try to make up the lost time. Excessive stops signs may cause drivers to divert to other streets. The When determined through engineering study, all-way stop controlled intersections may be converted to two-way stop. The reorganization of signs may also be warranted to simplify the information that drivers receive. The most important signs should be encountered by drivers first. Additional signage is not always beneficial, as sign clutter may desensitize drivers to the more vital information. Signs must also be purchased and maintained by the city, using funds that could be

more effectively spent elsewhere. Installation of removal of signage will be at the discretion of city staff.

Performance and Cost Measures

Exhibit 1: Toolbox Summary on the following page summarizes the toolbox of available traffic calming devices and their effectiveness at addressing specific concerns. More detailed information is provided in PART IV –TRAFFIC CALMING MEASURES TOOLBOX. For each of the physical and non-physical traffic calming devices, ten performance measures were assessed. Each of the following ten performance measures were rated very good, good, fair, poor, or not applicable for each applicable traffic calming device:

- **Crash** reduction potential
- **Speed** reduction potential
- **Volume** reduction potential
- **Cut-through** traffic reduction potential
- Impact to **emergency vehicles**
- **Pedestrian** improvements
- **Bicycle** improvements
- Potential **noise** reduction
- Ease of **maintenance**
- Implementation **cost**

The likely capital cost was determined for each traffic control device, and a range of costs based on 2024 data was provided. These costs should be reviewed periodically and adjusted for market conditions and inflation. The ultimate cost of any improvement may vary substantially based on the number of devices implemented, the length of the improvement, or the extent of necessary reconstruction. It is not the intent of this policy to determine detailed costs, but rather to provide generalized costs for comparison between devices. Costs were categorized as follows:

- $ = $0 to $25,000
- $$= $25,000 to $50,000
- $$$ = $50,000 to $100,000
- $$$$ = $100,000+

Toolbox Summary

See detailed device pages for more information

$=$0 to $25,000 $$=$25,000 to $50,000 $$$=$50,000 to $100,000 $$$$=$100,000+

Very Good · Good · Fair · Poor · N/A Not Applicable

	Effectiveness of traffic control measure at addressing concern									
	Crashes	Speed	Volume	Cut Through	Emergency Vehicle	Pedestrian	Bicycle	Noise	Maintenance	Cost
Non-Physical Control Measures										
Targeted Police Enforcement								N/A	N/A	$$
Portable Radar Speed Sign	N/A							N/A	N/A	$
Permanent Radar Speed Sign	N/A							N/A	N/A	$$
Centerline/ Edgeline/ Laneline Striping	N/A							N/A		$
Speed Limit Signage								N/A		$
High Visibility Crosswalks								N/A		$$
Parking Strategies								N/A	N/A	$$
Education and Community Involvement									N/A	$
Restricted Movement Signing	N/A							N/A		$
Textured or Colored Pavement										$$
Physical Control Measures										
Speed Control - Narrowing Measures										
Neckdowns and Bulbouts								N/A		$$
Lane Narrowing with Center Island/ Entry Island/ Pedestrian Refuge								N/A		$$$
Two-Lane Choker						N/A		N/A		$$$
Speed Control - Horizontal Measures										
Traffic Circle										$$$
Roundabout (Single Lane)			N/A							$$$$
Chicane	N/A									$$$
Lateral Shift	N/A		N/A					N/A		$$$
Realigned Intersection	N/A					N/A	N/A	N/A		$$$
Curb Radius Reduction				N/A				N/A		$$$$
Medians and Partial Medians								N/A		$$$
Star Diverter						N/A		N/A		$$$
Speed Control - Vertical Measures										
Speed Hump										$
Speed Table										$
Speed Kidneys/ Cushions										$
Raised Crosswalk										$
Raised Intersection			N/A	N/A				N/A		$$$
Volume Control Measures										
Full Closure (gate, midblock, cul-de-sac, Intersection cul-de-sac)									N/A	$$$$
Partial Closure or "Semi Diverter"									N/A	$$$$
Diagonal Diverter or "Partial Diverter"										$$$$
Median Barrier										$$$$
Forced Turn Island										$$$$
One-Way Couplet Conversions								N/A		$$$

Exhibit 1: Toolbox Summary

PART III – IMPLEMENTATION PROCESS

This section of the policy discusses the implementation process for the Traffic Calming Policy, including how residents can petition for traffic calming measures, and what criteria must be met for those measures to be considered by the City. Additionally, this section highlights the expectations and responsibilities of both petitioning residents and the City.

How Does the Decision Process Work?

The request for traffic calming measures on a street can be initiated by a resident, neighborhood group, and/or homeowners' association with specific concerns about speeding, traffic volume, cut-through traffic, and/or other traffic issues considered detrimental to the safety and livability of their community. Requests for traffic calming measures can be submitted using the **Traffic Calming Request Form** (found at the end of this document). Following a formal request, the Engineering Division will investigate the traffic issues and, through observations, data analysis, and review of historical traffic data, may recommend specific streets that could benefit from traffic calming measures. The plan development and implementation process phases include:

- Preliminary actions
- Implementation measures
- Assessment of effectiveness

Every request for traffic calming will be reviewed by City staff. Upon receipt, staff will determine if the request meets all of the following four criteria:

1. The roadway segment in question must be functionally classified as a local or collector roadway.
2. The roadway segment has a demonstrated need for traffic calming as determined through engineering study. (See **Exhibits 2 and 3: Minimum Threshold Criteria for Traffic Calming Projects** on the following pages.)
3. The roadway segment has not been considered for traffic calming measures within the last 5 years. (However, if conditions in the field have changed significantly, projects may be re-evaluated within this 5-year time frame. Such changes can be indicated on the **Traffic Calming Request Application Form**.)
4. The roadway segment does not have curves, grades, or other features that would be incompatible with traffic calming measures.

Only after a street or area meets all four of these criteria will it qualify for traffic calming evaluation and implementation. As illustrated in **Exhibit 4: Traffic Calming Process Flow Chart**, City staff will communicate to the applicant, the framework and sequence of phases necessary to implement traffic calming measures.

Exhibit 2

Minimum Threshold Criteria for **Local Roads**

Roadway Segment Being Considered: _____ Date: _____

Preliminary Data

1. Weekday 24-hour traffic volume – both directions combined (vpd)? _____
2. Speed Limit (mph)? _____
3. 85th Percentile Speed (mph)? _____

Single Factor Thresholds

"YES" for 1 or more of these factors grants eligibility for traffic calming measures

4. Is weekday 24-hour traffic volume greater than 1000 vpd? YES _____ NO _____
5. Is 85th percentile speed 8 mph or more over the speed limit? YES _____ NO _____
6. Have there been 3 or more correctable* traffic accidents reported in a 12-month period? YES _____ NO _____

Multi - Factor Thresholds

"YES" for 2 or more of these factors grants eligibility for traffic calming measures

7. Is weekday 24-hour traffic volume greater than 800 vpd? YES _____ NO _____
8. Is 85th percentile speed 5 mph or more over the speed limit? YES _____ NO _____
9. Is there a school or other significant pedestrian generator within ¼ of a mile of the segment being considered? YES _____ NO _____

YES _____ This roadway segment IS ELIGIBLE for traffic calming measures where City funds are utilized

NO _____ This roadway segment IS NOT ELIGIBLE for traffic calming measures where City funds are utilized

Exhibit 2: Minimum Criteria Threshold for Local Roads

* "Correctable traffic accidents" are defined as accidents where police reported speed as a primary or contributing factor.

Exhibit 3

Minimum Threshold Criteria for **Collector Roads**

Roadway Segment Being Considered: _____ Date: _____

Preliminary Data

1. Weekday 24-hour traffic volume – both directions combined (vpd)? _____
2. Speed Limit (mph)? _____
3. 85th Percentile Speed (mph)? _____

Single Factor Thresholds

"YES" for 1 or more of these factors grants eligibility for traffic calming measures

4. Is weekday 24-hour traffic volume greater than 10,000 vpd? YES _____ NO _____
5. Is 85th percentile speed 12 mph or more over the speed limit? YES _____ NO _____
10. Have there been 3 or more correctable* traffic accidents reported in a 12-month period? YES _____ NO _____

Multi - Factor Thresholds

"YES" for 2 or more of these factors grants eligibility for traffic calming measures

6. Is weekday 24-hour traffic volume greater than 7,000 vpd? YES _____ NO _____
7. Is 85th percentile speed 8 mph or more over the speed limit? YES _____ NO _____
8. Is there a school or other significant pedestrian generator within ¼ of a mile of the segment being considered? YES _____ NO _____

YES _____ This roadway segment IS ELIGIBLE for traffic calming measures where City funds are utilized

NO _____ This roadway segment IS NOT ELIGIBLE for traffic calming measures where City funds are utilized

Exhibit 3: Minimum Criteria Threshold for Collector Roads

* "Correctable traffic accidents" are defined as accidents where police reported speed as a primary or contributing factor.

