



# OLD LEE HIGHWAY TRANSPORTATION STUDY CITY OF FAIRFAX

## INTRODUCTION

### Study Purpose

This study is intended to evaluate the operational and geometric conditions of Old Lee Highway between Ridge Avenue and Layton Hall Drive. The primary objective of this evaluation was to preliminarily identify improvements for this corridor to improve traffic operations, pedestrian and bicycle circulation and safety. The recommendations of this study will be to reach consensus on the recommended improvements to be constructed, both short and long term.

### Project Study Area

The study area extends along Old Lee Highway through central Fairfax from Ridge Avenue to Layton Hall Drive, as shown in Figure 1.

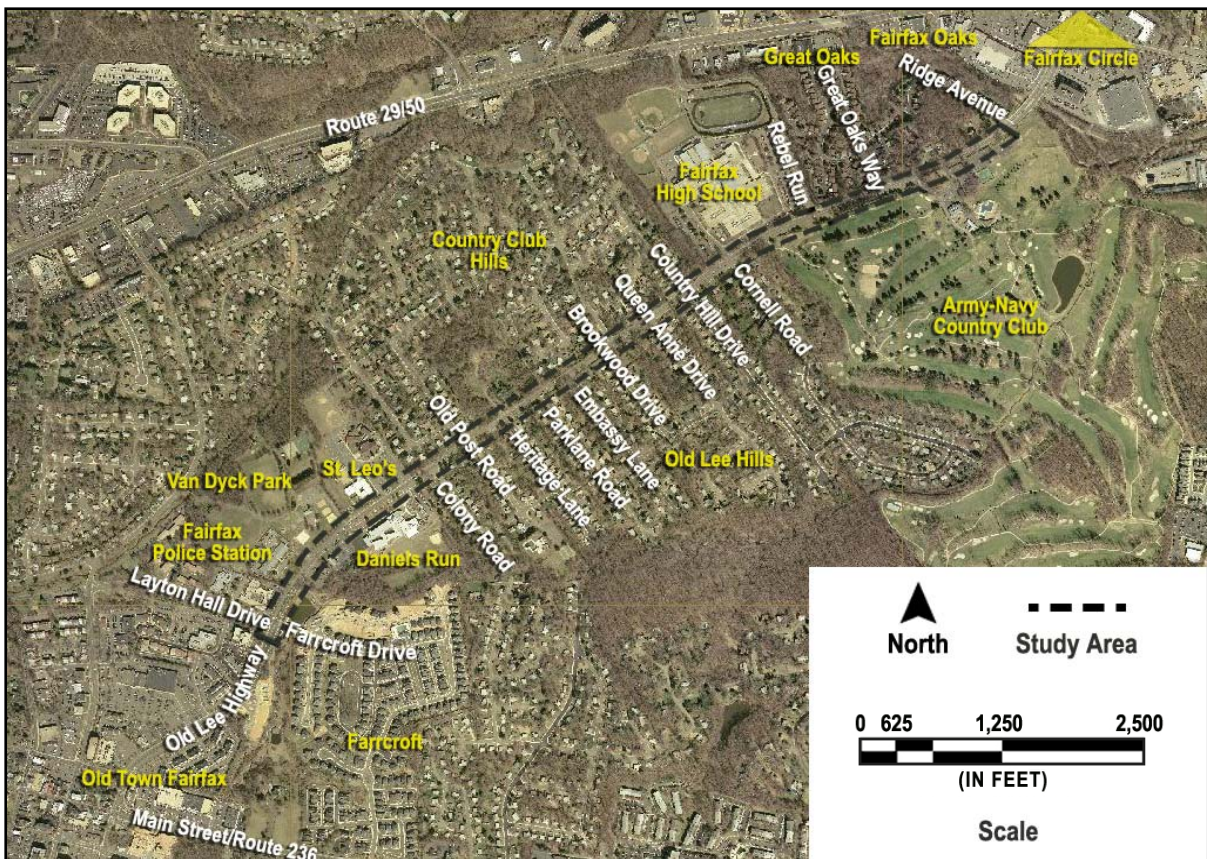


Figure 1 Old Lee Highway Study Area



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### Background

The City of Fairfax Draft Comprehensive Plan designates Old Lee Highway as an *Urban Collector Roadway*. In 1987, the designation of Old Lee Highway as Route 237, an Urban Minor Arterial, was transferred to Picket Road. An Urban Collector Roadway is defined by AASHTO as “providing both land access service and traffic circulation within residential neighborhoods”.<sup>1</sup> This designation gave primary responsibility for access to Old Town Fairfax to Pickett and Chain Bridge Roads rather than Old Lee Highway. Furthermore, Old Lee Highway was once planned for expansion to four lanes, but is now designated to remain a two-lane facility under the City’s Comprehensive Plan. A legacy of this change is the remaining excess pavement along the corridor, originally intended to serve two additional lanes of through traffic.

The Comprehensive Plan specifically states:

