



# Guide to Improving Street Safety

As prepared by the following:

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## MAINTENANCE CONCERNS?

*You do not need to go through the petition process.* Contact the Department of Public Works (DPW) at 703-255-6380 or [dpw@viennava.gov](mailto:dpw@viennava.gov) to report the problem. (Examples: Pothole, trip hazard, crack in sidewalk, repair to existing road striping, concern with existing traffic signal or signage). You can also use the Town's web portal or mobile app: [www.viennava.gov/engagement-central/make-a-service-request](http://www.viennava.gov/engagement-central/make-a-service-request). DPW will assess and address the problem or provide next steps for resolution.

Street light problems should be reported online to Dominion Energy Virginia:  
[www.dominionenergy.com/virginia/report-outage-or-emergency](http://www.dominionenergy.com/virginia/report-outage-or-emergency)



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## Scope and Objectives

The Town of Vienna seeks to be a safe, vibrant, and environmentally conscious community with small town character, strong neighborhoods, and distinguished businesses and services. Its goals include providing for efficient and reliable movement for all transportation modes; and maximizing safety and dependability ([Town of Vienna Comprehensive Plan 2015](#)).

The [Citizen's Guide to Traffic Calming](#) was first prepared by the Transportation Safety Commission (TSC) in January 2002 and then revised in April 2011. This Town of Vienna [Guide to Improving Street Safety](#) (referred to hereafter as "[Street Safety Guide](#)") replaces the April 2011 document.

This guide aims to help you understand the process involved in implementing measures to improve street safety. Improving street safety is defined as improving the safety of all forms of transportation available in the Town (e.g., vehicular, pedestrian, bike, etc.). All forms of transportation need to be addressed when reviewing safety concerns.

Three categories of street safety mitigations are used for this guide: Traffic Calming (vehicular), Traffic Controls (vehicular/bike), and Pedestrian Safety Improvements. This guide defines, describes, and provides examples for each of the street safety mitigation categories. Once a safety concern is identified and the petition is submitted, the TSC along with DPW will analyze the potential safety concern, determine if the street safety concern can be mitigated, and if so, recommend appropriate action.

Proactive measures DPW can take regarding street safety include pavement maintenance, pavement marking maintenance, tripping hazards (sidewalks), signage and vegetation removal/clearing. If the safety concern requires public input or a study, then DPW will ask you to fill out a petition with your neighbors and to go to the TSC. The goal is to address safety concerns with an area-wide approach to ensure that problems take the entire community into account and do not simply shift to adjacent local streets and parallel roads.

The Vienna Police Department (VPD) plays an integral role in enforcing traffic laws and maintaining the safety of our pedestrians, bicyclists and drivers. As you consider whether to create a petition to address a street safety issue in your neighborhood, you should also raise any concern about traffic law violations, enforcement and other safety issues with the VPD. The Department routinely patrols Town streets to enforce street safety (e.g., mitigate speeding, ticket those failing to stop at stop signs, etc.) and welcomes resident feedback as to where officers are needed for such enforcement. VPD non-emergency number is 703-255-6366. For your reference, we have included the Virginia law pertaining to a pedestrian's right-of-way in Appendix G.

### ACRONYMS

DPW:	Department of Public Works
DPZ:	Department of Planning and Zoning
VPD:	Vienna Police Department
TSC:	Vienna Transportation Safety Commission
FHWA:	Federal Highway Administration
ITE:	Institute of Transportation Engineers
MUTCD:	Manual on Uniform Traffic Control Devices
VDOT:	Virginia Department of Transportation

Achieving appropriate safety measures requires fostering collaborative working relationships among Town residents and businesses, Town staff, neighborhood and school organizations, and Town-appointed commissions and committees with the following objectives:

- A.** Enhance the quality of life and resident safety by improving street conditions throughout the Town of Vienna, to include:
  - Reducing speeds of automobiles in excess of the speed limit within residential areas.
  - Increasing pedestrian, bicycle and motorist safety.
  - Improving road design, signage, striping and pedestrian/bicycle passageways.
  - Improving effective traffic-calming measures and devices that consider current best practices and community needs.
- B.** Provide a process that will help the Town address concerns regarding traffic management and street safety in an objective, consistent manner to include:
  - Providing citizens appropriate methods by which street safety problems and concerns can be reported.
  - Encouraging resident involvement in assessing and solving neighborhood street safety problems.
  - Making efficient use of Town resources in responding to transportation management and safety issues.
- C.** Address limitations of traffic-related law enforcement by:
  - Encouraging voluntary compliance with speed limits and other traffic control regulations.
  - Informing and educating citizens of the benefits of proven street safety measures.

Petitioners should keep in mind that any desired action may be subject to approval by Town of Vienna officials and resource constraints.

## Section 1 - Petition Process to Address Street Safety<sup>1</sup>

Every situation is unique. You are encouraged to identify and communicate street safety concerns with the Town. Town staff will work with you to evaluate the issue and partner with residents on the best solution. The process allows you and Town staff to share information and collaborate to resolve street safety concerns.

### ESTIMATED PETITION TIMELINE

**Three months:** It can take up to three months to initiate petitions for traffic control measures, traffic calming measures, or new sidewalks, and requesting a TSC hearing. The timing of a hearing depends on the TSC agenda. The TSC meets monthly, excluding August and December.

**Two months added:** It can take an additional two months to analyze requests and conduct related studies (speed studies are conducted during the school year) plus any additional TSC action.

**One month added:** Town Council will review the TSC memo and if motion for action was passed, the Town manager will add agenda item for next possible Town Council meeting to review and vote on recommendation(s). Note: status of petitions will be regularly posted and updated on the Town website and petitioner(s) will be notified by staff when updates occur.

**Six months added:** Implementation of traffic calming, traffic control measures, or sidewalk requests that are approved depends on potential funding sources and related projects. Some approved sidewalk requests could take much longer to fulfill due to related infrastructure, for example, relocating water and electrical utility lines.

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<sup>1</sup> *Note:* Beginning at the date the TSC provides an official motion for improvement(s) or decides to make no motion (does not recommend improvements), petitions cannot be resubmitted until a three-year time limit expires. However, an exception to the time limit will be granted if conditional along the street segment have changed (ex: new development) or for petitions that were submitted prior to publication of this document.