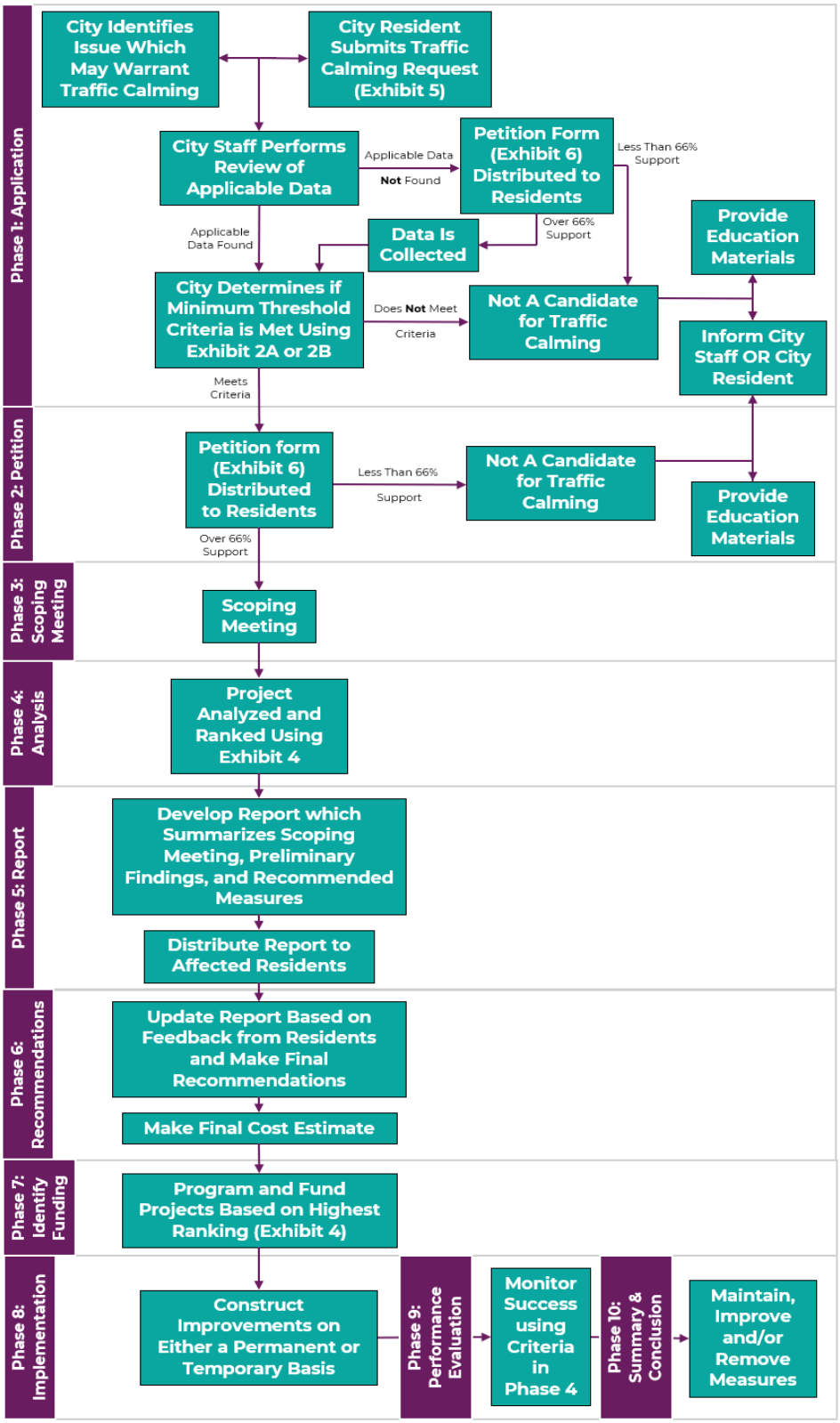


Exhibit 4: Traffic Calming Process Flowchart

What Are the Preliminary Actions?

The preliminary actions include Phases 1, 2, and 3 as part of the project Initiation and Scoping, and Phases 4 and 5 under Evaluation and Development. These phases are described in detail below.

Initiation and Scoping

Phase 1: Application

All local and collector City roadways are eligible for the program. Applicants are encouraged to work with a group of residents in the area of concern. Applications are available via email, website, or by calling 303-658-2120. Completed applications should be returned to City of Westminster Engineering Division. The traffic calming process may also be initiated by the City if it identifies issues along a roadway segment that may warrant traffic calming measures.

Upon receipt of a completed application, the City staff will review the application and perform a search for applicable data. Data is considered applicable if it has been collected by the City or a City-approved consultant/contractor no more than 3 years prior to the application, which would indicate the data is most likely still an accurate reflection of the existing conditions. On the application, it is important to note any significant changes that have affected traffic within a neighborhood, as these changes can be used to determine the applicability of data. The Engineering Division will respond in writing to the applicant. The response will inform the applicant if applicable data is available and whether or not the minimum criteria, as described in this policy, have been met. If the application has applicable data but the minimum criteria are not met, the application will be denied, and a date will be provided for the current data expiration. Applicants must re-apply for participation if they would like an area to be considered after the data has expired. If the application is accepted by the Engineering Division, the applicant will continue to Phase 2.

Applicant Responsibility: To the best of the applicant's ability, determine the traffic issue(s) of concern. Identify and appoint a point of contact. Submit a completed application to the City (**Traffic Calming Request Application Form**).

City Responsibility: Acknowledge receipt of the application within 10 business days. Review and respond to all submitted applications within 45 days with a timeline that will be determined on a case-by-case basis. Determine if the request meets the minimum guidance criteria. Research available data. Work with the applicant to define next steps.

Phase 2: Petition

Once the Engineering Division has determined if there is applicable data, the applicant will be provided with a petition form (**Traffic Calming Petition Form**). This petition form will be accompanied by a map of the area as determined by the Engineering Division and based on policy guidelines. A petition will be considered complete if two-thirds of the affected households have signed the petition. The petition process is used by the City only to determine if there is sufficient community support to expend City staff resources on data collection. The City staff may modify or expand the petition area to address unique circumstances. Upon completion of a successful petition, the Engineering Division will add the area and traffic concern, as described on the initial application, to a list of data collection and analysis needs. No petition will be required if the project has been initiated by City staff.

Applicant Responsibility: Circulate the petition to affected households and obtain the required two-thirds signatures.

City Responsibility: Provide map of area for signatures on petition. Maintain a list of data collection and analysis needs for traffic calming. Add the application to this list if it qualifies.

Phase 3: Scoping Meeting

Upon receipt of a completed petition, City staff will conduct an initial scoping meeting with the petitioning resident or neighborhood group. This meeting will be a collaborative working meeting to refine the study area as needed, understand the traffic issues, define the data collection effort, and provide specifics on the analysis that will be conducted. The scoping meeting may include a visit to the area to observe firsthand the traffic issues and concerns. The scoping meeting will serve as an opportunity for City staff to communicate to residents the next steps in the process, program and funding limitations, and current and ongoing education and enforcement efforts. Residents are encouraged to attend the scoping meeting and voice their concerns.

Applicant Responsibility: Attend the scoping meeting with the intent to work collaboratively to identify the study area, understand the traffic issues, define the data collection effort, and specify the analysis that will be conducted.

City Responsibility: Conduct the scoping meeting with the intent to work collaboratively to identify the study area, understand the traffic issues, define the data collection effort, and specify the analysis that will be conducted.

Evaluation and Development

Phase 4: Analysis

Once a clear understanding of the traffic issues is reached and the extent of the study area has been defined, City staff will collect the necessary data to perform the engineering traffic analysis. Upon completion of the traffic analysis, City staff will use the criteria listed in **Exhibit 5: Prioritization Criteria** (on the following page) to assess the extent of the reported traffic problem.

The results of the engineering traffic analysis and the toolbox of traffic calming measures described in Part IV of this policy will be used to develop traffic calming plans and identify specific traffic calming measures that are recommended for implementation.

Applicant Responsibility: None.

City Responsibility: Collect the necessary data and perform the engineering traffic analysis. Assess the extent of the traffic problem and recommend traffic calming measures for implementation.

