MURRAY

MURRAY

TRAFFIC CALMING MANUAL

MAY 2025

WCG
WALL CONSULTANT GROUP

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I. INTRODUCTION

Traffic Calming refers to the use of physical design or other measures to improve safety for roadway users. It aims to promote responsible driving and reduce vehicle speeds, and volumes on the road in some cases.

The purpose of the Murray Traffic Calming Manual is to provide directions on when traffic calming is recommended and the appropriate measures that should be installed. This Manual outlines a process that allows for a consistent approach to traffic calming requests and projects. It is intended to be used by the Murray City staff and the Traffic Safety Committee, which includes members from the following organizations:

- Mayor's office
- City planning
- Police department
- Fire department
- City engineering
- Murray public works

Implementing the right traffic calming measure is important as it impacts the safety and livability of a community.

Implementing the right traffic calming measure is vitally important to the safety and livability of a community. Installing an inappropriate calming measure can result in unintended consequences or be an inefficient use of resources. The guidelines presented in this manual aim to help Murray City use appropriate measures to most efficiently improve safety with available funding and to be supported by the community.

The Safe System Approach

In recent years, the Federal Highway Administration (FHWA) has adopted the Safe System Approach, shown in Figure 1. This approach deviates from traditional safety practices as it acknowledges that humans make mistakes and that crashes will occur. However, it is the responsibility of system designers and those in the system to ensure that those crashes do not result in a fatality or a serious injury.

A traffic crash results in the transfer of kinetic energy. The human body can only absorb so much energy before a serious injury or fatality occurs. Therefore, the goal of the Safe System principles and elements is to reduce the transfer of kinetic energy onto the human body. One crucial element of kinetic energy is speed. As speed is reduced, kinetic energy is also reduced. The goal of traffic calming is to reduce vehicle speeds, and consequently the kinetic energy should a crash occur. Thus, traffic calming fits within the Safe System Approach, particularly the Safe Roads and Safe Speeds elements.

The goal of traffic calming is to reduce vehicle speeds, and consequently the kinetic energy should a crash occur.

FIGURE 1: The Safe System Approach

II. TRAFFIC CALMING MEASURES APPROVED FOR MURRAY CITY

This section outlines the traffic calming measures the Murray City Traffic Safety Committee have determined appropriate for Murray City roadways. Traffic calming measures should only be installed when recommended by an engineering study and determined appropriate by the Traffic Safety Committee.

When installing traffic calming measures, it is important to note that often one single measure will not result in lower speeds. Combining multiple traffic calming measures creates a cumulative effect on speed reduction. Individual calming measures can have certain limitations or be less effective when operating independently. Installing multiple measures allows for the weaknesses of certain measures to be compensated by the strength of others. This comprehensive approach increases the chances of achieving goals of speed reduction.

Traffic calming measures can be categorized as passive, active, or temporary. The following subsections define each of these categories and outline the measures that Murray City has determined to be appropriate for their roadways.

Passive Measures

Passive traffic calming measures help to lower speeds by altering driver behavior through visual cues such as signage and roadway striping. These measures do not physically change the roadway. Passive measures can be installed on any roadway, and in combination with active measures. They are often less expensive and can be a cost-effective solution to increasing safety. However, effectiveness varies when compared to active measures. Listed below are passive measures that Murray City has determined are acceptable to use on city roadways. Details regarding these passive measures are included in **Appendix A**.

- Radar speed sign
- Variable message sign (VMS)
- Pavement speed limit marking
- Optical speed bars
- Additional speed limit signs
- Striping narrower lanes
- Landscaping
- Enforcement
- Education

Active Measures

Active traffic calming measures include physical changes to the roadway such as a vertical or horizontal deflection. The driver must actively engage and lower their speed when interacting with the traffic calming measure. Active measures are more expensive than passive measures but can be more effective in reducing vehicle speeds. However, these physical changes in the roadway can also impact emergency vehicles or maintenance vehicle operations. Therefore, active traffic calming measures are not recommended on roadways identified as emergency routes.

Active traffic calming measures can be categorized as horizontal or vertical deflections. Both are described below. Murray city prefers horizontal measures to vertical measures.

Horizontal Deflection

Horizontal deflection refers to active traffic calming measures that alter vehicle direction. By creating a horizontal shift in the roadway, they prevent drivers from traveling in a straight line and cause them to lower their speeds as they navigate the measure.

Murray City has determined that the following active traffic calming measures are appropriate for horizontal deflection on its roadways. Details regarding these horizontal deflection measures are included in **Appendix A**.

- Traffic circles
- Bulb-outs
- Roundabouts
- On-street parking
- Chicanes
- Medians

Active measures are more expensive than passive measures but can be more effective in reducing vehicle speeds.

Vertical Deflection

Vertical deflection refers to active traffic calming measures that change pavement elevation over short distances, causing vehicles to slow down. While effective at lowering speeds at specific locations, drivers may speed up after passing over the measure. Additionally, vertical measures can impact emergency and snow removal vehicles.

Murray City has determined that the following active traffic calming measure is appropriate for vertical deflection on its roadways.

- Raised crosswalks

Further information regarding this vertical deflection measure is included in **Appendix A**.

Temporary Measures

Temporary traffic calming measures can serve as substitutes for permanent active traffic calming measures. These options can be more cost effective and can be relocated if necessary. They require less construction time, providing a quick response to urgent issues. Temporary measures can be implemented as a trial period before installing a permanent active measure. However, it is worth noting they may not be as durable or effective. The following temporary measures have been determined to be appropriate by Murray City:

- Rubber raised crosswalks
- Rubber curbs
  - » Traffic circle
  - » Bulb-out

Further information regarding these traffic calming measures is included in **Appendix A**.

Inappropriate Measures for Murray City

The following measures are deemed inappropriate for Murray City Roadways.

- Speed bumps
- Speed cushions
- Diagonal divertors
- Rumble strips

Although these measures may be appropriate for other cities, the Murray Traffic Safety Committee has determined these measures to be inappropriate for Murray City due to their ineffectiveness, difficulty for maintenance and emergency vehicles, restricting access, or noise pollution.

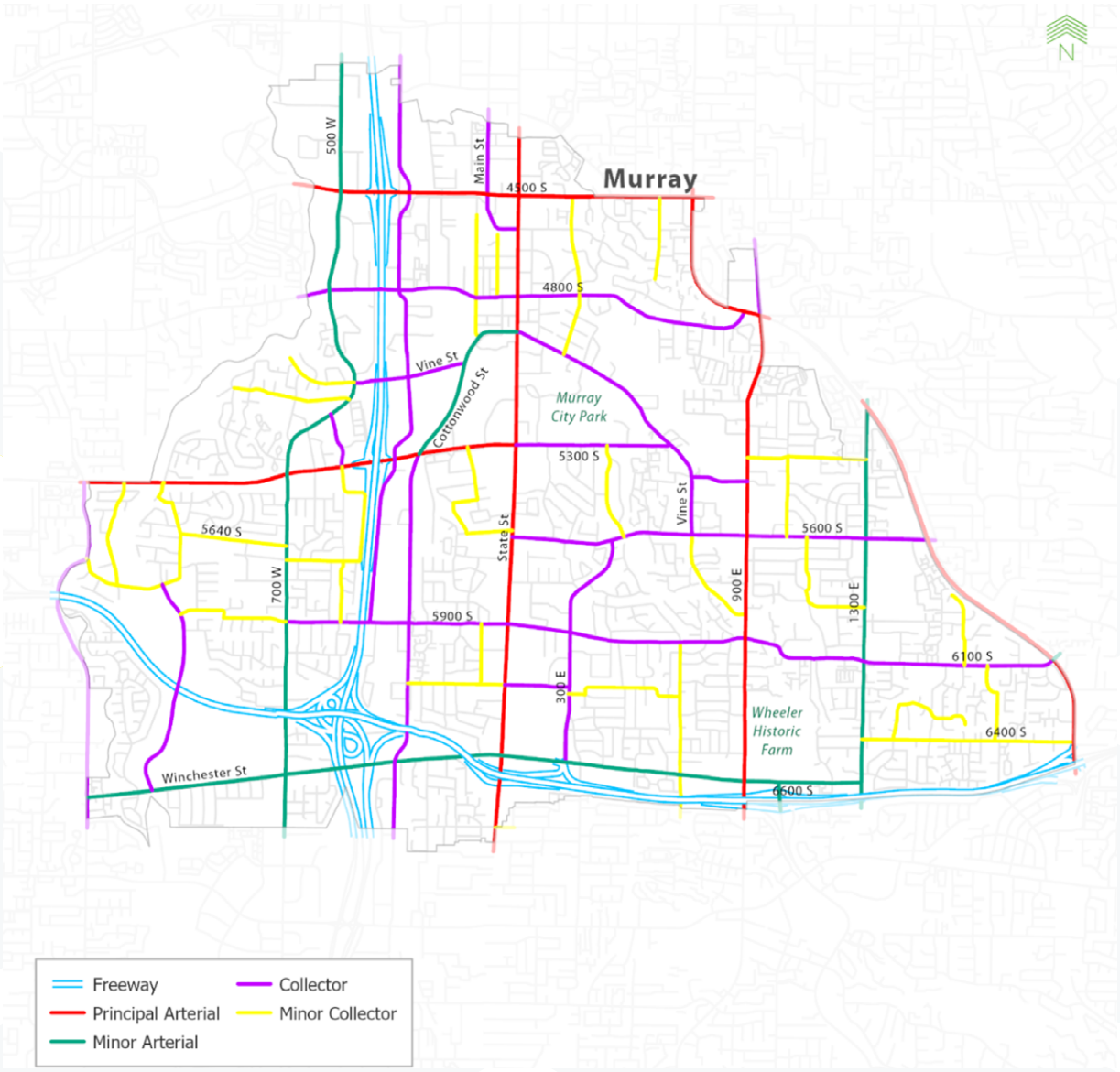
III. ROADWAYS ELIGIBLE FOR TRAFFIC CALMING

Roadway context is important when considering which traffic calming measures should be installed. Roadways have different classifications based on attributes such as speed, access, and their role in the transportation system:

- Freeways have very limited access and much higher speeds.
- Arterial roadways have higher speeds and low access.
- Collector roadways have a balance between speed, mobility, and access.
- Local roadways have more access and lower speed.

A functional classification map of Murray's roadways is shown in Figure 2.