## Step 1 – Identify street safety concern(s) and contact DPW to determine petition eligibility.

**1A** – Any resident can start the process. Residents and businesses should work with neighbors, civic associations, and other business and school groups to identify traffic and pedestrian safety concerns. Once issues have been identified and discussed, residents and businesses should inform DPW staff of their street safety concerns.

**1B** - Arterial roads such as Maple Avenue and Nutley Street require special consideration and should be discussed with Town staff and council on how to proceed.

**1C** – Following an initial discussion with concerned residents and businesses, DPW will examine the issues raised to determine whether a petition is needed. Some safety issues can be addressed without a petition. For example, pavement markings and minor pavement repairs can be resolved without a petition. Vegetation clearing, sign removals and sign additions also can be handled without a petition. Some matters will not be eligible for either a petition or a work order. For example, a matter may be subject to the three-year time limit on resubmitting petitions (see footnote on page 8 for more details) or DPW might already have work planned or scheduled for the street segment in question.

In general, sidewalk, traffic calming, traffic control and crosswalk requests require a petition with few exceptions. In addition, the *Town of Vienna Pedestrian Master Plan* provides guidelines for the Town to take proactive measures to improve pedestrian and bicycle safety, particularly in construction and redevelopment areas.

The Town of Vienna adheres to the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), a Federal Highway Administration (FHWA) guide used by federal, state and local agencies to ensure that traffic control devices are designed, installed and applied consistently across the United States. DPW will thoughtfully consider concerns and analyze them using the *MUTCD*, the *Virginia Supplement to the MUTCD*, and industry standards. DPW will consider factors such as pedestrian generators, bicycle use, traffic counts, roadway design (width and sight distance), existing and future projects, and other relevant information. If after reviewing the information DPW determines that the street safety concern can be addressed through a work order, it will place a work order to have the request prioritized and completed pending funding crew/contractor availability. Once this is done, a work order will be implemented and later evaluated for effectiveness.

### PETITION ELIGIBILITY REQUIREMENTS

#### Traffic Calming:

Two Lane Road

Speed limit: 25 mph

Collector or local road

No petition within past 3 years

#### Maple Avenue and Nutley Street, SW

Contact DPW directly

#### New Sidewalk or Crosswalk:

No existing sidewalk

No petition within the past 3 years

### **QUESTIONS TO CONSIDER WHEN IDENTIFYING CONCERNS**

What is the problem? Is it traffic volume, traffic speed, pedestrian safety, bicycle safety or a combination of concerns?

What time of day does the problem occur? Does it happen during rush hour or all day?

What is the history of the problem? Are there accidents or anecdotes? Please provide details and dates if available.

Is the street regularly used by pedestrians, bicyclists, and students?

What are the perceived dangers to pedestrians and bicyclists?

Does the street have sight distance issues?

Are there sidewalks on one or both sides?

Is the street near public transportation? Are there bus stops on the street? Do school buses stop to pick up children on the street?

Is the street near a school, park, shopping area, or community building?

Are there street designs or other unique situations that should be taken into consideration?

**Step 2 – Citizen(s) present petition to TSC.**

**2A** - Residents and businesses will submit completed petition identifying concern(s) (use template in Appendix A). TSC Chair will notify Town Council of pending petition. A valid petition must adhere to the following requirements:

- Must be signed by one member of 75 percent of the households and businesses on the street segment where the measure is requested.
- Note that by signing the petition, residents and businesses agree to have the safety measure (e.g., traffic calming measure, sidewalk, crosswalk, or other device or measure) placed where the transportation engineer/DPW recommends.
- Must be signed by one member of 50 percent of the households or businesses in cul-de-sacs or on dead-end streets that are accessed by way of the street segment in the petition.
- Include a map of the area. Maps can be found on the Vienna website, or a Google Map image is acceptable. DPW can help with this if requested.
- Affirm that a notice of petition has been given to residents and businesses in the impacted area.

**2B** - DPW will determine whether the petition is complete and notify the applicant of any deficiencies.

**2C** – The Town will schedule the petition for discussion at the next available TSC meeting. Petitions will be scheduled in the order they are received. The Town will announce the TSC meeting and agenda items following regular notification procedures.

### Step 3 – TSC holds initial hearing to review petition.

**3A** – Petitioners present their case to TSC at a public hearing. Each citizen has a three-minute time limit to present issues of concern. All residents are welcome to provide public comment.

**3B** – TSC may direct DPW and VPD to collect additional data on existing conditions and conduct an engineering study to determine safety concern(s) and recommendations to improve safety. This will include traffic counts over a one-week period. If a sidewalk is being considered, DPW will complete the sidewalk’s rating system (See Appendix B). The review should include the following information (and be included in DPW’s report):

#### (a) Street Segment Data:

- Street classification
- Traffic volumes
- Traffic speeds
- Posted speed limits
- Street blocks
- Accidents
- Bike usage
- School bus and student walking/biking usage

#### What is a “street segment”?

A street segment is the portion of residential street for which traffic calming and pedestrian and bicycle safety measures are sought.

#### (b) Vicinity Data:

- Pedestrian and bike generators such as nearby community facilities and schools
- Emergency vehicle and snow emergency routes
- Bus routes
- Truck routes
- Impact on alternate routes that drivers may take if traffic-calming measures are installed

#### **Step 4 – TSC reviews DPW guidance and decides at subsequent public meeting.**

**4A** - Public notification of TSC meeting agenda will be posted. Postings are made by mail. Public notice signs are placed at the site of the requested action. Information on the TSC meeting and agenda will also be placed on the Town's website.

**4B** - DPW will present findings and results from all data collected. (*Note: As mentioned earlier, DPW can move forward with a street safety measure without a TSC motion in certain circumstances.*)

**4C** - The TSC may make a motion to recommend a street safety measure(s) to the Town Council. If the motion is approved (requires majority vote), then DPW will develop a cost estimate, estimated timetable, and funding source to present with a motion at a future Town Council meeting.

**4D** – The TSC may vote to recommend to Town Council that no action be taken if no motion passes or if no street safety action is recommended by the TSC. The status of a petition will regularly be posted and updated on the Town website and petitioners(s) will be notified by staff when updates occur. (*Note: Citizens are always welcome to bring forward their concerns to Town Council whether a TSC motion passes or not.*)

#### **Step 5 – Town Council considers motion for approval.**

**5A** – Town Council will consider all TSC motions and recommendations at a regularly scheduled Town Council meeting. If a motion is passed by TSC, then DPW will present the motion to the Town Council. Interested parties will be notified of the meeting in advance. Town Council will also review and consider all TSC recommendations that no action be taken.