Criteria	Maximum Points	Project Score	Definition
Reported Crashes	**N/A**		**5 points for each reported and preventable crash within the past 3 years** **10 points for each crash that leads to an injury within the past 3 years** **25 points for each crash that leads to a fatality within the past 3 years**
Speed	**N/A**		**2 points for each mph that the 85th percentile speed is above the posted speed limit** *The posted speed limit is the maximum speed legally permitted on a given road. The 85th percentile speed is the speed at or below which 85 percent of vehicles travel. It is commonly used as a benchmark when posting speed limits. The City will conduct speed studies.* *(Example: if speed limit is 25, and 85% speed is 30 mph, then 2*(30-25) =10 points*
Traffic Volume	**15**		**Total traffic volume per day divided by 100** *Total volume is the number of vehicles crossing a section of road during a selected period of time. Traffic volume per day is determined by the City of Westminster Engineering Division.* *(Example: Total Volume is 400 = 400/100 = 4 points)*
Community Support	**5**		**2 points for ≥66% support on qualifying petition** **3 points for >70% support on qualifying petition** **4 points for >80% support on qualifying petition** **5 points for >90% support on qualifying petition**
Bicycle Routes	**5**		**5 Points based on officially designated routes and observed bicycle activity** *Bike routes refer to roads, tracks, paths, or marked lanes designated for use by cyclists from which motorized traffic is generally excluded*
Sidewalks and Pedestrians	**5**		**5 points based on sidewalk availability and observed pedestrian activity**
Activity Centers	**5**		**5 points if the street is within 0.25 mile of a major activity center** *(Example: school, park, shopping center, senior center, or RTD transit center)*
Sight Distance	**5**		**5 points for sight distance issues** *Stopping sight distance is defined as the distance needed for drivers to see an object on the roadway ahead and bring their vehicles to a safe stop before colliding with the object. Sight distance issues may be due to horizontal and vertical curves. The City staff will make this determination*
Existing Measures	**-5**		**Reduction of up to 5 points if there are existing traffic calming measures** *(Example: speed humps, raised crosswalks, etc.)*
Environmental Conditions	**-10**		**Reduction of up to 10 points if traffic calming would impact regular maintenance or snow removal activities, increase noise levels, or create visual impacts**
Total Points	**N/A**		

Exhibit 5: Prioritization Criteria

Phase 5: Report

The Engineering Division staff will summarize the results of the analysis and prepare a report. Input will be solicited from emergency response departments (Fire and Police), and their recommendations will be incorporated into the report. Depending on the size of the area and complexity of the issues, the report may consist of simply a technical memorandum or email. For larger areas with more complex issues a detailed recommendation report may be prepared. In whichever form is appropriate, at a minimum the recommendation report will consist of a summary of the scoping meeting, data collected, analysis conducted, preliminary findings, and recommended traffic calming measures. The applicant should widely distribute the recommendation report to all affected households and any neighborhood associations.

Applicant Responsibility: Distribute the recommendation report to affected households and neighborhood associations. Provide written feedback to the City to collaboratively identify reasonable traffic calming measures that can be implemented within available funding.

City Responsibility: Prepare the recommendations report with the intent to work collaboratively to identify reasonable traffic calming measures that can be implemented within available funding.

Phase 6: Recommendations

If needed, City staff will update the traffic engineering report based on the feedback from the public and make final recommendations. Specific devices and locations for traffic calming measures will be identified and recommended for implementation. Property owners directly adjacent to proposed measures will be reached for buy-in. As projects near the top of the priority list, the City will refine the cost estimate. For larger or more complex projects, a public meeting may be organized at the discretion of City staff to present the final recommendations to the residents.

Recommendations may include permanent traffic calming measures or the implementation of a “Pilot Project” which will install temporary traffic calming devices. These temporary devices will then be monitored for a period of at least 1 year, after which a determination will be made whether to make these measures permanent or to remove them. Pilot projects may be implemented in the spring so as to avoid snowplows and other maintenance vehicles which may damage less resilient temporary measures.

Applicant Responsibility: None.

City Responsibility: Update the traffic engineering report, finalize recommendations, and refine the cost estimate. Provide a copy of the finalized report to the applicant. If deemed necessary by City staff, hold a public meeting to present final recommendations to residents.

Phase 7: Identify Funding

Requests for funding for projects must compete with other requests for traffic calming funding and will be ranked City-wide based on their point score. The highest-ranking projects will be implemented first, and the number of projects executed will depend on the City’s resources. Projects will continue to be ranked for up to 5 years. This time condition has been set to ensure that projects do not become outdated due to resident and traffic condition changes.

Applicant Responsibility: Determine if non-City funding is available for construction and/or maintenance of traffic calming measures, e.g., grants, homeowners' association dues, or direct community support. Contribute financially or through organized volunteer efforts for maintenance.

City Responsibility: Rank projects based on their point score. Annually identify those projects that will be constructed. Attempt to include a specific traffic calming project in each year's capital program.

Phase 8: Implementation

Projects may be implemented on a temporary or permanent basis. Non-physical measures will be implemented first because they are easiest to install and are the least expensive. If the effects of a traffic calming measure are uncertain, it may be implemented initially on a temporary basis, also referred to as a "Pilot Project". Once a device or series of devices has proven effective, permanent traffic calming measures may be constructed.

Applicant Responsibility: None.

City Responsibility: Determine if traffic calming measures should be initially implemented on a temporary or permanent basis.

How is Effectiveness Assessed?

Once projects have been constructed and operational for at least one year, a post-implementation evaluation process will be conducted. Phases 9 and 10 outline how this process will determine whether the devices have been effective, if any changes or additional measures are required, or whether, due to ineffectiveness or other undesirable effects, the devices should be removed.

If staff determines that snow removal operations could impact the temporary nature of an implemented pilot project, the effectiveness will be evaluated 1 year after implementation.

Performance and Documentation

Phase 9: Performance Evaluation

The City of Westminster Engineering Division staff will revisit and reevaluate the traffic calming measures that have been implemented by conducting a post-implementation study, analyzing a period of at least 1 year. This study will determine if the traffic calming measures have been effective and if they accomplished their desired goal by using the same criteria identified in Phase 4. Any unanticipated or undesirable effects will be noted and ineffective devices will be removed. If a device was implemented on a temporary basis as part of a Pilot Project, the staff will determine if a more permanent traffic calming measure should be constructed. Finally, any additional measures that could enhance the effectiveness or improve overall traffic calming will be identified.

Applicant Responsibility: Notify the City of any positive or negative feedback that may be received from neighborhood residents or groups.

City Responsibility: Conduct a post-implementation study to determine effectiveness.

Phase 10: Summary and Conclusion

City staff will document the results of the post-implementation study and make recommendations on whether to maintain, improve, and/or remove traffic calming measures.

Applicant Responsibility: None.

City Responsibility: Provide a copy of the post-implementation study to the applicant.

PART IV –TRAFFIC CALMING TOOLBOX

This section of the policy provides a detailed toolbox of traffic calming measures for use in developing traffic calming plans. Each measure includes a brief description, noted positive and negative aspects, and an accompanying illustration or photograph. In selecting the correct set of tools to address an identified and documented problem, it is important to understand these considerations, as well as the initial and long-term costs associated with each tool. The individual devices are grouped so that the reader can compare and identify those measures that best address the traffic issues and are most appropriate for the specific area. The toolbox is divided into five categories:

1. **Non-Physical Control Measures**
2. **Speed Control – Narrowing Measures**
3. **Speed Control – Horizontal Measures**
4. **Speed Control – Vertical Measures**
5. **Traffic Volume Control Measures**

This Traffic Calming Toolbox consists of 32 potential devices to address traffic concerns, and each device is described in detail in the following pages of this document.

Parts V and VI of this policy include application forms for initiating a request for traffic calming, as well as a petition sheet for signatures.

1. NON-PHYSICAL CONTROL MEASURES

- NP-1: Targeted Police Enforcement
- NP-2: Portable Radar Speed Sign
- NP-3: Permanent Radar Speed Sign
- NP-4: Centerline/ Edgeline/ Laneline Striping
- NP-5: Speed Limit Signage
- NP-6: High Visibility Crosswalks
- NP-7: Parking Strategies
- NP-8: Education and Community Involvement
- NP-9: Signed Turn Restriction
- NP-10: Textured or Colored Pavement

DESCRIPTION: Targeted police enforcement is the stationing of police officers on roadways for a period of time to perform speed limit enforcements and enforcement of traffic laws. Police presence and enforcement of laws can result in reducing speeding, aggressive driving, stop sign violations, turn-restriction violations, and other traffic law violations. This is often not sustained for long term unless a sustained effort occurs.

APPLICATION: In cases where speeding, other traffic law violations, or crash patterns have been documented, police can be deployed for focused enforcement at the specified locations. If police department resources are limited, the duration of the targeted police enforcement may be for a limited time. Targeted enforcement may also be requested with new developments or implementation of new traffic patterns to help drivers become aware of new conditions or constraints, such as turn prohibitions.

The level of deployment can vary from a single officer or multiple officers depending on the characteristics of the roadway and violation history. Repeated short-term deployments over a longer term may be more effective and result in a greater effect than one longer deployment.

Effectiveness Scorecard

Crashes	Fair
Speed	Very Good
Volume	Poor
Cut-Through	Fair
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Highly effective in reducing speeding and other traffic law violations including stop sign running and illegal turns.
- Can be deployed on short notice and for the specific hours for which problems have been identified.
- Results are immediate.
- Can reduce crashes related to speeding and other violations.
- Low cost if used temporarily.
- Does not affect emergency vehicles.
- Targets violators without affecting normal traffic.