FIGURE 2: Murray City Functional Class Map (Murray City Transportation Master Plan 2021)

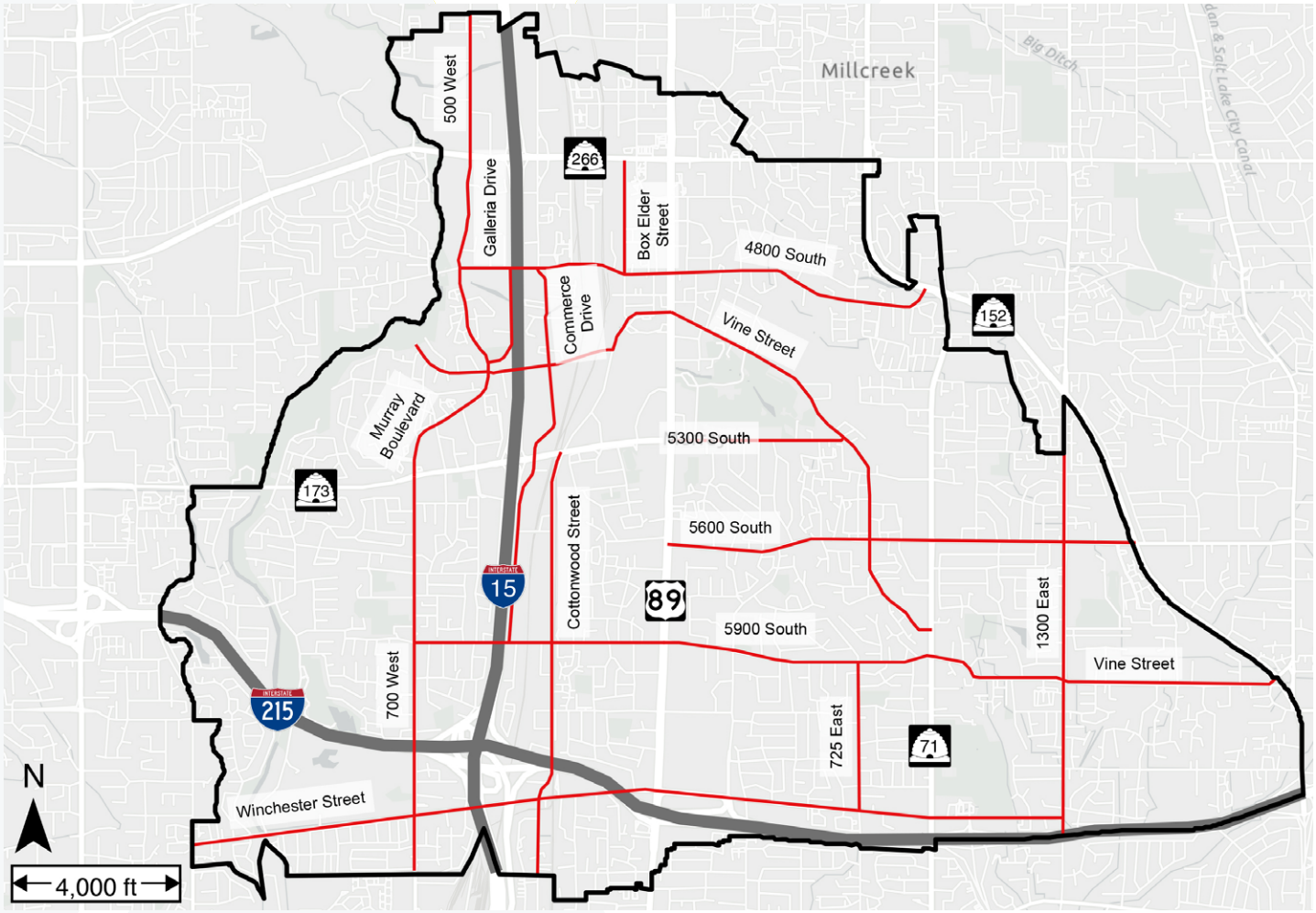


In addition to functional class, there are additional factors to consider, including whether the roadway has been identified as an emergency route, is under UDOT jurisdiction, or is part of a Safe Route to School Plan.

Emergency Routes

Murray City Police and Fire departments identified roadways that are used as key routes when responding to emergencies. Vertical deflection is not recommended on emergency routes as they can increase response time. Faster response times are critical for saving lives and minimizing property damage during emergencies. Any active measures installed on emergency routes require special approval from Murray City Engineering and Fire. The identified emergency routes are shown in Figure 3.

FIGURE 3: Emergency Routes in Murray City (Limited Active Measures Recommended)



Roadway Jurisdiction

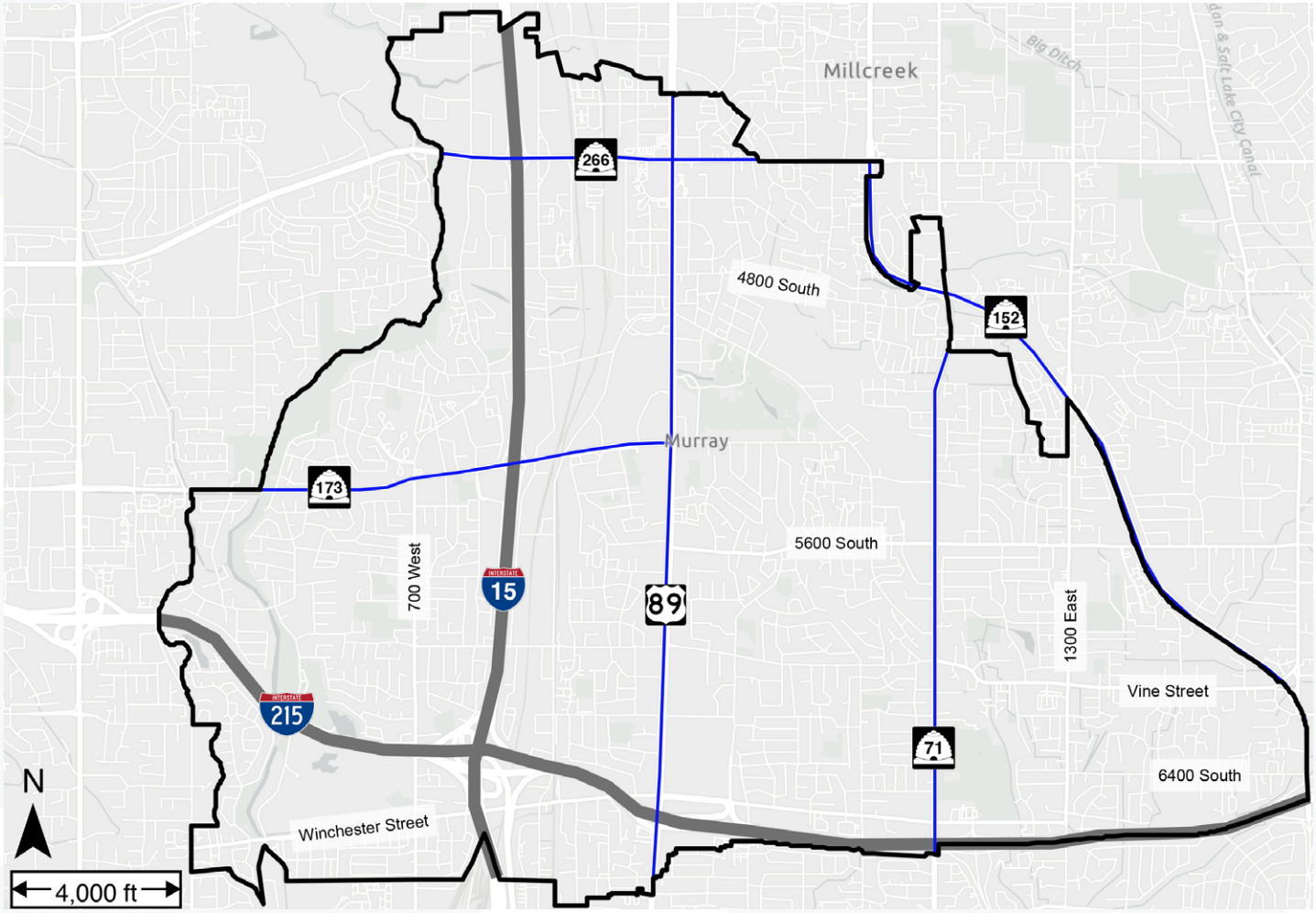
There are roadways within Murray that are not within their jurisdiction and are overseen by other governing bodies such as UDOT. UDOT has jurisdiction over the following roadways in Murray:

- 4500 South (SR-266)
- Van Winkle Expressway (SR-152)
- 5300 South (SR-173)
- 900 East (SR-71)
- State Street (US-89)

These roadways are shown in Figure 4. Murray City cannot install traffic calming on UDOT roads without permission or cooperation from UDOT first. UDOT has its own procedures for installing traffic calming measures as outlined in UDOT Policy 06C-25[1].

Murray City has limited budgets and resources for traffic calming measures. Focusing efforts on roadways within their jurisdiction is the most effective allocation of resources and provides the greatest benefit to their neighborhoods.

FIGURE 4: UDOT Roadways in Murray City (Cooperation with UDOT Required)

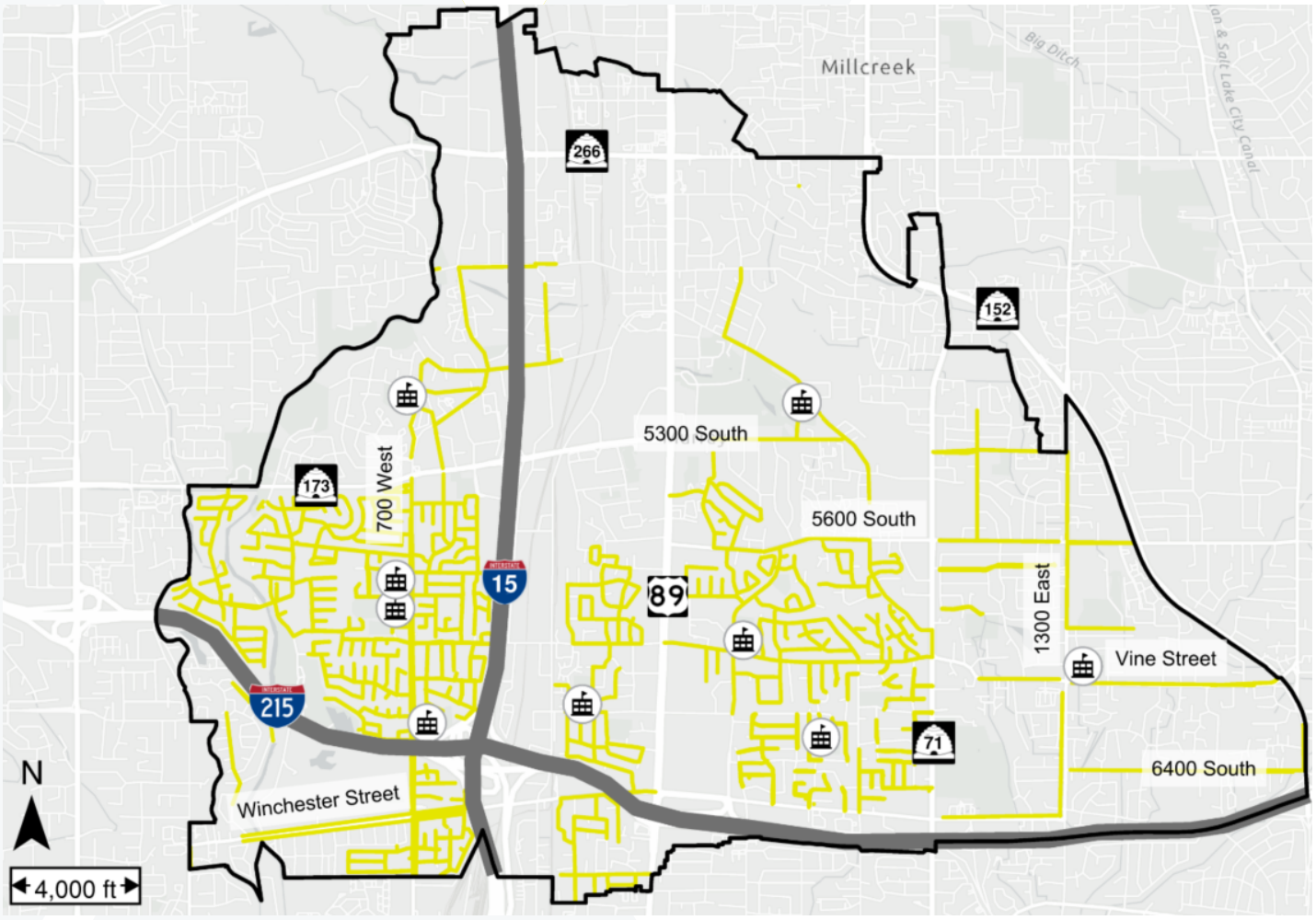


[1] UDOT Policy 06C-25 Establishment of Speed Limits on State Highways, November 2023

Safe Routes to School

A Safe Route to School is a designated route for students to use when walking or biking to school. These designated routes are identified on schools' Safe Routes to School Plans.[2] Roadways that are part of a Safe Route to School Plan are shown in Figure 5. There is a greater need for traffic calming along these roadways as there will be more children walking along these routes when school is in session. Routes along a Safe Routes to School Plan are given additional points when evaluating the need for a traffic calming measure. The evaluation form is included in **Appendix C**.