**5B** - If a motion receives majority Town Council approval, the DPW will be tasked with overseeing implementation of recommended street safety measures based on funding and crew/contractor availability.

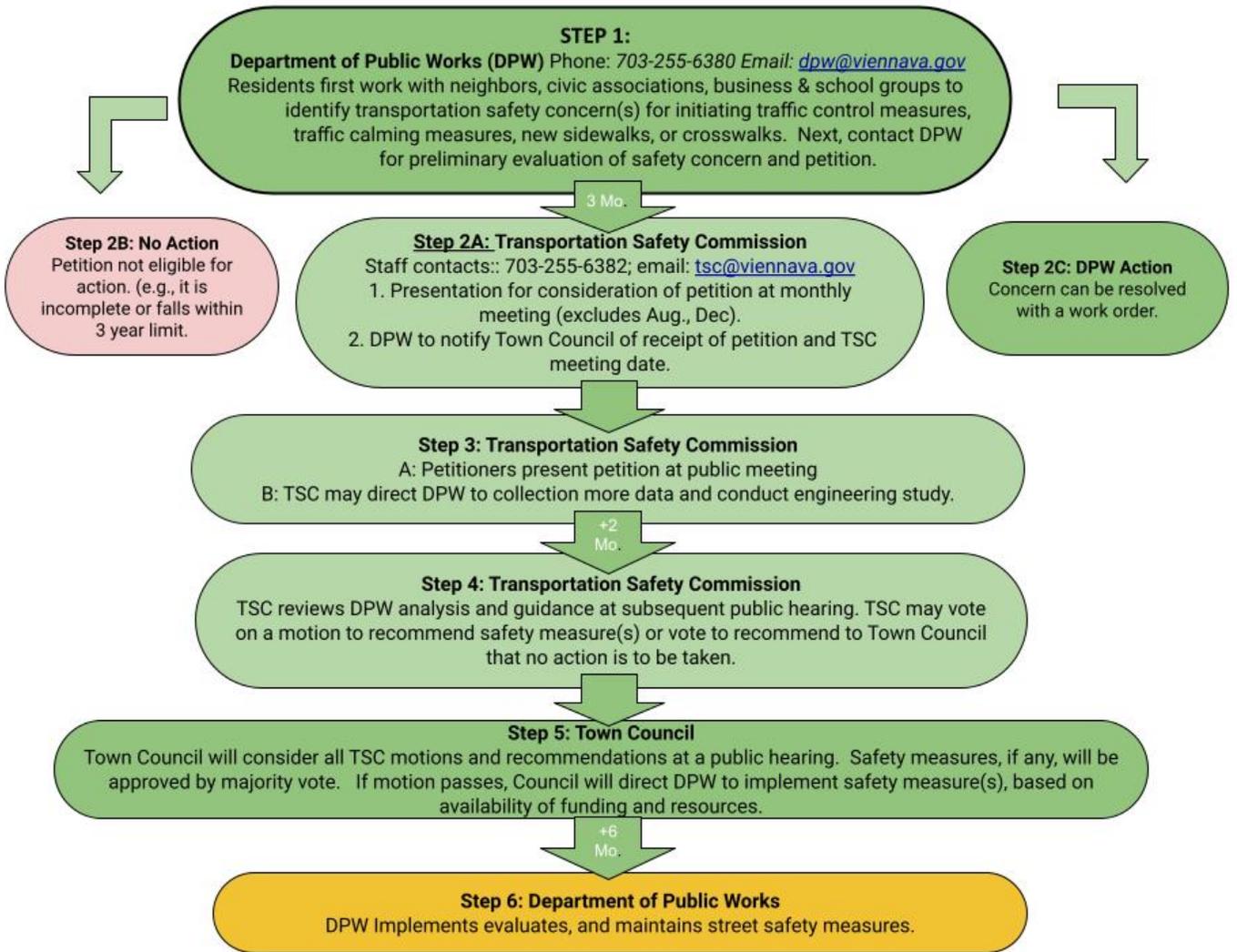
#### **Step 6 – DPW evaluates and maintains new street safety measure(s).**

**6A** - DPW will maintain and evaluate safety measure(s) as necessary per state and federal guidelines. Note that for new and existing safety measures, Vienna uses *VDOT Road Design Manual*, *VDOT Road and Bridge Standards*, *MUTCD*, and *Virginia Supplement to the MUTCD*.

**6B** - If DPW finds that a measure (e.g., traffic calming device) creates a hazardous situation, DPW may modify or remove the device.

**6C** - Residents and businesses wishing to have a traffic calming device removed or modified may need to follow the same petition process as installing it. Citizens should contact DPW to discuss concern(s) and determine how to proceed.

# Overview: Process for Addressing Street Safety



## Section 2 – Traffic Calming, Traffic Control, and Pedestrian Safety Measures

It is important to understand traffic calming and traffic control basics for vehicles and bicycles as well as pedestrian safety improvements such as sidewalks and crosswalks. Here is some information to help you. Additional information links are provided in the appendices.

### A. What is Traffic Calming?

Traffic calming is defined by the [Institute of Traffic Engineers](#) (ITE) as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." Improving neighborhood street safety involves effective traffic-calming measures and smart sidewalk development. 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. ([Federal Highway Administration ePrimer\\_2017](#))

#### EXAMPLES OF TRAFFIC CALMING:

- Education and Police enforcement
- Speed tables
- Speed cushions
- Traffic circles or roundabouts
- Signage
- Chokers
- Median strips
- Chicanes
- Lane narrowing striping
- Radar speed indicators
- Raised crosswalks
- Bike lanes

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. Lowering vehicle speeds reduces the likelihood of fatal injury where there is potential for conflict between a pedestrian and a motor vehicle. The slower the motor vehicle's speed, the greater the chances are for the pedestrian's survival. ([Federal Highway Administration ePrimer 2017](#)).

Understanding the appropriate measure(s) to correctly address the problem is important. Details on some of the most commonly used traffic calming measures can be found in the Guide Appendix. Road conditions, sight distance and traffic volume and speeds must be taken into consideration. Unusual road conditions and circumstances can also be a factor. Keep in mind that roads designated as emergency routes may not be suitable for traffic calming devices. For example, speed tables can slow the response time for emergency vehicles by as much as 10 seconds. See the Vienna street inventory and classification map in the appendix and check the [Vienna Comprehensive Plan](#) for more details on street classification.

