Neighborhood Transportation Management Program

CITY OF LAS VEGAS

Neighborhood Transportation Management Program

2024

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Neighborhood Transportation Management Program

1. INTRODUCTION

Many Las Vegas residents want safer and more walkable streets in their neighborhoods. They are worried about speeding, cut-through traffic, and having more user friendly conditions for pedestrians and cyclists.

This Neighborhood Transportation Management Program (NTMP) provides a clear process for the evaluation of neighborhood streets for the development and implementation of NTMP measures that address concerns related to speeding traffic, excessive traffic volumes, and unsafe conditions for pedestrians and bicyclists. It is a transparent process for residents to voice concerns and understand issues and opportunities, and for the City's Transportation Engineering Division to develop meaningful and relevant solutions.

The remainder of this chapter outlines NTMP goals, describes street classifications and street functions, identifies the types of streets the NTMP addresses, and briefly describes NTMP measures.

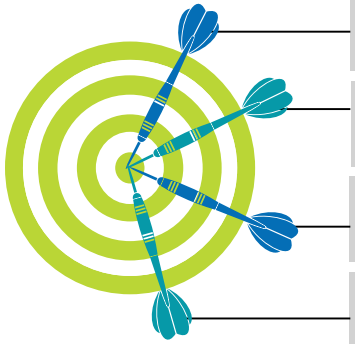
The second chapter provides NTMP background information including statistics on the safety importance of reduced vehicle speeds on neighborhood streets, related transportation initiatives common in the United States, and related transportation initiatives of the City.

The third chapter describes the NTMP implementation process in detail. It identifies information that citizens need to provide to request an NTMP study, as well as the steps involved during the process of studying, developing, reviewing, approving, and implementing/constructing potential NTMP measures.

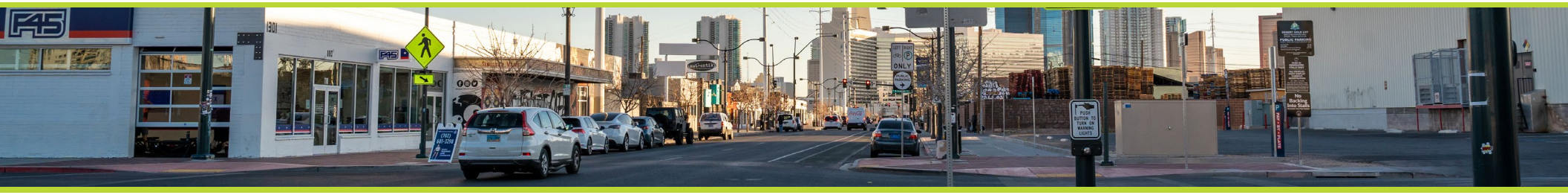
The fourth chapter addresses how NTMP measures are selected. The street characteristics that typically need to exist for a measure to be considered compatible with the street's functions are identified. The types of transportation concerns are also identified along with the measure's anticipated level of effectiveness for a given concern.

The Appendices include NTMP forms, related policies, and detailed descriptions of the different types of NTMP measures.

NTMP Goals



- **Improve residents' quality of life by promoting safe conditions for all vulnerable road users**
- **Reduce vehicular speeds, crash severity, and crash frequency**
- **Reduce unnecessary cut-through traffic on residential streets**
- **Encourage City transparency and accountability on neighborhood transportation management processes**



Street Hierarchy Classifications

Street classifications define the primary functions of a street and the standards to which they should be designed and operated. Primary classifications of City streets are described below and a map of the City's planned streets and highways can be found at **https://files.lasvegasnevada.gov/map/Planned-Streets-and-Highways-Map.pdf**.

NTMP Eligible

Local Streets

- Lower speed (25 mph)
- Bike and pedestrian friendly
- Direct access to and from individual homes
- Right-of-way width of ≤ 51 feet
- Daily traffic of ≤ 1,500 vehicles

Collector Streets

- Lower speed (25 to 30 mph)
- Travel between arterials and neighborhoods
- Access to adjacent land uses
- Lower levels of access management
- Passive intersection control such as roundabouts
- Right-of-way width of ≤ 60 feet
- Daily traffic of ≤ 7,500 vehicles

Not NTMP Eligible

Major and Minor Arterials

- Higher speed (> 30 mph)
- Move large volumes of traffic and transit
- Serve as truck routes
- Special protections for bikes and pedestrians
- Higher levels of access management
- Signalized intersections
- Right-of-way width of > 60 feet
- Daily traffic of > 7,500 vehicles

Collectors and arterials also serve as designated bike streets and transit streets. Bike streets have delineated bike lanes that may be physically separated (e.g., cycletracks) or buffered from adjacent motor vehicle lanes. Transit streets are existing or planned corridors with transit-oriented development and mixed-use centers that are designed to move high volumes of people in lieu of cars. They feature existing and planned light rail and bus rapid transit facilities, often in dedicated lanes.

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What is a Neighborhood Street?

Neighborhood streets are public two-lane local residential streets and minor collectors. They typically have the following characteristics and features:

Public right-of-way widths of 60 feet or less	**Curbed roadway widths of 50 feet or less**	**Speed limits of 30 mph or less**	**Traffic demands that are or should be less than 7,500 vehicles per day**

Note: Private streets are not NTMP eligible as they are the responsibility of the neighborhood's Homeowners Association.

What are NTMP Measures?

NTMP measures include education and enforcement initiatives, as well as maintenance of appropriate traffic engineering improvements such as signing, pavement markings, and illumination levels. Measures also include physical traffic calming treatments, a few of which are shown below. "**Traffic Calming**" is defined by the Federal Highway Administration (FHWA) and the Institute of Transportation Engineers (ITE) as:

"The primary purpose of traffic calming is to support the livability and vitality of residential and commercial areas through improvements in non-motorist safety, mobility, and comfort. These objectives are typically achieved by reducing vehicle speeds or volumes on a single street or a street network. Traffic calming measures consist of horizontal, vertical, lane narrowing, roadside, and other features that use self-enforcing physical or psycho-perception means to produce desired effects."

Physical Traffic Calming Treatments

Speed Humps

Chicane

Forced Turn Island

Wider and more heavily traveled public streets may be considered NTMP eligible on a case-by-case basis where they serve a local access and/or minor residential collector function, and have traffic demands suitable to one lane per direction.

Traffic concerns on major streets should be reported through the City's website at **https://seeclickfix.com/las-vegas**, or by calling **702-229-6331**. Concerns may include speeding, signing, and pavement marking deficiencies, the need for traffic signal control, or pedestrian crossing issues. Once reported, these concerns will be assessed and resolved following appropriate procedures that are outside of the NTMP process. Also, a number of common transportation questions and concerns are addressed by Transportation Fact Sheets available at **https://www.lasvegasnevada.gov/Residents/Parking-Transportation/Transportation-Engineering**.

Traffic concerns on major streets should be reported through the City's website at https://seeclickfix.com/las-vegas, or by calling 702-229-6331

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NTMP Measures by Level

Education and enforcement initiatives are classified as **Level 1** measures, and traffic engineering improvements such as signing, pavement markings, and higher illumination levels (e.g., luminaire upgrades) are classified as **Level 2** measures. Physical traffic calming treatments as defined by the FHWA and ITE are considered **Level 3** or **Level 4** measures, along with new lighting infrastructure (e.g., new poles and underground conduits).

The selection of an appropriate treatment is made with all vulnerable road users in mind. The treatments listed are common examples, but actual installations do vary and may include additional measures as determined necessary by the City Traffic Engineer.

Neighborhood Roundabout

1 Education and Enforcement

- Educational materials on transportation safety (e.g., CLV website, Transportation Fact Sheets)
- Referrals/requests to the Las Vegas Metropolitan Police Department (LVMPD) and City Marshals for targeted traffic enforcement
- Community involvement (e.g., neighborhood meetings)

2 Maintenance Improvements

- Speed limit & warning signs
- General signing & markings
- Crosswalk signing & markings
- Improved lighting levels
- Lane narrowing delineation treatments
- Sight distance improvements
- Speed feedback signs
- Curb extension delineation at crosswalk

3 Minor Construction

- Vertical deflections
  - Speed Humps
  - Speed Tables
  - Raised Crosswalk
  - Mountable Traffic Circle
- New lighting infrastructure

4 Major Construction

- Horizontal deflections
  - Curbed Lateral Shift/Chicane
  - Mini-Roundabout
  - Roundabout
- Vertical deflections
  - Raised Intersection
- Width reductions
  - Curb Extension
  - Chokers
  - Median Island
  - Curbed Road Diets
- Route restrictions
  - Street Closures
  - Diagonal Diverter
  - Median/Forced Turn Island

Neighborhood Transportation Management Program

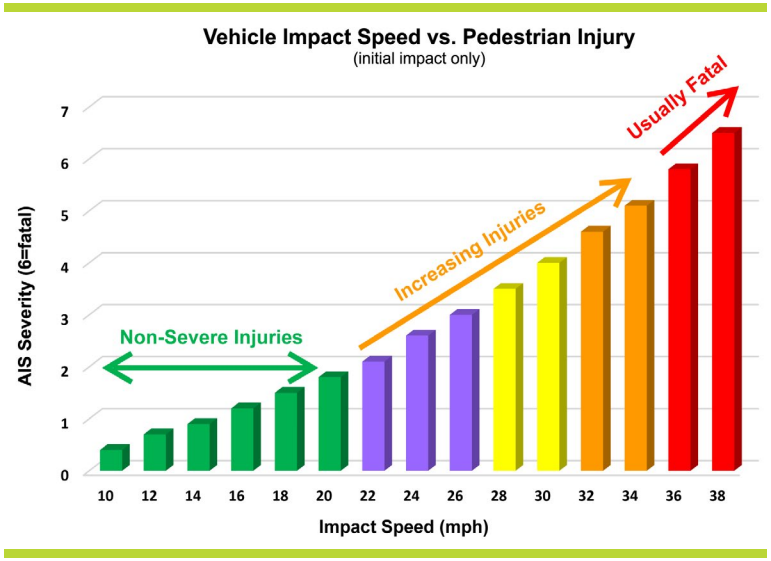
2. BACKGROUND

The City's NTMP, first adopted in 1995, aims to provide safe and livable streets while managing population growth. It covers many aspects of transportation management, traffic calming, and policy. It also involves citizens in improving neighborhood street safety in Las Vegas.

Las Vegas' growth has often resulted in congested arterial roadways as our infrastructure improvements and efforts to diversify transportation mode split struggle to keep up. Arterial congestion can cause motorists to seek cut-through routes and speed through local neighborhood streets that are not designed or intended for that use. The NTMP provides a clear process for the planning, evaluation, and implementation of appropriate measures to address cut-through traffic and other concerns to promote safe and livable neighborhood streets.

