

1. Item\_0\_CACT\_Agenda\_2016\_08\_06

Documents: [ITEM\\_0\\_CACT\\_AGENDA\\_2016\\_08\\_06.PDF](#),  
[ITEM\\_2\\_CACT\\_DRAFT\\_MINUTES\\_2016\\_11\\_05.PDF](#)

2. Item\_2\_CACT\_Draft\_Minutes\_2016\_11\_05

Documents: [ITEM\\_2\\_CACT\\_DRAFT\\_MINUTES\\_2016\\_11\\_05.PDF](#)

3. Item\_5\_CACT\_2016\_Priorities\_Tracking\_Sheet

Documents: [ITEM\\_5\\_CACT\\_2016\\_PRIORITIES\\_TRACKING\\_SHEET.PDF](#)

4. Item\_8a\_Play\_Streets\_Flyer\_V2

Documents: [ITEM\\_8A\\_PLAY\\_STREETS\\_FLYER\\_V2.PDF](#)

5. Item\_8b\_Fact\_Sheet\_For\_Spring\_2016

Documents: [ITEM\\_8B\\_FACT\\_SHEET\\_FOR\\_SPRING\\_2016.PDF](#)

6. Item\_8c\_Roadway\_Striping\_For\_Traffic\_Calming

Documents: [ITEM\\_8C\\_ROADWAY\\_STRIPING\\_FOR\\_TRAFFIC\\_CALMING.PDF](#)

7. Item\_8d\_FallsChurch\_BikeShare

Documents: [ITEM\\_8D\\_FALLSCHURCH\\_BIKESHARE.PDF](#)

8. Item\_8e\_Safe\_Track\_Press\_Release

Documents: [ITEM\\_8E\\_SAFE\\_TRACK\\_PRESS\\_RELEASE.PDF](#)

**AGENDA**  
**CITIZENS ADVISORY COMMITTEE ON TRANSPORTATION**  
**Wednesday, June 8, 2016**  
**7:00 pm**  
**City Hall, Dogwood Training Room**  
**300 Park Avenue, Falls Church, VA 22046**

+++++

1. **Public Comment** (7:00-7:05)
2. **ACTION ITEM:** Approval of March 2016 minutes (7:05-7:10)
3. **Committee Members Reports:** (7:10-7:30)
4. **Staff Report** (7:30-7:40)
5. **DISCUSSION ITEM:** CACT 2016 Priorities-Tracking Sheet (7:40-7:50)
6. **DISCUSSION ITEM:** Walkability Survey-Results of Trial Run (7:50-8:30)
7. **NTC Project Report:** (8:30-8:40)
  - a. Pennsylvania Ave.
  - b. N. Maple Avenue
8. **Articles of Interest:**
  - a. Play Streets flyer
  - b. Envision Route 7- Public Meeting on June 14<sup>th</sup> flyer
  - c. Roadway Striping as a Traffic Calming Option-ITE Journal
  - d. Falls Church Bike Share Meeting notice
  - e. Safe Track-Metro press release

Link to Walkability Survey: <https://goo.gl/Bkz1YF>



The City of Falls Church is committed to the letter and spirit of the Americans with Disabilities Act. To request a reasonable accommodation for any type of disability, call 703-248-5027 (TTY 711). For more information call 703-248-5178.

**Please Do Not Remove**  
**Posted June 3, 2016**

# Citizens Advisory Committee on Transportation

May 11, 2016- 7:00 pm-10:10 PM

## Meeting Minutes

### Attendance

#### CACT Members

Member	Present
Paul Baldino (Chair)	Yes
Hal Morgan (Vice-Chair)	Yes
Bill Ackerman	Yes
Andrea Caumont	Yes
Doug Devereaux	No
Addison Heard	Yes
Steve Knight	Yes

#### City Staff

1. Stephanie Rogers
2. Jeff Sikes

#### Liaisons

Liaison	Present
Karen Oliver (City Council)	Yes
Russ Wodiska (Planning Commission)	No
(Youth Representative)	No

### Agenda

1. Public Comment
2. Minutes Approval- Action to approve minutes of the April 2016 CACT meeting
3. Committee Members Reports
4. Staff Reports
5. Action Item: Election of Vice-Chairman for 2016
6. Discussion Item: CACT 2016 Priorities-tracking sheet
7. Discussion Item: FY-17 Neighborhood Traffic Calming Program Funding
8. Discussion Item: Street and Walkability Survey

## **1. Public Comment:**

A resident commented on the installation of the new traffic signal at S. Washington Street and Tinner Hill Street saying that the current installation has many problems that need to be addressed.

## **2. Minutes Approval for the March 2016 Meeting:**

The minutes for the April 2016 CACT were approved with no changes by a vote of (6-0).

## **3. Committee Members Reports**

- Chairman Baldino reported that the CACT had been invited to participate in the Streetscape Design Taskforce and was looking for volunteers. Steve Knight volunteered as the primary CACT representative with Bill Ackerman as alternate. The first meeting of the Task Force will be on June 14.
- Andrea Caumont reported on the Play Streets program and pilot project on Virginia Ave. on May 14<sup>th</sup>.
- Bill Ackerman asked about funding for the Neighborhood Traffic Calming Program.

## **4. Staff Report**

- Pennsylvania Ave NTC- Jeff reported that DPW staff is in the process of soliciting bids from on-call contractors and will report on this progress next month.
- Jeff also reported that the planning for Bike To Work Day was coming together for this annual event to be held on Friday, May 20<sup>th</sup>. There have been a number of citizens and staff who have volunteered to help with the event. Several sponsors have indicated that they will set up at the pit stop.
- Jeff reported that the Winter Hill Residential Permit Parking was moving forward for a likely July implementation.
- Stephanie announced a Play Streets Pilot to take place on Saturday May 14<sup>th</sup> on N. Virginia Ave. and Riley Street between Park Ave. and Great Falls Street for the time period between 10 am to 2 pm. She shared a flyer that had been developed to promote the event.

## **5. Action Item: Election of Vice-Chairman for 2016:**

Hal Morgan was selected by the CACT members present to continue as Vice-Chairman for 2016.

## **6. Discussion Item: CACT 2016 Priorities:**

Staff has updated the list of 2016 CACT Priorities. Updates are reflected in the Pace Car, Play Streets and Walkability Survey items.

## **7. Discussion Item: FY-17 Neighborhood Traffic Calming Program Funding:**

Jeff Sikes presented information on the status of funding for the NTC program for FY-17 and what the program may look like in FY-17. No new funding was provided by Council in the adopted CIP. Approximately \$50K will remain unallocated after the construction of Pennsylvania Ave and Maple Ave. Staff will continue to accept NTC requests and establish a queue for future funding. The CACT will advise requestors of limited funds for “heavy” solutions and rely primarily on light solutions until funds become available. Staff will explore and apply for appropriate grant funding for NTC projects although this is likely a lengthy process and requires staff time for reporting project progress.