Vienna generally avoids the use of turn and road-entry restrictions as they often do not fully consider what is best for the community at large and can shift the problem on to other neighborhood streets.

## B. What is a Traffic Control Device?

Traffic control devices are placed in set locations to inform, guide and/or control vehicle and bicycle movement. Traffic control devices are not intended to be used for calming traffic. One purpose of traffic control is to assign right-of-way between motorists and among various modes of travel. They can be signs, signals, pavement markings, and other devices that are outlined by the [Virginia Supplement to the Manual of Uniform Traffic Control Devices](#) (MUTCD).

Community awareness, education and enforcement are also key to improving neighborhood street safety. The Town of Vienna describes its goals associated with these elements in the *Town of Vienna's Pedestrian Master Plan*.

Two-way stops may be implemented where safety considerations may justify stopping traffic to permit left-hand turns at heavily traveled intersections. All-way stop controlled intersections will be considered following VDOT and Federal standards and guidelines.

## C. What is a Pedestrian Safety Improvement?

Walking is a fundamental form of transportation. Sidewalks, paths, trails and street crossings are a significant component of the transportation network. As stated in the Town of Vienna Comprehensive Plan and the Pedestrian Master Plan, the Town desires to promote walking and bicycling for recreation and transportation. The Town is pursuing policies that will help fill gaps in the sidewalk network and expand on the walkways that already exist. For more information on the Town of Vienna's policies regarding sidewalk construction and filling the gaps in the pedestrian network please see the *Town of Vienna Comprehensive Plan and Pedestrian Master Plan* (See reference page for details).

**Sidewalks:** The goal is to provide safe and accessible sidewalks on both sides of every street in Town based on an objective, priority rating system. Sidewalk projects are prioritized so that available funds are paired with projects that provide the most benefit to as many citizens as possible in the shortest time frame.

**Note:** If you desire to fill in a small gap on an existing walkway, then a petition may not be needed. You should contact DPW to discuss the issue.

The Town's sidewalk rating system is maintained by DPW and allows for discretion-based flexibility to incorporate the professional judgment of staff. Please contact DPW for a current priority list. Prioritization is based on the following eight elements (See details in Appendix):

1. Safety
2. Sidewalk classification
3. Feasibility
4. Suitability analysis (i.e., proximity to Town infrastructure and commerce)
5. Road category
6. Vehicle volume
7. Proximity to metro stations
8. Proximity to transit stops
9. Proximity to Safe Route to School and/or school bus stops

Sidewalk projects are prioritized so that available funds are paired with projects that provide the most benefit to the community. Many projects are partially funded with state and federal grants. You are encouraged to work with neighbors and community organizations such as local school PTAs to help identify safety issues and sidewalk needs and to help secure funding through the Safe Routes to School program.

Please note that significant sidewalk projects can take years depending on the existing underground and surface utilities such as fire hydrants and poles, surface storm water drainage and right-of-way acquisitions.

**Crosswalks:** The Town has been installing crosswalks where the need has been identified. The Town installs two types of crosswalks, high visibility (see pavement markings in the RRFB image below) and two parallel lines. High visibility crosswalks are used at stop sign-controlled intersections and mid-block crossings. Two parallel lines are used at intersections where traffic/pedestrian signals are present. These crosswalks generally are being placed at intersections that are controlled by either stop signs or traffic lights. Crosswalks placed in uncontrolled locations have been the subject of much debate and are considered by some to be unsafe because they provide a false sense of security to pedestrians in an area where drivers might not be expecting them to cross (Federal Highway Administration 2005).

**Rectangular Rapid Flash Beacons (RRFBs).** Are used at crosswalks where no traditional traffic signal is present. They are a lower-cost alternative to traffic signals and have been shown to increase driver awareness of pedestrian and bicycle crossings and improve driver compliance on stopping at crosswalks when pedestrians and bicyclists are present. They are user-actuated, amber LEDs and can operate with solar devices when electrical wiring is not available. They can be activated by pedestrians and bicyclists manually or they can be activated passively by a detection system. They also can be used to enhance other safety measures such as advance signage and yield markings that warn drivers of upcoming crosswalks.



(RRFBs on Beulah Road in Vienna)

## Section 3 – Criteria for Evaluating Street Safety Measures

### A. Street segment considerations.

- 1) **Traffic calming measures generally are limited to streets classified as collector or local.**
  - Streets that are designated emergency routes might not be suitable for some traffic calming devices.
  - Traffic calming devices are limited to streets with a maximum of one travel lane in each direction.
  - The grade of the street is also taken into consideration since certain traffic calming devices may not be suitable on hilly streets with a steep grade.
  - Certain traffic calming devices also may not be suitable if curves or other obstacles would create unsafe conditions for motorists driving at normal speed under average [consider “normal” or “typical” instead of “average”] conditions.
- 2) **Speed limits and traffic volumes are a consideration as well.**
  - Posted speed limit may not exceed 25 miles per hour.
  - Generally, the minimum street volume for physical traffic calming devices is 500 vehicles per day (250 vehicles each way).
  - Typically, priority is given to streets that exceed 2,000 vehicles on an average weekday.
  - Posted speed limit exceeded by five or more miles per hour.
  - Physical traffic calming measures will be considered when the 85<sup>th</sup> percentile speeds average 31 miles per hour or higher. (*See insert for more information*).

### DEFINITION 85<sup>TH</sup> PERCENTILE

Results of a traffic study will note the 85<sup>th</sup> percentile speed for traffic. This is the speed at which 85 percent of drivers will drive at, or below, during free-flowing conditions. This reflects the collective judgement of most drivers as to a reasonable speed for given traffic and roadway conditions. According to the Federal Highway Administration, most people don't drive according to the posted speed limit. They tend to account for the visual aspects of the street and a 'feel' for the street.

**B. Location Considerations**

- 1) Streets that are access routes for schools and community facilities will be considered priorities.
- 2) Streets that are primary routes for fire and rescue equipment are not suitable for certain traffic calming devices.
- 3) Streets that are bus routes and truck routes may not be suitable for traffic calming measures unless acceptable alternative routes are identified.