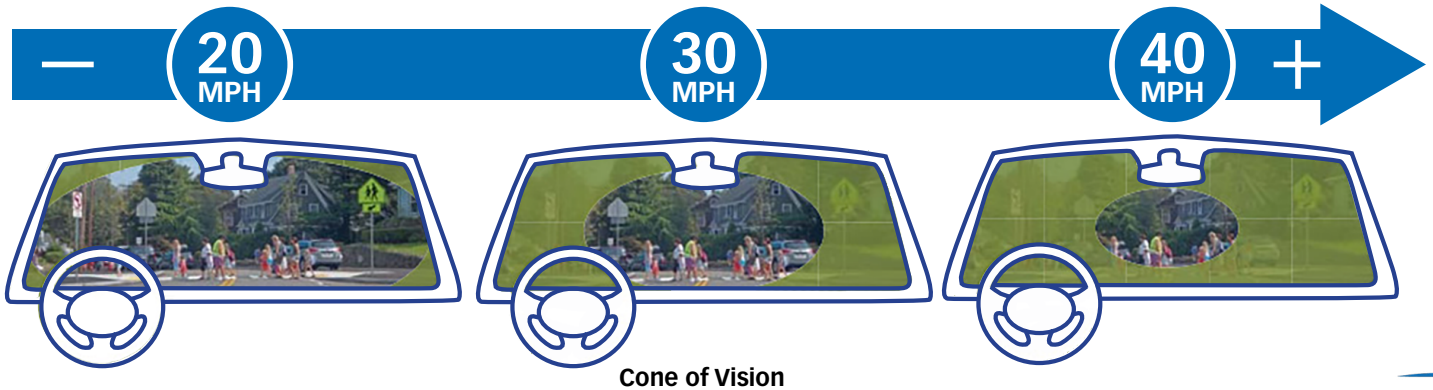
No single answer to the problem of speeding vehicles on all residential streets exists. The purpose of many NTMP measures is to alter a driver's behavior, either by forcing a vehicle to slow or to use an alternative route by using engineering solutions and the installation of physical devices. The challenge with applying these measures is balancing the need for an efficient transportation network and a safe environment for residents, bicyclists, and pedestrians.

Reducing vehicle speeds is a critical element to increasing safety. For example, a pedestrian struck by a vehicle traveling at a speed of 20 mph or less is typically not permanently injured. But a pedestrian struck by a vehicle traveling at a speed of 36 mph or more is usually fatally injured. Higher speeds also reduce the **cone of vision** for a driver, lengthen vehicular stopping distances, and lessen the ability of the motorist to properly react to the presence of vulnerable road users.



Vehicle Impact Speed vs. Pedestrian Injury
(Source: C.E. "Rick" Chellman)

A pedestrian struck by a vehicle traveling at a speed of 20 mph or less is typically not permanently injured. But a pedestrian struck by a vehicle traveling at a speed of 36 mph or more is usually fatally injured.



Cone of Vision
(Source: 2016 FHWA)

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Related Transportation Initiatives

NTMPs are common in the United States as well as other countries, and their influence has evolved into other related transportation initiatives such as Complete Streets and Context Sensitive Solutions. **Complete Streets** are streets, including major arterials and walkable downtown streets, that are designed and operated to facilitate safe use and mobility for all users. A Complete Street design will include many of the same measures used in NTMPs (e.g., curb extensions and median islands). A **Context Sensitive Solution** is about designing with enough flexibility and sensitivity to create a transportation facility that fits its surroundings. That is essentially what an NTMP strives to do for neighborhood streets.

Existing Street

Proposed Complete Street

Coordination with Other City Initiatives

The NTMP works in concert with and conforms with goals of other City Master Plan initiatives. This includes:

- **Vision Zero**, which includes strategies to eliminate all transportation fatalities and serious injuries in the City by 2050.
- **The Mobility Master Plan** goals for developing transportation connectivity, ensuring safe roadways, and providing safe and convenient mobility choices.
- **2050 Master Plan** goals to create and maintain safe neighborhoods by:
  - Creating a more walkable community to attract and retain residents.
  - Improving safety with lighting, sidewalks, and trees.
  - Improving crosswalks and bike lanes.
  - Reducing vehicle speed on residential streets.
  - Creating opportunities to get more “eyes on the street” day and night.

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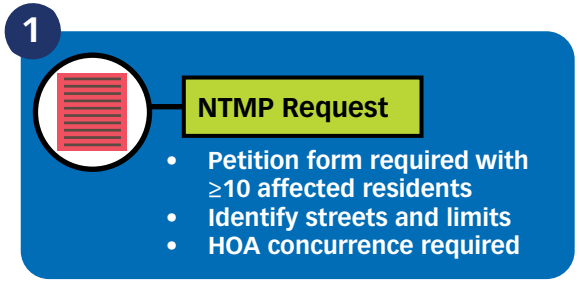
3. PROCESS AND PROCEDURES

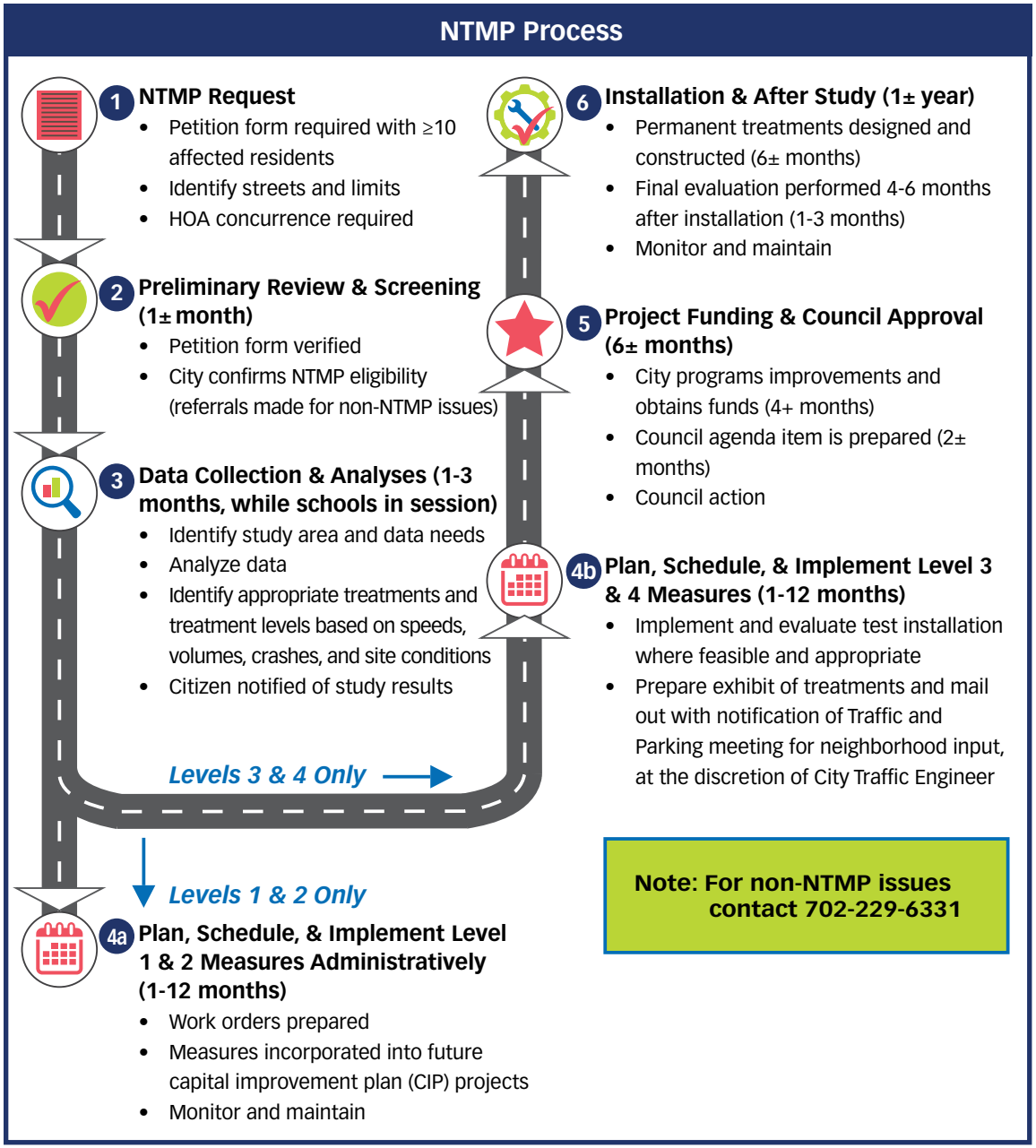
This chapter highlights the process for implementing new NTMP measures and removing or upgrading/replacing existing treatments. It is important that a structured process is followed to consistently address requests.

NTMP Process for New Installations



The process starts with identification of a transportation concern through a NTMP study request. A study can be initiated to address concerns identified by City staff or the Ward's Council office, but typically the City requires that the request for a study include a petition with at least 10 signatures of residents living along the street(s) in question stating their agreement with the request.

The petition should identify all public streets and their end point limits for which a study is being requested. If the request is for multiple streets, then multiple petition forms must be completed. Only one petitioner per property address is allowed. If a Homeowner Association (HOA) exists, Board approval of the NTMP request is required, along with HOA contact information. The petition form is available at the City's website at https://www.lasvegasnevada.gov/Residents/Parking-Transportation/Transportation-Engineering and is provided in **Appendix A**.



It is important that the contact person for the petition coordinates with the neighborhood's Homeowners Association (HOA), if one exists. HOA Board approval of the NTMP study request is required, and HOA contact information must be provided.

2 Preliminary Review & Screening (1± month)

- Petition form verified
- City confirms NTMP eligibility (referrals made for non-NTMP issues)

Upon receipt of a petition, the Transportation Engineering Division (TED) conducts a preliminary review to confirm that the streets and issues identified are potentially eligible for NTMP measures. If not, appropriate referrals are made for non-NTMP issues. TED staff will also check the validity of signatures and contact the neighborhood HOA, if there is one. Once complete, TED staff will notify the petition's contact person of the preliminary findings and whether the submission is eligible for further study within the NTMP.

3 Data Collection & Analyses (1-3 months, while schools in session)

- Identify study area and data needs
- Analyze data
- Identify appropriate treatments and treatment levels based on speeds, volumes, crashes, and site conditions
- Citizen notified of study results

The study process begins with determining the appropriate study area and data collection needs. For instance, if there is a parallel street to the street petitioned for study, it may need to be included to address the potential for diverted traffic impacts. Also, if the request involves potential major construction, particularly route restrictions, the scope of the study is likely to involve a larger area and a longer timeline to complete.