CONSTRAINTS

- Effectiveness may be temporary, especially if the enforcement is only deployed once.
- Enforcement is limited to police availability.

DESCRIPTION: Portable radar speed signs are signs installed on the side of the road that use radar to detect the speed of oncoming vehicles and display that speed for the approaching driver to view. The signs are installed with a regulatory speed limit sign on the same post. This combination is intended to give the driver a visual of their speed, which if it exceeds the posted speed limit, may flash their traveling speed. The radar speed signs do not have cameras and do not take any photos of violating drivers for enforcement purposes.

APPLICATION: On roadways where there is a history of speeding traffic, radar speed signs may be installed to assist in reducing traffic speeds. The radar speed sign should be installed where there is enough room within the roadway right-of-way to install the sign so that it is visible for adequate distance for drivers to see to be effective. The signs can be hard-wired for electrical power where service is available, or they can be solar electric powered. Some radar speed signs have the capability to record traffic-speed data for download and

Effectiveness Scorecard

Crashes	N/A
Speed	Very Good
Volume	Poor
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- The visual reminder of drivers' speeds has been shown to be effective in prompting some speeding drivers to slow down.
- Radar speed signs alert violators without affecting normal traffic.
- Can be implemented with hard-wired electric service or solar powered.
- These portable signs can be deployed and redeployed to dynamically respond to traffic issues.

CONSTRAINTS

- Effectiveness may reduce over time as routine drivers become desensitized.
- Some drivers may ignore, knowing that the radar speed signs do not include automated enforcement.
- Some drivers may try to register a high speed.
- Units and solar panels are subject to vandalism and theft.
- Costly and requires maintenance.

DESCRIPTION: Permanent radar speed signs are post-mounted signs installed on the side of the road that use radar to detect the speed of oncoming vehicles and display that speed for the approaching driver to view. The signs are installed with a regulatory speed limit sign on the same post. This combination is intended to give the driver a visual of their speed, which if it exceeds the posted speed limit, may flash their traveling speed. The radar speed signs do not have cameras and do not take any photos of violating drivers for enforcement purposes.

Effectiveness Scorecard

Crashes	N/A
Speed	Very Good
Volume	Poor
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

APPLICATION: On roadways where there is a history of speeding traffic, radar speed signs may be installed to assist in reducing traffic speeds. The radar speed sign should be installed where there is enough room within the roadway right-of-way to install the sign so that it is visible for adequate distance for drivers to see to be effective. The signs can be hard-wired for electrical power where service is available, or they can be solar electric powered. Some radar speed signs have the capability to record traffic-speed data for download and analysis.

BENEFITS

- The visual reminder of drivers' speeds has been shown to be effective in prompting some speeding drivers to slow down.
- Radar speed signs alert violators without affecting normal traffic.
- Can be implemented with hard-wired electric service or solar powered.

CONSTRAINTS

- Effectiveness may reduce over time as routine drivers become desensitized.
- Some drivers may ignore, knowing that the radar speed signs do not include automated enforcement.
- Some drivers may try to register a high speed.
- Units and solar panels are subject to vandalism and theft.
- Costly and requires maintenance.

DESCRIPTION: While most local streets exist without any traffic striping, centerline, edge line, and lane line striping can be used to create designated travel lanes, bicycle lanes, parking lanes, and/or medians. As a traffic calming measure, striping is positioned to reduce travel lane widths, making drivers feel more restricted and thereby inducing them to lower their speeds.

APPLICATION: On local or collector streets where a problem of speeding traffic has been documented, traffic stripes may be painted where there was previously none, or existing stripes may be removed and new stripes painted in the new desired configuration. This installation is most suited to long, straight, and wide streets where drivers feel unconstrained and speeds are high. On curvilinear streets, striping can reinforce lane designations, causing drivers to slow in order to maintain their travel within their lane. Centerlines, edge lines, and lane line markings should be installed according to the guidance provided in Chapter 3: Markings of the MUTCD.

Effectiveness Scorecard

Crashes	N/A
Speed	Fair
Volume	Fair
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	Fair
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Striping is relatively easy and low-cost to install and modify.
- Traffic striping does not slow emergency vehicles.

CONSTRAINTS

- Regular maintenance is required. Stripes must be repainted approximately every 4 years.
- Removal of existing traffic stripes in order to change the configuration may leave unsightly scars on the pavement surface.
- Effectiveness may be low.

DESCRIPTION: Regulatory Speed Limit signs (MUTCD Sign Code R2-1) are installed along streets to inform drivers of the legal speed limit.

APPLICATION: Speed limit signs should be provided on roadways to notify drivers of the posted speed limit. These can be used in coordination with radar enforcement if permitted with the state to cite violators. Where a history of speeding traffic has been documented, signs may be installed to inform drivers to check their traveling speed. If enforced by radar, the posted speed limit should be in conformance with Colorado speed limit permitting policies. Speed limit signs of nonconforming designs or colors, or nonconforming speed values should not be installed on public roadways.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Poor
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	Very Good
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Speed limit signs provide a clear indication of the speed limit and indisputable basis for enforcement.
- Speed limit signs are relatively easy and low-cost to install.

CONSTRAINTS

- Signs alone do not guarantee responsible driving behavior.
- Overuse of unnecessary signs creates visual clutter that detracts from the importance of the signs and can lead to loss of effectiveness.
- Signs require regular maintenance and must be replaced periodically.

DESCRIPTION: High visibility crosswalks utilize striping patterns, advance markings, raised pavement markers, enhanced signage, activated flashing beacons, and/or activated in-pavement lights to improve the visibility of the crossing. Various special pavement treatments may also be used to create a visual and tactile demarcation of the crosswalk, including colored pavement, pavers, patterned concrete, or applied surfacings.

APPLICATION: At locations where safe pedestrian crossings are a concern (due to poor visibility, speeding traffic, or vulnerable user types such as school children, elderly, vision or hearing-impaired pedestrians), the various treatments listed above may be employed to address the specific deficiencies identified. The standard crosswalk marking style in the City of Westminster is the continental type (a series of 24" x 10' bars), which is highly visible. Enhancements are best applied only where there is a high volume of pedestrian usage.

Effectiveness Scorecard

Crashes	Good
Speed	Fair
Volume	Poor
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Good
Noise	N/A
Maintenance	Poor
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Increases driver awareness of the crossing.
- Attracts pedestrians to a single crossing location.
- Pavement treatments can be aesthetically pleasing.

CONSTRAINTS

- May give pedestrians a falsely high sense of safety.
- More complex installations (lights, pavement treatments) can be costly.
- May result in increased maintenance costs for pavement treatments, beacon systems, and in-pavement lights.

DESCRIPTION: Parking issues are often as prevalent as volume or speeding concerns and issues. While some parking treatments can themselves calm traffic, issues resulting from parking should be considered when applying parking measures. Several other narrowing and horizontal measures may reduce available parking spaces, while others may create additional parking. These can be used in combination to create a solution that is context sensitive for each specific application.

APPLICATION: As part of any traffic calming measure implementation, the parking needs and concerns in areas should be identified while considering volume and speeding issues in the area as well. Items to consider when reviewing parking strategies should include questions like: Are there enough parking spaces for general demand? Are existing parking issues stemming from nearby land uses? Are there any parking permitting regulations in place that can be modified to impact parking? While on-street parking is common on most residential streets or prevalent in some downtown areas, where feasible, streets may be converted to angled or perpendicular parking to increase available spaces and narrow the general travel way.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Fair
Cut-Through	Fair
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Fair
Noise	N/A
Maintenance	N/A
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Parking spaces can be increased by reconfiguring available street width.
- No Parking zones near intersections and driveways can improve safety for motorists, pedestrians, and cyclists.
- The presence of perpendicular or angled parked vehicles can result in reduced traffic speeds.

CONSTRAINTS

- Angled and parallel parking can impact bike lanes and cyclists.
- Corridors with lots of driveways limit parking treatment options.
- Angled and parallel parking could increase backing-out collisions.
- Parking requires monitoring, enforcement, compliance, and signage that comes at an expense.

DESCRIPTION: Education efforts involve working with the community to make residents aware of speed limits, traffic laws, and safe driving habits, and enlisting their support in practicing and promoting safer driving habits. This may include presentations at schools or neighborhood meetings, local workshops, signs, and individual pledge letters to obey speed limits and traffic laws. Educational efforts can be particularly useful when changes will be implemented in areas where driver expectancies have stayed consistent for a long period of time or new practices not commonly used in the community will be implemented.

APPLICATION: Public education is crucial in any traffic calming program. While it may seem that most area traffic problems are caused by non-residents, the majority of traffic issues in a community usually are the result of local drivers. Public education programs seek to make all drivers more aware of correcting their own driving behavior to promote safety within their communities. As such, it is recommended that communities applying for traffic calming treatments first attend a traffic calming educational forum with City staff, including the likes of public works staff and local enforcing police agencies. Additional education materials such as informational handouts or publicly available videos can be used to illustrate topics discussed which can then be reviewed later by attendees following meetings.