**C. Engineering Considerations**

- 1) Traffic calming devices should not be placed closer than 200 feet from any stop sign, yield sign, or traffic signal.
- 2) Devices should be at least 300 feet apart. Also, any traffic calming device shall not adversely affect street drainage.

**D. Other Considerations**

- 1) Pedestrian and bicycle safety are a top priority; and any traffic-calming measure should not adversely affect the safety of pedestrians or bicyclists. It should aim to improve pedestrian and bicycle safety.
- 2) As noted earlier, traffic calming efforts should take a broad approach to avoid shifting problems to adjacent local streets and parallel roads.



(Crossing sign on Park Street in Vienna)

# Appendices



(Street sign used in Vienna)

### Appendix A – PETITION TEMPLATE

We, the residents and/or businesses of \_\_\_\_\_ (*name of affected street(s)*), as signified by our signatures below, hereby request the evaluation of the concerns identified in this request.

It is the opinion of the residents and/or businesses there should be improvement to \_\_\_\_\_ (identify perceived street safety concerns) along this section of roadway. This concern arises \_\_\_\_\_ (identify time of day and/or direction of traffic when problem occurs, if appropriate). As such, we would like to ask the Vienna Transportation Safety Commission and DPW to evaluate the concerns identified in this request and consider appropriate action for Town Council approval. Signatories acknowledge that the Town, per the guidance of DPW, will put any measures deemed appropriate in the most effective location.

We understand this request will be evaluated and any modifications will be assessed based on availability of funding or grants as well as the guidelines set forth in the “Guide to Improving Street Safety” and the “Pedestrian Master Plan.”

SIGNATURE	PRINTED NAME	ADDRESS

PETITION, Page \_\_\_\_ of \_\_\_\_



**Appendix B – EXAMPLE TRAFFIC CALMING MEASURES (Not Exhaustive)**

1. **Speed Tables**
2. **Speed Cushions**
3. **Raised Crosswalk**
4. **Raised Intersection**
5. **Neighborhood Traffic Circle**
6. **Chicanes**
7. **Choker**
8. **Center Island Narrowing**
9. **Lane Narrowing/Parking**
10. **Reduced Corner Radii**
11. **Textured/Colored Pavements**
12. **Street Markings**
13. **Zig Zag Pedestrian Crossing**
14. **Signage**
15. **Radar Speed Display**
16. **Enforcement**

## 1. SPEED TABLES

**Description:** Long raised speed humps with a flat section in the middle and ramps on the ends, made of rubber composite, pavers/brick, stamped asphalt or concrete



**Pros:** Low cost, low maintenance, self-enforcing.

**Cons:** Increased noise, drainage impacts, increased emergency response time, point reduction, snow removal, street sweeping.

## 2. SPEED CUSHIONS

**Description:** Speed table that includes wheel cutouts to allow large vehicles to pass unaffected, while reducing speed of passenger cars



**Pros:** Low cost, low maintenance, self-enforcing.

**Cons:** Increased noise, drainage impacts, potential increased emergency response time, point reduction, snow removal, street sweeping.

### 3. RAISED CROSSWALK

**Description:** Essentially a speed table with a flat portion the width of a crosswalk.



**Pros:** Low maintenance, self-enforcing, clear pedestrian crossing.

**Cons:** Increased noise, drainage impacts, increased emergency response time, point reduction, snow removal, street sweeping.

#### 4. RAISED INTERSECTION

**Description:** Essentially a speed table with a flat portion the width of a crosswalk.



**Pros:** Low maintenance, self-enforcing, clear pedestrian crossing.

**Cons:** Increased noise, drainage impacts, increased emergency response time, point reduction, snow removal, street sweeping.

## 5. NEIGHBORHOOD TRAFFIC CIRCLE/ROUNDBABOUTS

**Description:** Raised circular island constructed in center of intersection. Vehicles travel in counterclockwise direction.



**Pros:** Improves access from side streets, minimal diversion of traffic, breaks up sight lines.

**Cons:** Increased emergency response time, additional maintenance, turning movements for large vehicles, bikes to merge with traffic.

## 6. CHICANES

**Description:** A series of narrowings or curb extensions that alternate from one side of the street to the other forming s-shaped curves.



**Pros:** Utilizes on-street parking, breaks up sight lines, lower impact on emergency response time.

**Cons** Requires design to be effective, drainage impacts, access to driveways.

## 7. CHOKER

**Description:** Curb extensions at midblock or intersection corners that narrow a street by extending the sidewalk or the planting strip.



**Pros:** Breaks up sight lines, lower impact on emergency response time, increased pedestrian visibility.

**Cons:** Require design to be effective, drainage impacts, impact to parking and access to driveways, additional maintenance.

## 8. CENTER ISLAND NARROWING

**Description:** Raised island placed in the center of a roadway to separate opposing traffic.



**Pros:** Breaks up sight lines, lower impact on emergency response time, pedestrian refuge.

**Cons:** Require design to be effective, drainage impacts, access to driveways and parking, additional maintenance, potential U-turns, snow removal.

## 9. LANE NARROWING/PARKING

**Description:** Narrowing travel lanes through pavement markings.



**Pros:** Inexpensive, lower maintenance, lower impact on emergency response time, create delineated parking and bike lanes.

**Cons:** Potential eradication of existing pavement striping.

## 10. REDUCED CORNER RADII

**Description:** Reduced corner radii at an intersection force drivers to slow for turning movements (TOV standard for new intersections is 25').



(Photos show reduced corners at the intersection of Marshall Rd. and Hillcrest Dr. SW, in Vienna, Va.)

**Pros:** Self-enforcing, minimal maintenance.

**Cons:** Increased emergency response time, large vehicle turning movements, drainage impacts, snow removal.

## 11. TEXTURED/COLORED PAVEMENTS

**Description:** Delineate entry to a traffic calming area or pedestrian zone (colored pavements, brick, stamped concrete, etc.).



**Pros:** Change in driver's perspective.

**Cons:** Maintenance cost, increased noise, difficulties for pedestrians and bikes.

## 12. STREET MARKINGS

**Description:** Pavement markings may be installed where appropriate and in accordance with the MUTCD to supplement signage.



**Pros:** Inexpensive, low maintenance, placement options.

**Cons:** Requires police enforcement.

### 13. ZIG ZAG PEDESTRIAN CROSSING

**Description:** Implemented by VDOT with a good success rate for W & OD Crossings. Not yet included in Virginia Supplement to the MUTCD.