NTMP studies will typically include the collection of traffic volume, traffic speed, and crash data as well as street characteristics to determine appropriate mitigation measures. Level 1 or Level 2 measures will be implemented administratively. Level 3 and Level 4 measures will be evaluated based on a **scoring system** that considers multiple factors. The scoring sheet is provided in **Appendix A**. A minimum of 100 points is required for eligibility, subject to the discretion of the City Traffic Engineer.

Scoring System

- Speed (Excessive & Racing)
- \+ Volume (Demands & Cut-Thru)
- \+ Crash Experience (3 years)
- \+ Fronting Residential Percent
- \+ Adjacent/Nearby School
- \+ School Crossing
- \+ Pedestrian Oriented Facility
- \+ Sight Restriction

<100	Level 1 & 2 Eligible
≥100	Level 3 & 4 Eligible

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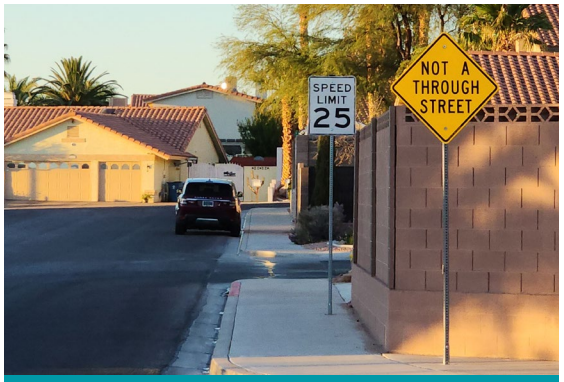
TED staff will notify the petition's contact person of the study findings, and whether the street(s) in question are considered eligible for a Level 3 or Level 4 measure. The construction of improvements is contingent on available funding, and a score meeting the 100-point threshold is not guaranteed to go to construction. Other factors that determine an improvement's priority and timing include cost-effectiveness opportunities, such as the potential to be incorporated into a pending CIP project as well as its total cost (e.g., funding may be available for a lower cost project that has a lower score than a higher cost project with a higher score).

Examples of Level 2 Mitigation Measures



Signing

Pavement Markings

4a

Levels 1 & 2 Only

Plan, Schedule, & Implement Level 1 & 2 Measures Administratively (1-12 months)

- **Work orders prepared**
- **Measures incorporated into future CIP projects**
- **Monitor and maintain**

The administrative implementation of **Level 1 (Education and Enforcement) and Level 2 (Maintenance Improvements)** measures will be accomplished in several ways. Where appropriate, educational materials will be made available or disseminated to the neighborhood and referrals will be made to the LVMPD for targeted speed limit enforcement. If requested, a neighborhood meeting can be held to discuss neighborhood needs and the steps to address them.

Where updated or missing signs and markings are needed, work orders will be written for City operations and maintenance crews to install them. In some instances, these types of improvements may be incorporated into pending projects for that street. This process also applies to sight distance and lighting deficiencies.

The implementation of speed feedback signs will follow the City's adopted policy which is included in **Appendix B**.

4b

Levels 3 & 4 Only

Plan, Schedule, & Implement Level 3 & 4 Measures (1-12 months)

- **Implement and evaluate test installation where feasible and appropriate**
- **Prepare exhibit of treatments and mail out with notification of Traffic and Parking meeting for neighborhood input, at the discretion of the City Traffic Engineer**

A conceptual plan will be developed for **Level 3 and Level 4 mitigation measures** describing the recommended measure(s) and illustrating the proposed locations. Photos of a few potential measures are shown to the right. The development of any Level 3 or Level 4 mitigation plan will include a review by the Fire Department to verify that emergency access needs are not compromised. This is particularly important for any route restrictions, width reductions, or vertical deflections.

Certain traffic calming treatments will not be used on streets with right-of-way widths of 60 feet or greater because they are more often used by emergency vehicles. Any measure found to compromise emergency access needs will not be considered.

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If the study determines that a Level 3 or Level 4 measure is appropriate, TED staff will determine if there is available funding to move forward with the improvements. If funding is not currently available, TED staff will notify the contact person of the petition that implementation of recommended improvements are on hold pending the availability of funding.

As a first step in implementation, TED staff will determine if a temporary test installation is feasible and appropriate. Temporary test installations are often constructed to determine if the proposed mitigation measure is likely to have the desired effect, absent unacceptable adverse consequences, before more costly permanent improvements are constructed.

If a test installation is deemed appropriate, TED staff will prepare a letter describing the test installation and the evaluation process. This letter will be mailed out to affected residents along with a conceptual exhibit of the proposed installation.

Approximately four to six months after installation, a study is conducted consisting of data collection, analyses, and conclusions. If the test installation is not successful, it may be modified and re-evaluated, or it may be removed. If removed, the process may end or start over with consideration of other alternatives.

Speed Hump (Level 3)

Curbed Road Diet (Level 4)

Street Closure (Level 4)

If the test installation is successful, TED staff will prepare a conceptual exhibit and letter describing proposed permanent measures that will be mailed to affected residents. Many NTMP measures (i.e., speed humps, closures, and speed limit changes) require approval of the Traffic and Parking Commission (T&PC). In that event, the letter will include notification of the time, date, and location of the T&PC meeting, which will serve as a public meeting for residents to provide input on the proposed measures. Residents will also be able to provide input on proposed measures by emailing **ntmpsurvey@LasVegasNevada.gov** or by calling **702-229-6331**.

Residents can provide input on proposed measures by emailing ntmpsurvey@LasVegasNevada.gov or by calling 702-229-6331.

If proposed measures are approved by the T&PC, they will proceed to final implementation planning and City Council approval. If proposed measures are not approved by T&PC, residents may choose to pursue a City Council appeals process. If the petition's contact person is not present at the T&PC meeting, TED staff will notify them of the meeting's result, and will also advise them of the City Council appeals process.

Final implementation of an approved NTMP measure may be as a stand-alone project, or part of a CIP project. If incorporated into a CIP project, final City Council approval of the NTMP funding and measures may be part of the CIP project approval process.

5

Levels 3 & 4 Only

Project Funding & Council Approval (6± months)

- City programs improvements and obtains funds (4+ months)
- Council agenda item is prepared (2± months)
- Council action

If Level 3 or Level 4 measures proceed as a stand-alone project, the City will program and obtain the necessary funding. Once funding is identified and secured, a Council agenda item is prepared including necessary background information. If a project is not approved, residents may request that the TED identify alternative measures.

Installation of approved Level 3 and Level 4 measures will start with the preparation of construction drawings and associated work orders. This typically requires a two-to-six-month period. The actual construction of improvements by City forces can take two to three months. Measures that are contracted out can take at least four additional months to account for the bidding and award process. Measures that are constructed as part of a CIP project will need to be installed per the schedule of that project.

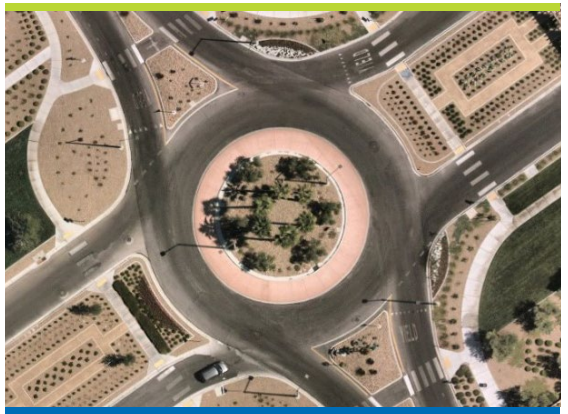
6

Levels 3 & 4 Only

Installation & After Study (1± year)

- Permanent treatments designed and constructed (6± months)
- Final evaluation performed 4-6 months after installation (1-3 months)
- Monitor and maintain

A final evaluation study is initiated four to six months after installation to measure effectiveness and determine if any operational issues have been created. If necessary, based on data and public feedback, modifications or even removal of the measure can be considered at the disrection of the City Traffic Engineer. If the study determines satisfactory operation, the measure will be monitored and maintained on a routine basis.



Roundabout (Level 4)

Neighborhood Transportation Management Program

Removal Process

One of the objectives of the NTMP is to avoid the wasteful installation of measures that end up needing to be removed. On occasion, however, it may be determined that NTMP measures have become obsolete with changing street and traffic conditions, or that they are simply creating unintended safety or operational issues. If the City Traffic Engineer determines the NTMP measure is no longer operating as intended, the City will have the measure removed. The City may or may not provide advance notification to affected residents.

Old Speed Hump Standard

Current Speed Hump Standard

Residents may request that a NTMP measure be removed. The request for removal is similar to an installation. Upon receipt of a valid petition of 10 affected residents, TED staff conducts a study to assess the performance of the subject measure.

The petition can be submitted by email to: ntmpsurvey@lasvegasnevada.gov

If the City Traffic Engineer determines that removal of the measure is likely to create unacceptable safety issues, the request will be denied. Once a petition is received and validated, a removal project will follow the same procedures as an installation project.

Speed Hump Replacement Process

Over time, some NTMP measures, particularly speed humps, need to be re-installed or updated to meet current standards. Upon request, the City will review existing speed humps in terms of their physical dimensions as well as their impact on vehicle speeds.

Speed humps should meet current standards which is typically is 3" inches with a ¼-inch tolerance (i.e., they should be 2.75" to 3.25" in height). However, specified heights can and do vary at the discretion of the City Traffic Engineer to best address site-specific conditions.

Current speed hump standards, commonly referred to as "cushions", incorporate cutouts to accommodate the wide wheelbase of emergency response vehicles.

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4. MEASURE SELECTION

The primary benefits of candidate NTMP measures can be broadly categorized as speed reduction, traffic volume reduction, and crash reduction through increased driver awareness or other physical measures. Their success, however, is dependent on appropriate applications at locations and situations where they are effective. Inappropriate measures can cause adverse operational and safety issues and not achieve intended goals.

Measure Applicability Summaries

A useful initial screening process includes evaluating the measure for various street characteristics to determine if a measure is likely to have a limitation in its applicability for a particular setting (Table 1). Once eligible measures have been identified, the Measure Effectiveness by Concern data (Table 2) can be used to identify measures to effectively mitigate the operational concern. The cost of a measure is also a consideration in its evaluation and potential implementation. There is wide variance in the cost of measures depending on their scale (e.g., size and number), associated components (e.g., landscaping), and impacts on existing street infrastructure (e.g., need for drainage and utility adjustments). Table 3 categorizes the cost of a typical measure as Low, Medium, or High, with additional notes for consideration. Many measures occupy multiple categories due to cost variability.