## **8. Discussion Item: Street and Walkability Survey:**

Steve Knight had developed an automated Walkability Survey which had been put on the web for CACT members to review. The committee went through the survey and made revisions and additions to the survey document. It was decided that CACT members would survey a block of Broad Street and turn in their surveys by the end of May and the results would be discussed at the June meeting.

# Citizens Advisory Committee on Transportation

May 11, 2016- 7:00 pm-10:10 PM

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## Status of 2016 CACT Action Items

Updated: May 31, 2016

Action Item	Responsibility	Status
<p><b>Refine the Neighborhood Traffic Calming (NTC) Program:</b> The CACT plans to work closely with petitioners and staff and to modify the administration of the program as needed to assure it fulfills the goal of improving safety on residential streets as efficiently and cost effective as possible.</p>	<p>Staff CACT</p>	
<p><b>W&amp;OD Trail Projects</b> (1) construct at least one plaza (2) replace welcome signs at eastern and western entrances</p>	<p>Doug Paul B</p>	<p>CIP Funding proposed by Planning Commission CIP Funding not included in adopted budget Staff working on a master plan to develop a vision for the W&amp;OD and provide policy guidance for grant applications</p> <p>August 3, 2015 Planning Commission work session September 9, 2015 CACT-comments provided November 2, 2015-City council work session February 2, 2016, CACT recommend approval to Council February 2016, Planning Commission-action and recommendation March 2016 –City Council-work session and adoption VPIS approved funding for welcome signs in 2015. This would involve installation of previously constructed, smaller versions of the City’s roadway signs. On April 11, Council adopted the W&amp;OD Master Plan with the stipulation that signs must say “Welcome to Falls Church”. The VPIS signs do not say “Welcome”..</p>
<p><b>Neighborhood Pace Car Program:</b> develop proposal</p>	<p>Staff</p>	<p>April 2015: Andrea coordinating with WABA August 2015-staff to coordinate with WABA September 2015- Staff spoke with WABA about the program. Was referred to DDOT to inquire about their Pace Car Program Nov. 5<sup>th</sup> CACT meeting-staff update April 2016-staff requesting quote to print decal May 2016-staff waiting for printing price quote</p>
<p><b>Play Streets:</b> seek feedback from boards and commissions</p>	<p>Andrea/Stephanie</p>	<p>September 9, CACT to take action on memo to Boards and Planning Commission seeking work session. Andrea to present proposal to the Planning Commission on November 16th and the Recreation and Parks Advisory Board on November 4. May 2016-Guidelines for Play Street applications developed by DPW; Play Street Pilot on May 14<sup>th</sup> on N. Virginia Ave. and Riley Street.</p>

<p><b>Development Plan Review-</b> The CACT plans to intensify committee review of development plans seeking more comprehensive TDM management strategies and coordination with the city-wide transportation network and facilities.</p>	<p>CACT</p>	
<p><b>Bikeability Survey</b> Survey the City's narrow marked streets (Park Ave., Maple Ave. and West Street) and the segment of the W&amp;OD trail within the City limits and assess bikeability through factors affecting the safety, comfort and appeal of cycling. Summarize findings and recommendations in a report to Council, boards, committees and staff.</p>	<p>Paul B.</p>	
<p><b>Walkability Survey</b> Survey the commercial areas of Broad and Washington Streets and assess walkability through factors affecting the safety, comfort and appeal of the streets and sidewalks. Summarize findings and recommendations in a report to Council, boards, committees and staff.</p>	<p>Paul B. Steve</p>	<p>April 2016: First draft of the survey and instructions discussed. Revisions underway. Steve volunteered to convert the survey to an automated form. May 2016-CACT reviews and comments on Walkability Survey- CACT members to "survey" a block of Broad street and report results by end of May for discussion at June meeting.</p>
<p><b>Joint Meeting with EDA to discuss options for increasing transit in the City.</b></p>	<p>CACT</p>	<p>Met with the EDA on February 2 to discuss areas of common interest and opportunities for cooperation Complete!</p>



The City of Falls Church

# Play Streets

**The City invites you to a pilot Play Street event from 10 a.m. to 2 p.m. on May 14 on N. Virginia Ave. and Riley Street.**

A "Play Street" closes a neighborhood street to traffic so that kids and adults can have more space for play and physical activity.

Stop by with your kids and enjoy fun with Virgil Seay Sports and Activities at 11 a.m. and Prophetic Dance and Fitness at 12:30 p.m. (weather permitting).

No need to RSVP -- just come on by and play! Keep in mind that no vehicles will be allowed unless you are a resident of those streets. City Hall is a short walk away (300 Park Ave.) where parking is free.

For more information, please email [srogers@fallschurchva.gov](mailto:srogers@fallschurchva.gov).



[www.FallsChurchVa.gov/PlayStreets](http://www.FallsChurchVa.gov/PlayStreets)



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CITY OF **FALLS CHURCH**



# ENVISION ROUTE 7

[www.EnvisionRoute7.com](http://www.EnvisionRoute7.com)

## Public Meetings on Recommended Mode & Alignment

JUNE

6

**Mon., June 6 7-9 p.m.**

**The Pavilion**

Apartments at the Mark Center  
5708 Merton Court, Alexandria, VA 22311

JUNE

8

**Wed., June 8 7-9 p.m.**

**Glen Forest Elementary School**

Ground Floor Cafeteria  
5829 Glen Forest Drive, Falls Church, VA 22041

JUNE

14

**Tues., June 14 7-9 p.m.**

**Mary Ellen Henderson Middle School**

Ground Floor Cafeteria  
7130 Leesburg Pike, Falls Church, VA 22043

## Route 7 Transit by the Numbers

*Preliminary Comparison  
of Two Modal Options*



**LRT**

**RECOMMENDED**



**BRT**

Travel Time Saved

55%

50%

New Daily Transit Trips

9,600

8,600

Passengers Per Vehicle

200

120

Capital Costs

\$990 M

\$250 M

Operating Costs (Annual)

\$31 M

\$17 M

## Creating a Vision for Route 7

*requires that we...*

- identify the mode of transit and route for service
- determine the level of public support
- assess the financial, economic and technical viability
- identify steps to move the project forward

## The Goal of Envision Route 7

*is to identify the best  
transit option for the  
corridor. One that...*

- connects people and businesses to economic opportunity
- increases transportation choices
- moves more people
- provides a faster trip
- offers higher quality service



NORTHERN VIRGINIA TRANSPORTATION COMMISSION  
[NoVaTransit.org](http://NoVaTransit.org) 703-524-3322