Effectiveness Scorecard

Crashes	
Speed	
Volume	
Cut-Through	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	
Maintenance	N/A
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Heightens driver knowledge of traffic laws and review their own driving practices.
- Allows residents to meet, share their views, and move toward a consensus on issues.
- Community can share thoughts, issues, and concerns with City staff.

CONSTRAINTS

- May require considerable City staff time, potentially outside of normal working hours.
- Meetings need to be actively led to maintain focus and stay on topic.
- Meeting location size may limit attendance.

DESCRIPTION: Regulatory movement prohibition signs (MUTCD Standard Signs R3-1, R3-2, R3-3, R3-4, R3-18, or R3-27) can be installed at intersections to restrict turning movements associated with cut-through traffic or areas identified with turning vehicles crash patterns in order to reduce congestion on roadways and improve safety.

APPLICATION: On streets where a problem of "cut-through" traffic has been documented, movements at some intersections may be restricted so that traffic is routed to a more appropriate roadway. Cut-through traffic is defined as vehicles using smaller neighborhood roads to avoid traffic at major intersections. If the problem is documented to occur mainly during peak traffic periods, such as morning or afternoon school drop-off times, the movement prohibition can be posted to apply only during those hours. Turn prohibitions are most effective when placed on heavier volume roadways on the outer limits of a neighborhood to prevent vehicles from using neighborhood streets. Wherever posted, an assessment should be made of the resulting downstream route as well as alternate cut-through routes to assure that the problem is not just displaced to another area. Prohibitions are most effective when limited to posted hours. For full-time movement prohibitions, physical measures, such as restricted crossing U-turns, are more effective and appropriate. Enforcement is also a key component in its effectiveness, as studies have shown violation rates decreasing from 50% to 20% with regular enforcement.

Effectiveness Scorecard

Crashes	N/A
Speed	Poor
Volume	Good
Cut-Through	Good
Emergency Vehicle	Very Good
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	Very Good
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Effective in addressing cut-through traffic problems.
- Movement prohibition signs are relatively easy and have low-cost installations.
- Movement prohibition signs posted alone do not slow or divert emergency vehicles.
- Signs can address safety concerns where angle crashes are prevalent if other more permanent modifications are not feasible.

CONSTRAINTS

- Compliance may be low for signs alone without enforcement.
- May increase trip length for drivers.
- May adversely affect adjacent intersections as a result of new traffic patterns.
- Signs require regular maintenance.

DESCRIPTION: Paving materials such as brick, cobbles, or concrete pavers can be used to identify a traffic-calmed area. The variety of color and texture signal to drivers that they are traveling in a pedestrian-centric zone. Some projects include colored and textured pavement along the entire calmed roadway, while others limit the special pavement to the edges of calmed areas to announce entry into a new area where through traffic is not the priority.

APPLICATION: Bricks or blocks are sometimes also used to provide the same traffic calming benefits as rumble strips, delineating crosswalks and pedestrian zones.

Effectiveness Scorecard

Crashes	Fair
Speed	Good
Volume	Poor
Cut-Through	Poor
Emergency Vehicle	Very Good
Pedestrian	Good
Bicycle	Good
Noise	Good
Maintenance	Poor
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

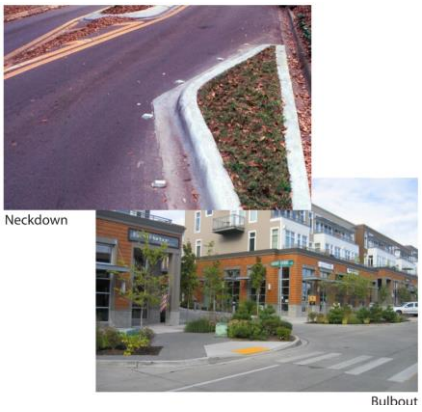
- Textured pavements attract the driver's attention visually, audibly, and physically.
- Ideal for residential and neighborhood shopping areas.
- Permanent, effective and can add to the aesthetics of an area.

CONSTRAINTS

- Some material, particularly cobblestones, present a hazardous riding surface to bicyclists.
- Loose or uneven installations of paving stones pose a tripping hazard to pedestrians.
- Should be regularly inspected.
- Increased maintenance costs over ordinary asphalt or concrete pavement.

2. SPEED CONTROL – NARROWING MEASURES

- SCN-1: Neckdowns and Bulbouts
- SCN-2: Lane Narrowing with Center Island
- SCN-3: Two-Lane Choker



Effectiveness Scorecard

Crashes	
Speed	
Volume	
Cut-Through	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	N/A
Maintenance	
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

DESCRIPTION: Neckdowns and bulbouts are raised curb extensions at intersections that narrow the available roadway width. They can be used at corners and at mid-block and have been shown to increase pedestrian confidence and safety at intersections by reducing their crossing distance and increasing pedestrian visibility to vehicles via increased raised sidewalk area. They also tighten the radii at the corners, reducing the turning speed of larger vehicles. The benefits are greater the further the bulb-out extends into the roadway and the tighter the turn radius as they increase speed reduction between points by requiring drivers to slow.

APPLICATION: Neckdowns created for turning speed control measures and pedestrian enhancements are most effective when constructed with permanent raised curbs, but they can also be implemented more cost-effectively by using striping. Bulbouts occur at the corners of intersections using raised curbs to extend the sidewalks and narrow the travel lanes. This slows vehicles by providing visually obvious cues of pedestrian activity as well as by reducing the curb radii. Implementation reduces the pedestrian crossing distance, and therefore the time pedestrians are exposed to conflicting traffic. Neckdowns are typically best suited for neighborhood roadways, while bulbouts are beneficial along wider roadways and areas with higher pedestrian and traffic volumes.

BENEFITS

- Reduced vehicle speeds.
- Reduced pedestrian crossing distance.
- Provides clearer delineated areas of pedestrian activity.

CONSTRAINTS

- May reduce available on-street parking.
- Can impact drainage
- Reduces bicycle lane and/or side of road used by bicyclists.
- May slow right-turn emergency response vehicles.

DESCRIPTION: Installing center islands on a wider street can assist in reducing the width of the travel lanes and to provide a pedestrian refuge area. Like neckdowns, center islands are useful for providing visual cues to pedestrian activity, reducing vehicle speed, and shortening pedestrian crossing distances.

APPLICATION: A center island can be installed strictly as a speed-reducing measure at a midblock location without a marked pedestrian refuge. Additionally, center islands can increase pedestrian safety, especially when combined with highly visible signage, if installed at a pedestrian crossing location. Another alternative of the measure is to install it as a community gateway, to reduce traffic speed entering a community. Center islands can provide an area for community signage and landscaping when they are placed at an entryway.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Poor
Cut-Through	Fair
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Fair
Noise	N/A
Maintenance	Fair
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Reduce vehicle speeds.
- Reduces pedestrian crossing distance.
- Provides clearer delineated areas of pedestrian activity.
- Opportunity for landscaping, visual enhancement, and signage.

CONSTRAINTS

- May reduce on-street parking.
- Longer islands may restrict driveway access.
- May impact bicycle lane availability.
- Impacts turning movements from perpendicular roadways and driveways.
- Impacts drainage on non-crowned roadways.

DESCRIPTION: A two-lane choker consists of curb extensions that are constructed at midblock locations to narrow the travel way while still providing one lane in each direction. The resultant narrowed roadway cross section can reduce vehicle speeds and can result in reducing cut-through traffic.

APPLICATION: Like neckdowns or center islands, two-lane chokers are used to reduce vehicle speeds. They are most effective when constructed with permanent raised curbs, but can be implemented using a combination of striping and signage. The curb extensions, approach signing, and narrower travel lanes are used as visual cues to slow vehicles and discourage cut-through traffic by slowing vehicles.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Fair
Cut-Through	Fair
Emergency Vehicle	Good
Pedestrian	N/A
Bicycle	Fair
Noise	N/A
Maintenance	Fair
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Reduce vehicle speeds.
- May reduce cut-through traffic.

CONSTRAINTS

- May reduce available on-street parking.
- Can impact drainage.
- Reduces bicycle lane and/or side of road area used by bicyclists.
- May require occasional maintenance.
- They can impact adjoining infrastructure such as sidewalk, existing landscape, and could require private property acquisition due to limited rights of way on older roadways.

3. SPEED CONTROL – HORIZONTAL MEASURES

- SCH-1: Traffic Circle
- SCH-2: Roundabout
- SCH-3: Chicane
- SCH-4: Lateral Shift
- SCH-5: Realigned Intersection
- SCH-6: Curb Radius Reduction
- SCH-7: Medians and Partial Medians
- SCH-8: Star Diverter

DESCRIPTION: Traffic circles are raised, circular islands installed in the middle of intersections, around which traffic circulates. Yield signs are often installed at the approaches of the traffic circle in order to indicate the right of way of vehicles in the traffic circle. Traffic circles can prevent drivers from speeding through intersections by adding curvature to the through movements and forcing drivers to slow down or yield.