*“Old Lee Highway currently exists as a two-lane road. Excess sections of pavement should be removed. It should remain in that configuration subject to safety improvements. Safety conditions of the sidewalks and trails along this roadway should be examined and improvements made where warranted. Access issues for local streets bordering on this section should be studied. Public transportation should be improved.”*<sup>2</sup>

The Comprehensive Plan also indicates:

*“At appropriate locations along the City’s streets, the provision of sidewalks, trails, pedestrian signals and crosswalks will help facilitate the safe travel of pedestrians. It is especially critical to connect residential areas with one another and with public facilities, businesses and residents that residents need.”*<sup>3</sup>

In the Fall of 2002, the Community Appearance Committee, a volunteer citizen group for the City of Fairfax, finalized a Citizen’s Report for conceptual redesign of Old Lee Highway. The Report showed a typical cross section (Figure 2) of what the Committee perceived as the preferred scenario for the corridor.

The report recommended to:

- Reduce road width to consistent two lanes and add crosswalks in residential areas
- Reduce oversized intersections
- Add curb, gutter, and grass where gravel shoulders are in front of churches and the Army-Navy Country Club (ANCC)
- Add sidewalk, trail, or bike lane along ANCC
- Improve existing center islands

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<sup>1</sup> *A Policy on Geometric Design of Highways and Streets 2001*, AASHTO. Fourth Edition. P. 12. An Urban Minor Arterial is defined by AASHTO as those ‘serving local bus routes and providing intra-community continuity but not penetrating identifiable neighborhoods’. An Urban Minor Arterial serves principal arterials that “serve the centers of urbanized areas”.

<sup>2</sup> *Draft Comprehensive Plan – City of Fairfax* (11-3-03); p. 129.

<sup>3</sup> *Draft Comprehensive Plan – City of Fairfax* (11-3-03); p. 121.



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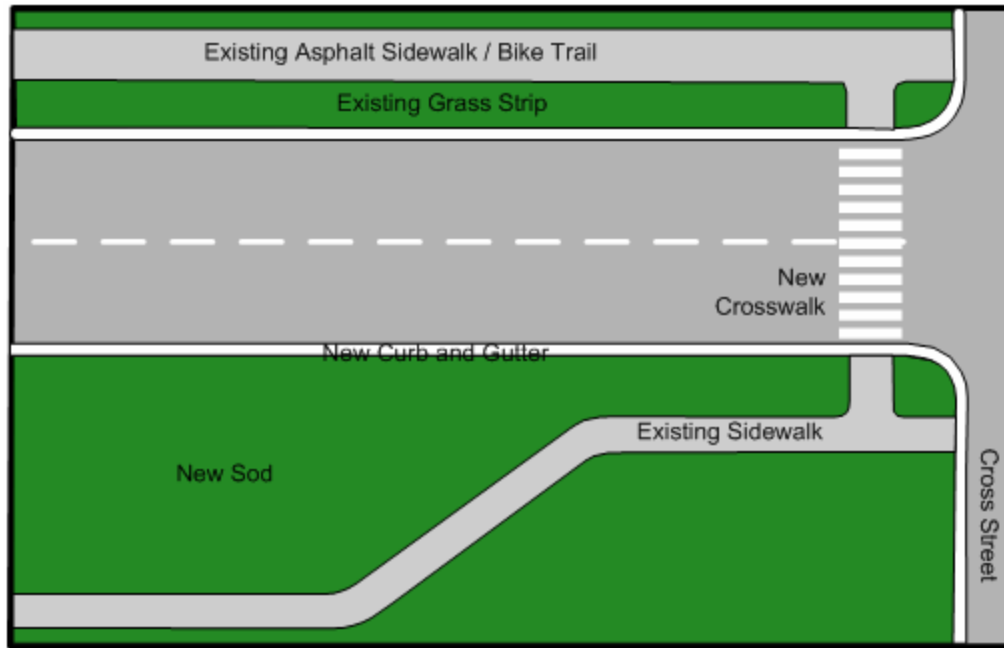