# Roadway Striping as a Traffic Calming Option

**IN LIEU OF TRADITIONAL TRAFFIC CALMING, ROADWAY STRIPING AS A TRAFFIC CALMING OPTION IS A VIABLE, LOW-COST ALTERNATIVE TO TRADITIONAL VERTICAL/HORIZONTAL ROADWAY DESIGN FEATURES. THE ROADWAY STRIPING ALTERNATIVES HAVE LESS DETRIMENTAL IMPACT TO EMERGENCY SERVICES, ARE LESS COSTLY TO CONSTRUCT, AND CAN SUCCESSFULLY REDUCE SPEEDS FROM TWO TO MORE THAN SEVEN MILES PER HOUR.**

**BY ROBERT KAHN, P.E. AND ALLISON KAHN GOEDECKE, MBA**

## INTRODUCTION

Traditional traffic calming techniques include vertical and horizontal displacement of the roadway surface, which can be effective in reducing speeds and cut-through traffic on roadways. These roadway design features can include speed humps, cushions, chokers, chicanes, medians, mini traffic circles, diverters, and full/partial roadway closures. While these features can have significant benefits to a community, they are sometimes difficult to implement as a result of potential negative impacts to local residents, emergency service departments, and persons with disabilities and may not be consistent with public agency policies.

In lieu of many of the traditional traffic calming devices, roadway striping can be implemented as a traffic calming option that is a viable, low-cost alternative to vertical/horizontal displacement traffic calming features. The roadway striping alternatives

- Have less detrimental impacts upon emergency services;
- Are less costly to construct;
- Provide greater flexibility to meet future changes;
- Have no adverse impact to highway drainage;
- Are recognized by local residents as standard traffic control devices;
- Can provide bike/parking lanes;
- Can successfully reduce speeds from one to more than seven miles per hour. Even greater speed reductions have been documented in some case studies; and

- Can be implemented quickly.

A number of roadway striping calming alternatives have been successfully installed in Southern California with positive results. In many cases, these have been implemented on private streets and have resulted in reduced speeds in these communities. These private streets have been designed to pub-

lic street standards. Traffic calming striping has also been used on public streets in Southern California. The calming alternatives that have been implemented follow standard *California Manual on Uniform Traffic Control Devices* (CMUTCD) requirements. These traffic calming options have been implemented in a timely and cost-effective manner and are easily understood by the local residents and driving public. They have resulted in some speed reductions, which were desired by the local residents. While more traditional traffic calming devices (e.g., speed humps) may be required in certain instances to obtain greater speed or volume reductions, roadway striping is a viable traffic calming option in many cases.

## TRAFFIC STRIPING AS AN ALTERNATIVE TO STANDARD TRAFFIC CALMING TECHNIQUES

Striping as a traffic calming technique has less disruption to emergency service vehicles, since no vertical or horizontal displacement occurs within the roadway surface. Emergency service requirements are a major barrier to the installation of many traffic calming projects. Roadway striping that is used for traffic calming is universally recognized by the traveling public and emergency agencies. Traffic calming striping gives the visual impression that roadway width has been reduced, which has been shown to slow vehicles down while traveling along a roadway. This type of striping will not slow down emergency service vehicles utilizing the roadway or adversely affect traffic operations. Other types of traffic calming devices are new to some drivers, particularly out-of-the-area drivers who are not familiar with a particular area that has the traffic calming devices.

In addition, there is considerably less cost to striping than other traffic calming techniques. As opposed to \$2,500-\$3,500 USD per installation for speed humps

or speed cushions, the same segment of roadway can be striped for only \$500 to \$1,000 USD. Another advantage of traffic striping as a traffic calming option is future flexibility. Traffic striping can easily be changed in the future by sandblasting the painted striping, if a particular installation is unsuccessful in meeting its goals or needs to be changed. Furthermore, traffic striping can be implemented quickly through conventional construction techniques by existing in-house public works staff or contract services.

Another significant benefit of traffic striping is that it does not adversely affect drainage. Many traffic calming devices such as speed humps, roadway chokers/curb extensions, medians, and chicanes can adversely affect roadway drainage. These devices can constrict normal drainage patterns within the roadway surface, which could affect drainage for the roadways. This can require additional roadway maintenance for local public works departments.

Traffic striping as a traffic calming device can effectively reduce speeds on a roadway. This is particularly effective on long, straight roadways where there are wide travel lanes for long distances. Before-and-after speed surveys by RK Engineering Group, Inc., with which the author is affiliated, have shown that speed reductions in the range of one to more than seven miles per hour are easily accomplished through roadway striping, especially for wide local streets with a curb-to-curb width of 36 to 40 feet. Another advantage of roadway striping is that it can provide for bike lanes or parking areas adjacent to the travel lanes as part of the "complete streets" system. These bike or parking lanes are used to define the various functions of the roadway: not only vehicular travel but also vehicle access to the neighborhood, parking, and accommodations for other modes of transportation, such as bicycles.

### STRIPING ALTERNATIVES

There are numerous striping alternatives that can be used for traffic calming. The basic concept of traffic calming striping is to reduce the driver's perceived width of the roadway. By doing this, the drivers tend to reduce speed and may also be diverted from a particular route as a

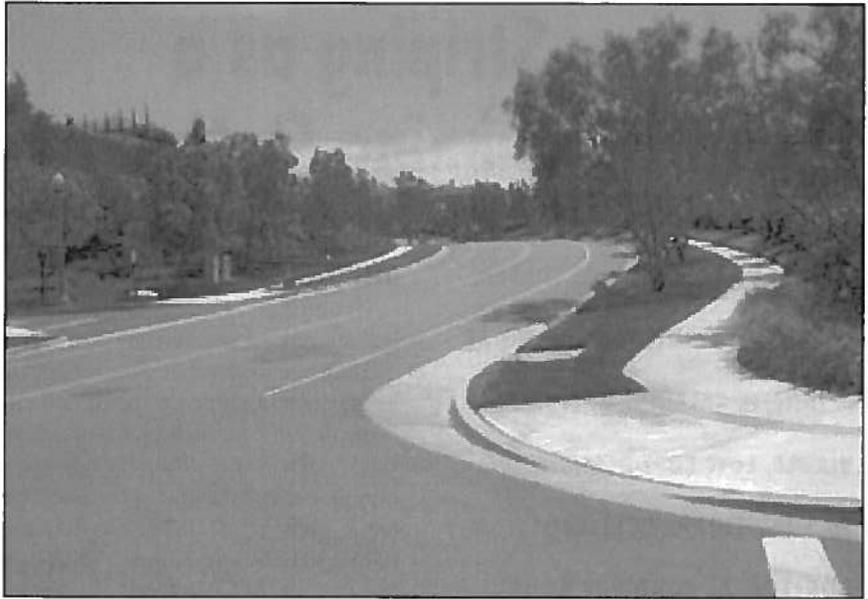


Figure 1. Typical traffic calming striping.

result of the reduced speed. The striping alternatives can consist of adding the following:

- Centerline stripe;
- Edge lines;
- Centerline plus edge line;
- Striped median;
- Striped choker or chicane;
- Striped speed hump without the raised speed hump; and
- Psycho-perceptive striping.