**Pros:** Lower impact on emergency response time, inexpensive.

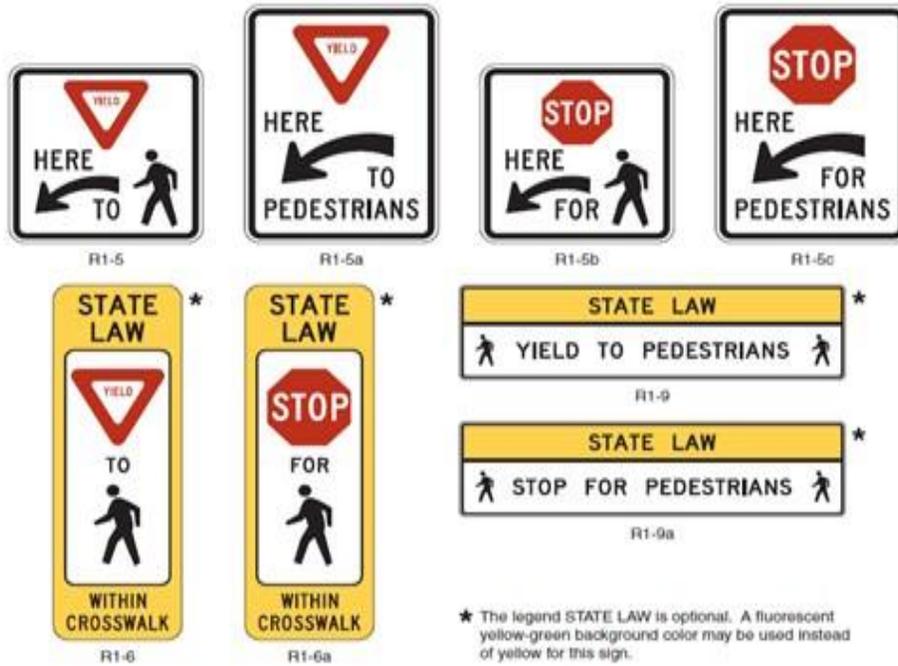
**Cons:** Requires police enforcement.

### 14. SIGNAGE

**Description:** Signs may be installed where appropriate and in accordance with the MUTCD (Note, stop signs cannot be used for speed control).



Figure 2B-2. Unsignalized Pedestrian Crosswalk Signs



**Pros:** Inexpensive, low maintenance, placement options.

**Cons:** Requires police enforcement.

## 15. RADAR SPEED DISPLAY

**Description:** Portable signs that use radar to provide electronic display to alert drivers of speed.



**Pros:** Inexpensive, portable.

**Cons:** Residual effects are negligible when removed, long- term placement has mixed results.

## 16. ENFORCEMENT

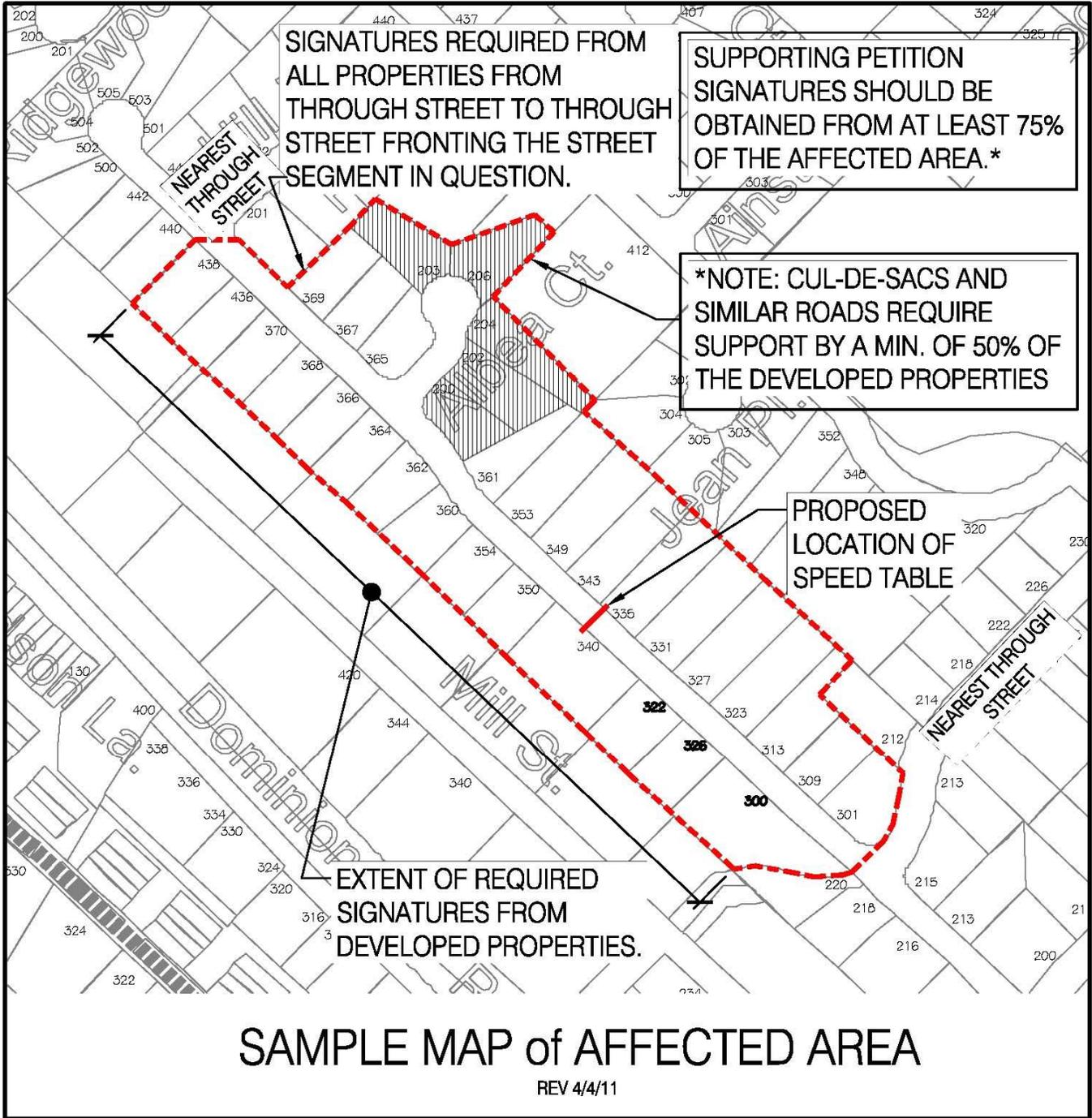
**Description:** Police target specific areas of known speeding.