FIGURE 5: Safe Routes to School in Murray City

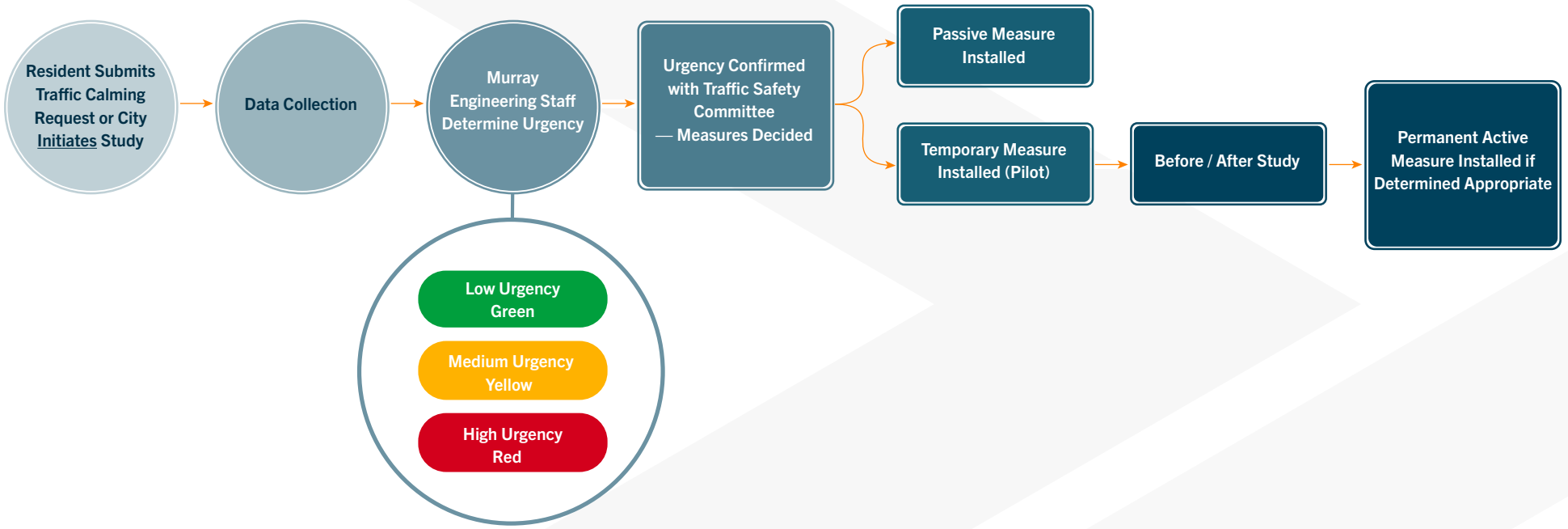


[2] Utah Safe Routes to School https://saferoutes.utah.gov/

IV. TRAFFIC CALMING IMPLEMENTATION PROCESS

The implementation process for traffic calming projects in Murray is outlined in Figure 6. The purpose of this implementation process is to establish a fair, consistent, and data-driven approach for all traffic calming projects. This process is an administrative process for the Murray City staff and the Traffic Safety Committee.

FIGURE 6: Murray City Traffic Calming Implementation Process Flowchart



* Permanent active measures are subject to budget and funding approval

The purpose of this implementation process is to establish a fair, consistent, and data-driven approach for all traffic calming projects

Each step is discussed below.

Application Submittal

Any resident of Murray City may request a traffic calming study on their street of residence. This is done by completing a "Traffic Calming Request" form included in **Appendix B**. The form requires the following information:

- Applicant information
- Study location information
- Description of issue
  - What is the main concern?
  - What time of day is the issue most prominent?
- Names and signatures of at least five other residents who live on the same street
- A $25 fee

Murray City staff may also initiate a traffic calming study at locations they or the Traffic Safety Committee determine necessary locations that have been evaluated within the last two years are not eligible for a new study except in cases of recent crashes or significant changes in development such as a new neighborhood or roadway configuration.

Data Collection

After a study request has been received or initiated, Murray City staff will collect 48 hours of data. This will be collected during the midweek (Tues-Thurs), unless special circumstances require it to be collected on a different day. The following data will be collected:

- **Speed Data**
  - Average speed
  - 85th percentile speed
  - Percent of drivers driving 10 MPH over the posted speed limit
- **Vehicle Counts**
  - Daily traffic volume
- **Crash Data**
  - Previous five years
- **Sight Distance**
  - Stopping sight distance at study location
- **Roadway Context**
  - Bike lanes
  - Crosswalks or trail crossings
  - Bus route
  - Nearby schools or Safe Routes to School Plans
  - Nearby pedestrian generators (public parks, library, etc.)

This data will be used to evaluate the need for traffic calming at the study location.

Project Scoring and Evaluation by Murray City Staff

The collected data will be evaluated by the Murray City staff to determine the need for traffic calming at the study location. This data will be evaluated using the "Project Evaluation" form included in **Appendix C**. This evaluation form allows for a consistent approach for all traffic calming requests. The evaluation form includes a scoring categories for the collected data, with a higher score given for higher recorded speeds and areas with more pedestrian activity.

Low Urgency (Green)

A study location that scores less than 45 points is considered low urgency (green). Traffic calming is not required at this location. Passive measures may be installed if the city engineering staff and Traffic Safety Committee feel it is appropriate.

Medium Urgency (Yellow)

A study location that scores between 45 and 84 points is considered medium urgency (yellow). Passive measures are recommended at this location. Temporary measures may be installed if the city engineering staff and Traffic Safety Committee determine it is appropriate.

High Urgency (Red)

A study location that scores 85 points or higher is considered high urgency (red). Both passive measures and temporary measures are recommended at this location. The temporary measures may eventually be replaced with permanent active measures if deemed appropriate by the city engineering staff and Traffic Safety Committee.

— GREEN —
LOW URGENCY

Projects scoring
under 45 points

Traffic Calming not required, passive measure may be installed.

— YELLOW —
MEDIUM URGENCY

Projects scoring
between 45 and 84 points

Passive measures recommended at this location. Temporary measures may be installed.

— RED —
HIGH URGENCY

Projects scoring
84 or more points

Both passive and temporaary measures recommended at this location. Temporary measures should eventually be replaced with permanent active measures.

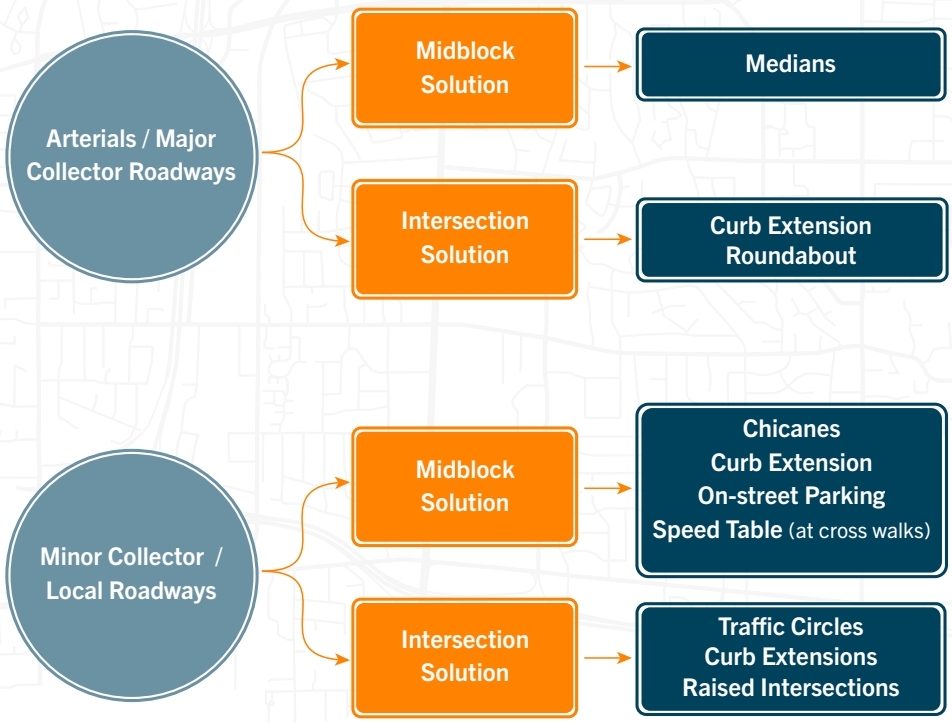
Urgency Confirmed by Traffic Safety Committee and Measures Determined

After the city engineering staff determine an urgency level for the study location, their findings will be presented to the Traffic Safety Committee. The committee can provide additional insights that are not evaluated in the study form and confirm the urgency level of the location. The committee may also discuss possible traffic calming solutions at the study location.

When temporary or active traffic calming solutions are determined appropriate, flowchart presented in Figure 7 can provide guidance on which measure to install based on the roadway classification and proximity to intersections. A roadway classification map of Murray City is presented in Figure 2.

It is important to note that often one single measure will not result in lower speeds. Combining multiple traffic calming measures creates a cumulative effect on speed reduction.

FIGURE 7: Active Traffic Calming Measure Guidance Flowchart



Before/After Study

After the traffic calming measure is installed, resident feedback and traffic data will be collected to determine the effectiveness of the measure and next steps. The after-study data will be collected under the discretion of the Murray City staff. The "Before and After Study" form is included in **Appendix D**. Based on the results of this before and after study, Murray City staff and the Traffic Safety Committee will determine if the temporary measure should be replaced with a permanent active measure.