**Centerline** striping consists of adding a typical double-yellow centerline stripe or single-dash yellow line in the roadway. This separates the direction of traffic and reduces the roadway width of the travel lane to the driver. White 4-inch **edge lines** can be added to the right and left side of the roadway where there is sufficient width for the 8-foot parking lane. The parking lane can be provided and separated by the 4-inch white edge line. A combination of both centerline and edge line striping is the most effective method of reducing the overall travel way width of the roadways. This can be provided on typical local streets and will provide for 10-12 foot travel lanes and 7-8 foot parking lanes. A sample of this design is shown in Figure 1.

Another method of reducing the roadway width is by providing a **striped median**. The median can be provided by double-yellow centerline stripes or can

be a two-way left-turn lane, which provides left turns from the roadway to the adjacent properties or across the roadway itself. Another option for reducing roadway width is **striping chokers or chicanes**. These can be striped with a white 8-inch channel to provide the delineation of the choker or chicane. Although not as prominent as the raised curbing of a typical choker or chicane, it does provide some of the same operational features as the raised curbing for chokers or chicanes by requiring the driver to slow while traveling the traffic calming area.

Another traffic calming option is to provide "**striped**" **speed humps** across the roadway. These can be effective where normal speed humps cannot be implemented, such as a hilly area or where grades exceed 8 percent. While limited operational data is available on this type of striping, it can give the impression of a speed hump in the roadway area, therefore slowing vehicles. "**Psycho-perceptive**" striping has also been used in conjunction to implementation of speed humps. This type of striping is shown in CMUTCD (Figure 3B - 31). Smaller stripes are provided, initially going to larger stripes when approaching the traffic calming device. A photo of this type of striping is included in Figure 2. The evaluation of the effectiveness of optical speed bars was presented in the November 2001 (Eric Meyers) and March 2009



traffic calming striping, the 85th percentile speed along Chambord ranged from 45 to 47 miles per hour, and the average speeds ranged from 40 to 41 miles per hour.

Traffic calming striping was implemented along the entire length of Chambord. This included a double-yellow centerline and 4-inch edge line stripes 8 feet from the curb face. After the traffic calming striping was implemented, the 85th percentile speed was reduced to 37 to 39 miles per hour and the average speed decreased to 35 to 36 miles per hour throughout the length of Chambord as shown in Table 1.



Figure 4. Chambord Road before restriping.

*Case Study No. 2  
(August 2005–December 2007)*

Traffic calming striping was implemented in south Orange County within the city of San Clemente, California, USA at the Reserve Community Association. This project consists of a large number of single-detached family dwelling units with a recreation center located in the southern portion of the community. The project has four electronic gates, which provide access to an adjacent arterial highway (Camino Vera Cruz). This community had four roadways serving a series of cul-de-sacs throughout the community, both north and south of Camino Vera Cruz.

The main roadways serving the community south of Camino Vera Cruz were 40-foot curb-to-curb width streets and those roadways serving the northerly section of the community had a curb-to-curb width of 36 to 38 feet. Existing traffic volume and speeds were collected throughout the community before traffic calming was implemented. The 85th percentile speeds ranged from 23 to 34 miles per hour prior to the implementation of traffic calming striping. Before-and-after 85th percentile speeds are summarized in Table 1.

Traffic calming striping consisted of adding double-yellow centerlines and white 4-inch edge lines on the wider roadways and the striping of edge lines only for the narrower roadways. The 85th percentile was reduced to some degree after the implementation of traffic calming striping. The 85th percentile speeds were reduced to 22-33 miles per hour, with some minor reductions after the implementation of the striping. The rec-

Table 1. Before-and-after speed surveys.

Location	Roadway	85th% Speed	
		Before Traffic Calming Striping (mph)	After Traffic Calming Striping (mph)
Case Study #1 Newport Ridge North (Newport Beach)	• Chambord N/O Rivay	46	37
	• Chambord S/O Musset	47	39
	• Chambord S/O Baryemon	45	39
Case Study #2 The Reserve (San Clemente)	• Montana del Sol N/O Camino Vera Cruz	23	22
	• Colina Rodante S/O Camino Vera Cruz	32	30
	• Calle de Los Arboles N/O Camino Vera Cruz	27	26
	• Calle de Los Arboles S/O Camino Vera Cruz	34	33
Case Study #3 Oak Creek (Irvine)	• Eagle Creek W/O Indigo	37	31
	• Eagle Creek W/O Palm Wood	38	27
Case Study #4 Summit at Turtle Ridge (Irvine)	• Garden Terrace E/O Hedgewood	31	30
	• Crest Terrace N/O Blue Summit	29	29
	• Canyon Terrace N/O Cezanne Valley	33	31
	• Valley Terrace S/O Climbing Vine	30	28
Summit at Turtle Ridge (Irvine)	• Garden Terrace N/O Summit Park	31	30
	• Crest Terrace W/O Summit Park	29	29
	• Canyon Terrace N/O Summit Park	33	31
	• Valley Terrace N/O Summit Park	30	28
	• Summit Park Drive at Valley Terrace	46	44
	• Summit Park Drive W/O View Terrace	44	44
	• Summit Park Drive E/O Garden Terrace	43	42
	• Summit Park Drive at Garden Terrace	39	39

ommended speed limits ranged from 25 to 35 miles per hour depending on the location and the 85th percentile speed. Although not as significant of a reduction in comparison to the Newport Ridge North Community, speeds were reduced 1 to 2 miles per hour with the traffic calming striping. The smaller reduction in speed was probably caused by the fact that the true existing speeds before the traffic calming measures were implemented were lower than the existing speeds in the Newport Ridge North Community.

*Case No. 3 (June 2002–December 2009)*

The Oakcreek Village Community located in the city of Irvine, California, USA also implemented traffic calming striping. This is a private community with two sets of electronic gates located at the east and west ends of the project. The roadway layout for the Oakcreek Development is a linear alignment with very little curvature. The Oakcreek Development is served by a single roadway (Eagle Creek) which has direct access to driveways and homes along its entire length of 0.50 miles. The Oakcreek Village Community is served by two electronic gates located on the northwest and southeast end of Eagle Creek.

Eagle Creek is a two-lane, undivided street with a curb-to-curb width of 36 feet with sidewalks on both sides of the street. The 85th percentile speed on Eagle Creek before traffic calming striping was 37 to 38 miles per hour. The community felt that this was excessive, since the prima facie speed limit is 25 miles per hour for this type of roadway. Also, there was a concern that the crosswalk across Eagle Creek served an adjoining elementary school where there was a significant amount of pedestrian crossing.