APPLICATION: Traffic circles are effective at intersections where there are fewer heavy vehicles or larger trucks and have had speeding and safety concerns.

Effectiveness Scorecard

Crashes	
Speed	
Volume	
Cut-Through	
Emergency Vehicle	
Pedestrian	
Bicycle	
Noise	
Maintenance	
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Effective at slowing travel speeds.
- Improves safety.
- Provides increased access to main street from side street.

CONSTRAINTS

- Slows emergency vehicles and can be difficult for large vehicles to navigate.
- May reduce available on-street parking.
- May require additional costs for modifications to curb, gutter, utilities, lighting, and sidewalks.
- Can impact drainage.

DESCRIPTION: Roundabouts require traffic to circulate counterclockwise around a center island. Differing from traffic circles, roundabouts can be implemented on higher volume streets to evenly distribute right-of-way among competing movements. They are larger than traffic circles, have raised islands on approaches to channel approaching traffic through the roundabout. Roundabouts are used as an alternative to a traffic signal, as they are relatively easy to maintain.

APPLICATION: Roundabouts are typically an alternative for all-way stop or traffic signal intersections. They are most conveniently installed for new developments, as the cost of right-of-way can be a large barrier to modifying existing intersections. If a roundabout is being considered in an established location, there are many criteria that should be considered before application, including crash history, queue lengths, geometry, and right-of-way restrictions.

Effectiveness Scorecard

Crashes	●
Speed	◕
Volume	N/A
Cut-Through	▲
Emergency Vehicle	◒
Pedestrian	◕
Bicycle	◒
Noise	◕
Maintenance	◒
Cost	$$$$

● Very Good ◕ Good ◒ Fair ▲ Poor N/A Not Applicable

BENEFITS

- Enhanced safety compared to traffic signal or stop sign-controlled intersections.
- Can reduce queue lengths at approaches.
- Lower lifetime cost to operate and maintain compared to a traffic signal.
- Can be generally aesthetically pleasing if well landscaped.
- Can reduce speeds approaching and going through the roundabout.

CONSTRAINTS

- May be difficult for large vehicles to circumnavigate.
- May reduce available on-street parking.
- May require additional costs for modifications to curb, gutter, utilities, lighting, and sidewalks.
- Can impact drainage.
- Landscaping must be maintained if installed.

DESCRIPTION: Chicanes are curb extensions that alternate from one side of the roadway to the other, forming S-shaped curves. Chicanes insert curvature in an otherwise straight stretch of roadway. They generally fall into two categories: single-lane and two-way. Single-lane chicanes consist of staggered build-outs narrowing the road so that traffic in one direction has to give way to opposing traffic. Two-way chicanes use build-outs to provide curvature, but the lanes are separated by road markings or a central island.

APPLICATION: On a neighborhood street with a recorded speed problem, chicanes may be installed to reduce speeds in order to negotiate the lateral displacements in the vehicle path. They are most effective when placed on existing streets that have long, straight, flat roadway sections. They are also most effective when used in a series. They are useful at locations where speed is a problem, but the noise associated with speed humps and related measures would be unacceptable.

Effectiveness Scorecard

Crashes	N/A
Speed	Good
Volume	Fair
Cut-Through	Fair
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Fair
Noise	Fair
Maintenance	Fair
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Offer visual traffic calming effect by reducing line of sight
- Reduces travel speeds
- Negotiable by emergency vehicles
- Provide opportunities for streetscaping

CONSTRAINTS

- May divert traffic to adjacent roadways
- The effect on vehicle speeds is limited
- May require bicyclists to merge with vehicular traffic for a short distance
- May require removal of some on-street parking
- Curb realignment and landscaping can be costly, especially if there are drainage issues

DESCRIPTION: A lateral shift consists of curb extensions along roadways that cause travel lanes to jog, adding curvature to an otherwise relatively straight movement. They are similar to a chicane you might see on a racecourse; however, the roadway alignment only shifts once. Lateral shifts generally have higher speeds relative to chicanes since the configuration does not include a series of alternating curb extensions or a switchback.

APPLICATION: Lateral shifts may be used on roadways where high traffic volumes and high posted speeds prevent more abrupt measures. Changing the alignment on the roadway may also require significant right-of-way.

Effectiveness Scorecard

Crashes	N/A
Speed	Fair
Volume	N/A
Cut-Through	Fair
Emergency Vehicle	Good
Pedestrian	Fair
Bicycle	Fair
Noise	N/A
Maintenance	Fair
Cost	$$$

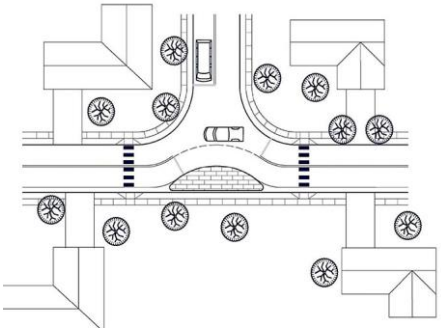
Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Do not significantly impact roadway capacity, but can if installed along with a lane reduction.
- Easily negotiable by emergency vehicles.
- Areas can be landscaped.

CONSTRAINTS

- May reduce available on-street parking.
- Can impact drainage.
- Landscaping must be maintained if installed.
- May require additional costs for design and modifications to roadway.
- Will require cyclists to alter their path, forcing them further into the roadway.



DESCRIPTION: For the purpose of traffic calming, a realigned intersection is the reconfiguration of an intersection with perpendicular angles to have skewed approaches or travel paths through the. The expectation is that these physical features will remove or discourage fast vehicle movements through the intersection.

The most common application is the conversion of a T-intersection with straight approaches into curving streets meeting at right angles. The result is the removal of all straight paths through the intersection.

Effectiveness Scorecard

Crashes	N/A
Speed	Good
Volume	Fair
Cut-Through	Fair
Emergency Vehicle	Good
Pedestrian	N/A
Bicycle	N/A
Noise	N/A
Maintenance	Very Good
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

APPLICATION: Re-alignment can be an effective treatment at T-intersections where a speeding problem has been documented.

BENEFITS

- Realigned intersections can effectively reduce speeds and improve safety at T-intersections that are commonly ignored by motorists.

CONSTRAINTS

- The curb realignment can be costly.
- They may require some additional right-of-way to cut the corner.

DESCRIPTION: Removal of existing larger radius curb returns at an intersection and construction of smaller radius curb returns.

APPLICATION: Curb radius reductions slow vehicle turning speeds and shorten pedestrian crossing distance.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Fair
Cut-Through	N/A
Emergency Vehicle	Poor
Pedestrian	Very Good
Bicycle	Good
Noise	N/A
Maintenance	Very Good
Cost	$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Shorter pedestrian crossing width.
- Slower vehicle turning speeds.
- Opportunity for landscaping.
- Improves sight distance.

CONSTRAINTS

- Impacts large vehicle turns.
- Careful attention needs to be given to drainage issues and turning radii.

DESCRIPTION: A median is a raised curb island placed at the center of a roadway. Medians are typically concrete and may include landscaping to provide additional visual enhancement. They provide physical separation between on-coming traffic lanes, narrow the travel lanes, and can create the perception of a narrower roadway. They can also act as a refuge for pedestrians in certain applications.

APPLICATION: Medians may be used for speed reduction, turn restrictions, enhanced safety, or a mix of all three. Medians are best suited for wide streets with a history of high speeds to narrow the travel lanes, improve sight distances, and reduce pedestrian crossing distances.

Effectiveness Scorecard

Crashes	Fair
Speed	Fair
Volume	Fair
Cut-Through	Poor
Emergency Vehicle	Fair
Pedestrian	Fair
Bicycle	Fair
Noise	N/A
Maintenance	Fair
Cost	$$$

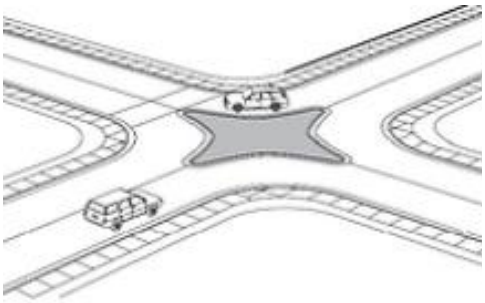
Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- May help reduce travel speed
- Separates opposing traffic lanes
- Can shorten pedestrian crossings
- Can improve safety both for vehicles and pedestrians

CONSTRAINTS

- Potential for increased maintenance if landscaped
- Medians are not as effective as speed humps or traffic circles in slowing speeds
- May interrupt emergency access and operations
- May interrupt driveway/side street access and result in U-turns at the end of medians
- Can create drainage issues



DESCRIPTION: Star diverters are star-shaped islands placed in the middle of an intersection to deter cut-through traffic by forcing right turns.