V. RECOMMENDATIONS FOR INITIAL STUDIES

During the development of this manual in 2024, the following locations within Murray were identified by the City staff as locations where a traffic calming study would be beneficial:

- 725 East
- Bullion Street
- Atwood Boulevard
- Loch Hawkins Drive
- Green Oaks
- 5290 South

These locations can serve as the first locations to implement the process and measures outlined in this Manual. Insights gained from these initial studies can guide further efforts, helping to ensure that Murray City's neighborhoods are safer and more comfortable for all residents.

VI. APPENDICES

Appendix A – Approved Traffic Calming Measures for Murray City

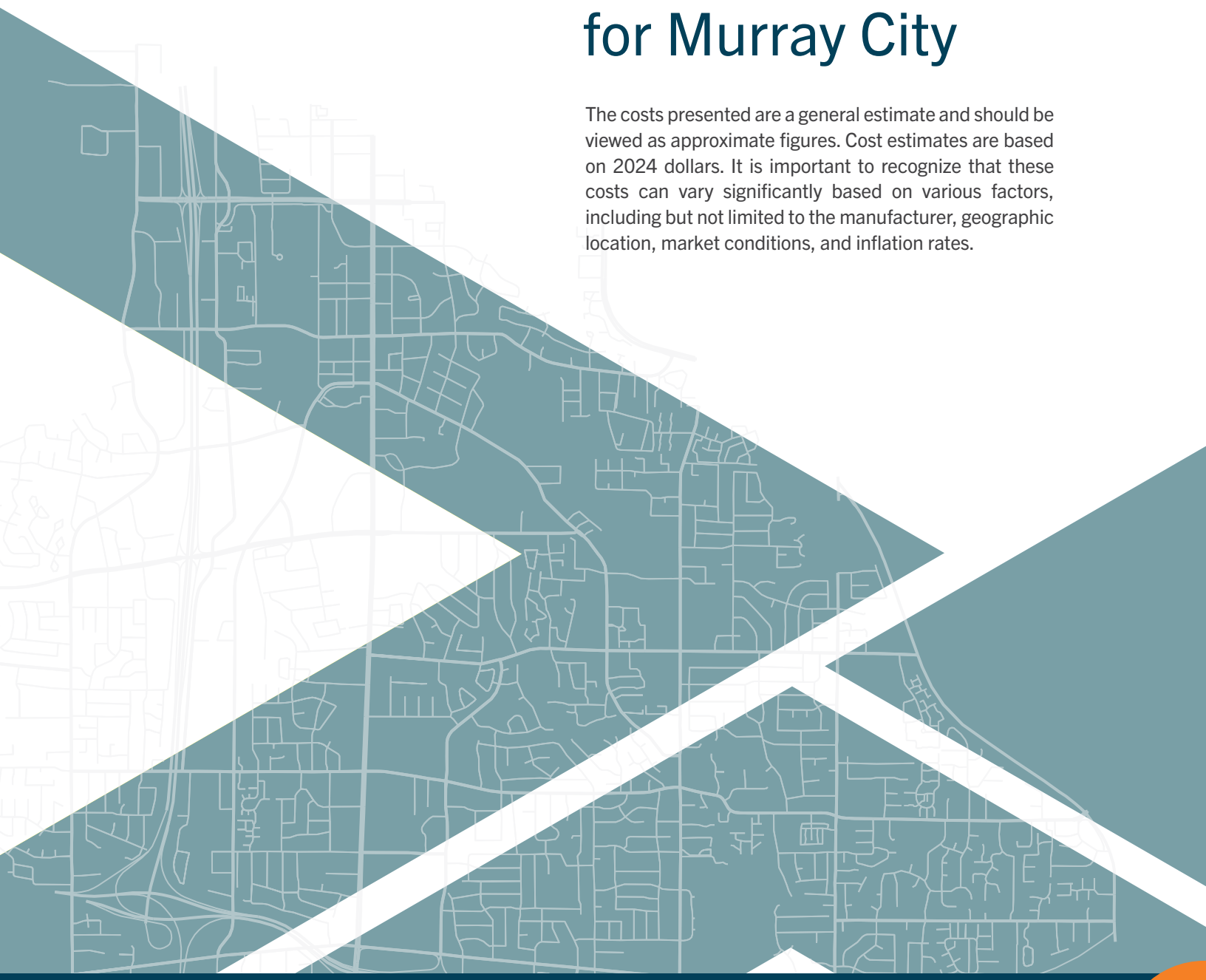
Appendix B – Murray City Traffic Calming Request Form

Appendix C – Murray City Traffic Calming Project Prioritization Form

Appendix D – Traffic Calming Before and After Form

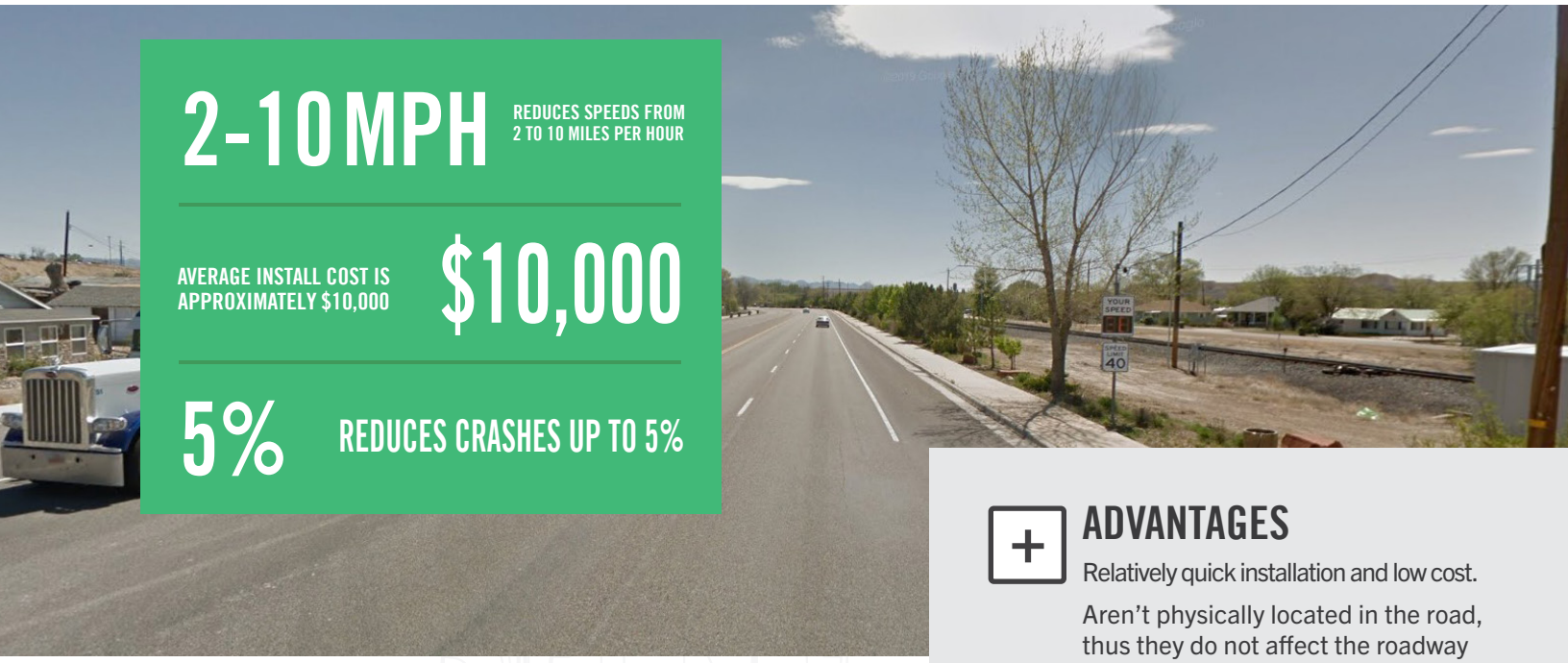
Appendix A — Approved Traffic Calming Measures for Murray City

The costs presented are a general estimate and should be viewed as approximate figures. Cost estimates are based on 2024 dollars. It is important to recognize that these costs can vary significantly based on various factors, including but not limited to the manufacturer, geographic location, market conditions, and inflation rates.



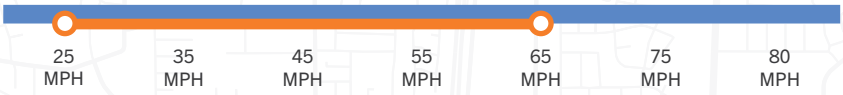
Passive Measures

RADAR SPEED SIGN



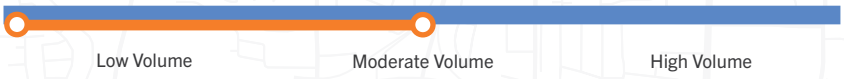
TRAVEL SPEEDS

Radar Speed Signs are appropriate for roadway speeds between 25 and 65 miles per hour.



TRAFFIC VOLUMES

Radar Speed Signs are appropriate for Low to Moderate traffic volumes.



NUMBER OF LANES

Radar Speed Signs are appropriate for 1 to 2 lanes of traffic in each direction.

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Relatively quick installation and low cost.

Aren't physically located in the road, thus they do not affect the roadway surface maintenance, emergency vehicle operations, drainage, etc.

DISADVANTAGES

Overuse could result in a loss of effectiveness.

Passive measure which doesn't require driver to alter behavior, so over time effectiveness could wear off.

TYPICAL LOCATIONS

Collector Roadways

Rapid decrease in posted speed limit.

Where 85th percentile speeds are > 10 MPH above posted speed limit.

EXAMPLE LOCATIONS

700 West

Vine Street

VARIABLE MESSAGE SIGN (VMS)

APPROXIMATELY

$20,000-$35,000

Source: Macgen.co

TRAVEL SPEEDS

Appropriate for all speeds.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Low to moderate volumes

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Appropriate for 1-2 lanes

1 Lane | 2 Lanes | 3 Lanes | 4 Lanes

ADVANTAGES

Can be relocated

Can convey a variety of messages

DISADVANTAGES

Effectiveness can wear off as it is a passive measure

Unclear messages can result in driver distraction

ENFORCEMENT

SPEED REDUCTION DOWNSTREAM OF POLICE VEHICLE

ADVANTAGES

Can be applied on majority of roadways

Can result in compliance of additional traffic laws besides

DISADVANTAGES

Requires police labor hours

Can result in driver frustration or mistrust

EDUCATION

Zero Fatalities
A Goal We Can All Live With

RAISES COMMUNITY AWARENESS AND PRIORITIZES SAFETY

ADVANTAGES

May result in more defensive drivers

Increased awareness of road rules

DISADVANTAGES

Requires driver commitment outside of the vehicle

Most education focuses on younger drivers

ADDITIONAL SPEED LIMIT SIGNS

Source: ksl.com

APPROXIMATELY
$1,000

TRAVEL SPEEDS

Appropriate for all speeds.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Appropriate for all volumes