The traffic calming striping consisted of a double-yellow centerline stripe along with white 4-inch edge lines on both sides of the street. Initially this was constructed with a 7-foot parking lane on each side of the roadway and 11-foot travel lanes in each direction. Since the original implementation of traffic calming striping, the travelway has been reduced further to 10 feet and parking lanes were increased in width to 8 feet. The 85th percentile speed after the traffic calming ranged from 31 to 27 miles per hour (see Table 1). The

**ANOTHER ADVANTAGE  
OF TRAFFIC STRIPING  
AS A TRAFFIC CALMING  
OPTION IS FUTURE  
FLEXIBILITY. TRAFFIC  
STRIPING CAN EASILY BE  
CHANGED IN THE FUTURE  
BY SANDBLASTING THE  
PAINTED STRIPING,  
IF A PARTICULAR  
INSTALLATION IS  
UNSUCCESSFUL IN  
MEETING ITS GOALS OR  
NEEDS TO BE CHANGED.**

traffic calming measures implemented by the community of Oak Creek Village have been successful in reducing speeds as much as 6 to 11 miles per hour. After careful review, the original recommended striping was modified to create 10-foot-wide travel lanes and an 8-foot-wide parking lane. This should further reduce traffic speeds in the area.

*Case Study No. 4 (April 2008–April 2010)*

The community of the Summit at Turtle Ridge in the city of Irvine requested traffic calming to reduce the vehicle speeds on some of its local streets. The Summit at Turtle Ridge is a private manned-gated

community with a primary collector road (Summit Park Drive). This hillside community included numerous cul-de-sac streets where speeds were generally low and consistent with what would be expected in the local street system. However, the local community association felt that these speeds were too high and traffic calming options should be investigated.

For this study, RK surveyed four local streets in the community. This included Garden Terrace, where the 85th percentile speed was 31 miles per hour before the implementation of traffic calming striping and was reduced to 30 miles per hour after implementation. On Crest Terrace the 85th percentile speed was only 29 miles per hour before traffic calming striping and remained at 29 miles per hour after the implementation of the striping. Canyon Terrace was the location with the highest speeds in the community on the local streets, where the 85th percentile speed was 33 miles per hour. This speed was reduced to 31 miles per hour after the implementation of traffic calming striping. The final location where traffic calming was implemented was Valley Terrace Street. This cul-de-sac had a speed of 30 miles per hour before implementation of the striping and 28 miles per hour after traffic striping was implemented.

In the community of the Summit at Turtle Ridge, the speeds were already low and generally consistent with what would be expected for local residential streets. However, the community was concerned with the speeds; therefore, rather than placing more aggressive traffic calming devices (e.g., speed humps, chokers, and so forth), traffic calming striping was utilized as the preferred option within the community. The recommended traffic calming striping included centerline and edge line striping with parking on one or both sides of the street depending on whether the streets were 32- or 36-foot wide. Although the speed reductions were not substantial within the community, the community was satisfied with the reduction of speeds as a result of the implementation of traffic calming striping. The relationship of speed reduction with traffic calming striping can be seen in Figure 5.

One conclusion that can be reached from the various case studies is that if local streets are operating at speeds typical for

these types of roadways (i.e. 25-32 mph), then only minor speed reductions can be obtained by traffic calming striping. Where speeds are significantly higher (i.e., more than 35 mph), then much greater speed reductions can be achieved from traffic calming striping.

### COMPARISON TO OTHER TRAFFIC CALMING TECHNIQUES

The use of traffic calming striping compares favorably to other traffic calming techniques. Although speed reduction can vary from site to site, positive speed reductions can be anticipated with the traffic calming, depending on the specific roadway configurations and the width of travel way. There are significant pros and cons to all types of traffic calming devices, as summarized in Table 2.

As can be seen from Table 2, traffic calming striping can typically result in speed reductions of approximately one to seven miles per hour depending on the situation. Speed hump and speed cushions have considerable speed reduction capabilities of approximately 8 miles per hour. Chokers and chicanes can reduce speeds 3 to 6 miles per hour, and medians and pavement texture can result in 2 to 3 miles per hour reduction. When there are situations that require speed reductions on local roadways, traffic calming striping can be considered the first step in the traffic calming process. More aggressive traffic calming devices such as speed humps/speed cushions, chokers, chicanes, medians, and pavement textures can cost considerably more but can be utilized in the event that the traffic calming striping is not successful in reaching the speed-reduction goals set by the community.

### COST COMPARISON

One of the major advantages of traffic calming striping is its cost. Not only can traffic calming striping be implemented less expensively than many other options, but it also can be modified or removed without major cost implications. An approximate cost comparison of various traffic calming devices is included in Table 2.

### SAFETY CONSIDERATIONS

There are numerous safety considerations for implementing traffic calming

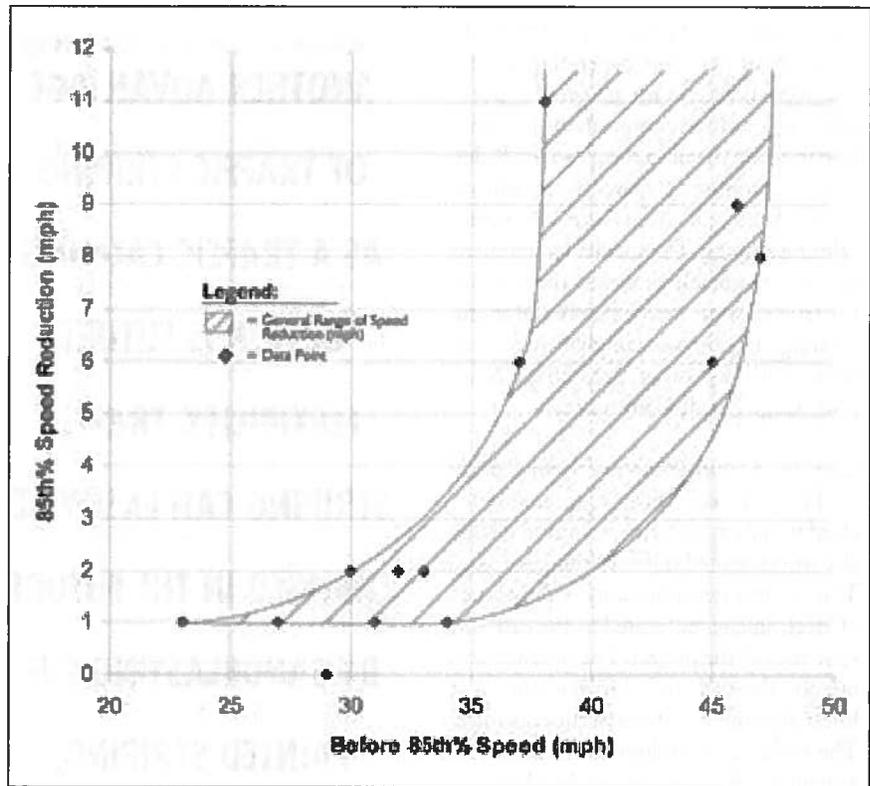


Figure 5. Speed reduction with traffic calming striping.

devices. Anytime that the vertical or horizontal displacement of the roadway surface occurs, there is a potential for vehicles going out of control, hitting objects, or other actions which could be detrimental to the safety of the driver and passengers of the vehicle. Furthermore, impacts to emergency service vehicles can indirectly affect safety when responding to emergency events.