Figure 2 Citizen's Report Recommended Cross Section - Old Lee Highway

Table 1 compares the existing conditions with the proposed modifications, as recommended in the Citizen's Report.

Quality	Existing	Proposed
Consistent Cross-Section	No	Yes
Green Space Share	12%	47%
Overarching Trees	No	Yes
Landscaping	No	Yes
Traffic Speed	Current	Slower
Safety	Current	Better
Buildable in Small Stages	N/A	Yes
Comprehensive Plan Agreement	No	Yes
Cost	Maintenance	\$285K

Table 1 Fall 2002 Citizen's Report Summary Table (Stage 1)

## Methodology

This study began with a survey of existing conditions, a review of previous studies and data collection. Seven previous or on-going reports were reviewed for the "Old Lee Highway Preliminary Transportation Study".

- Traffic Impacts at the Entrance to Farrcroft Condominiums, Old Lee Highway (December 30, 1996)



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- Traffic Impact Analysis – Layton Hall Elementary School (1998)
- Bikeway Program Review for the City of Fairfax (July 1980)
- Citizens' Report (Fall 2002)
- 2003 Draft Comprehensive Plan – City of Fairfax (2003)
- Historic Blenheim Master Plan (September 16, 2003)
- Northern Virginia Regional Bikeway and Trail Network Study: Final Draft Report (September 25, 2003)

Based on this information, an analysis was performed for crosswalks, roadway geometry, sight lines and observations of traffic conditions. A key factor in the analysis was determination of locations where accepted design standards or preferred practices are not being met. The results of the analysis were then used to identify the location and types of improvements that would be needed to improve conditions. These improvements were then documented and reviewed in a series of public meetings and consultations with stakeholders. The input received in these meetings was then used to evaluate the alternatives and identify those that appear most promising and desirable both for technical reasons and given public input. Those recommendations were then reviewed with Fairfax officials and finalized.



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### EXISTING CONDITIONS

#### Land Uses

The Old Lee Highway Study Area is a mixed-use corridor including five residential communities, three schools (Daniels Run Elementary School, St Leo the Great Catholic School, and Fairfax High School), the City of Fairfax Police Headquarters / John C. Wood Municipal Complex, Van Dyck Park, the Army–Navy Country Club, and three churches (Saint Leo the Great Catholic Church, the Northern Virginia Mennonite Church, and the Christian Science Facility). The dominant land use of the corridor is residential. The residential areas along Old Lee Highway are oriented to the cross streets of Old Lee Highway with only a few residences having direct access to that roadway. The nonresidential corridor uses do front on Old Lee Highway. With few exceptions, Old Lee Highway is the sole means of vehicular access to the uses in the corridor.

#### Streets and Traffic

Old Lee Highway, as its name implies, was once a major thoroughfare through Fairfax. With construction of Lee Highway, its function as a long-distance corridor was supplanted. Old Lee Highway is now classified an *Urban Collector Roadway*, the functions of which are:

“The collector street system differs from the arterial systems in that facilities on this system penetrate neighborhoods and provide access to abutting land use.