Detailed descriptions of the NTMP measures are provided in **Appendix C**.

Road Closure (Level 4)

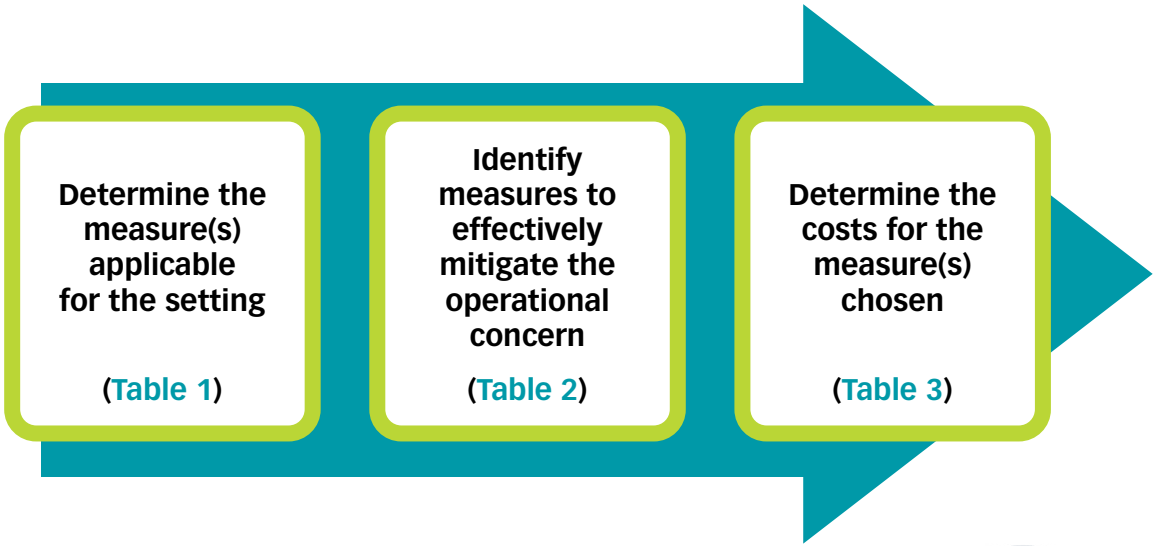

Table 1. Measure Applicability by Street Characteristic

Classification Level	Sub Classification	Measure	Street Type		Transit Route	Daily Traffic Range	Speed Limit	Grade
			Local	Minor Collector				
Level 1 Education & Enforcement and Level 2 Maintenance Improvements	N/A	Targeted Enforcement	◒	●	●	○	○	○
		Speed Limit & Warning Signs	◒	●	●	○	○	○
		General Signing & Markings	◒	●	●	○	○	○
		Crosswalk Signing & Markings	◒	●	●	○	○	○
		Delineation Treatments	◒	●	◒	○	○	○
		Sight Distance Improvements	◒	●	●	○	○	○
		Speed Feedback Signs	✕	●	●	○	○	○
		Improved Lighting Levels	◒	●	●	○	○	○
Level 3 Minor Construction	Vertical Deflection	Speed Humps (cushions)	●	◒	✕	500-3,000	≤25 mph	<8%
		Speed Tables (cushions)	◒	●	✕	500-5,000	≤30 mph	<10%
		Raised Crosswalk	✕	◒	✕	500-5,000	≤30 mph	<8%
		Mountable Traffic Circle	●	◒	✕	500-3,000	≤25 mph	<8%
	Other	New Lighting Infrastructure	◒	●	●	○	○	○
Level 4 Major Construction	Horizontal Deflection	Lateral Shift/Chicane	◒	●	◒	500-7,500	≤30 mph	<10%
		Mini-Roundabout	✕	●	◒	500-7,500	≤30 mph	<10%
		Roundabout	✕	●	◒	<12,000	≤35 mph	<6%
	Vertical Deflection	Raised Intersection	✕	●	✕	<5,000	≤30 mph	<10%
	Width Reductions	Curb Extensions	◒	●	●	○	○	○
		Chokers (two-lane)	◒	●	◒	500-7,500	≤30 mph	○
		Median Island	◒	●	◒	500-7,500	≤30 mph	○
		Curbed Road Diets	✕	●	◒	500-7,500	≤35 mph	○
	Route Diversions/ Access Management	Closures	◒	◒	✕	>25% non-local	○	○
		Diagonal Diverters	◒	◒	✕		○	○
		Median/Forced Turn Island	◒	●	◒		○	○

● Generally applicable ○ Immaterial/Indifferent

◒ May be applicable ✕ Not recommended

* Table for reference only. The City Traffic Engineer reserves the right to install or omit treatments based on conditions and engineering judgment.

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Table 2. Measure Effectiveness by Concern

Classification Level	Sub Classification	Measure	Speed Reduction	Volume Reduction	Crash Potential Reduction	Multi-Modal Safety Improvement	Noise Reduction
Level 1 Education & Enforcement and Level 2 Maintenance Improvements	N/A	Targeted Enforcement	●	○	◒	◒	◒
		Speed Limit & Warning Signs	●	◒	◒	◒	◒
		General Signing & Markings	◒	○	◒	◒	○
		Crosswalk Signing & Markings	○	○	◒	●	○
		Delineation Treatments	◒	○	◒	◒	◒
		Sight Distance Improvements	○	○	●	◒	○
		Speed Feedback Signs	◒	○	○	○	◒
		Improved Lighting Levels	○	○	●	●	○
Level 3 Minor Construction	Vertical Deflection	Speed Humps (cushions)	●	●	◒	◒	✕
		Speed Tables (cushions)	●	●	◒	◒	✕
		Raised Crosswalk	●	◒	◒	●	✕
		Mountable Traffic Circle	●	◒	◒	◒	✕
	Other	New Lighting Infrastructure	○	○	●	●	○
Level 4 Major Construction	Horizontal Deflection	Lateral Shift/Chicane	●	◒	○	○	○
		Mini-Roundabout	◒	◒	●	○	◒
		Roundabout	◒	◒	●	○	◒
	Vertical Deflection	Raised Intersection	●	◒	◒	●	✕
	Width Reductions	Curb Extensions	◒	○	◒	●	○
		Chokers (two-lane)	◒	○	○	○	○
		Median Island	◒	○	◒	◒	○
		Curbed Road Diets	◒	◒	◒	◒	◒
	Route Diversions/ Access Management	Closures	○	◒	◒	◒	◒
		Diagonal Diverters	○	◒	◒	◒	◒
		Median/Forced Turn Island	○	◒	◒	◒	○

● Generally effective ○ Immaterial/Indifferent

◒ May be effective ✕ Not recommended

* Table for reference only. The City Traffic Engineer reserves the right to install or omit treatments based on conditions and engineering judgment.

Neighborhood Transportation Management Program

Table 3. Approximate Implementation Costs

NTMP Measure	Typical Cost for Implementation[1]			Notes
	Low <$15k	Medium $15k - $50k	High >$50k	
Level 3 Minor Construction:				
Speed Humps	$	$$		~$10,000 per hump
Speed Tables	$	$$		Requires more material than hump
Raised Crosswalk		$$	$$$	Potential drainage impacts and utility adjustments
Traffic Calming Roundabout		$$	$$$	Potential utility adjustments
New Lighting Infrastructure		$$	$$$	Approx. $25,000 for new streetlight and associated underground improvements
Level 4 Major Construction - Horizontal Deflections:				
Curbed lateral Shift/Chicane		$$	$$$	Potential drainage and utility adjustments
Mini-Roundabout			$$$	>>$50k. Extensive curb line revisions are common
Roundabout			$$$	
Level 4 Major Construction - Vertical Deflections:				
Raised intersection			$$$	>>$50k. Typically requires drainage and utility adjustments
Level 4 Major Construction - Width Reductions:				
Curb Extensions		$$	$$$	Often requires drainage and utility adjustments
Choker		$$	$$$	
Median Island	$	$$	$$$	Cost varies widely due to length, utility and drainage impacts, and landscaping
Curbed Road Diets			$$$	Typically applied to significant length of street
Level 4 Major Construction - Route Restrictions:				
Closure		$$	$$$	Cost varies widely due to number of treatments needed, utility and drainage impacts, and landscaping
Diagonal Diverter	$	$$		
Median/Forced Turn Island	$	$$	$$$	

[1] 2024 Dollars in $1,000's

Neighborhood Transportation Management Program

GLOSSARY OF TERMS

AASHTO
American Association of State Highway and Transportation Officials

ADT
Average Daily Traffic

Capital Improvements Plan (CIP)
Summary of the City's capital investment for the next five years

Complete Streets
Streets designed and operated to facilitate safe use and mobility for all users, including people of all ages and abilities, regardless of whether they are traveling in motor vehicles, or as pedestrians, bicyclists, or transit passenger

Cut-through traffic
Traffic that does not have an origin or destination that should be served by the street in question

85th Percentile Speed
Speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions past a monitored point

Excessive Speeding
Motorists traveling 5 mph or more over the speed limit

FHWA
Federal Highway Administration

HOA
Homeowner Association

ITE
Institute of Transportation Engineers

NTMP
Neighborhood Transportation Management Program

Pedestrian Oriented Facility (POF)
POFs include parks, elderly housing, and other land uses characterized by significant pedestrian activity and/or vulnerable road users as determined by the City Traffic Engineer

Racing
Motorists traveling 10 mph or more over the speed limit

TED
City of Las Vegas Transportation Engineering Division

Traffic and Parking Commission (T&PC)
Nine-member commission that makes recommendations on matters dealing with traffic and parking such as speed humps, and requests and changes in speed limits

Vulnerable Road Users (VRU)
Non-motorized road users, such as pedestrians and cyclists as well as motorcyclists and persons with disabilities or reduced mobility and orientation

Neighborhood Transportation Management Program

APPENDIX A: NTMP FORMS

Forms

Petition Form Request for NTMP Study
Scoring Sheet for Level 3 and Level 4 Measures

Neighborhood Transportation Management Program

NEIGHBORHOOD TRANSPORTATION MANAGEMENT PROGRAM (NTMP)
Petition Form for NTMP Study Request

The undersigned request a study be conducted for the installation of an appropriate NTMP treatment or safety measure on the following street: _____

From: _____ To: _____

Study concerns (check as appropriate or describe):

☐ Speeding ☐ Cut-through traffic ☐ Pedestrian or bicycle safety ☐ Crashes

☐ Other: _____

Contact person: _____ Phone Number: _____

Address: _____ Email: _____

(At least 10 signatures of adult residents or owners of homes on the subject street (one signature per address) are needed at time of Study request)