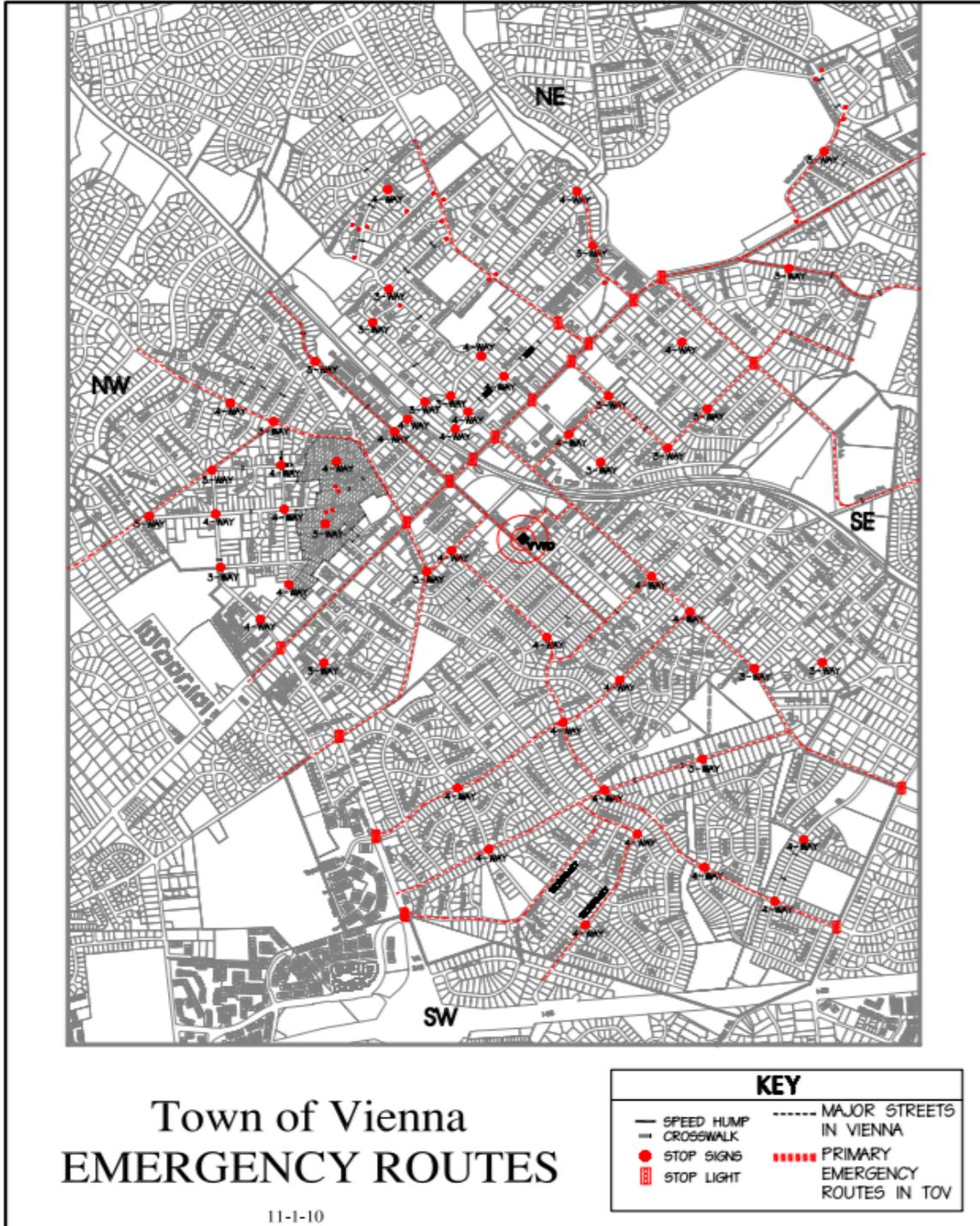
**Pros:** Can be used where engineering solutions are problematic, low impact to normal traffic flow.

**Cons:** Long-term efforts are required to make substantial changes

### Appendix C – Sample Map



### Appendix D – Emergency Routes Map



**Appendix E – Sidewalk Rating System (detailed in [Pedestrian Master Plan](#))**

	DESCRIPTION
SAFETY	SAFETY WILL CONSIDER ITEMS INCLUDING SIGHT DISTANCE, LACK OF REFUGE AREAS OR OTHER UNSAFE CONDITION, AGE IN PLACE, SPECIAL NEEDS
SIDEWALK CLASSIFICATION	DETERMINE WHETHER AND HOW MUCH EXISTING SIDEWALK EXISTS
FEASIBILITY	FEASIBILITY CAN RANGE FROM POTENTIAL CONSTRUCTION ISSUES, OFF SITE IMPACTS, AND ENVIRONMENTAL IMPACTS. 0 POINTS FOR LESS FEASIBLE AND 20 POINTS FOR VERY FEASIBLE.
GIS HEAT MAP (SUITABILITY ANALYSIS)	GIS HEAT MAP SHOWING WEIGHTED CHURCHES, W&OD TRAIL, ACTIVE PARKS, PASSIVE PARKS, COMMERCIAL / RETAIL, OFFICE SPACE, SCHOOLS, GOVERNMENT FACILITIES, AND POPULATION DENSITY.
ROAD CATEGORY	ROAD CATEGORIES
VEHICLE VOLUMES	VEHICLE VOLUMES BASED ON DATA OR ENGINEERING ESTIMATES
METRO STATION	DISTANCE FROM VIENNA OR GREENSBORO METRO STATION
TRANSIT STOP	PUBLIC TRANSPORTATION STOP STATIONS

## Appendix F – Example Application of Sidewalk Rating System

(for illustrative purposes)