It distributes trips from the arterials through the area to the ultimate destination that may be a local or collector street.

In some instances, a small amount of through traffic may, due to the design of the collector facility, find its way to the collector system.”<sup>4</sup>

#### Intersections

Within the study area Old Lee Highway has the following 13 intersections:

- |                                      |                       |
|--------------------------------------|-----------------------|
| 1. Layton Hall Drive/Farrcroft Drive | 8. Queen Anne Drive   |
| 2. Colony Road                       | 9. Country Hill Drive |
| 3. Old Post Road                     | 10. Cornell Road      |
| 4. Heritage Lane                     | 11. Rebel Run         |
| 5. Parklane Road                     | 12. Great Oaks Drive  |
| 6. Embassy Lane                      | 13. Ridge Avenue      |
| 7. Brookwood Drive                   |                       |

The minor approaches of these intersections are currently stop-controlled. Old Lee Highway is free-flow for the length of the study area.

The corridor has dedicated right turn lanes at four locations: Farrcroft Drive in the northbound direction, Ridge Avenue southbound, Great Oaks Drive southbound, and Rebel Run southbound. The corridor also has five left turn lanes: Layton Hall Drive northbound, at the

<sup>4</sup> Fairfax City “Street Functional Classifications”



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south entrance to Fairfax High School, Rebel Run (the High School's north entrance) Cornell Road (southbound across from the High School) and Farrcroft Drive southbound.

### Roadway Geometry

Old Lee Highway's pavement varies in width throughout the length of the study area. Figure 3 shows one of the areas where the pavement width substantially exceeds that needed for the vehicles.

Figure 4 summarizes the variation in pavement widths along the length of Old Lee Highway.