Generally, traffic calming striping minimizes safety considerations, since they follow standard traffic engineering practices pursuant to the CMUTCD. Drivers are familiar with these types of traffic control features and respond accordingly. This is true not only for local residents who are familiar with the traffic calming implemented in an area but also for drivers from outside the area that are unfamiliar with the traffic calming installations.

Speed humps do reduce vehicle speed if properly designed and when adequate signage/pavement markings are provided. Speed humps can have an adverse affect on safety—but only if drivers ignore them and if reduced speeds do not occur. Speed humps can also reduce travel times for

emergency service vehicles, which have an indirect impact on safety.

Speed cushions have a similar effect on safety as speed humps. However, they can be traversed better by larger vehicles, including emergency service vehicles, which can travel through the speed cushions at a normal speed as opposed to a typical speed hump. This is a major advantage of speed cushions over speed humps.

Chokers can affect safety if they are hit by vehicles. Proper signage and pavement markers are necessary to ensure that this does not occur. Chokers can improve safety for pedestrians by providing a shorter walking distance for crosswalks. Chicanes, similar to chokers, can have a safety impact if a vehicle strikes them while traversing through the traffic calming device area. Implementation of sharp curb-width transitions can result in vehicle collision with the curb, causing vehicle damage and possible out-of-control vehicle operations.

Medians have been shown to improve safety by separating the direction of travel of vehicles. However, when implemented in only selective areas, vehicles can hit the ends of medians, causing damage to the

**Table 2. Comparison of traffic calming devices.**

Traffic Calming Technique	Pros	Cons	Speed Reduction (mph)	Cost <sup>2</sup>
Speed Hump	<ul style="list-style-type: none"> <li>Effectively reduces speed by approximately 8 mph.</li> <li>Can cause some diversion of excess traffic volumes.</li> </ul>	<ul style="list-style-type: none"> <li>Not accepted by many local jurisdictions and emergency service agencies.</li> <li>Improper driving can cause vehicle damage and can cause vehicles to go out of control.</li> <li>Moderate cost considerations.</li> <li>Can impact bicycles/motorcycles.</li> <li>Difficult to remove.</li> </ul>	8	\$1,500 to \$3,000
Speed Cushion	<ul style="list-style-type: none"> <li>Effective in reducing speeds up to 5 miles per hour.</li> <li>More acceptable to public agencies / emergency service agencies, because can slow normal size vehicles but allows larger emergency vehicles to pass without speed reductions.</li> </ul>	<ul style="list-style-type: none"> <li>Some agencies and emergency service agencies do not support these devices.</li> <li>Cost for construction is moderate.</li> <li>Difficult to remove.</li> <li>May impact bicycles/motorcycles.</li> </ul>	5	\$2,500 to \$3,500
Chokers and Chicanes	<ul style="list-style-type: none"> <li>Effectively reduces traffic speeds approximately 3 miles per hour.</li> <li>Can reduce roadway width to reduce walking distance for pedestrian (which is a safety benefit).</li> <li>Can be enhanced with landscaping to improve aesthetics.</li> </ul>	<ul style="list-style-type: none"> <li>Expensive to implement.</li> <li>Can cause drainage issues.</li> <li>Difficult to remove in the future if not effective.</li> <li>Some loss of parking.</li> <li>Can impact bicycles.</li> </ul>	3-5 Up to 6	\$7,000- \$15,000 per pair \$10,000- \$15,000
Medians	<ul style="list-style-type: none"> <li>Can reduce speeds to some degree.</li> <li>Can provide aesthetic benefits to the community.</li> </ul>	<ul style="list-style-type: none"> <li>Costly to implement.</li> <li>Difficult to remove if not successful.</li> <li>Can cause additional maintenance costs.</li> <li>Water overall on pavement.</li> <li>May lose parking.</li> </ul>	2-3	\$5,000- \$15,000
Pavement Texture	<ul style="list-style-type: none"> <li>Can cause minor reduction in speed.</li> <li>Can be aesthetically pleasing.</li> <li>Can be tied into crosswalks or intersections to define channelized areas for pedestrians.</li> </ul>	<ul style="list-style-type: none"> <li>Costly to implement.</li> <li>Difficult to remove.</li> <li>Can effect some types of pedestrians crossing the street.</li> <li>Can cause noise impacts.</li> </ul>	Limited data	\$5-\$16 per sq. ft.
Mini Traffic Circles	<ul style="list-style-type: none"> <li>Minor reduction in speed.</li> <li>Improves aesthetics.</li> <li>Slows traffic through the intersection.</li> </ul>	<ul style="list-style-type: none"> <li>Costly to implement.</li> <li>Can confuse drivers regarding which way to travel through an intersection.</li> <li>May affect bicycles and pedestrians.</li> <li>Can impact left turns for large vehicles.</li> <li>Can slow emergency service vehicles.</li> </ul>	4-6	\$10,000- \$60,000
Traffic Calming Striping	<ul style="list-style-type: none"> <li>Effective in reducing speeds from 1 to 7+ miles per hour.</li> <li>Accepted by many public agencies and emergency service agencies because they are standard traffic control.</li> <li>Easy to change if required in the future.</li> <li>Less costly option to install</li> <li>Installation can be implemented quickly.</li> <li>Can be removed more easily than other options (sand blast).</li> </ul>	<ul style="list-style-type: none"> <li>Some limitations in speed reduction.</li> <li>Less effective when speeds are already low.</li> </ul>	1-7 +	\$500- \$1,000 per 500-feet

vehicles, driver/passenger, and can also cause vehicles to go out of control. If medians are not properly designed, they can cause water to flow into the pavement. This can cause pavement deterioration and loss of control of vehicles.

Pavement texture has limited impact on safety, although vehicles can possibly lose traction, depending on the type of texture during wet conditions. Pedestrians crossing on pavement texture can trip or slip depending on the pavement type and condition. In addition, pedestrians (especially children) may not see the textured pavement as a part of the "street," which make them less aware of traffic.