	Name (Print)	Signature	Address
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Note:
1. Coordinate requests with your HOA if you have one. HOA approval is required.
   HOA Contact info: _____
2. Speed hump or other device could be placed be in front of your home.
3. Neither application nor eligibility mean an agreement to install.
4. Installations are contingent on available funding.
5. There is no time limit for installation of recommended improvements.
6. Attach additional forms for additional streets.
7. Form can be emailed to: ntmpsurvey@LasVegasNevada.gov

NEIGHBORHOOD TRANSPORTATION MANAGEMENT PROGRAM (NTMP)
NTMP Evaluation Sheet

Street: _____ **Limits:** _____ **To:** _____

Speed Limit: ____ mph **Length:** ____ Miles **Classification:** _____

Right-of-way Width(s): _____

Date(s) of counts & speed data: _____

		Points
Speed Criteria:		
2/3 point for every % ≥5 mph over limit (50 max), +	% Excessive Speeding: ____	
1-1/3 point for every % ≥10 mph over limit (50 max)	%Racing Speeding: ____	0
85th % Speed (not direct input for points): ____ mph		
Volume Criteria:		
1 point for every 40 vpd over 500 ADT + 1 point	ADT: _____	
for every 10 vpd of est. cut-thru ADT (40 max)	Est. Cut-thru ADT: _____	0
Crash Experience Criteria (3-year period):		
5 points for every crash per mile (2 crash min) (20 max)	No. of crashes: ____	0
Fronting Residential Criteria:		
Percent of Fronting Residential x 10% (10 max)	% Fronting Residential: ____	0
Adjacent/Nearby School Criteria:		
10 points for each public or private elementary, middle or high school within 200 feet of street	No. of Schools within 200': ____	0
School Crossing Criteria:		
10 points for each suggested route to school crossing	No. of Schools Xing's: ____	
+ 5 points for every uncontrolled crossing	No. of Uncontrolled Xing's: ____	0
Pedestrian Oriented Facility Criteria:		
5 points for each pedestrian oriented facility (POF) within 200 feet of street	No. of POF's within 200': ____	0
Sight Restriction Criteria:		
5 points for each side street with significant sight visibility restriction	No. of sight restrictions: ____	0
	TOTAL POINTS:	0

NOTE:

1. **A minimum of 100 points is required for eligibility for NTMP Level 3 and Level 4 measures.**
2. **Level 3 and Level 4 NTMP treatment recommendations determined by City Transportation Engineering Division staff based on traffic characteristics and site conditions.**
3. **Sight restriction is based on American Association of State Highway Transportation Officials guidelines.**

Abbreviations: vpd = vehicles per day, ADT = Average Daily Traffic, POF = Pedestrian Oriented Facility

APPENDIX B: SPEED FEEDBACK SIGN POLICY

Neighborhood Transportation Management Program

1.0 ADMINISTRATIVE PROCEDURES

1. Citizen to submit a request for the installation of a radar speed feedback sign (see bottom of sheet).
2. Staff evaluates the corridor based on Minimum Criteria and Additional Considerations below. Evaluation would include performing a speed and volume study on the subject corridor. Please allow up to 2 months for data collection.
3. If the minimum criteria is met, the corridor shall be placed in the City's queue for the next available sign.
4. Once at the front of the queue, the City shall install the sign for a period of 6 months, during which another speed and volume study shall be conducted to evaluate the effectiveness of the device at reducing speeds. Please allow up to 2 months for sign installation.
5. At the end of the 6-month period, the sign shall be removed:
   a. If the radar speed feedback sign was deemed effective at reducing speeds by at least 10%, the corridor can be placed back at the bottom of the queue for future re-installment. Additionally, the neighborhood can invest in their own permanent speed feedback sign.
   b. If the radar speed feedback sign was not deemed effective at reducing speeds by at least 10%, the corridor shall not be placed in queue and other traffic calming measures will be considered at the City's discretion.

2.0 MINIMUM CRITERIA

1. The 85th percentile speeds must be greater than 10 mph over the speed limit.
2. The Daily Average Traffic must be at least 1,500 vehicles per day (vpd).
3. The corridor must be a collector or arterial, not a local residential road.
4. The corridor must have appropriate poles and sunlight to accommodate the installation of the sign and solar panels.

3.0 ADDITIONAL CONSIDERATIONS

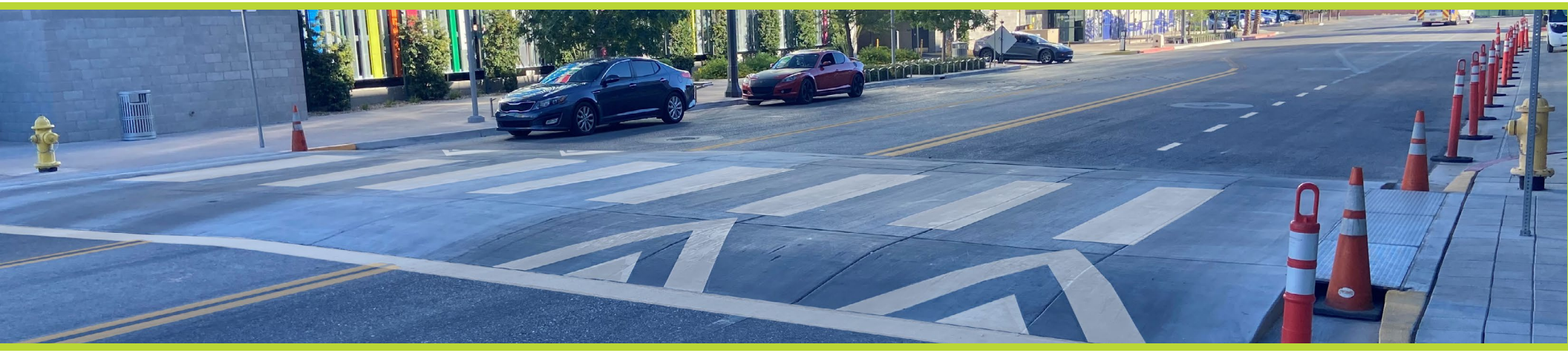
If the above minimum criteria is not met, additional considerations are as follows:

1. A radar speed feedback sign may be considered if there is a noteworthy number of crashes that are correctable by reducing the speed, or crashes involving pedestrians and/or bicyclists.
2. A radar speed feedback sign may be considered for use within one half (1/2) mile of a school zone or park.
3. A radar speed feedback sign may be considered where a speed transition zone exists (high to low speed limits).
4. A radar speed feedback sign may be considered where a curve speed warning advisory sign exists (high to low speed).

Any citizen or neighborhood association may request consideration for installation of a radar speed feedback sign by submitting either an email to **ntmpsurvey@LasVegasNevada.gov** or a written request, mailed to:

City Traffic Engineer
Transportation Engineering Division
City of Las Vegas
495 S. Main St, 5th Floor
Las Vegas, Nevada 89101

For further information, please call the City's Public Works Transportation Engineering Division at 702-229-6331.



APPENDIX C: NTMP TOOLBOX OF MEASURES

Level 1

Education and Enforcement

Level 2

Maintenance Improvements

Level 3

Speed Humps
Speed Tables
Raised Crosswalk
Mountable Traffic Circle
Lighting Infrastructure

Level 4

Lateral Shift/Chicane
Mini-Roundabout
Roundabout
Raised Intersection
Curb Extensions
Chokers (two-lane)
Median Island
Curbed Road Diets
Street Closures
Diagonal Diverters
Median/Forced Turn Island

Neighborhood Transportation Management Program

Education and Enforcement (Level 1)

Education plays a critical role in NTMP efforts and assists residents in making informed decisions about traffic concerns. It promotes neighborhood awareness and community building and is a readily implementable means of modifying driver behavior. In many instances, problem drivers are residents of the neighborhood, and discussions among neighbors can help reduce the problem behaviors.

If requested, a neighborhood meeting can be held to discuss neighborhood needs and the steps to address them.

Useful information can be found at the following links to related City transportation initiatives.

Vision Zero strategies to eliminate all transportation fatalities and serious injuries by 2050.

Mobility Master Plan for developing transportation connectivity, ensuring safe roadways, and providing convenient mobility choices.

The transportation component of the City's **2050 Master Plan**.

Also, the City's **Transportation Engineering Fact Sheets (https://www.lasvegasnevada.gov/Residents/Parking-Transportation/Transportation-Engineering)** address a wide range of transportation engineering topics and frequently asked questions.

Enforcement initiatives by the Las Vegas Metropolitan Police Department (LVMPD) and City Marshals that result in citations are an obvious deterrent to problem drivers, but these efforts are dependent on available staff resources. Where appropriate based on crash histories, resident complaints, and observed behaviors, referrals will be made to the LVMPD and City Marshals for enforcement of speed limits and other traffic laws.

Street Applicability - Targeted Education and Enforcement					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	●	○	○	○

Concern Effectiveness and Cost - Targeted Education and Enforcement					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	○	◒	◒	◒	$-$$

NTMP Toolbox of Measures Key

- ● Generally applicable/effective
- ◒ May be applicable/effective
- ○ Immaterial/Indifferent
- ✖ Not recommended

- $ Low (< $15,000)
- $$ Medium ($15,000 - $50,000)
- $$$ High (> $50,000)

*Table for reference only. The City Traffic Engineer reserves the right to install or omit treatments based on conditions and engineering judgment.

Neighborhood Transportation Management Program

Maintenance Improvements (Level 2)

Description

NTMP studies will often reveal deficiencies in signing and pavement marking treatments. These can include faded crosswalks and lane delineation, missing warning or speed limit signs, and conditions that do not meet current standards.

Studies may also identify opportunities for pavement delineation treatments that can be cost-effectively implemented as part of pavement rehabilitation. These include speed reducing lane narrowing and road diet treatments, and delineated curb extensions that improve crosswalk safety.

Development and land use changes can also create the need for additional signing and delineation treatments for vulnerable users (e.g., new crosswalks, bike lanes, and all-way stop control).

Other conditions evaluated for NTMP studies include motorist sight distance, the adequacy of street lighting levels, and appropriateness of speed limits.

Adequate sight distance is fundamental to safe street operations for both motorists and vulnerable users. Landscape growth and other obstacles including parking characteristics can change over time and create visibility limitations that need to be corrected.

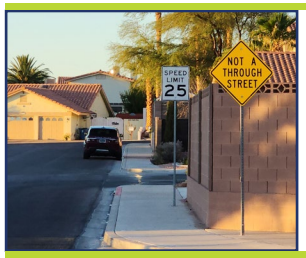
Adequate street lighting is particularly important for the safety of vulnerable road users during nighttime and dusk conditions. Often times inadequate illumination can be corrected by replacing a burned-out luminaire or replacing it with a brighter one.