Figure 3 Old Lee Highway Looking East at Parklane Road

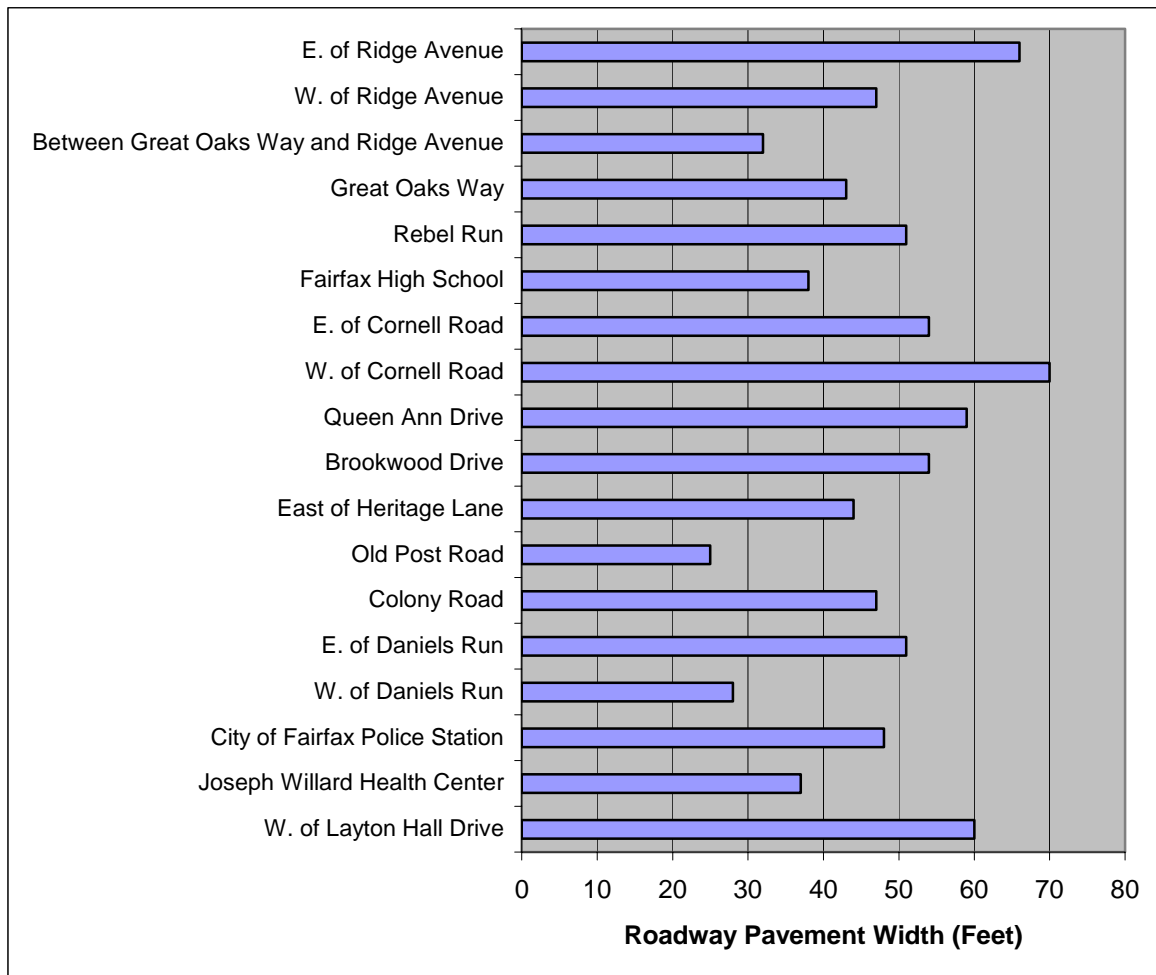


Figure 4 Old Lee Highway Pavement Widths



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### Traffic Volumes

Traffic counts on Old Lee Highway were performed in late 2003 and indicate a daily traffic volume of about 16,500 vehicles. The peaking pattern of traffic is typical, with an AM peak hour between 6 AM and 8 AM and a peak between 4 PM and 6 PM. The PM peak is about 16% higher than the AM, with about 1400 vehicles per hour at its crest versus 1200 in the AM. Given the low-density residential development of the corridor and the moderate intensity of the other uses in the corridor, Old Lee Highway accommodates a moderate to high percentage of through traffic. Appendix E provides summaries of the traffic counts used for this analysis.

### Traffic Capacity Analysis

The existing traffic volumes at the intersections along Old Lee Highway were analyzed to determine traffic operational Levels of Service. Level of Service (LOS) is a quality measurement of traffic flow in terms of speed and travel time, freedom to maneuver, comfort, and convenience. There are six LOS designations, represented by the letters A through F, with LOS A representing the best operating conditions (free flow) and LOS F the worst (gridlock congestion). Table 2 provides the LOS ratings for unsignalized intersections, which are defined in terms of average vehicle delay (seconds per vehicles).

Level of Service	Average Delay
A	< 10
B	10 - 15
C	15 - 25
D	25 - 35
E	35 - 50
F	> 50

Table 2 Level of Service Measure

Table 3 summarizes the LOS results from this analysis for side street traffic attempting to enter the mainline. Intersections operating at LOS F on the minor approaches have been highlighted.

Intersection with Old Lee Highway	Level of Service		Approach Delay (Seconds/Vehicle)	
	AM	PM	AM	PM
Colony Road	D	E	26.1	36.5
Old Post Road	E	E	35.8	47.5
Heritage Lane	C	C	20.0	20.4
Parklane Road	C	C	24.8	24.3
Embassy Lane	C	D	24.5	25.4
<b>Brookwood Drive</b>	<b>E</b>	<b>F</b>	<b>44.9</b>	<b>53.4</b>
Queen Anne Drive	D	C	25.4	23.6
<b>Country Hill Drive</b>	<b>E</b>	<b>F</b>	<b>44.2</b>	<b>60.8</b>
<b>Cornell Road</b>	<b>F</b>	<b>F</b>	<b>63.3</b>	<b>56.5</b>
<b>Rebel Run</b>	<b>F</b>	<b>F</b>	<b>68.1</b>	<b>61.2</b>
Great Oaks Drive	C	C	21.0	15.5
Ridge Avenue	C	C	18.5	23.5

Table 3 Existing Levels of Service (2003)

While some of the intersections exhibit poor operational characteristics on the side streets during peak hours, the issues with delay and gaps are mainly confined to those periods. Field observations indicate Old Lee Highway flows freely during non-peak periods. The side street



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volumes do not generally warrant installation of a traffic signal at this time, but may need to be re-examined in the future if and major land-use changes were to occur in the area.