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Appropriate for 1-2 lanes

1 Lane | 2 Lanes | 3 Lanes | 4 Lanes

ADVANTAGES

Increased driver awareness of speed limit

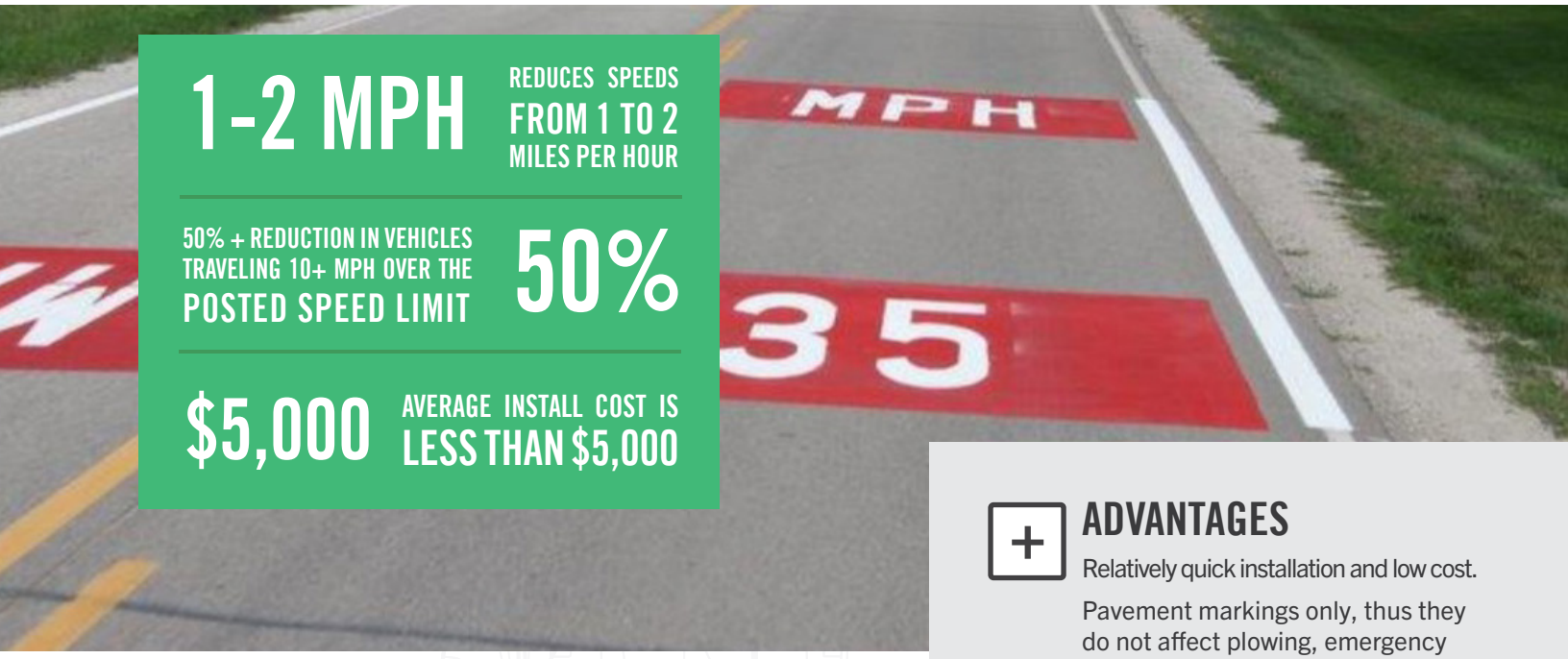
Quick installation

DISADVANTAGES

Effectiveness can wear off as it is a passive measure

Over-saturation of signs can result in drivers ignoring them

PAVEMENT SPEED LIMIT MARKING



1-2 MPH REDUCES SPEEDS FROM 1 TO 2 MILES PER HOUR

50% + REDUCTION IN VEHICLES TRAVELING 10+ MPH OVER THE POSTED SPEED LIMIT **50%**

$5,000 AVERAGE INSTALL COST IS LESS THAN $5,000

TRAVEL SPEEDS

Pavement Speed Limit Markings are appropriate for ALL roadway speeds.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Pavement Speed Limit Markings are appropriate for ALL traffic volumes.

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Pavement Speed Limit Markings are appropriate for ALL lanes of traffic.

1 Lane | 2 Lane | 3 Lane | 4 Lane

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Relatively quick installation and low cost.

Pavement markings only, thus they do not affect plowing, emergency vehicle operations, drainage, etc.

DISADVANTAGES

Passive measure which doesn't require driver to alter behavior, so over time effectiveness could wear off.

In the traveled way, thus wear off over time.

TYPICAL LOCATIONS

Any location where additional emphasis is needed. (curves, entering developed areas, reduction in posted speed limit).

EXAMPLE LOCATIONS

Atwood Boulevard near 4600 South

OPTICAL SPEED BARS

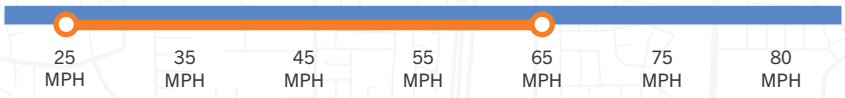
TRANSVERSE MARKINGS WITH REDUCING SPACING TO PROVIDE THE VISUAL ILLUSION OF INCREASING SPEEDS

REDUCES SPEEDS FROM 0 TO 3 MILES PER HOUR **0-3 MPH**

$5,000 AVERAGE INSTALL COST IS LESS THAN $5,000

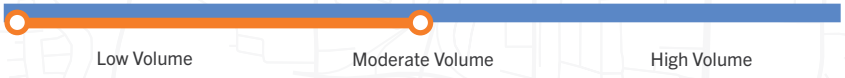
TRAVEL SPEEDS

Optical Speed Bars are appropriate for roadway speeds between 25 and 65 miles per hour.



TRAFFIC VOLUMES

Optical Speed Bars are appropriate for Low to Moderate traffic volumes.



NUMBER OF LANES

Optical Speed Bars are appropriate for 1 to 2 lanes of traffic in each direction.

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Relatively quick installation and low cost.

Pavement markings only, thus they do not affect plowing, emergency vehicle operations, drainage, etc.

DISADVANTAGES

Passive measure which doesn't require driver to alter behavior, so over time effectiveness could wear off.

In the traveled way, thus wear off over time.

TYPICAL LOCATIONS

Curves and entering rural communities.

EXAMPLE LOCATIONS

None within Utah

ROADWAY NARROWING

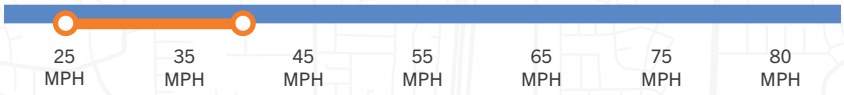
STARTING AT $20,000 PER MILE (STRIPING ONLY)

0-3 MPH MINOR (0 TO 3 MILES PER HOUR) EFFECT ON VEHICLE SPEED WITHOUT OTHER CHANGES

PROVIDES SPACE FOR BIKE LANES OR PARKING

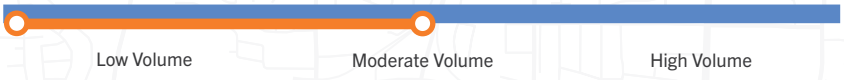
TRAVEL SPEEDS

Roadway Narrowing is appropriate for roadway speeds between 25 and 40 miles per hour.



TRAFFIC VOLUMES

Roadway Narrowing is appropriate for Low to Moderate traffic volumes.



NUMBER OF LANES

Roadway Narrowing is appropriate for 1 to 3 lanes of traffic in each direction.

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Potentially improved bike facilities or increased on-street parking.

Low cost.

DISADVANTAGES

Without other changes has not been shown to drastically vehicle speeds.

TYPICAL LOCATIONS

Combined with other treatments. Where treatments are needed for bicycle activity, high demand for parking, etc. and not just lowering vehicle speeds.

Roadways with wider pavement section than needed.

EXAMPLE LOCATIONS

200 South @ 800 East, SLC

Daybreak Parkway, South Jordan

LANDSCAPING

0-4 MPH REDUCES SPEEDS 0-4 MILES PER HOUR

AVERAGE INSTALIATION COSTS ARE $5,000 TO $10,000 **$5-10,000**

INCREASES SPEED COMPLIANCE

TRAVEL SPEEDS

Landscaping is appropriate for roadway speeds between 25 and 65 miles per hour.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Landscaping is appropriate for LOW to HIGH traffic volumes.

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Landscaping is appropriate for 1 to 4 lanes of traffic in each direction.

1 Lane | 2 Lane | 3 Lane | 4 Lane

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

- Mid-level treatment provides a physical change without rebuilding a road
- Provides continuous narrowing of perceived width
- Improves streetscape aesthetics and reduces heat-island effect
- Works well in conjunction with other treatments

DISADVANTAGES

- Must be designed to avoid creating sight distance triangle obstructions
- Often requires maintenance
- May be challenging in a dry climate

TYPICAL LOCATIONS

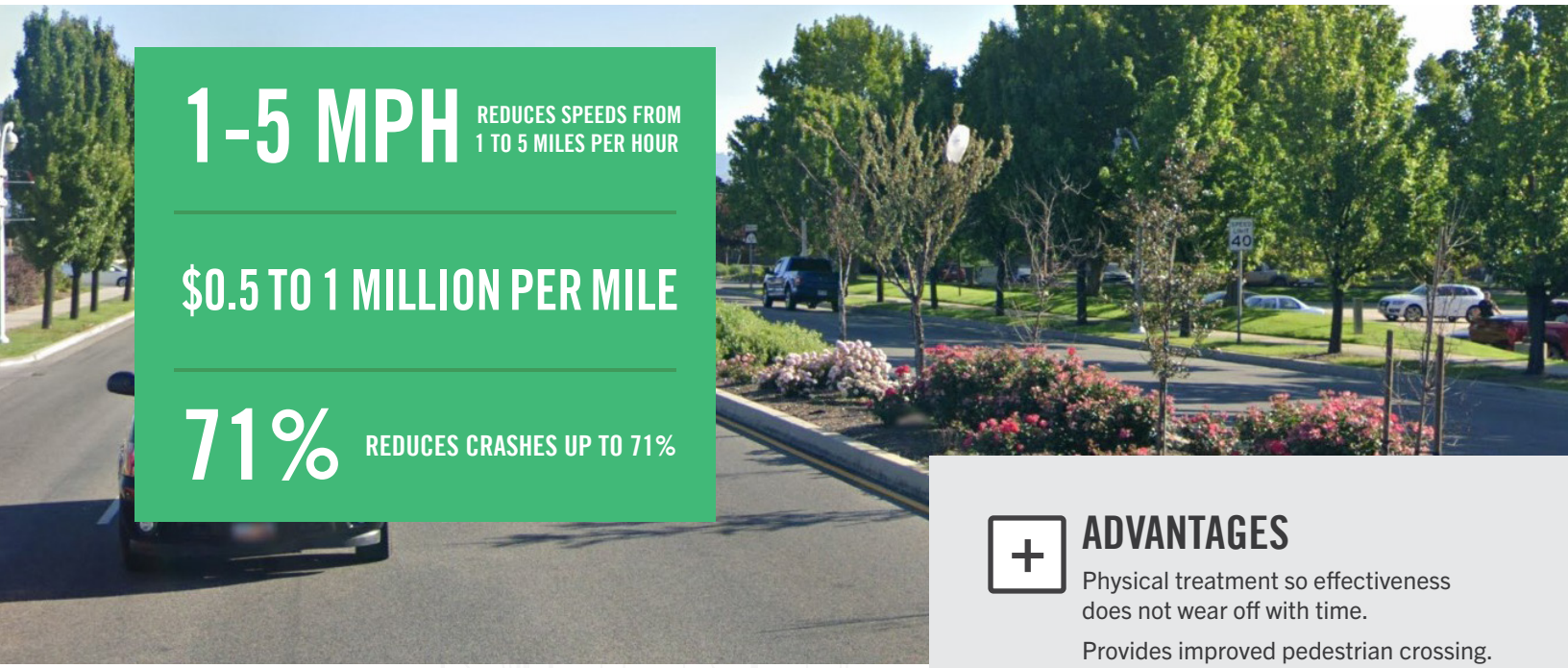
- Along transition zones
- At gateways
- Within developed areas

EXAMPLE LOCATIONS

- St George S.R. 34
- Hurricane S.R. 9
- Brigham City S.R. 13
- Park City S.R. 248
- Farmington S.R.106

Active Measures

MEDIAN ISLAND



1-5 MPH REDUCES SPEEDS FROM 1 TO 5 MILES PER HOUR

$0.5 TO 1 MILLION PER MILE

71% REDUCES CRASHES UP TO 71%

Treatment also includes curb extensions

TRAVEL SPEEDS

Median Islands are appropriate for roadway speeds between 25 and 65 miles per hour.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Median Islands are appropriate for ALL traffic volumes.