APPLICATION: Star Diverters can be useful at intersections within neighborhoods where conflicting movements have caused accidents.

Effectiveness Scorecard

Crashes	●
Speed	●
Volume	●
Cut-Through	●
Emergency Vehicle	◔
Pedestrian	N/A
Bicycle	◔
Noise	N/A
Maintenance	◔
Cost	$$$

● Very Good ◕ Good ◑ Fair ◔ Poor N/A Not Applicable

BENEFITS

- Star diverters tend to reduce speed.
- May reduce traffic volumes.
- Reduces potential for crashes by eliminating conflicting movements.
- Both easier and safer for school buses and service vehicles to navigate.
- Can be attractively landscaped.

CONSTRAINTS

- Can shift traffic/problems elsewhere unless a strategic pattern of measures are implemented.
- They may create circuitous routes for local residents and emergency vehicles.
- May cause some vehicles to make unsafe U-turns at mid-block.

4. SPEED CONTROL – VERTICAL MEASURES

- SCV-1: Speed Hump
- SCV-2: Speed Table
- SCV-3: Speed Cushion
- SCV-4: Raised Crosswalk
- SCV-5: Raised Intersection

Spacing Recommendations:

The Institution of Traffic Engineers recommends spacing these vertical measures between 260 - 500 ft apart. 500 ft is the maximum recommended spacing to achieve an 85th percentile speed of 25-30 MPH. Closer spacing will have a greater effect on speed reduction.

DESCRIPTION: Speed humps are commonly used traffic calming devices that are familiar for drivers. Speed humps consist of raised pavement placed across the width of the roadway to create a vertical deflection to slow crossing vehicles. The humps are often between 3 and 3.5 inches in height along the width of the roadway.

APPLICATION: Speed humps are installed on local roadways to address speeding, heavy volume, and reduce cut-through traffic. Speed humps should be designed to allow vehicles to travel at or near the posted speed limit (typically 35mph or less) without causing damage to the vehicle. When multiple speed humps are installed, they should be spaced close enough together to limit drivers speeding in between them, however placing them too close together can become a nuisance to roadway users and cause an uncomfortable ride. Speed humps are not intended for use along collector roads.

Effectiveness Scorecard

Crashes	Fair
Speed	Very Good
Volume	Good
Cut-Through	Good
Emergency Vehicle	Poor
Pedestrian	Good
Bicycle	Good
Noise	N/A
Maintenance	Good
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Reduces vehicle speeds.
- Discourages cut through traffic.
- Are relatively inexpensive and easy to construct.

CONSTRAINTS

- May result in speeding between speed humps.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- May increase noise levels as vehicles travel over speed humps.
- May cause drainage issues when curb and gutter are present.
- May delay emergency vehicle response times.

DESCRIPTION: Speed tables are trapezoidal humps that ramp up on either side to a short flat section in the middle. The flat sections are often textured and are generally long enough for the entire wheelbase of a passenger vehicle. The long flat design allows cars to pass without slowing as significantly as with speed humps but will also deter extremely high speeds. Speed tables can also be used alongside curb extensions and curb radius reductions for increased effectiveness of countermeasures.

APPLICATION: Speed tables can be effective on roadways with recorded high traffic speeds and roadways with moderate daily traffic volumes. Shorter length roadways are unlikely to benefit from the countermeasure; however, roadways that have had a history of speeding can benefit from installations.

Effectiveness Scorecard

Crashes	Fair
Speed	Very Good
Volume	Good
Cut-Through	Good
Emergency Vehicle	Poor
Pedestrian	Good
Bicycle	Good
Noise	Poor
Maintenance	Poor
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Reduces vehicle speeds.
- Discourages cut through traffic.
- More easily navigable for emergency vehicles.
- Crosswalks can be installed along top of speed table, increasing pedestrian visibility at crossings.

CONSTRAINTS

- Speed table materials can be expensive.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- May increase noise levels as vehicles travel over speed tables.
- May impact drainage.

DESCRIPTION: Speed Cushions are an arrangement of three speed lumps elongated with a curvilinear shape in the direction of traffic. The main speed lumps of the speed cushion are placed in the travel lane, while a complimentary speed lump is placed between the lanes. Passenger vehicle drivers choosing to drive over the speed cushions in a straight path experience vertical discomfort as two or four wheels traverse the different parts of the speed cushion. Passenger vehicle drivers may also choose to take a curvilinear path to avoid the vertical deflection. In either case, field evaluation has documented speed reductions. The effective width of the speed cushion is narrow enough to allow emergency vehicles and trucks to follow a straight path straddling the in-lane lump.

Effectiveness Scorecard

Crashes	Fair
Speed	Very Good
Volume	Good
Cut-Through	Good
Emergency Vehicle	Good
Pedestrian	Good
Bicycle	Good
Noise	Fair
Maintenance	Fair
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

APPLICATION: Speed cushions may be installed on local streets to address speed, volume, and cut-through traffic and are designed and constructed to allow vehicles to travel at or near the posted speed limit. Speed Cushions have the advantage over speed humps, speed lumps, and speed cushions in that passenger car drivers may adapt their travel path to the device and avoid any vertical deflection. Bicyclists may also negotiate the device without crossing any vertical deflection. Speed cushions are designed to allow emergency vehicles to pass without any vertical deflection, which reduces their impact on emergency response times.

BENEFITS

- Decreases vehicle speeds
- Discourages cut through traffic
- Inexpensive and easy to construct

CONSTRAINTS

- May cause speeding beyond the speed cushion
- May divert traffic to an adjacent street
- May increase noise levels as vehicles decelerate and accelerate

DESCRIPTION: A raised pedestrian crosswalk is designed to channelize pedestrians crossing a road. Similar in structure to a speed table, this type of calming measure raises the crosswalk to the level of the sidewalk to improve the visibility of crossing pedestrians to conflicting vehicles and can reduce speeds of crossing vehicles. They are trapezoidal in shape with a flat area for crossing pedestrians and ramps for the vehicle approaches traversing the raised crossing. The crossing can often incorporate textured materials.

Effectiveness Scorecard

Crashes	Fair
Speed	Good
Volume	Good
Cut-Through	Good
Emergency Vehicle	Poor
Pedestrian	Very Good
Bicycle	Good
Noise	Poor
Maintenance	Poor
Cost	$

Very Good · Good · Fair · Poor · N/A Not Applicable

APPLICATION: Community roadways with recorded speeding issues and hazardous pedestrian crossings will benefit most from this measure. They can be used at intersections or mid-block crossings.

BENEFITS

- Improved safety between pedestrians and vehicles.
- Effective at slowing travel speeds.
- Discourages cut through traffic.
- More easily navigable for emergency vehicles.

CONSTRAINTS

- May impact drainage.
- May increase noise levels as vehicles travel over raised crosswalk.
- Textured materials can be expensive.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.

DESCRIPTION: A raised intersection refers to a roadway intersection that is entirely elevated above the travel way for all approaches. All vehicles must be ramped up to the intersection center, and these large, raised surfaces will often feature textured pavements. Typically, they are raised to slightly below or equal to the sidewalk, creating a large pedestrian area that includes the sidewalk and crosswalks.

APPLICATION: Raised intersections are best suited for intersections with a relatively large pedestrian volume. Trucks and emergency vehicles do have difficulties with this measure, so raised intersections are not advised on routes with a high percentage of heavy vehicles. Detectable warnings need to be installed for those with vision impairment.

Effectiveness Scorecard

Crashes	Fair
Speed	Good
Volume	N/A
Cut-Through	N/A
Emergency Vehicle	Poor
Pedestrian	Very Good
Bicycle	Good
Noise	N/A
Maintenance	Poor
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Increases pedestrian safety at the intersection.
- Eliminates need for accessible ramps at pedestrian crossings.
- Impacts all approaches of an intersection.

CONSTRAINTS

- May impact drainage.
- Less effective in reducing speeds than speed humps, speed tables, or raised crosswalks.
- Construction costs can be expensive.
- May increase noise levels.
- May divert traffic to other routes.

5. VOLUME CONTROL MEASURES

- VC-1: Full Closure
- VC-2: Partial Closure
- VC-3: Diagonal Diverter
- VC-4: Median Barrier
- VC-5: Forced Turn Island
- VC-6: One-Way Couplet Conversion

DESCRIPTION: Full closures typically involve putting temporary barriers or constructing permanent barriers across a street to completely close it to vehicular traffic. Closures vary from barriers, bollards, gates, landscaped islands, etc. Gaps are often left in the barriers to allow access for pedestrians or cyclists. Automatic gates or removable bollards are sometimes used to accommodate emergency vehicles.

APPLICATION: Full closures are effective at addressing roadways with speeding issues, high traffic volumes, and cut-through traffic. This measure is often seen as a last resort for addressing traffic problems because of potential extensive legal processes needed to close a public street to vehicle traffic.