Mini traffic circles can cause vehicles to hit the curbs or cause other accidents. Also, if such traffic circles are not properly designed, trucks can have a difficult time navigating the intersection and could hit objects in the roadway.

Traffic calming striping generally has a positive impact from a traffic safety standpoint. Traffic calming striping should be implemented pursuant to the CMUTCD requirements with respect to location, type, and placement of the striping. Where used as transitions, striping should be properly designed based upon the operating speed of the vehicles on that segment roadway.

## COMMUNITY ACCEPTANCE

The community acceptance of any traffic calming measure is critical in long-term implementation and effectiveness. The vast majority of the professional literature indicates that at least two-thirds of the community must support the traffic calming techniques in order for them to be implemented within the community.

In many cases, vertical and horizontal displacement of traffic calming devices are heavily resisted by the local community and driving public. This is one of the major advantages of traffic calming striping, since it is readily acceptable to the local community because it is already implemented on most roadways throughout communities. Traffic calming striping is understood by the driving public throughout local communities. It causes little damage to vehicles and drivers/pedestrians of the community. It does not adversely effect the operation of vehicles for emergency service agencies. Traffic

calming striping is not permanent and can easily be changed if required in the future. As a result of this, traffic calming striping can be less controversial than more restrictive devices.

## CONCLUSIONS

RK Engineering Group, Inc. has completed a review of traffic calming striping as an alternative to vertical or horizontal displacement traffic calming devices such as speed humps, speed cushions, chokers, medians, pavement textures, and other roadway design features. Traffic calming striping has been shown to reduce speeds effectively as a first step of a traffic calming process. Striping is a low-cost traffic calming solution that can have major benefits to the community compared to other vertical/horizontal displacement traffic calming devices, yet still provides substantial benefits in terms of reducing traffic speeds on the roadways.

In conclusion, traffic calming striping is an effective measure in a traffic/transportation engineer's toolbox of traffic calming devices. These roadway striping techniques follow standard design practice, which reduces future tort liability. Traffic striping is a cost-effective and efficient traffic calming method that can be implemented quickly to reduce speeds on roadways. ■

### Resources for further information

1. City of Colorado Springs, *Traffic Calming Handbook*. 2003. Accessible at [www.springsgov.com/files/TCHandbook.pdf](http://www.springsgov.com/files/TCHandbook.pdf).
2. Remington & Vernick Engineers, *Old Newark Traffic Calming Plan*. 2002. Accessible at [www.wilmapco.org/Newark/Newark\\_traffic\\_calming\\_sect1.PDF](http://www.wilmapco.org/Newark/Newark_traffic_calming_sect1.PDF).
3. Brown, Steven (Fehr Peers), *City of La Habra Traffic Management Program*. 2006. Accessible at [www.lahabracity.com/article.cfm?id=191](http://www.lahabracity.com/article.cfm?id=191).
4. Ewing, Reid, *Traffic Calming State of the Practice*. Washington, DC: ITE/FHWA. 1999.
5. Delaware Department of Transportation. *Delaware Department of Transportation Traffic Calming Manual*. 2000. Accessible at [www.deldot.gov/information/pubs\\_forms/manuals/traffic\\_calming/pdf/deldotfinal.pdf](http://www.deldot.gov/information/pubs_forms/manuals/traffic_calming/pdf/deldotfinal.pdf).
6. Gulden, Jeff, Reid Ewing. "New Traffic Calming Device of Choice." *ITE Journal*, Vol 79, No. 12, (December 2009): 26-31. Washington, DC: ITE. 2009.



**ROBERT KAHN,**  
P.E. is president of RK Engineering Group, Inc. which is a full-service transportation engineering firm located in Newport Beach, California, USA. Mr

Kahn has more than 40 years of professional experience and has owned his own consulting firm for 23 years. He is a registered engineer in the states of California, Colorado, and Nevada. Mr. Kahn has been involved in the practice of traffic calming since the early 1980s, when he designed some of the first speed humps in Orange County, California. He currently teaches "Fundamentals of Traffic Engineering" for the University of California and has been a guest lecturer at the University of California, Irvine. Mr. Kahn received his B.S. and M.S. in civil engineering from the University of California, Berkeley. He is a fellow of ITE.



**ALLISON KAHN GOEDECKE,**  
MBA is a project manager with RK Engineering Group, Inc. She showed her first interest in the transportation field after completing

a report, titled "Red Light, Green Light," about her father's role in helping communities as a transportation engineer back in 1981. Allison has now worked as a senior transportation planner for more than 12 years, focusing on preparing traffic impact studies for commercial, industrial, institutional, and residential projects. She graduated Phi Beta Kappa from University of California, Irvine, received her MBA from Pepperdine University, and did postgraduate work at Oxford University. She is a member of American Planning Association (APA).



# CITY OF FALLS CHURCH

## **Bike-share funding is at risk! Your public comments can make the difference.**

### **Why Extend Bike-Share into Falls Church?**

1. **Transit Connections:** Provide first-mile / last-mile connections to / from Metrorail Stations and the City of Falls Church, a COG-designated regional activity center.
2. **Regional Network:** Be part of the expanding regional bike-share network that already covers Washington, D.C.; Arlington County; City of Alexandria; and Montgomery County; and will soon provide service in Fairfax County.
3. **Relieve Congestion:** Relieve congestion on area highways by increasing travel options; the Council of Governments Region Forward Plan explicitly calls for increasing travel options as a way to relieve congestion.

### **Northern Virginia Transportation Authority (NVTA)**

#### **Application:**

\$2 million to install up to 16 bike-share stations along corridors defined in the City's Bicycle Master Plan (see map on reverse side).

#### **How to Get Involved:**

NVTA will host a public hearing at their June meeting. Attend the hearing and voice your support.

3040 Williams Dr, Suite 200  
Fairfax, VA 22031  
Thursday, June 9  
6:00 PM Open House  
7:00 PM Public Hearing

Alternatively, comments can be emailed to:

[FY2017Program@TheNoVaAuthority.org](mailto:FY2017Program@TheNoVaAuthority.org)

### **Northern Virginia Transportation Commission (NVTC)**

#### **Application:**

\$850,000 to fully fund the first 3 years of operating expenses for 16 stations.

#### **How to Get Involved:**

NVTC action is scheduled for the group's Thursday, June 2 meeting.

2300 Wilson Blvd, 1st floor  
Arlington, VA 22201  
Thursday, June 2  
7:30 PM Commission Meeting

The deadline for submitting comments to NVTC staff has already closed, so address your comments directly to the NVTC Commissioners. Comments can be emailed to [i66multimodal@nvtc.org](mailto:i66multimodal@nvtc.org).