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Median Islands are appropriate for All lanes of traffic.

1 Lane | 2 Lane | 3 Lane | 4 Lane

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Physical treatment so effectiveness does not wear off with time.

Provides improved pedestrian crossing.

Landscaped medians improve aesthetics as well as reduce travel speeds.

DISADVANTAGES

Increased maintenance. Could require additional right-of-way.

Back to back curb medians without landscaping have not been shown to reduce travel speeds.

Blocks driveway access and turning

TYPICAL LOCATIONS

Roadways with two-way left-turn lanes and where u-turns, alternate access, or median openings can be accommodated. Existing and potential pedestrian crossing locations.

EXAMPLE LOCATIONS

US-89, downtown Ogden

US-89 @ 50 North, SLC

S.R. 68 @ 5500 South, Taylorsville

S.R. 34, St. George

1300 East, Sandy

US-89 and 5th Avenue, Murray

TRAFFIC CIRCLE

Source: Scott Batson

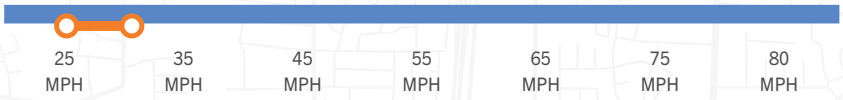
Source: Scott Batson

$13,000-$32,000

APPROXIMATELY 10% SPEED REDUCTION AND A REDUCTION IN CONFLICT POINTS

TRAVEL SPEEDS

25-30 MPH



TRAFFIC VOLUMES

Low to moderate volumes

NUMBER OF LANES

Traffic circles are appropriate at intersections that have a single in each direction

ADVANTAGES

Can be combined with roads that have on street parking

Requires drivers to slow to navigate around measure

DISADVANTAGES

Bicyclists and motorist may share lane due to narrowed roadway

May require additional street lighting

Left turns for larger vehicles can be difficult

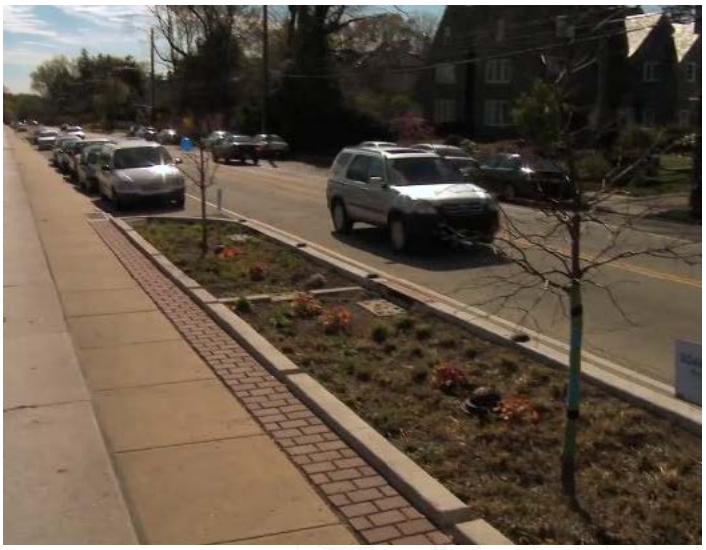
TYPICAL LOCATIONS

Local roadway and minor collector intersections

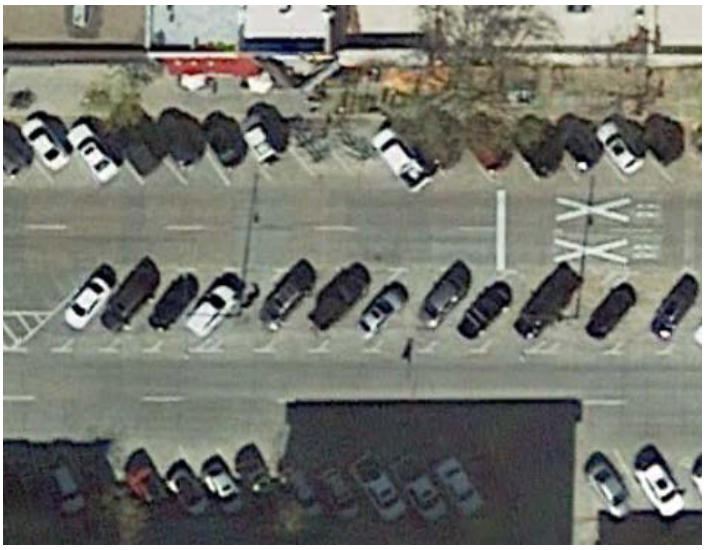
Not used at intersections with a large number of trucks and buses turning left

Source: ITE Traffic Calming Fact Sheets May 2018

ON-STREET PARKING



Source: PennDOT Local Technical Assistance Program



Source: Google Earth, Fort Collins, CO

APPROXIMATELY

$7,500

BUT VARIES GREATLY DEPENDING ON DESIGN AND LENGTH OF APPLICATION

TRAVEL SPEEDS

25 MPH

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Low to moderate volumes

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

1 lane in each direction

1 Lane | 2 Lanes | 3 Lanes | 4 Lanes

Source: ITE Traffic Calming Fact Sheets May 2018

ADVANTAGES

Creates a buffer between vehicles and pedestrians

DISADVANTAGES

Can be blocked by snow during snow removal

Can limit sight distance

TYPICAL LOCATIONS

Along bus transit routes

Urban or suburban settings

EXAMPLE LOCATIONS

Provo, Center Street

CHICANE

REDUCTION OF UP TO 5 MPH

$10,000-$32,000

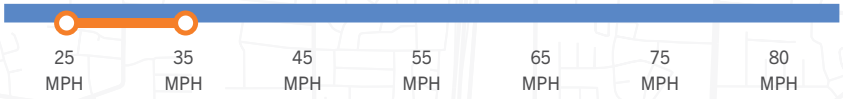
APPROXIMATELY 10% SPEED REDUCTION

Source: summitcountyutah.gov

Source: summitcountyutah.gov

TRAVEL SPEEDS

25 - 35 MPH



TRAFFIC VOLUMES

Low to moderate volumes

NUMBER OF LANES

1 lane in each direction

ADVANTAGES

Forces drivers to slow down to navigate measure

DISADVANTAGES

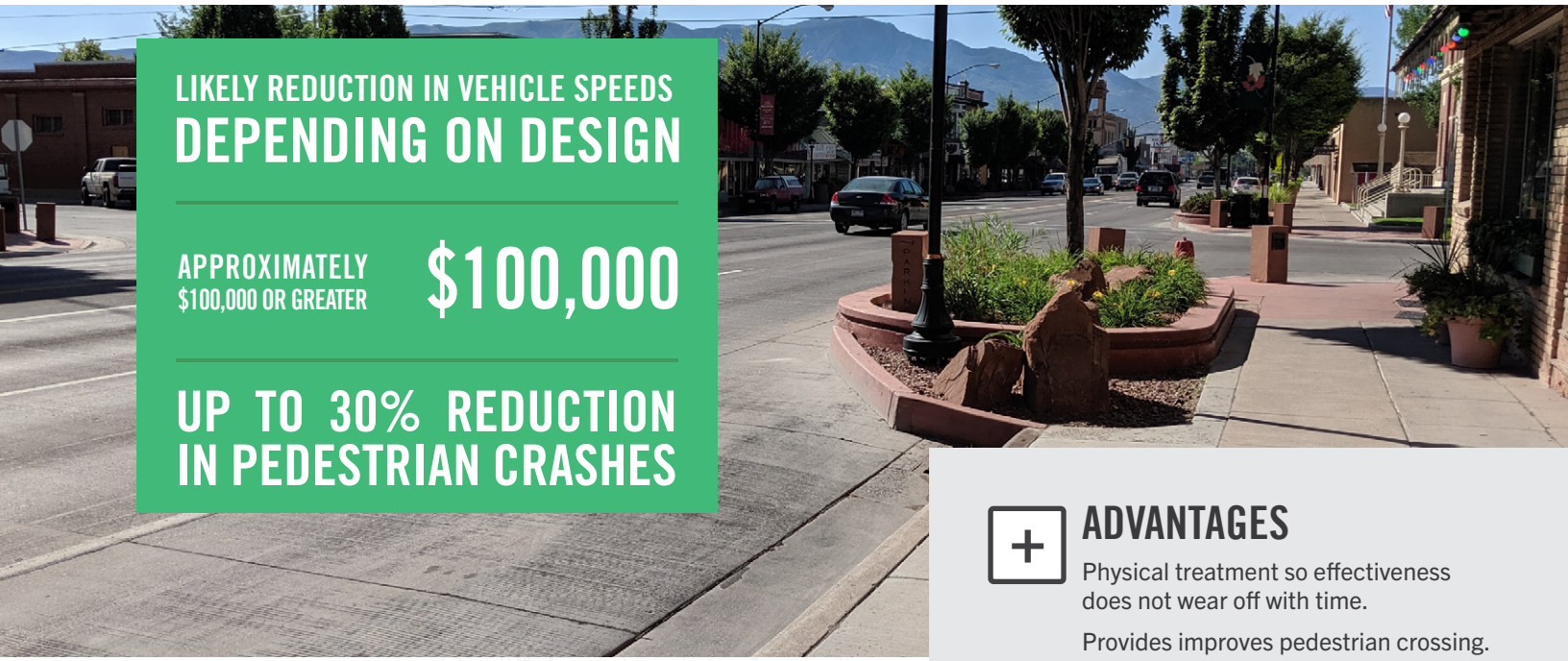
Impacts street sweepers

TYPICAL LOCATIONS

Midblock locations on minor collectors and local roadways

Source: ITE Traffic Calming Fact Sheets May 2018

CURB EXTENSIONS



LIKELY REDUCTION IN VEHICLE SPEEDS
DEPENDING ON DESIGN

APPROXIMATELY $100,000 OR GREATER
$100,000

UP TO 30% REDUCTION IN PEDESTRIAN CRASHES

TRAVEL SPEEDS

Curb Extensions are appropriate for roadway speeds between 25 and 40 miles per hour.