Effectiveness Scorecard

Crashes	Fair
Speed	Very Good
Volume	Very Good
Cut-Through	Very Good
Emergency Vehicle	Poor
Pedestrian	Good
Bicycle	Good
Noise	Good
Maintenance	N/A
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Eliminates cut-through traffic.
- Reduces speeds and volume along closed roadways.

CONSTRAINTS

- Potential delays emergency vehicles.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- Increased travel time for local residents.

DESCRIPTION: A partial closure is a traffic calming measure that restricts access to a street by physically blocking one direction of vehicle traffic, while still allowing two-way bicycle and pedestrian access. This measure creates a narrowed roadway or an obstruction, such as a curb extension or barrier, on one side of the road, effectively limiting vehicular access to one direction while maintaining passage for other users. Partial closures reduce traffic volume on targeted streets without completely prohibiting access.

APPLICATION: Partial closures are ideal for streets that experience high volumes of cut-through traffic but still require local access. They are most effective in residential neighborhoods or areas where reduced traffic volumes are desired to enhance safety and livability. Partial closures can be implemented alone or as part of a broader traffic calming strategy.

Effectiveness Scorecard

Crashes	Fair
Speed	Good
Volume	Very Good
Cut-Through	Very Good
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Good
Noise	Good
Maintenance	N/A
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Reduces traffic volume by restricting vehicular access in one direction.
- Maintains two-way access for bicycles and pedestrians.
- Enhances safety and livability by discouraging cut-through traffic.
- Allows local access while preventing non-local through traffic.

CONSTRAINTS

- May require modifications to street infrastructure, such as barriers or curb extensions.
- Could potentially increase traffic volumes on adjacent streets.
- Requires signage and potential enforcement to ensure compliance.
- May impact emergency vehicle access and response times.

DESCRIPTION: Diagonal diverters involve placing barriers diagonally across an intersection. The barrier connecting the opposing corners of the intersection serves to redirect through traffic while allowing turning movements. Gaps in the barriers permit bicycle and pedestrian access.

APPLICATION: Diagonal diverters are particularly effective at addressing roadways with speeding issues, high traffic volumes, and cut-through traffic. When staggered on multiple streets, particularly in a grid street system, diagonal diverters can make travel through a neighborhood more circuitous, but also less convenient, adding travel time for shorter distances.

Effectiveness Scorecard

Crashes	Fair
Speed	Good
Volume	Very Good
Cut-Through	Very Good
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Good
Noise	Good
Maintenance	Very Good
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Eliminates cut through traffic.
- Reduces speeds and volume along closed roadways.

CONSTRAINTS

- Delays emergency vehicles.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- Increased travel time for local residents.
- The adjacent corners of the intersection may require reconstruction to maintain adequate width for two-way traffic.
- Potential drainage impacts.

DESCRIPTION: Median barriers involve the construction of permanent curb and gutter or raised islands along the centerline of the roadway. The median islands are extended through an intersection to effectively block cross-street through traffic and left turning movements, in order to cut down on delays and reduce collisions.

APPLICATION: Median barriers are effective at addressing roadways with speeding issues, high traffic volumes, and cut-through traffic. The median barrier prohibits both through traffic and left turning movements at either minor-street approach. This right turn only condition can make travel through a neighborhood more circuitous, but also less convenient, adding travel time for shorter distances.

Effectiveness Scorecard

Crashes	◕
Speed	◒
Volume	◕
Cut-Through	●
Emergency Vehicle	◒
Pedestrian	◕
Bicycle	◕
Noise	◕
Maintenance	●
Cost	$$$$

● Very Good ◕ Good ◒ Fair ▲ Poor N/A Not Applicable

BENEFITS

- Can reduce cut through traffic.
- Reduces speeds and volume in the area of the blocked roadway.
- Improves intersection safety by eliminating vehicular conflict points.

CONSTRAINTS

- Delays emergency vehicles.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- Increased travel time for local residents.
- May increase U-turning movements at adjacent intersections.
- May increase wrong-way travel along the main line.
- Construction may require additional right of way.

DESCRIPTION: Forced turn islands are the construction of raised islands at intersection approaches to prohibit certain turning movements. They can be created temporarily using parking blocks, delineators, and signage, or on a permanent basis with raised curbs, bollards, or barriers. Prohibiting turning movements may also result in reduced collisions and increased intersection safety.

APPLICATION: Forced turn islands are implemented to eliminate undesirable turning movements that allow cut-through traffic and reduce high delays. They should be used in combination with signage, road markings, or median closures to be effective. Forced turn islands can increase travel distance and add travel time.

Effectiveness Scorecard

Crashes	Good
Speed	Fair
Volume	Good
Cut-Through	Very Good
Emergency Vehicle	Fair
Pedestrian	Good
Bicycle	Good
Noise	Good
Maintenance	Very Good
Cost	$$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Can reduce cut-through traffic.
- Reduces speeds and volume in the area of the prohibited movement.
- Improves intersection safety by eliminating vehicular conflict points.

CONSTRAINTS

- Delays emergency vehicles.
- May divert traffic to an adjacent roadway, resulting in negative impacts from the new travel patterns.
- Increased travel time for local residents.
- May increase U-turning movements at adjacent intersections.
- May require right-of-way and adjustments to drainage and utilities.

DESCRIPTION: One-way couplets consist of a pair of parallel one-way streets that carry traffic in opposing directions. Couplets are established to provide greater capacity for automobiles, particularly in areas with heavy peak directional demand. In a grid system, one-way couplets are often separated by a single city block, have fewer turning movements at intersections, and better synchronization of traffic signals.

APPLICATION: One-way couplets are most appropriate for core urban areas with an established grid street system where the emphasis on mobility over land access is desired. Recognizing the need to maintain capacity for peak hour travel, this strategy is meant to manage rather than restrict or redirect vehicles. One-way couplets can be designed and configured to reduce the pedestrian crossing distances, establish bicycle lanes, and/or create needed on-street parking.

Effectiveness Scorecard

Crashes	Very Good
Speed	Very Good
Volume	Fair
Cut-Through	Fair
Emergency Vehicle	Fair
Pedestrian	Very Good
Bicycle	Very Good
Noise	N/A
Maintenance	Very Good
Cost	$$$

Very Good · Good · Fair · Poor · N/A Not Applicable

BENEFITS

- Higher automobile capacity than equivalent two-way streets
- May reduce pedestrian crossing distances
- Fewer intersection turning movements may increase safety
- Provides opportunities to create bicycle lanes and/or on-street parking

CONSTRAINTS

- Without other traffic calming strategies, speeds may increase
- Delays emergency vehicles
- Increases travel time and out-of-direction travel for local residents

PART V –TRAFFIC CALMING REQUEST FORM

Traffic Calming Request Form

Criteria for an Application:

1. The primary applicant does not have to be a resident on the requesting street segment.
2. Supporting applicants must be residents on the requesting street segment.
3. Street segments must be at least 800 feet long.
4. Must have at least 40% of the houses fronting the street segment. This does not apply to collector roads
5. Dead-ends or Cul-de-sacs that front fewer than 10 homes are not eligible.
6. Not eligible if traffic calming measures are already located on requesting street segment.
7. Not eligible if the roadway has already been studied in the last 5 years.
8. Must be within City of Westminster limits

Name of Applicant: _____
(Does not have to live on street)

Address of Applicant: _____

Email of Applicant: _____

Phone Number of Applicant: _____

Street for Traffic Calming Request: _____

Address Range of Study Area: FROM: _____TO: _____

Supporting Applicants: (Must be residents within the Study Area defined above)

Name	Address	Email

Reasons for Request (Select All that Apply):

- ☐ Safety
- ☐ Speeding
- ☐ Excess Traffic Volumes
- ☐ Bicycle or Pedestrian
- ☐ Commercial Vehicle Restriction
- ☐ Parking
- ☐ Noise
- ☐ Other (Please Describe): _____

Description of conditions or recent changes in traffic, leading to this application:

PART VI –TRAFFIC CALMING PETITION FORM

Traffic Calming Petition Form

Date: <INSERT DATE SENT TO NEIGHBORHOOD CONTACT>

Representatives from the <INSTERT REQUESTING NEIGHBORHOOD> neighborhood, on <INSERT APPLICATION DATE> request the initiation of a Traffic Calming Study. Based on available data, the households and properties identified in the attached ***Exhibit 1*** (prepared by City Engineering Staff) are considered to be in the affected area. An initial assessment of available data has been conducted, and to continue processing the application, neighborhood support is required. Two-thirds of the shown households/properties on Exhibit 1 must agree with the application and sign the petition below. The completed petition should be submitted to the City of Westminster Engineering Division.

Section II

Name (print)	Address	Telephone	Email	Signature

(PLEASE COPY THIS PAGE FOR ADDITIONAL SIGNATURES)