## Planning for Bike-share

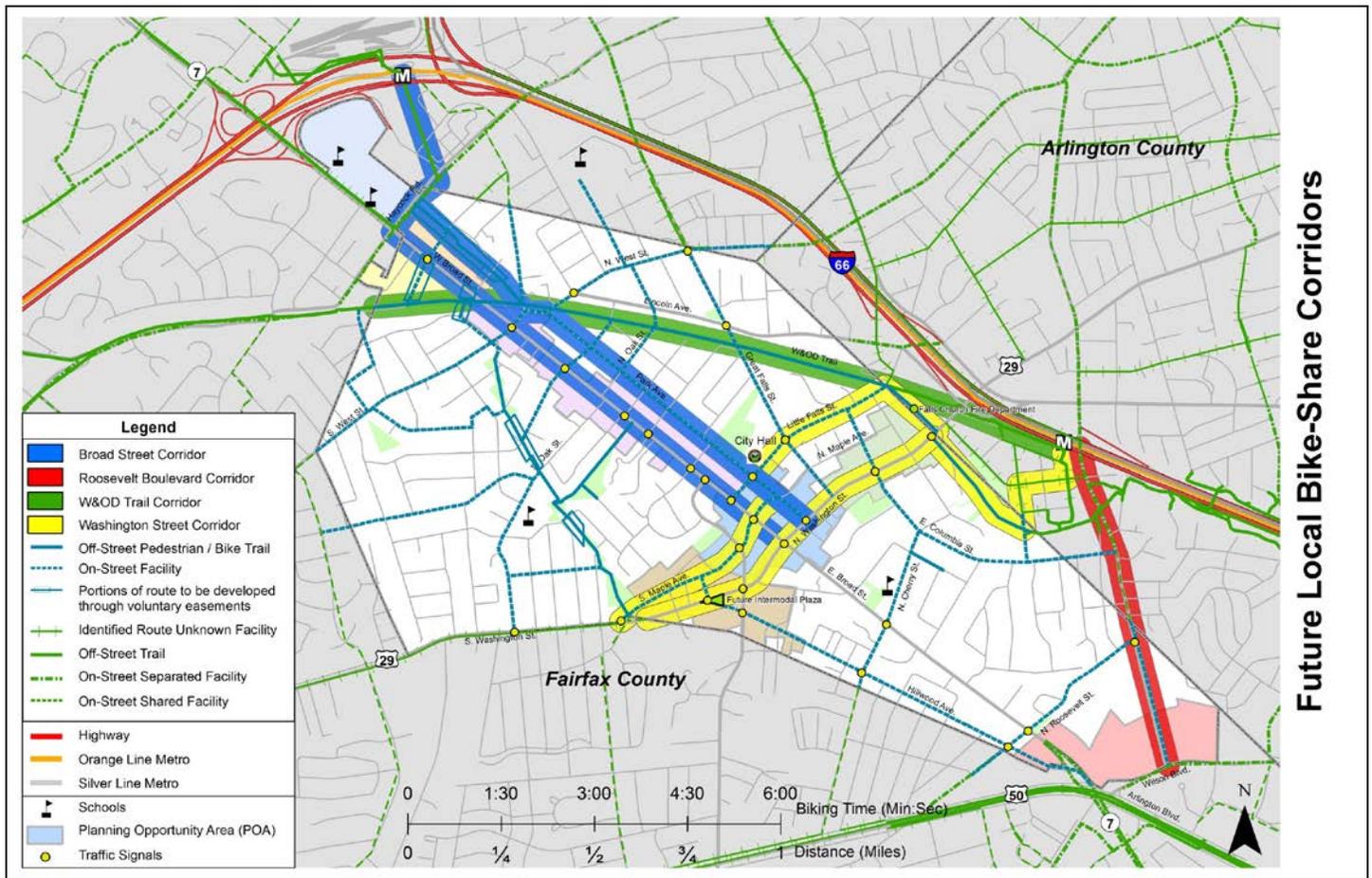
In 2015, the City Council unanimously adopted the City's Bicycle Master Plan, <http://www.fallschurchva.gov/BicycleMasterPlan>. That plan identifies several bike-share corridors in the City. The corridors are designed to extend the region of regional transportation facility by better connecting the City to nearby Metrorail stations. These stations will be part of the growing bike-share network in Washington, D.C., Arlington County, City of Alexandria, Fairfax County, and Montgomery County.

## Contact Information

If you have questions about either of these applications or the City's bicycle planning efforts, please contact Paul Stoddard.  
email: [pstoddard@fallschurchva.gov](mailto:pstoddard@fallschurchva.gov)  
phone: 703-248-5041 (TTY 711)

## In the News

For more information about bike-share, read this article about the City's plans for bike-share: <https://goo.gl/D9M3tf>



The City of Falls Church is committed to the letter and spirit of the Americans with Disabilities Act. To request a reasonable accommodation for any type of disability, call 703-248-5040 (TTY 711).



# SafeTrack

[www.fallschurchva.gov/SafeTrack](http://www.fallschurchva.gov/SafeTrack)

Metro’s SafeTrack maintenance plan will reduce service on sections of the Blue, Orange, Silver and Yellow lines over the next year (June 2016-March 2017). The changes are necessary to allow time to rehabilitate and improve the overall system in the shortest time possible.

The East Falls Church and West Falls Church Metro Stations will be impacted during six surge cycles:

- June 4-16, 2016
- June 18 – July 3, 2016
- July 20-31, 2016
- September 9 – October 20, 2016
- November 3-11, 2016
- March 6-19, 2017

## REDUCING TRAFFIC

These surges will affect our entire region — we’re all in this together! What should you do? Consider and plan for telework (if possible), and transportation options. **A single driver in a vehicle should be your last resort.** To get through these important maintenance projects, we are encouraging those who are able to telework to do so ... and those who must travel to work to take transit or car/vanpool.

The City of Falls Church will monitor traffic and adjust traffic lights, especially along Washington St./Rt.29/Lee Highway.

## WHAT ARE MY TRANSPORTATION OPTIONS?

[CommuterPage.com](http://CommuterPage.com) is Arlington County’s webpage where you can learn about the many options available:

- Ridesharing, carpooling, vanpooling, slug lines, and the Guaranteed Ride Home program
- Local bus systems and commuter buses
- Bicycling, bikesharing, and trails
- Telework
- Paratransit and accessible transit

CarFree A to Z, [www.carfreeatoz.com](http://www.carfreeatoz.com): Enter your starting and ending address, and your trip options will be displayed.

Car-Free Near Me, [www.carfreenearme.com](http://www.carfreenearme.com): Provides locations of bus stops and other transportation services near your home, workplace, current location, or any location you choose. Car-Free Near Me also tells you what transit services and routes serve those locations, and provides real-time information.

Telework: The easiest of all commutes! Ask your employer if you are eligible. If your company is located in Virginia, Telework!VA and Mobile Work Exchange are good resources.