### Speed

The posted speed limit of Old Lee Highway is 30 mph. An analysis of data provided by the City of Fairfax Police Department indicates about 32 percent of the vehicles using Old Lee Highway exceed this posted limit by up to 10 mph and only 1 percent by more than 10 mph. The distribution of speeders varies significantly by time of day, with most speeding occurring between 8 PM and 5 AM. All speeders exceeding 40 mph (more than 10 mph over the limit) were recorded between 11 PM and 5 AM.

### Accident Data

As part of the scope of this study, accident history was evaluated to determine if any trends were apparent on Old Lee Highway. Accident data was gathered from the City of Fairfax Police Department for the past five years, from 1999 to 2003. The most accidents were recorded on Rebel Run, followed by Old Post Road, then Brookwood Drive and Layton Hall Drive. In the five years examined, only one accident involved a bicyclist (relatively minor injuries were incurred and the bicyclist was faulted). No accidents involved pedestrians.

Most of the accidents (65%) involved rear-end collisions. The intersection with the most accidents, Old Post Road, had 18 collisions (of which 16 were rear-end collisions). This is almost double the number of accidents as the next intersection, Rebel Run with 10 accidents (of which 7 were rear-end collisions).

### School Zones

There are three school zones along Old Lee Highway. Each location is marked with signing to indicate that the speed limit is reduced to 25 miles per hour during school hours. A crossing guard controls traffic at the crosswalk between Saint Leo the Great School and Daniels Run Elementary School to allow students to cross from the south or north side of the road. There is also a crossing guard who controls traffic at Fairfax High School for the crosswalk near the south end of the school. All of the school crosswalks are marked with school advanced warning signage and school crosswalk warning assemblies.

In the morning, each zone starts 40 minutes before and ends 30 minutes after school starts. In the afternoon, each zone starts 30 minutes before and ends 30 minutes after school let out for the day. Figure 5 indicates the periods that each school affects traffic Tuesdays through Fridays. On Mondays Daniels Run Elementary and Saint Leo the Great School let out at 1:20 pm and 12:30 pm, respectively.

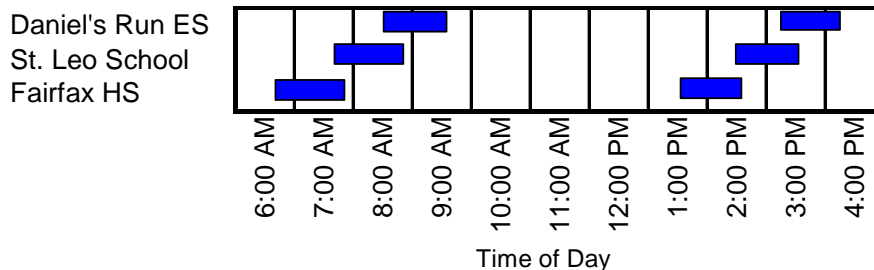


Figure 5 School Zone Times





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## Bus Stops

The City of Fairfax bus system, CUE, has 15 stops along Old Lee Highway, of which 4 have shelters. All of the paired stops (on opposite sides of the roadway) are near crosswalks. Those stops are at the following locations:

- |   |                |
|---|----------------|
| 1. Layton Hall Drive                                  | Both sides     |
| 2. Daniels Run Elementary/ Saint Leo the Great School | Both sides     |
| 3. Blenheim Home / Heritage Lane                      | Both sides     |
| 4. Embassy Lane                                       | Eastbound side |
| 5. Brookwood Drive                                    | Westbound side |
| 6. Queen Anne Drive                                   | Eastbound side |
| 7. Fairfax High School / Cornell Drive                | Both sides     |
| 8. Great Oaks Drive/ Army-Navy Country Club           | Both sides     |
| 9. Ridge Avenue                                       | Both sides     |

## Bicycle and Pedestrian Circulation

The bike paths and sidewalks along Old Lee Highway are discontinuous and vary in width, design and alignment throughout the length of Old Lee Highway. There are eight marked crosswalks along Old Lee Highway, one of which, at Fairfax High School and Cornell Drive, is supplemented with lights and a manual switch. The crossing is marked with white pavement striping highlighted by flashing lights in the pavement and two flashing lighted crosswalk signs on either side of the crosswalk. The other crosswalks are also striped but are not illuminated or signed, except at the school crosswalks, as discussed above.

The crosswalks along Old Lee Highway vary in length due to the varying width of Old Lee Highway. Figure 6 graphically conveys the variation in crosswalk lengths.

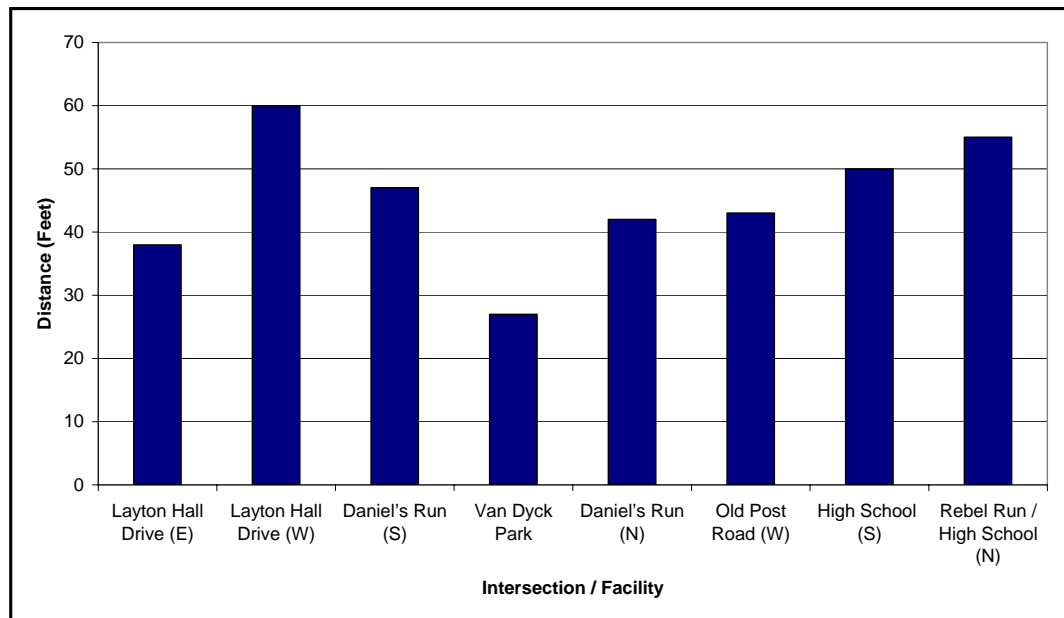


Figure 6 Crosswalk Lengths



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### Landscaping

The corridor varies substantially along its length in its visual/aesthetic character. Beginning in the vicinity of the Army/Navy Country Club the roadway is confined to a shallow valley with overarching trees providing a sense of confinement. This gives way to a more open cross section heading southwest, with Fairfax High School set below the grade of the roadway on the north side of the corridor. The middle section of the corridor is characterized by a series of cross streets to adjacent residential areas with smaller trees and varying pavement widths. At Saint Leo the Great School and Daniels Run Elementary School, the corridor opens up and flattens out, a condition that continues almost as far as Layton Hall Drive. The roadbed itself traverses a series of modest rises and dips along its length.