NTMP studies can also include reviews of speed limits to consider motor vehicle speeds, roadway conditions, area development, crash history, and vulnerable users. The City uses USLIMITS2, a web-based expert system tool available through the FHWA, to assist in setting reasonable, safe, and consistent speed limits.

Level 2 treatments also include speed feedback signs that are governed by adopted policies enclosed in **Appendix B**.

Measure	Street Applicability					
	Street Type					
	Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
Speed Limit & Warning Signs	◒	●	●	○	○	○
General Signing & Markings	◒	●	●	○	○	○
Crosswalk Signing & Markings	◒	●	●	○	○	○
Delineation Treatments	◒	●	◒	○	○	○
Sight Distance Improvements	◒	●	●	○	○	○
Speed Feedback Signs	✖	●	●	○	○	○
Higher Lighting Levels	◒	●	●	○	○	○

Measure	Concern Effectiveness and Cost					
	Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
Speed Limit & Warning Signs	●	◒	◒	◒	◒	$
General Signing & Markings	◒	○	◒	◒	○	$
Crosswalk Signing & Markings	○	○	◒	●	○	$
Delineation Treatments	◒	○	◒	◒	◒	$
Sight Distance Improvements	○	○	●	◒	○	$ - $$
Speed Feedback Signs	◒	○	○	○	◒	$ - $$
Higher Lighting Levels	○	○	●	●	○	$



Signing


Pavement Markings

Speed Feedback Signs

Neighborhood Transportation Management Program

Speed Humps (Level 3)

Description

Speed humps are raised areas of pavement 12 to 14 feet in length and approximately 3 inches high with a parabolic profile. They include longitudinal slots (cushion design) that accommodate the wide wheelbase of emergency vehicles, allowing them to pass through with minimal impact to their speed. They are typically spaced 200 to 500 feet apart and have warning signs in advance of each hump.

Application Considerations

- Appropriate for midblock applications on local residential streets and minor collectors.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Work well in combination with curb extensions.
- Approximately $5,000 per hump (typically consisting of three "cushions").
- Speed hump installation should not cause excessive diversion of traffic to other residential streets.

Effectiveness

- Average speed reductions of 20 to 25 percent between humps.[1]
- Typical volume reductions of 20 percent.[2]
- Average crash rate reduction of 13 to 45 percent.[1]
- No significant impact on non-emergency access (for cushion design).

Concerns

- Objections to aesthetics of hump and associated signs and pavement markings.
- Increased noise at hump due to vehicle rocking and acceleration/deceleration.
- Possible negative effects on property values.
- Ongoing maintenance cost of hump and associated signs and pavement markings.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
●	◒	✖	500-3,000	≤25 mph	<8%

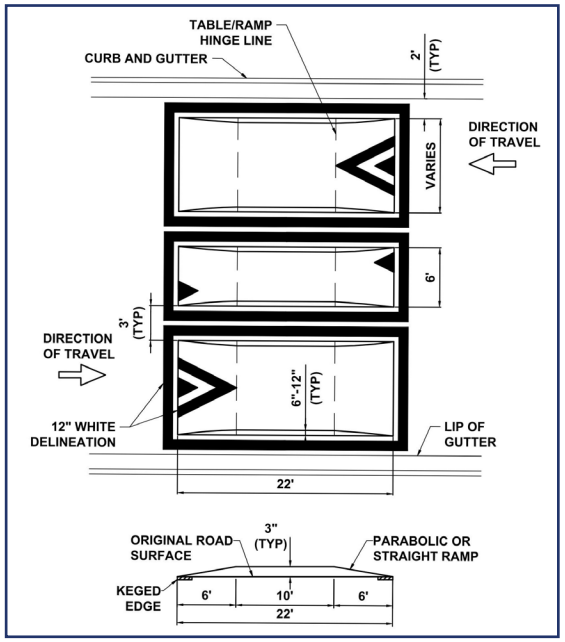
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	●	◒	◒	✖	$ - $$

[1] Institute of Transportation Engineers. *Traffic Calming Fact Sheet*, Institute of Transportation Engineers. https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures, accessed September 4, 2023.

[2] Federal Highway Administration. *Traffic Calming ePrimer*. Washington, DC: U.S. Department of Transportation, Federal Highway Administration, 2017. https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, accessed September 4, 2023.

Neighborhood Transportation Management Program

Speed Tables (Level 3)



Description

Speed tables are raised areas of pavement similar to speed humps but with a 10-foot-long flat section in between 6-foot ramps on each end. They also have a typical height of approximately 3 inches and are also slotted like speed humps (cushion design) to accommodate emergency vehicles. The ramps can have parabolic or straight profiles. Like humps, they are typically spaced 200 to 500 feet apart and have warning signs in advance of each speed table.

Application Considerations

- Appropriate for midblock applications on minor collectors.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Work well in combination with curb extensions.
- Slightly higher cost than speed humps due to additional material required.

Effectiveness

- Speed reductions less than humps with typically traversing speeds of 25 to 27 mph.[1]
- Typical volume reductions of 20 percent.[2]
- Average crash rate reduction of 13 to 45 percent.[2]
- No significant impact on non-emergency access (cushion design).

Concerns

- Objections to aesthetics of raised pavement and associated signs and pavement markings.
- Increased noise at speed table due to vehicle rocking and acceleration/deceleration.
- Possible negative effects on property values.
- Ongoing maintenance cost of raised pavement and associated signs and pavement markings.

Street Applicability					
Street Type		Transit Route	Daily Traffic Range	Speed Limit	Grade
Local	Minor Collector				
✗	●	✗	500-3,000	≤30 mph	<10%
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	●	◒	◒	✗	$ - $$

[1] Institute of Transportation Engineers. *Traffic Calming Fact Sheet*, Institute of Transportation Engineers. https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures, accessed September 4, 2023.

[2] Federal Highway Administration. *Traffic Calming ePrimer*. Washington, DC: U.S. Department of Transportation, Federal Highway Administration, 2017. https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, accessed September 4, 2023.

Neighborhood Transportation Management Program

Raised Crosswalk (Level 3)

Description

Raised crosswalks are speed tables without emergency vehicle slots that also serve as a pedestrian crosswalk with a flush or near flush elevation relative to adjacent sidewalk. They have a height of 3 to 6 inches. Where heights exceed 3 inches the approach ramps are lengthened to maintain a slope at or below 5 percent (i.e., 10-foot ramp for 6-inch height). The ramps can have parabolic or straight profiles.

Because raised crosswalks are not slotted for emergency vehicles, they are often not acceptable on streets commonly used for emergency access. Also, because they span curb-to-curb, they often intercept drainage flows in gutters. This must be mitigated with special placement of storm drain drop inlets or by using walkway treatments that span the gutter.

Application Considerations

- Appropriate for midblock applications on minor collectors.
- May be used in isolation as a pedestrian safety improvement or in conjunction with other vertical deflection measures for a corridor treatment.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Works well in combination with curb extensions and textured crosswalks.
- Costs can include mitigation for drainage impacts and utility adjustments.
- Approximately $75,000 for typical residential collector (50-foot roadway width) plus drainage and utility adjustments if needed.

Effectiveness

- Speed reductions less than humps with typically traversing speeds of 25 to 27 mph.[1]
- Typical volume reductions of 20 percent.[2]
- Average crash rate reduction of 13 to 45 percent.[1]
- No significant impact on non-emergency access.
- Increases pedestrian visibility and likelihood of motorist yielding.

Concerns

- Objections to aesthetics of raised pavement and associated signs and pavement markings.
- Increased noise at raised crosswalk due to vehicle rocking and acceleration/deceleration.
- Possible negative effects on property values.
- Ongoing maintenance cost of raised pavement and associated signs and pavement markings.
- Cost of required drainage mitigation.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
✗	◒	✗	500-5,000	≤30 mph	<8%

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	◒	●	✗	$$ - $$$

[1] Institute of Transportation Engineers. *Traffic Calming Fact Sheet*, Institute of Transportation Engineers. https://www.ite.org/technical-resources/traffic-calming/traffic-calming-measures, accessed September 4, 2023.

[2] Federal Highway Administration. *Traffic Calming ePrimer*. Washington, DC: U.S. Department of Transportation, Federal Highway Administration, 2017. https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, accessed September 4, 2023.

Mountable Traffic Circle (Level 3)

Description

Mountable traffic circles are intersections with a fully traversable central island with no other raised elements and yield control on all intersection approaches. It has been described as a "peppermint candy" placed in the center of a local street intersection. It has a height of 3 inches and its circular edge is typically formed by 8-inch to 12-inch-wide curb with no more than a ¼-inch lip.

Mountable traffic circles have both vertical and horizontal deflection elements. Most passenger cars travel around but its fully traversable central island accommodates larger vehicles traveling over it.

Application Considerations

- Appropriate for intersection applications on local residential streets and minor collectors.
- May be used in isolation as an intersection safety improvement or in conjunction with other vertical deflection measures for a corridor treatment.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- The central island needs to stay clear of pedestrian crosswalk areas between corners of the intersection (whether marked or unmarked).
- Splitter islands on street approaches are delineated with pavement markings.
- Potential utility adjustments.
- Typically used on streets where volumes are low enough that specific accommodations for bicyclists (e.g., bike ramps to sidewalk) are not needed.
- Approximately $50,000 to $100,000.

Effectiveness

- Speed reductions less than humps with typically traversing speeds of 25 to 27 mph.
- Typical volume reductions of 20 percent.
- Average crash rate reduction of 45 percent.
- No significant impact on non-emergency access.

Concerns

- Objections to aesthetics of raised pavement and associated signs and pavement markings.
- Increased noise at central island due to vehicle rocking and acceleration/ deceleration.
- Possible negative effects on property values.
- Ongoing maintenance cost of raised pavement and associated signs and pavement markings.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
●	◒	✖	500-3,000	≤25 mph	<8%

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	◒	◒	✖	$ - $$

Neighborhood Transportation Management Program

Lighting Infrastructure (Level 3)

Description

Adequate street lighting is critical to reduce crash potential for motor vehicles, bicycles and pedestrians, and it is routinely evaluated as part of NTMP studies. In some cases, appropriate lighting levels cannot be provided by a Level 2 luminaire upgrade. New lighting infrastructure may be needed, which may consist of new streetlight poles, underground conduit and pullboxes, and new electrical services and transformers.

Application Considerations

- Particularly important for the safety of vulnerable users during nighttime and dusk conditions.
- Critical in areas of high pedestrian and cycling activity (e.g., near parks and trails).
- Streetlight layouts and spacings are standardized based on street classification. Streetlights for local residential streets and minor collectors are typically located on just one side of the street and are able to provide adequate illumination due to the relatively narrow street widths.
- Streetlight pole styles and luminaire fixtures vary based on zoning and for certain areas of the City (e.g., Downtown, Summerlin, Centennial Hills, etc.).
- Approximately $30,000 for each streetlight and associated underground improvements.