### MARSHALL ROAD SW 600 - 700 BLOCK (SCHOOL)

NO.	CATEGORY	POINTS	NOTES
1	SAFETY	15	NO REFUGE, PAVEMENT WIDTH (36'), LOW SIGHT DIST
2	SIDEWALK CLASSIFICATION	5	SIDEWALK ONE SIDE
3	FEASIBILITY	10	MINOR DRAINAGE IMPROVEMENTS, EXISTING UTILITIES
4	GIS HEAT MAP	5	COLOR 2
5	ROAD CATEGORY	0	LOCAL ROAD
6	VEHICLE VOLUME	10	2000 - 3999 VPD
7	METRO STATION	10	VIENNA METRO
8	TRANSIT STOP	15	2 TRANSIT STOPS
	<b>TOTAL POINTS</b>	<b>70</b>	

### AYITO ROAD SE 300 BLOCK

NO.	CATEGORY	POINTS	NOTES
1	SAFETY	10	NO REFUGE, PAVEMENT WIDTH (24')
2	SIDEWALK CLASSIFICATION	5	SIDEWALK ONE SIDE
3	FEASIBILITY	15	MINOR DRAINAGE IMPROVEMENTS
4	GIS HEAT MAP	5	COLOR 2
5	ROAD CATEGORY	0	LOCAL ROAD
6	VEHICLE VOLUME	0	< 1000 VPD
7	METRO STATION	0	NO METRO
8	TRANSIT STOP	0	0 TRANSIT STOPS
	<b>TOTAL POINTS</b>	<b>35</b>	

**JOHN MARSHALL DRIVE NW  
600 - 700 BLOCK**

<b>NO.</b>	<b>CATEGORY</b>	<b>POINTS</b>	<b>NOTES</b>
1	SAFETY	15	NO REFUGE, PAVEMENT WIDTH (36')
2	SIDEWALK CLASSIFICATION	15	NO SIDEWALKS
3	FEASIBILITY	15	MINOR DRAINAGE IMPROVEMENTS AND TREES
4	GIS HEAT MAP	10	COLOR 3
5	ROAD CATEGORY	0	LOCAL ROAD
6	VEHICLE VOLUME	0	< 1000 VPD
7	METRO STATION	0	NO METRO
8	TRANSIT STOP	10	1 TRANSIT STOP
	<b>TOTAL POINTS</b>	<b>65</b>	

**BEULAH ROAD NE  
300 BLOCK**

<b>NO.</b>	<b>CATEGORY</b>	<b>POINTS</b>	<b>NOTES</b>
1	SAFETY	10	NO REFUGE, PAVEMENT WIDTH (24')
2	SIDEWALK CLASSIFICATION	15	GAP FILL IN
3	FEASIBILITY	10	DRAINAGE IMPROVEMENTS AND SLOPES
4	GIS HEAT MAP	5	COLOR 2
5	ROAD CATEGORY	5	COLLECTOR STREET
6	VEHICLE VOLUME	15	> 4000 VPD
7	METRO STATION	0	NO METRO
8	TRANSIT STOP	20	3 TRANSIT STOPS
	<b>TOTAL POINTS</b>	<b>80</b>	

**DRAFT RATING RESULTS**

<b>RATING NO.</b>	<b>POINTS</b>	<b>NAME</b>	<b>SEGMENT</b>	<b>DATE</b>
1	80	BEULAH ROAD NE	300 BLOCK	6/8/2017
2	70	MARSHALL ROAD SW	600 - 700 BLOCK (SCHOOL)	6/8/2017
3	65	JOHN MARSHALL DRIVE NW	600 - 700 BLOCK	6/8/2017
4	35	AYITO ROAD SE	300 BLOCK	6/8/2017

## **Appendix G – Virginia Right-of-Way of Pedestrians Law**

Section 46.2-924, Right-of-Way of Pedestrians, of the Virginia Criminal and Traffic Manual reads as follows:

A. The driver of any vehicle on a highway shall yield the right-of-way to any pedestrian crossing such highway:

1. At any clearly marked crosswalk, whether at mid-block or at the end of any block;
2. At any regular pedestrian crossing included in the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of a block;
3. At any intersection when the driver is approaching on a highway or street where the legal maximum speed does not exceed 35 miles per hour.

B. Notwithstanding the provisions of subsection A, at intersections or crosswalks where the movement of traffic is being regulated by law-enforcement officers or traffic control devices, the driver shall yield according to the direction of the law-enforcement officer or device.

No pedestrian shall enter or cross an intersection in disregard of approaching traffic.

The drivers of vehicles entering, crossing, or turning at intersections shall change their course, slow down, or stop, if necessary, to permit pedestrians to cross such intersections safely and expeditiously.

Pedestrians crossing highways at intersections shall always have the right-of-way over vehicles making turns into the highways being crossed by the pedestrians.

## Appendix H – Helpful References

Federal Highway Administration ePrimer  
[https://safety.fhwa.dot.gov/speedmgt/traffic\\_calm.cfm](https://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)

Town of Vienna Comprehensive Plan [www.viennava.gov/your-government/town-departments-at-your-service/planning-and-zoning/comprehensive-and-long-range-planning](http://www.viennava.gov/your-government/town-departments-at-your-service/planning-and-zoning/comprehensive-and-long-range-planning)

Manual of Uniform Traffic Control Devices (MUTCD)  
[https://mutcd.fhwa.dot.gov/kno\\_2009r1r2.htm](https://mutcd.fhwa.dot.gov/kno_2009r1r2.htm)

Town of Vienna Pedestrian Master Plan  
[www.viennava.gov/home/showpublisheddocument?id=1408](http://www.viennava.gov/home/showpublisheddocument?id=1408)

TRAFFIC CALMING GUIDE FOR NEIGHBORHOOD STREETS  
[www.virginiadot.org/programs/resources/Traffic-Calming-Guide-For-Neighborhood-Streets.pdf](http://www.virginiadot.org/programs/resources/Traffic-Calming-Guide-For-Neighborhood-Streets.pdf)

### **Additional References for Street Safety Best Practices:**

[www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/parking/rta-p-general-operating-procedures.pdf](http://www.fairfaxcounty.gov/transportation/sites/transportation/files/assets/documents/pdf/parking/rta-p-general-operating-procedures.pdf)

[www.fairfaxva.gov/home/showdocument?id=5660](http://www.fairfaxva.gov/home/showdocument?id=5660)

[www.virginiadot.org/business/locdes/rdmanual-index.asp](http://www.virginiadot.org/business/locdes/rdmanual-index.asp)