25 MPH | 35 MPH | 45 MPH | 55 MPH | 65 MPH | 75 MPH | 80 MPH

TRAFFIC VOLUMES

Curb Extensions are appropriate for Low to Moderate traffic volumes.

Low Volume | Moderate Volume | High Volume

NUMBER OF LANES

Curb Extensions are appropriate for 1 to 2 lanes of traffic in each direction.

1 Lane | 2 Lane | 3 Lane | 4 Lane

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Physical treatment so effectiveness does not wear off with time.

Provides improves pedestrian crossing.

DISADVANTAGES

Increased maintenance. Could interfere with large vehicle movements.

TYPICAL LOCATIONS

Corridors with on-street parking. Intersections with pedestrian activity and a small number of turning heavy vehicles.

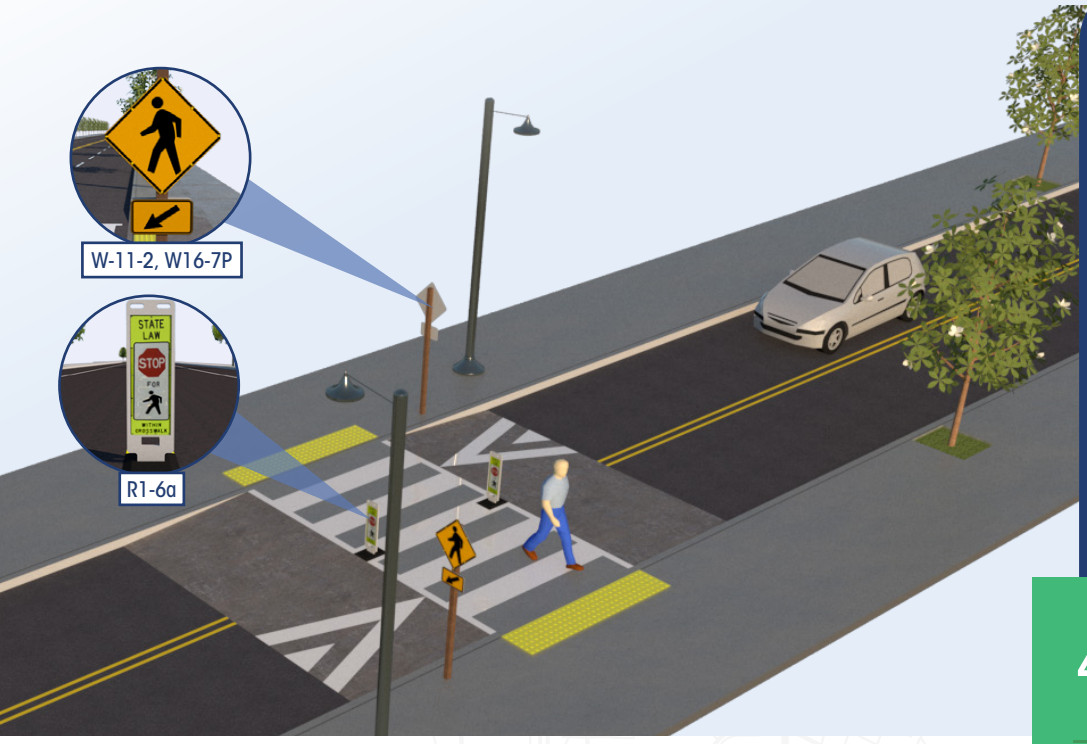
EXAMPLE LOCATIONS

US-89, downtown Ogden
US-89 & 500 N, SLC
US-40, downtown Ogden
S.R. 120, Richfield
US-89, Gunnison
S.R. 12, Triopic

RAISED CROSSWALK

Safe Transportation For Every Pedestrian

A Counter Measure Tech Sheet



Local and collector roads with high speeds pose a significant challenge for pedestrians crossing the roadway.

A raised crosswalk can reduce vehicle speeds and enhance the pedestrian crossing environment.

45% REDUCES PEDESTRIAN CRASHES BY 45%

AVERAGE INSTALLATION COSTS FROM
$8,000 - $32,000

Raised crosswalks are ramped speed tables spanning the entire width of the roadway, often placed at midblock crossing locations. The crosswalk is demarcated with paint and/or special paving materials. These crosswalks act as traffic-calming measures that allow the pedestrian to cross at grade with the sidewalk.

In addition to their use on local and collector streets, raised crosswalks can be installed in campus settings, shopping centers, and pick-up/drop-off zones (e.g., airports, schools, transit centers).

Raised crosswalks are flush with the height of the sidewalk. The crosswalk table is typically at least 10 feet wide and designed to allow the front and rear wheels of a passenger vehicle to be on top of the table at the same time. Detectable warnings (truncated domes) and curb ramps are installed at the street edge for pedestrians with impaired vision.

FEATURES:

- Elevated crossing makes the pedestrian more prominent in the driver's field of vision, and allows pedestrians to cross at grade with the sidewalk
- Approach ramps may reduce vehicle speeds and improve motorist yielding

OFTEN USED WITH:

- Crosswalk visibility enhancements

Source: FHWA Raised Crosswalk Tech Sheet June 2018

Boston, MA. Photo: Peter Furth / nacto.org

CONSIDERATIONS

Raised crosswalks are typically installed on 2-lane or 3-lane roads with speed limits of 30 mph or less and annual average daily traffic (AADT) below about 9,000. Raised crossings should generally be avoided on truck routes, emergency routes, and arterial streets.

Drainage can be an issue. Raised crosswalks may be installed with curb extensions where parking exists. They may also be used at intersections, particularly at the entrance of the minor street.

Since this countermeasure can cause discomfort and noise (especially with larger vehicles), it may be appropriate to get public buy-in. Raised crosswalks may not be appropriate for bus transit routes or primary emergency vehicle routes. For States that experience regular snowfall, snowplowing can be a concern.

COST

The cost associated with a raised crosswalk ranges from $7,110 to $30,880 each, with the average cost estimated at $8,170.

References

Federal Highway Administration. (2013). "Raised Pedestrian Crossings" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=7

Thomas, L., Thirsk, N. J., & Zegeer, C. (2016). NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways. Transportation Research Board, Washington D.C.

Bushell, M., Poole, B., Zegeer, C., & Rodriguez, D. (2013). Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public. Pedestrian and Bicycle Information Center.

Elvik, R., Christensen, P., and Amundsen, A. (2004). "Speed and Road Accidents An Evaluation of the Power Model." Transportokonomisk Institutt, Oslo, Norway.

Source: https://www.fhwa.dot.gov/innovation/everydaycounts/edc-4.cfm

ROUNDABOUT

SIGNIFICANT SPEED REDUCTIONS

AVERAGE INSTALL COST OF 1-3 MILLION

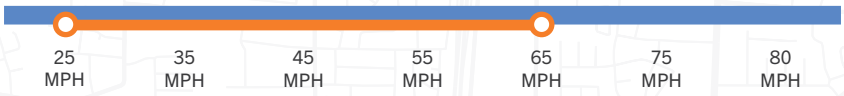
$1-3 MILLION

88%

REDUCE FATAL AND SERIOUS INJURY CRASHES BY UP TO 88%

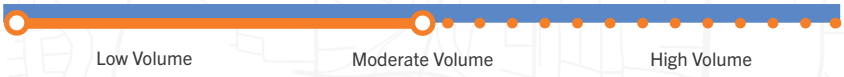
TRAVEL SPEEDS

Roundabouts are appropriate for roadway speeds between 25 and 65 miles per hour.



TRAFFIC VOLUMES

Roundabouts are appropriate for Low to Moderate traffic volumes.
**High volume roadways may be possible with additional review / design.*



NUMBER OF LANES

Roundabouts are appropriate for 1 to 2 lanes of traffic in each direction.
**3 lane roadways may be possible with additional review / design.*

Source: UDOT Speed Info Management Sheets, March 2022

ADVANTAGES

Alters vehicle path thus necessitates major reductions in speed.

Major safety improvements.

Can handle a wide range of mainline and turning traffic.

Pedestrian safety improved due to lower speeds.

DISADVANTAGES

Relatively expensive. May require additional right-of-way.

TYPICAL LOCATIONS

Intersections with available right-of-way. Where speeds, safety, and congestion are all concerns.

EXAMPLE LOCATIONS

I-80 interchange, Jeremy Ranch Park City

S.R.63, Oljato-Monument Valley

S.R. 12 & S.R. 63, Bryce Canyon

S.R. 130, Enoch

PEDESTRIAN REFUGE ISLAND

Safe Transportation For Every Pedestrian

A Counter Measure Tech Sheet

The combination of a long crossing distance and multiple lanes of oncoming traffic can create an unsafe pedestrian environment.

A pedestrian refuge island can improve safety and comfort by providing pedestrians with the option of waiting in the median area before beginning the next stage of the crossing.

32% REDUCES PEDESTRIAN CRASHES BY 32%

AVERAGE INSTALLATION COSTS FROM
$5,000 - $45,000

A pedestrian refuge island is a median with a refuge area that is intended to help protect pedestrians who are crossing a multilane road. This countermeasure is sometimes referred to as a crossing island, refuge island, or pedestrian island. The presence of a pedestrian refuge island at a midblock location or intersection allows pedestrians to focus on one direction of traffic at a time as they cross, and gives them a place to wait for an adequate gap in oncoming traffic before finishing the second phase of a crossing.

Refuge islands are highly desirable for midblock pedestrian crossings on roads with four or more travel lanes, especially where speed limits are 35 mph or greater and/or where annual average daily traffic (AADT) is 9,000 or higher. They are also a candidate treatment option for uncontrolled pedestrian crossings on 3-lane or 2-lane roads that have high vehicle speeds or volumes. When installed at a midblock crossing, the island should be supplemented with a marked high-visibility crosswalk.

FEATURES:

- Median can enhance visibility of the crossing and reduce speed of approaching vehicles.
- Refuge area provides a place to rest and reduces the amount of time a pedestrian is in the roadway

OFTEN USED WITH:

- Crosswalk visibility enhancements
- Curb extensions (where road width allows)

Source: FHWA Raised Crosswalk Tech Sheet June 2018

Asheville, NC. Photo: Lyubov Zuyeva, pedbikeimages.org

CONSIDERATIONS

The design must accommodate pedestrians with disabilities. Islands should be at least 4 feet wide (preferably 8 feet) and of adequate length to allow the anticipated number of pedestrians to stand and wait for gaps in traffic before crossing. The cut-through must include detectable warnings if island width is at least 6 feet.

Islands should be illuminated or highlighted with street lights, signs, and/or reflectors to ensure that they are visible to motorists. They can be constructed so that crossing pedestrians are directed to the right, so they can more easily view oncoming traffic after they are halfway through the crossing. If applicable, evaluate the impact of the island on bicycle facility design.

COST

The cost of a median island depends on its size and construction materials. The costs range from $2,140 to $41,170 per island, depending on the length of the island, with an average cost of $13,520. The average cost per square foot is approximately $10. Costs will be higher for concrete islands versus asphalt islands, though the lifespan of concrete is longer compared to the lifespan of asphalt. Cost reductions may be realized if the refuge island can be incorporated into planned roadway improvements or utility work.