Effectiveness

- Average reduction of 28 percent in nighttime injury crashes.[3]
- Average reduction of 17 percent in nighttime non-injury crashes.[3]

Concerns

- Lighting trespass onto private property.
- Objections to "dark sky" impacts.
- Objections to additional pole installations.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	●	○	○	○

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
○	○	●	●	○	$$ - $$$

[3] American Association of State Highway and Transportation Officials. *Highway Safety Manual*, 1st edition. Washington, DC: American Association of State Highway and Transportation Officials, 2010.

Neighborhood Transportation Management Program

Lateral Shift/Chicane (Level 4)

Description

Lateral shifts/chicanes are realignments of an otherwise straight street segment that causes travel lanes to shift in at least one direction. A chicane is a series of lateral shifts that force a motorist to steer back and forth multiple times along the street alignment. A typical lateral shift/chicane treatment separates opposing traffic with the aid of a raised median to prevent motorists from crossing the centerline.

Application Considerations

- Appropriate for midblock applications on local residential streets and minor collectors.
- Preferred locations are near streetlights for nighttime visibility.
- Can have drainage impacts.
- Can require removal of parking.
- Additional curbed areas provide landscape opportunities.
- Can be combined with crosswalk locations.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Potential drainage and utility adjustment costs.
- Consider bicycle bypass lane, shared lane markings, and/or "bike may use fall lane" signage for streets with bike lanes or significant bike traffic.
- Approximately $20,000 per lateral shift.

Effectiveness

- Although intent is speed reduction, there is limited data on their effectiveness in terms of speed reduction, volume reductions, and reduced crash risk.
- No significant impact on non-emergency access.

Concerns

- Objections to aesthetics of raised median and associated signs and pavement markings.
- Objections to parking removal.
- Possible negative effects on property values.
- Ongoing maintenance cost of raised median and associated signs and pavement markings.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	◒	500-7,500	≤30 mph	<10%
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	○	○	○	$$ - $$$

Neighborhood Transportation Management Program

Mini-Roundabout (Level 4)

Description

Mini-roundabouts are circular intersections that are designed in accordance with roundabout design principles with yield control on all intersection approaches. Splitter islands are often painted to direct passenger car traffic into counterclockwise circulation around the central island. Pedestrian crosswalks are located one car length upstream of the yield line. The central island is typically fully traversable.

Application Considerations

- Appropriate for intersection applications on minor collectors.
- Separate bike lane delineation, if present, is terminated on the approach to the roundabout.
- Likely well over $50,000 due to extensive curb line and sidewalk ramp modifications that are common.
- Bicyclists traversing through a mini-roundabout should claim the entire lane on the approach by riding near the center of the lane as a car would. If a bicyclist is uncomfortable riding like a car through a mini-roundabout they should dismount and exit to the sidewalk to traverse the mini-roundabout as a pedestrian.

Effectiveness

- Speed reduction primarily limited to the treated intersection.
- Typically create little traffic diversion.
- Significant reduction in crash potential compared to minor street stop-controlled or signal-controlled intersections.
- Mini-roundabout safety performance is similar to all-way stop control, but mini-roundabouts have higher capacities and lower delays.

Concerns

- Applicable only at intersections.
- Typically not used where there are significant truck or bus traffic turning left.
- Pedestrian ramps have to be relocated one car length upstream of intersection.
- Parking removal requirements.
- Maintenance of additional signing, pavement markings, and lighting.

Street Applicability					
Street Type		Transit Route	Daily Traffic Range	Speed Limit	Grade
Local	Minor Collector				
✗	●	◒	500-7,500	≤30 mph	<10%
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	◒	○	◒	$$$

Neighborhood Transportation Management Program

Roundabout (Level 4)

Description

Single-lane roundabouts are a larger version of a mini-roundabout, with similar advantages and limitations. Their larger size provides higher capacities and accommodates a raised central island that does not have to be fully traversable (like a mini-roundabout) and can therefore be landscaped. Splitter islands, which direct passenger car traffic into counterclockwise circulation around the central island, are typically raised as well. The raised splitter islands provide a median refuge for pedestrian crosswalks located one car length upstream of the yield line.

Application Considerations

- Appropriate for intersection applications on minor collectors.
- Separate bike lane delineation, if present, is terminated on the approach to the roundabout.
- Bicyclists traversing through a roundabout should claim the entire lane on the approach by riding near the center of the lane as a car would. If a bicyclist is uncomfortable riding like a car through a roundabout they should dismount and exit to the sidewalk to traverse the roundabout as a pedestrian.
- Likely start at $75,000 due to extensive curb line and sidewalk ramp modifications that are common.

Effectiveness

- Speed reduction primarily limited to the treated intersection.
- Typically create little traffic diversion.
- Significant reduction in crash potential compared to minor street stop-controlled or signal-controlled intersections.
- Roundabout safety performance is similar to all-way stop control, but mini-roundabouts have higher capacities and lower delays.

Concerns

- Applicable only at intersections.
- Typically not used where there are significant truck or bus traffic turning left.
- Right-of-way limits do not accommodate desired roundabout footprint.
- Extensive utility relocation may be needed.
- Pedestrian ramps have to be relocated one car length upstream of intersection.
- Parking removal requirements.
- Maintenance of additional signing, pavement markings, and lighting.

Street Applicability					
Street Type		Transit Route	Daily Traffic Range	Speed Limit	Grade
Local	Minor Collector				
✗	●	◒	<12,000	≤35 mph	<6%
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	◒	○	◒	$$$

Raised Intersection (Level 4)

Description

Raised intersections are non-slotted speed tables that encompass an entire intersection. They typically include crosswalks across intersection legs and are used at locations with high pedestrian demands. Like raised crosswalks, they have a height of 3 to 6 inches. Where heights exceed 3 inches the approach ramps are lengthened to maintain a slope at or below 5 percent (i.e., 10-foot ramp for 6-inch height). The ramps can have parabolic or straight profiles.

Because they are not slotted for emergency vehicles, raised Intersections may not be acceptable on many streets with right-of-way of 60 feet or more, due to their frequent use by emergency vehicles. Also, because they span curb-to-curb, they often intercept drainage flows in gutters. This may require the construction of additional storm drain drop inlets.

Application Considerations

- May be used in isolation as an intersection pedestrian safety improvement or in conjunction with other vertical deflection measures for a corridor treatment.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Often combined with curb extensions, textured pavement treatments, and all-way stops.
- May require bollards to define edge of roadway.
- Not commonly used in residential areas primarily due to cost.
- Bicyclists should not be adversely affected by a raised intersection as long as uncomfortable textured surfaces (e.g., uneven pavers) are avoided.
- Costs can include mitigation for drainage impacts and utility adjustments; likely well over $50,000.

Effectiveness

- Through movement speed reduction likely at intersection.
- Mid-block speed reductions are typically less than 10 percent.
- No data available on volume diversions or crash rate impacts.
- No significant impact on non-emergency access.

Concerns

- Visually impaired pedestrians may have difficulties identifying crossing alignments and tactile direction indicators may be needed.
- Increased noise due to vehicle rocking and acceleration/deceleration.
- Ongoing maintenance cost of raised pavement and associated signs and pavement markings.

Street Applicability					
Street Type		Transit Route	Daily Traffic Range	Speed Limit	Grade
Local	Minor Collector				
✗	●	✗	<5,000	≤30 mph	<10%

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
●	◒	◒	●	✗	$$$

Neighborhood Transportation Management Program

Curb Extensions (Level 4)

Description

Curb extensions are horizontal extensions of the sidewalk into the street at intersection corners that result in a narrower roadway section. They are an effective treatment for narrowing pedestrian crossings distances and improving pedestrian visibility. When used with reduced corner radii they can also reduce turning speeds.

Curb extensions are typically 6 to 8 feet in width and offset from travel lane at least 1.5 feet.

Application Considerations

- Typically appropriate on streets frequently used by emergency vehicles and on transit routes.
- Adequate corner radii must be provided for required transit turns and truck access.
- Should not extend into bike lanes.
- Drainage mitigation may be needed due to gutter realignment.
- Utility relocations or adjustments may be needed.
- Approximately $60,000 for each corner with concrete cross gutter.
- Can be cost-effectively implemented with striping delineation and marker post treatments where needed.

Effectiveness

- Primary purpose is to "pedestrianize" an intersection and reduce crash potential by improving visibility and shortening crossing distances, particularly where there is on-street parking.
- Limited effect on vehicle speeds due to lack of vertical or horizontal deflection.
- Limited impact on traffic volumes.
- Limited data available on crash rate impacts.

Concerns

- May require some parking removal.
- Impacts on large vehicle access and potential for vehicle tracking onto sidewalk areas.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	●	○	○	

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
◒	○	◒	●	○	$$ - $$$

Chokers (two-lane) (Level 4)

Description

Chokers are curb extension treatments at mid-block locations that encourage slower speeds by narrowing the roadway to funnel traffic through a pinch point. They can be landscaped and/or combined with mid-block crosswalks, in which case, they reduce crossing distances and improve pedestrian visibility. Choker islands should be a minimum of 20 feet in length and ideally should be located near streetlights for enhanced nighttime visibility. They are typically 6 to 8 feet in width and offset from the travel lane approximately 1.5 feet.

Application Considerations

- Appropriate for midblock applications on local streets and minor collectors.
- Appropriate on streets frequently used by emergency vehicles and on transit routes.
- Applicable with or without dedicated bicycle facilities.
- May require drainage mitigation and utility relocations or adjustments.
- Approximately $15,000 per choker.

Effectiveness

- Limited speed reduction impacts under low volumes where the likelihood of a motorist encountering an opposing motorist within the narrowed area is low.
- Limited impact on traffic volumes.
- Shortens pedestrian crossing distance and exposure if used as mid-block crossing.

Concerns

- May require parking removal.
- May force bicyclists and motor vehicles to share travel lane.
- Objections to aesthetics of raised curbed areas and associated signs and pavement markings.
- Landscape maintenance.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	◒	500-7,500	≤30 mph	○
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
◒	○	○	○	○	$$ - $$$

Neighborhood Transportation Management Program

Median Island (Level 4)

Description

Median islands are treatments similar to chokers that are used at mid-block and intersection locations to encourage slower speeds by narrowing the roadway section to funnel traffic through a pinch point. They can be landscaped and/or combined with crosswalks, in which case, they provide a pedestrian refuge and reduce crossing distances. If placed through an intersection they also serve as a route restriction (see Median/Forced Turn Island).

Median islands should generally be a minimum of 50 feet in length and should be a minimum of six feet in width if serving as a pedestrian refuge function. They should ideally be located near streetlights for enhanced nighttime visibility.

Application Considerations

- May simply be a painted area but are most effective when defined by a raised curb and landscaped to further reduce the open feel of a street.
- Appropriate for applications on local streets and minor collectors.
- Midblock applications appropriate on streets frequently used by emergency vehicles and on transit routes.
- Applicable with or without dedicated bicycle facilities.
- May require utility relocations or adjustments.
- Can serve as a gateway or entry feature to an area.
- Can improve safety by eliminating U-turn conflicts and providing access management.
- Costs vary widely depending on length, utility and drainage impacts, and landscaping.

Effectiveness

- Have typically been found to reduce speeds 2-3 mph at the island location.[2]
- Have not been found to have significant impacts on volumes.
- Shortens pedestrian crossing distance and exposure if used as mid-block crossing.

Concerns

- May impact access to adjacent properties.
- May require parking removal.
- May force bicyclists and motor vehicles to share travel lane.
- Objections to aesthetics of raised curbed areas and associated signs and pavement markings.
- Landscape maintenance.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	◒	500-7,500	≤30 mph	○
Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
◒	○	◒	◒	○	$ - $$$

[2] Federal Highway Administration. *Traffic Calming ePrimer*. Washington, DC: U.S. Department of Transportation, Federal Highway Administration, 2017. https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, accessed September 4, 2023.

Curbed Road Diets (Level 4)

Description

Curbed road diets are conversions of an undivided roadway to a cross-section with fewer or narrower through travel lanes for motor vehicles. The most common application is conversion of an undivided four-lane roadway to a three-lane roadway consisting of one through lane per direction and a center turn lane. The reduction in lanes permits the inclusion of multi-modal facilities such as bike lanes, wider sidewalks, pedestrian refuge islands, transit facilities, and on-street parking.

Application Considerations

- Appropriate for applications on minor collectors.
- Appropriate on streets frequently used by emergency vehicles and on transit routes.
- Typically, acceptable for up to 1,000 vehicles per direction during peak hour.
- Must consider transitions from adjacent roadway sections and through intersections.
- Typically applied to significant length of street.
- Costs are higher if the outside portion of pavement is converted to other non-motorized uses (e.g., raised bicycle facilities, sidewalks, grass buffers).

Effectiveness

- Elimination of a travel lane can reduce higher speeds that are achieved through passing.
- Two studies measured reductions of 1 to 2 mph for 85th percentile speeds.[2]
- Limited impact on traffic volumes as long as adequate capacity is retained.
- Can be expected to improve pedestrian crossing ease and safety.
- Improve bicycle accessibility, if bike lanes are incorporated.
- Positive multi-modal features can reduce crash frequencies by 19 to 47 percent.[2]

Concerns

- Objections to aesthetics of raised pavement and associated signs and pavement markings.
- Objections to loss of lanes and ability to pass.
- Ongoing maintenance cost of raised curbed areas and associated signs and pavement markings.

Before

After

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
✗	●	◒	500-7,500	≤35 mph	○

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
◒	◒	◒	◒	◒	$$$

[2] Federal Highway Administration. *Traffic Calming ePrimer*. Washington, DC: U.S. Department of Transportation, Federal Highway Administration, 2017. https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, accessed September 4, 2023.

Street Closures (Level 4)

Description

Street closures, which consist of half- and full-street closures, are route diversion measures that are not typically considered unless other less restrictive measures have failed or been deemed inappropriate or ineffective. Also, they are not typically considered unless non-local cut-through traffic constitutes more than 25 percent of traffic.

Restricting access to a street or intersection requires a thorough review of where the diverted traffic is likely to shift, and the suitability of those alternate routes.

Closures are not applicable on most streets with right-of-way of 60 feet or more due to their frequent use by emergency vehicles or on transit routes. Closures typically maintain two-way travel for pedestrians and bicyclists, and the additional curbed areas can be landscaped.

Half closures are placed at intersections and block traffic either entering or exiting the side street. The most common half closure is one that blocks entries to the side street. The treatment needs to be long enough to make a wrong-way maneuver uncomfortable for a motorist to execute.

A full closure is a physical barrier placed across the entire roadway section to completely close the street to vehicular through traffic. Full closures can be done at either mid-block or intersection locations and may require crash gates or other elements for emergency access.

Application Considerations

- Appropriate for local streets.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Treatments may be needed at multiple locations to affect a shift in traffic to the arterial and collector streets suited to handling the demands.
- Costs vary widely depending on the number of treatments needed, utility and drainage impacts, and landscaping.

Effectiveness

- Highly effective in reducing traffic volumes where there is significant cut-through traffic.
- Volume reductions improve pedestrian and bicycle safety, and reduce vehicular crashes on the treated streets.

Concerns

- Reduces overall network connectivity for vehicular traffic.
- Potential traffic diversions to other local streets.
- Requires more circuitous routing to and from some properties.
- Objections to aesthetics of raised curbed areas and associated signs and pavement markings.
- Ongoing maintenance cost of raised curbed areas and associated signs and pavement markings.
- Landscape maintenance.

Street Applicability

Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	✖	>25% non-local	○	○

Concern Effectiveness and Cost

Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
○	●	◒	◒	◒	$-$$$

Neighborhood Transportation Management Program

Diagonal Diverters (Level 4)

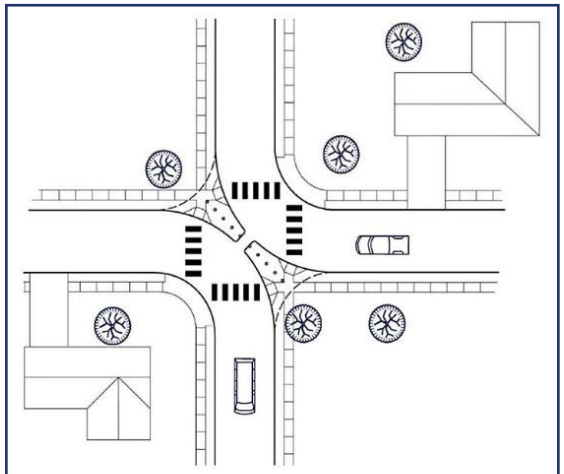


Figure 3.21.1. Diagonal Diverter Schematic
(Source: Delaware Department of Transportation)

Description

Physical barriers placed diagonally across a four-legged intersection to block through movements and require approaching traffic to turn right or left.

Diagonal diverters are route diversion measures that are not typically considered unless other less restrictive measures have failed or been deemed inappropriate or ineffective. Also, they are not typically considered unless non-local cut-through traffic constitutes more than 25 percent of traffic.

Restricting access to a street or intersection requires a thorough review of where the diverted traffic is likely to shift, and the suitability of those alternate routes.

Diagonal diverters are not applicable on most streets with right-of-way of 60 feet or more due to their frequent use by emergency vehicles or on transit routes. They typically maintain two-way travel for pedestrians and bicyclists with ramps and bike lane slots, and the additional curbed areas can be landscaped.

Application Considerations

- Only appropriate for local street intersections.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Treatments may be needed at multiple locations to affect a shift in traffic to the arterial and collector streets suited to handling the demands.
- Geometry should be designed to allow for a single unit truck or fire truck to pass.
- Signing, delineation, and lighting are needed to appropriately warn motorists of the treatments.
- Parking prohibitions may be needed along the diverter.
- May require drainage mitigation and utility relocations or adjustments.
- Costs vary widely depending on the number of treatments needed, utility and drainage impacts, and landscaping.

Effectiveness

- Highly effective in reducing traffic volumes where there is significant cut-through traffic.
- Volume reductions improve pedestrian and bicycle safety, and reduce vehicular crashes on the treated streets.
- The turns that are required reduce speeds at the intersection, which has a positive effect on pedestrian and bicyclist safety.

Concerns

- Reduces overall network connectivity for vehicular traffic.
- Potential traffic diversions to other local streets.
- Requires more circuitous routing to and from some properties.
- Objections to aesthetics of raised curbed areas and associated signs and pavement markings.
- Ongoing maintenance cost of raised curbed areas and associated signs and pavement markings.
- Landscape maintenance.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	◒	✖	>25% non-local	○	○

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
○	●	◒	◒	◒	$-$$

Neighborhood Transportation Management Program

Median/Forced Turn Island (Level 4)

Description

Medians/forced turn islands are measures that are variations of physical turn restrictions at an intersection to eliminate specific movements to and from a side street. They are not typically considered unless other less restrictive measures have failed or been deemed inappropriate or ineffective. Also, they are not typically considered unless non-local cut-through traffic constitutes more than 25 percent of traffic.

Restricting access to a street or intersection requires a thorough review of where the diverted traffic is likely to shift, and the suitability of those alternate routes.

A median barrier is a raised island along the centerline of a street that continues into an intersection to block all left-turn movements at the intersection as well as through movements on the cross street.

A forced turn island is a triangular-shaped raised median on a side street approach that restricts that leg of the intersection to certain turn movements. Barrier treatments are made passable for pedestrians and bicyclists and the additional curbed areas can be landscaped.

Application Considerations

- Applicable to arterial or collector roadways to restrict access to minor roads or local streets and/or to narrow lane widths.
- Requires Fire Department approval to ensure that emergency access needs are not compromised.
- Treatments may be needed at multiple locations to affect a shift in traffic to the arterial and collector streets suited to handling the demands.
- Costs vary widely depending on the number of treatments needed, utility & drainage impacts, and landscaping.

Effectiveness

- Highly effective in reducing traffic volumes where there is significant cut-through traffic.
- Volume reductions improve pedestrian and bicycle safety, and reduce vehicular crashes on the treated streets.
- A median barrier can also reduce speeds by lane narrowing, and a forced turn island can reduce intersection speeds by requiring side street turn movements.

Concerns

- Reduces overall network connectivity for vehicular traffic.
- Potential traffic diversions to other local streets.
- Requires more circuitous routing to and from some properties.
- Objections to aesthetics of raised curbed areas and associated signs and pavement markings.
- Ongoing maintenance cost of raised curbed areas and associated signs and pavement markings.
- Landscape maintenance.

Street Applicability					
Street Type					
Local	Minor Collector	Transit Route	Daily Traffic Range	Speed Limit	Grade
◒	●	◒	>25% non-local	○	○

Concern Effectiveness and Cost					
Speed Reduction	Volume Reduction	Crash Reduction	Multi-modal Safety Improvement	Noise Reduction	Cost
○	●	◒	◒	○	$-$$$

Neighborhood Transportation Management Program