References

Zegeer, C., R. Srinivasan, B. Lan, D. Carter, S. Smith, C. Sundstrom, N.J. Thirsk, J. Zegeer, C. Lyon, E. Ferguson, and R. Van Houten. (2017). NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.

Federal Highway Administration. (2013). "Crossing Islands" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. Available: http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=6

Federal Highway Administration. "Medians and Pedestrian Crossing Islands in Urban and Suburban Areas." Proven Safety Countermeasures. Available: https://safety.fhwa.dot.gov/provencountermeasures/fhwa_sa_12_011.cfm

Bushell, M., Poole, B., Zegeer, C., & Rodriguez, D. (2013). Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public. Pedestrian and Bicycle Information Center.

Source: FHWA Crosswalk Visibility Enhancements Tech Sheet June 2018
https://www.fhwa.dot.gov/innovation/everydaycounts/edc-4.cfm

Appendix B — Murray City Traffic Calming Request Form

MURRAY CITY TRAFFIC CALMING REQUEST FORM

APPLICANT INFORMATION

Applicant Name: _____

Applicant Address: _____

Applicant Phone Number: _____

Applicant Email: _____

STUDY LOCATION INFORMATION

Street Name: _____

Beginning address or cross street: _____

Ending address or cross street: _____

Locations that have been evaluated less than 2 years ago are not viable for consideration **UNLESS** a recent crash has happened, or development has changed (new neighborhood, roadway lane configuration, change in speed limit).

DESCRIPTION OF ISSUE

What is the concern at this location? When is the issue the worst (dates, times)? Is this a speed, pedestrian safety, or volume concern?

SUPPORTING SIGNATURES

Supporting signatures must be residents on the same street as the request for traffic calming. Only one signature is allowed per property owner.

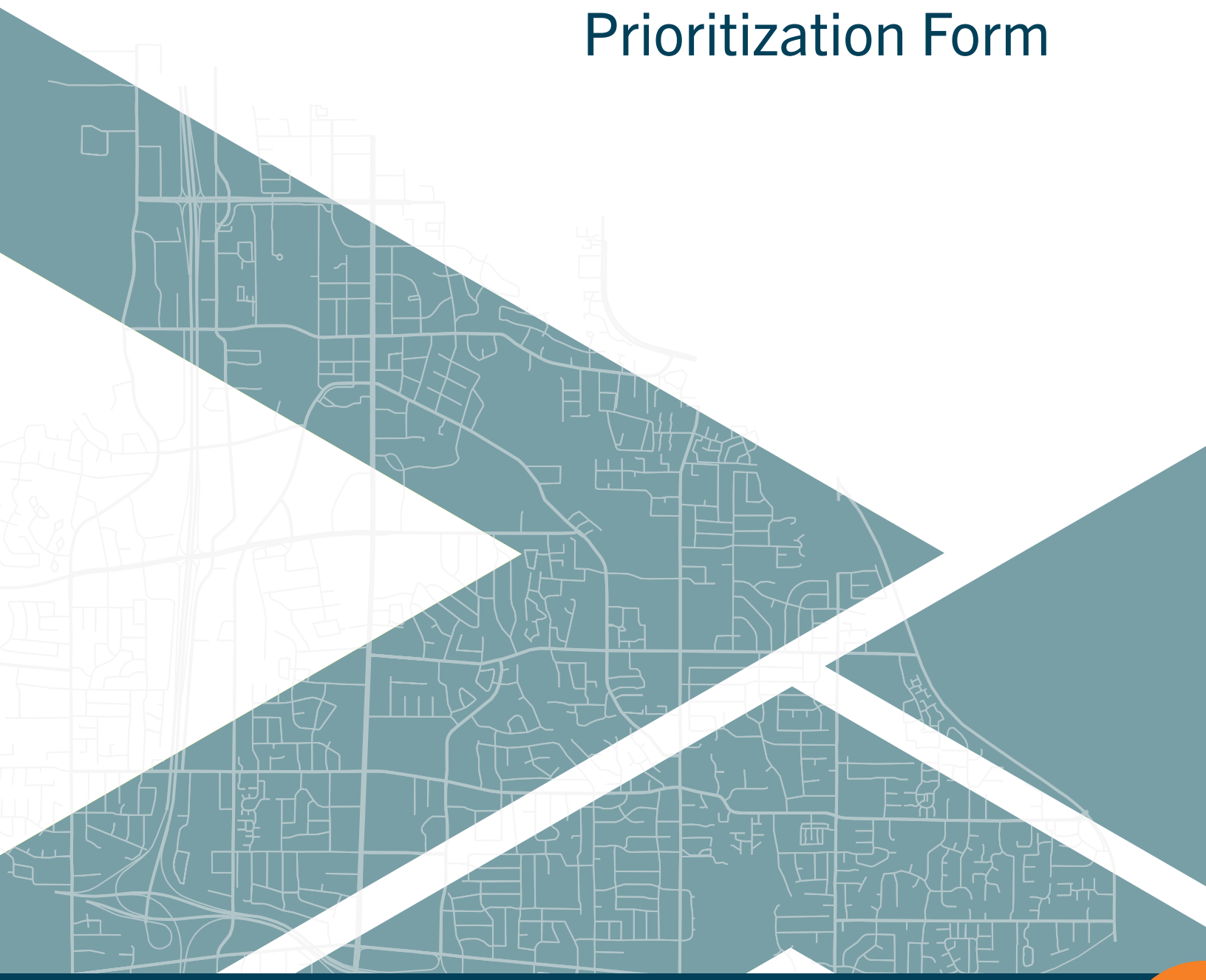
	Name	Address	Signature	Phone Number	Email
1)					
2)					
3)					
4)					
5)					

FEE

The required application fee is $25.

Please attach any relevant documents or photographs to this request form.

Appendix C — Murray City Traffic Calming Project Prioritization Form



MURRAY CITY TRAFFIC CALMING EVALUATION FORM

PROJECT INFORMATION

Project Location: _____ Project Number: _____

Date of Evaluation: _____

Date(s) of Data Collection: _____

HISTORY

Locations that have been evaluated less than 2 years ago are not viable for consideration **UNLESS** a recent crash has happened, or development has changed (new neighborhood, roadway lane configuration, change in speed limit).

Date of Previous Evaluation (if applicable): _____

AVERAGE SPEED

Posted Speed Limit: _____

Recorded Average Speed: _____

Average speed equal to or less than the speed limit?	0 points
Average speed less than 5 mph over the speed limit?	5 points
Average speed 5-10 mph over the speed limit?	10 points
Average speed 11+ mph over the speed limit?	15 points

Points from Average Speed: _____

85TH PERCENTILE SPEED

Posted Speed Limit: _____

Recorded 85th Percentile Speed: _____

85th percentile speed less than 5 mph over the speed limit?	0 points
85th percentile speed 5-10 mph over the speed limit?	5 points
85th percentile speed 11-15 mph over the speed limit?	10 points
85th percentile speed 16+ mph over the speed limit?	15 points

Points from 85th percentile speed: _____

PERCENT DRIVERS 10 MPH OVER LIMIT

Posted Speed Limit: _____

Percent of drivers that are 10 mph over posted speed limit: _____

Less than 10% drivers 10 mph over speed limit?	0 points
10%-15% drivers 10 mph over speed limit?	5 points
16%-20% drivers 10 mph over speed limit?	10 points
20% or more drivers 10 mph over speed limit?	15 points

Points from percent speeders: _____

If any of the above factors receive a score of 15 points individually, then traffic calming should be considered at this location.

DAILY TRAFIFC VOLUMES

Two directional daily vehicle volume: _____

Less than 500 vehicles	0 points
Between 500 and 749 vehicles	5 points
Between 750 and 999 vehicles	10 points
Between 999 and 1,249 vehicles	15 points
Greater than 1,250 vehicles	20 points

Points from Volume: _____

STOPPING SIGHT DISTANCE

85th Percentile speed: _____

Required stopping sight distance for 85th Percentile speed: _____

Availlable Sight Distance: _____

Adequate stopping sight distance?	0 points
Inadequate stopping sight distance?	15 points

Points from stopping sight distance: _____

CRASH HISTORY (5-YEAR PERIOD)

If more than 1 of the following applies, choose the value with the most points.

Number of Crashes: _____

Are there any speed related crashes?	15 points
Are there any severe (fatal/suspected serious injury) crashes?	30 points
Do any of the crashes involve ped/bike?	30 points

Points from crash history: _____

ROADWAY CONTEXT

Shared Roadway

If more than 1 of the following applies, choose the value with the most points.

Bus route	10 points
Bike lanes	15 points
Pedestrian crossing	15 points
Trail crossing	20 points
School crossing	25 points

Points from Shared Roadway: _____

Schools

If more than 1 of the following applies, choose the value with the most points.

School within 1/2 Mile of Study Location	
Elementary (or is this location on a Safe Routes to School Plan?)	20 points
Middle School	15 points
High school	10 points

Points from Schools: _____

Pedestrian Generator

Pedestrian generator includes facilities with high pedestrian volumes (public park, library, etc.)

Pedestrian generator within ¼ mile	15 points

Points from Pedestrian Generator: _____

ADDITIONAL INSIGHTS FROM THE TRAFFIC SAFETY COMMITTEE

_____

_____

Total Points _____

If the average speed, 85th Percentile speed or percentage of drivers 10 mph over speed limit reaches 15 points independently, traffic calming should be considered at this location.

— GREEN —
LOW URGENCY
Projects scoring
under 45 points
Traffic Calming not required, passive measure may be installed.

— YELLOW —
MEDIUM URGENCY
Projects scoring
between 45 and 84 points
Passive measures recommended at this location. Temporary measures may be installed.

— RED —
HIGH URGENCY
Projects scoring
84 or more points
Both passive and temporaary measures recommended at this location. Temporary measures should eventually be replaced with permanent active measures.

Appendix D — Traffic Calming Before and After Form

MURRAY CITY TRAFFIC CALMING BEFORE / AFTER EVALUATION FORM

PROJECT INFORMATION

Project Location: _____ Project Number: _____

Date(s) of Original Data collection: _____

Date(s) of Original Evaluation: _____

Date(s) of After Data Collection: _____

Date(s) of After Evaluation: _____

AVERAGE SPEED

Average speed before traffic calming measure	Average speed after traffic calming measure	Difference

85TH PERCENTILE SPEED

85th percentile speed before traffic calming measure	85th percentile speed after traffic calming measure	Difference

PERCENT DRIVERS 10 MPH OVER LIMIT

Percent drivers 10 mph over limit before traffic calming measure	Percent drivers 10 mph over limit after traffic calming measure	Difference

DAILY TRAFFIC VOLUMES

Two directional daily volume before traffic calming measure	Two directional daily volume after traffic calming measure	Difference

CRASHES

Number of crashes that have occurred since traffic calming measure: _____

RESIDENT FEEDBACK

Resident response to the traffic calming measure: _____

November 2024

ADDITIONAL CONSIDERATIONS FROM THE TRAFFIC SAFETY COMMITTEE:

NEXT STEPS: