Wiehle Avenue/Reston Parkway

Station Access Management Plans

Final Report

Submitted to
Fairfax County,
Department of Transportation

Submitted by
VHB *Vanasse Hangen Brustlin, Inc.*

April 15, 2008

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Reston Metrorail Station
Access Management Plan

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Prepared for:

Fairfax County, VA

Prepared by:

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Acknowledgements

This project is the accumulation of many months of work, none of which would have been possible without the help and support of the community. The project team would like to extend its sincerest thanks to the many members of the Reston community who participated in this planning process, including those who provided us with invaluable feedback through the series of community meetings that were a part of this project. Most especially, we would like to thank the members of the Reston Metrorail Access Group (RMAG), who advised the evolution of these station access plans on a monthly basis, and to Supervisor Cathy Hudgins for understanding the need for this project in the community and for assembling such a dedicated and hardworking group.

- Patty Nicoson, Chair
- Faitmah Allahdoust, Virginia Department of Transportation
- Michael Batt, Greater Reston Chamber of Commerce
- Daniel Bibeault, Winterport Cluster President
- Jennifer Blackwell, Reston Association Board of Directors President
- Andrew Camarda, Newbridge Cluster President
- Robert Deans, Hunters Green Cluster President
- Dave Edwards, Reston Association Transportation Committee
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- Keith Goodman, Fairfax County Department of Transportation
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- Joe Leighton, Wethersfield Cluster Association President
- Diana Lord, Disability Services Board
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Executive Summary

With the expectation that the initial phase of Metrorail service from West Falls Church to Tysons Corner, Reston, Dulles Airport and Loudoun County would open for revenue service as early as 2011, Fairfax County recognized the need for detailed analyses to determine the appropriate improvements to support access to and from the rail stations. The County initiated the Wiehle Avenue/Reston Parkway Station Access Management Plans study to consider the current status and future needs in the vicinity of the two stations to provide pedestrian and bicycle access, to provide effective bus feeder service, and to deal with traffic projected in the area of the stations. A project team headed by Vanasse Hangen Brustlin, working closely with County staff and the Reston Metrorail Access Group (RMAG), a citizens group appointed by Supervisor Cathy Hudgins, conducted inventories of existing facilities, examined forecasts of the projected modal demands for 2030, identified current and projected deficiencies of the existing roadways, transit services, pedestrian facilities and bike facilities, developed principles for the priority to be given to each mode in developing solutions, and developed a prioritized program of recommended actions.

The primary goal of this plan is to provide access to and from the two Metrorail stations that are proposed for the Reston area in the median of the Dulles International Airport Access Highway (DIAAH) at Reston Parkway and Wiehle Avenue. The Wiehle Avenue station is planned to be the last stop in the first phase of the rail line development. The second phase of the rail project, which would extend the Metrorail line past Dulles Airport, will include the station at Reston Parkway. Once construction commences, the time period between these two phases is predicted to be small; only a few years by some estimates. This project uses a planning horizon of 2030, when both stations will be fully operational as mid-line stations. This project has the additional benefit of highlighting infrastructure improvements that are necessary or desired by community members throughout Reston. Many of the elements in the plan will benefit residents and employees of Reston regardless of the existence of Metrorail stations and should be considered for implementation on their own merits.

Congestion and safety for all modes of transportation will be major issues in the Reston for 2030 unless a set of comprehensive actions are implemented to accommodate the projected growth in travel demand. This report details an array of strategies and projects that can be used to improve conditions for all travelers, residents and employees in Reston. Increased roadway capacity, travel demand management (TDM) strategies, additions to the network of pedestrian paths and spot safety improvements are all represented in these recommendations. The implementation of these recommendations will help ease congestion, improve safety and increase mobility and accessibility for Metrorail passengers and local residents and employees.

The Wiehle Avenue/Reston Parkway Metrorail Station Access Management Study was designed with the intention of providing access to the new Metrorail stations and around the station areas for all modes of transportation including private vehicles, buses, pedestrians and bicyclists. A more detailed analysis was conducted in the areas closest to the stations, as the transportation network in this Influence Area will have the highest travel volumes of all modes. The four modes of travel will be competing for limited space, capacity and resources in the areas around the Reston stations.

In order to arrive at the best set of solutions, a delicate balance between each of the modes must be established by evaluating the tradeoffs between specific recommendations. Through a series of

meetings, the RMAG and the general public worked with the project team to determine the community's priorities for improvements and how these tradeoffs should be considered. The ultimate decision, which has received significant support from community members, is that in the station areas priority should be given as follows:

1. Pedestrians
2. Bicyclists
3. Transit Users (buses)
4. Private Vehicles (drivers and carpools)

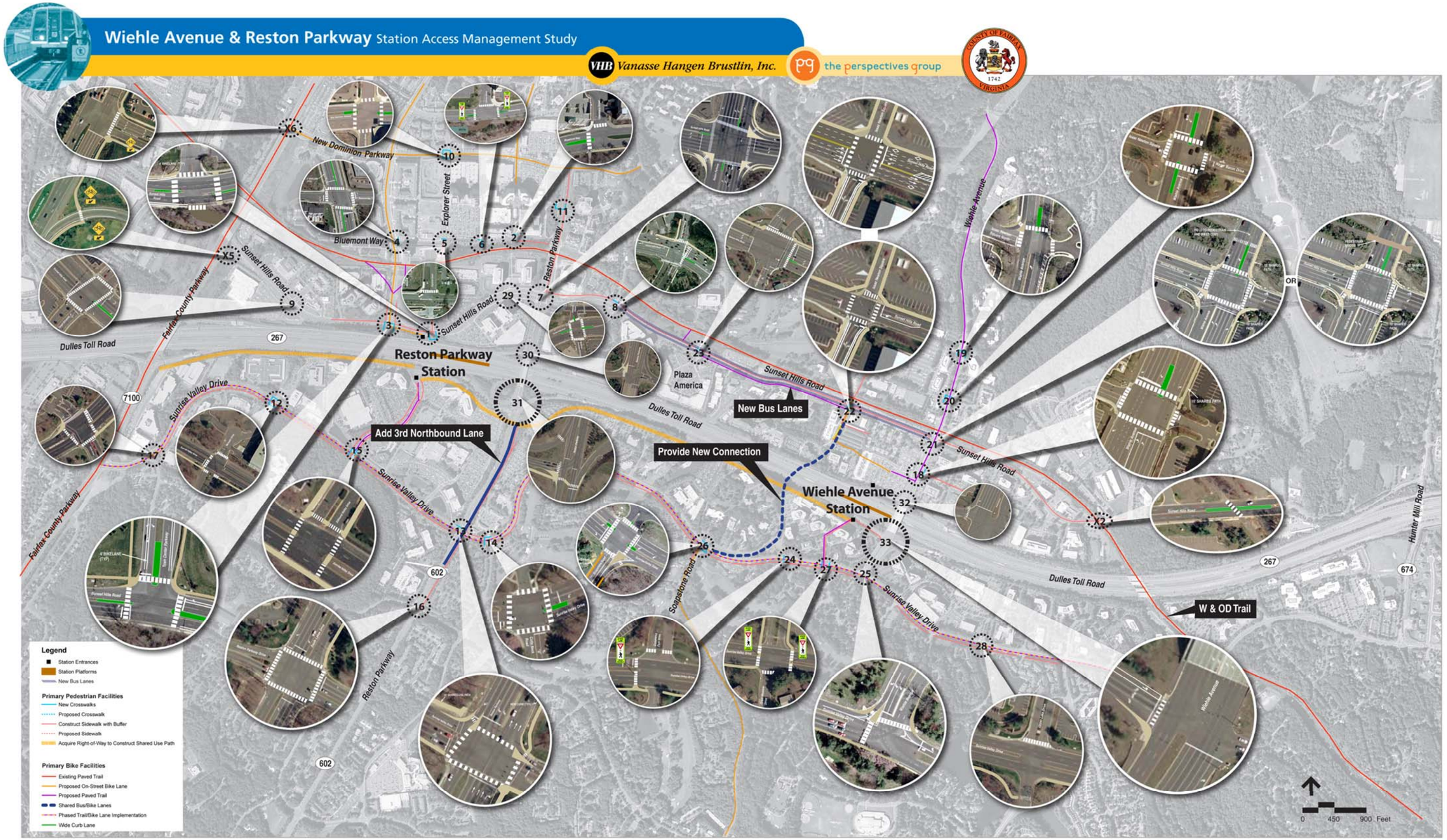
In effect, this prioritization methodology recognizes that some level of vehicular congestion in the area is unavoidable and that the safety and convenience of the other modes (especially the non-motorized modes) should be considered more important than reducing the level of congestion. Walking, bicycling and transit use are encouraged in Reston in 2030. The full set of recommended physical actions can be found in Figure ES - 1.

Cost estimates are developed for each of the actions recommended in this report. The majority of the costs will be capital costs which include facility construction and the purchase of new equipment. All of the roadway, pedestrian and bicyclist projects are included in this category, along with some of the transit costs including the new garage space and new vehicles. These costs total over $105 million in 2007 dollars as shown in Table ES- 1. Transit operating costs are estimated to be approximately $15.2 million annually, in 2007 dollars.

Table ES- 1: Total Estimated Costs (in 2007 dollars)

Capital Costs			
	Roadways		$69,817,500
	Pedestrian/Bicyclist		
		Intersections	$5,383,800
		Paths & Bike Lanes	$22,029,500
	Transit		
		Vehicles	$4,400,000
		Facilities	$3,500,000
	TOTAL		$ 105,130,800
Operating Costs			
	Feeder Bus System	$15,248,575	annually

Figure ES - 1: Recommended Station Access Management Actions



A. Roadways

Projected travel demand in the study area was evaluated by investigating the estimated growth in residents, jobs and other travel in the region. The project team used a traffic micro-simulation tool called VISSIM that accounted for the complex interactions of traffic flow between different intersections when analyzing the vehicular traffic in Reston. The tool also accounts for the needs of pedestrians and buses by including them during simulation.

By 2030, the existing transportation network will not be able to accommodate all of the unconstrained projected peak-hour demand for vehicle travel at all intersections in the study area. Many more vehicles will want to use the roadways than can be accommodated using the existing facilities. The analysis looks at the series of roadway improvements called for in the Environmental Impact Statement (EIS) in addition to a series of supplemental improvements designed to improve traffic throughput at the most congested intersections. The effects of each of these potential improvements were analyzed using the simulation tool and the effects on pedestrians, bicyclists and transit passengers were also considered. Based on this work, a series of roadway projects is recommended, including:

A. New signal and turn lanes on Sunset Hills Road for access into the proposed Reston Parkway Metrorail station
B. New left turn lane for westbound left turning movement at the intersection of Sunset Hills Road/Isaac Newton Square W
C. Add a second left turn lane for northbound traffic at the intersection of Wiehle Avenue and the Station Entrance (between Sunset Hills Road and the Dulles International Airport Access Highway [DIAAH]) and provide a second inbound lane
D. Add an additional left turn lane on the eastbound DIAAH ramps at Wiehle Avenue
E. Improve the existing right turn lane for the eastbound Sunset Hill Road at Wiehle Avenue
F. Improve the existing right turn lane for the westbound Sunrise Valley Drive at Wiehle Avenue
G. Add northbound through lane on Reston Parkway from Sunrise Valley Drive to the on-ramp for eastbound DIAAH
H. Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Drive
I. Provide a new connection over the DIAAH between Soapstone Drive and Isaac Newton Sq W.
J. Construct dedicated bus lanes on Sunset Hills Rd from Old Reston Avenue to Wiehle Avenue
K. Isaac Newton Square West from Isaac Newton Square South to the station as an extension of the proposed Soapstone Connector.
L. The Station Entrance (already planned for improvements as part of station construction) should be extended across Wiehle Avenue to the Private Driveway as far east as Samuel Morse Dr.
M. Michael Faraday Court extension from the new roadway described in (L) north to the extended Roger Bacon Dr described in (N)
N. Extension/improvements to Isaac Newton Square South from Isaac Newton Square West to Wildlife Center Drive.

Projects A-H were included in the Record of Decision[1] (ROD) as mitigation efforts tied to the rail project. The need for dedicated bus facilities is also addressed by the recommendations. The projected level of congestion in Reston will slow transit vehicles if they are forced to travel in general purpose lanes. Providing dedicated bus lanes during peak periods where possible will allow the buses to travel faster and will encourage more people to use transit instead of their private vehicles. Two locations are recommended for the inclusion of dedicated bus lanes including:

[1] Amended Record of Decision. <http://www.dullesmetro.org/about/resources_links.cfm>

- New connector between Soapstone Rd and the Wiehle Ave station
- Sunset Hills Rd between Wiehle Ave & Old Reston Ave

Planning level cost estimates have been developed for each of these projects. The total cost, including an allowance for right-of-way acquisition and other contingencies, is estimated to be almost $70 million in 2007 dollars. Even with these recommended actions, the areas immediately surrounding the stations will experience heavy congestion during peak periods. The full demand will not be accommodated and many travelers, particularly those who do not have an origin or destination within the study area, will find it desirable to change their route, their mode of travel or their time of travel. Policies and programs that encourage other modes of travel, including a comprehensive TDM program will be a key element in accommodating residents, employees and visitors in Reston.

B. Pedestrians and Bicyclists

A set of general recommendations has been developed that should be applied to all roadways and intersections in the whole study area. Based on the proposed roadwork network, intersection infrastructure deficiencies and missing links in the pedestrian and bicycle networks along these paths were identified and recommended improvements were highlighted. Thirty-three intersections and six trail crossings were analyzed in detail with specific recommendations developed for each. The recommendations reflect the desire to complete the network of pedestrian and bicycle facilities in Reston. On-street bike lanes, currently absent in Reston, were also recommended for inclusion on several roadways.

Pedestrian and bicycle recommendations were developed to improve circulation and safety throughout the Reston community, not only for people accessing the stations directly. Internal trips within the Reston community are expected to account for a large portion of pedestrian and bicycle traffic. Access to and around the Reston Town Center was addressed, in addition to pedestrian and bicycle access across the DIAAH. In total, these recommendations are estimated to cost over $27 million to construct. The major types of recommended actions included:

- Crosswalks, pedestrian countdown signals and median refuges.
- Additional sidewalks.
- Shared-use trails.
- On-street bike lanes.

Several features of each intersection including user safety, distance to the Metrorail stations and community input were used to prioritize these recommendations. Many of these recommended actions would be appropriate and necessary regardless of whether or not Metrorail comes to Reston, as pedestrian activity is still likely to grow in the area and should be encouraged to avoid intolerable congestion.

C. Transit and Feeder Bus

Opportunities for expanded bus service to feed the new Metrorail stations and provide local access around for residents and employees in Reston are explored. The project team worked very closely with FAIRFAX CONNECTOR and Fairfax County staff to determine the new bus routings and developed a set of thirteen routes that connect the community to the new Metrorail stations. In addition to the needs of commuters, local bus service was also retained and expanded for those residents and employees who utilize the bus to make local trips within Reston. The proposed routes were discussed with the RMAG and modified as deemed appropriate. Figure ES - 2 and Figure ES - 3 show the structure of the new feeder bus service and the coverage provided in the Reston community during the peak service hours.

Figure ES - 2: Recommended Peak Period Transit Route Structure - North

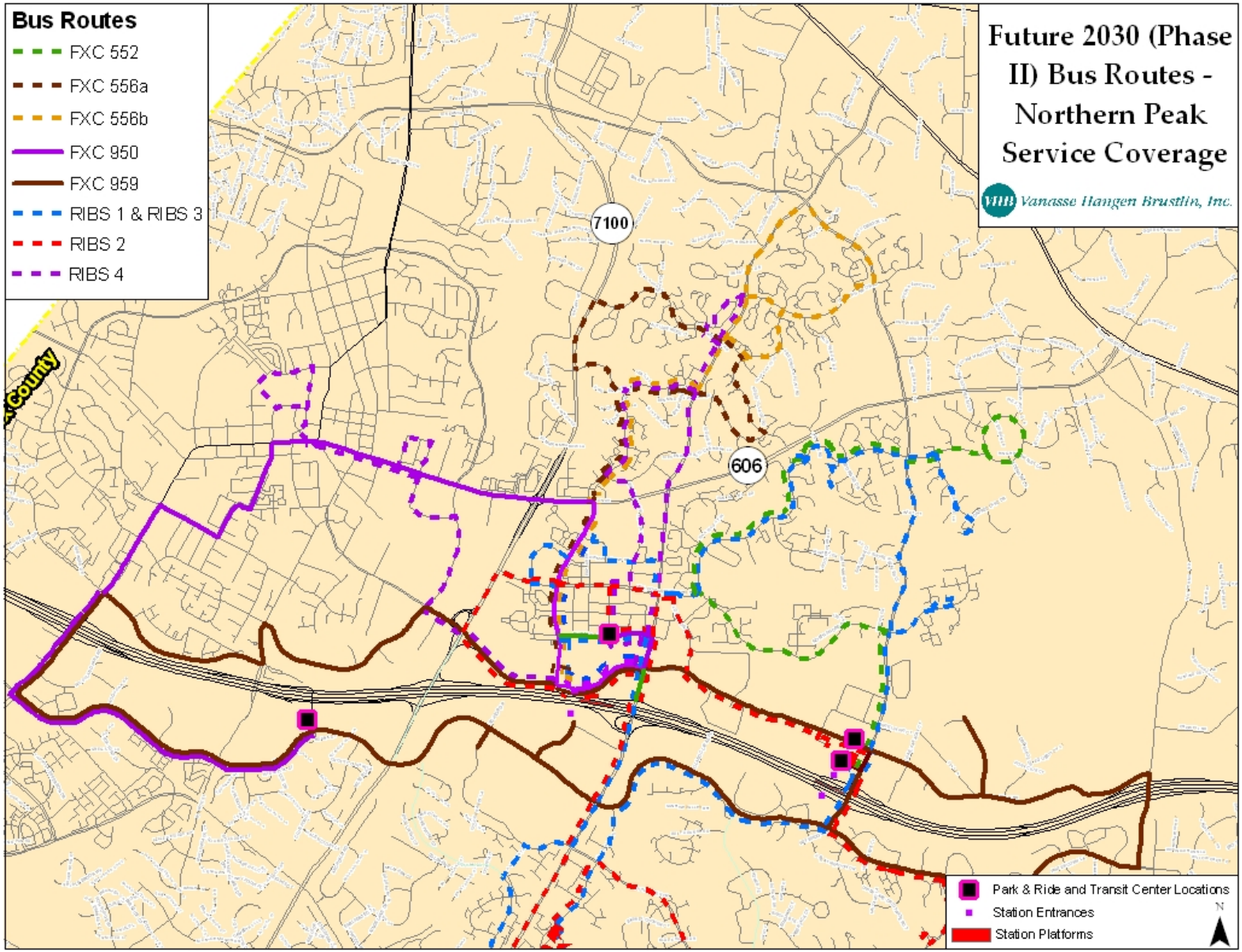
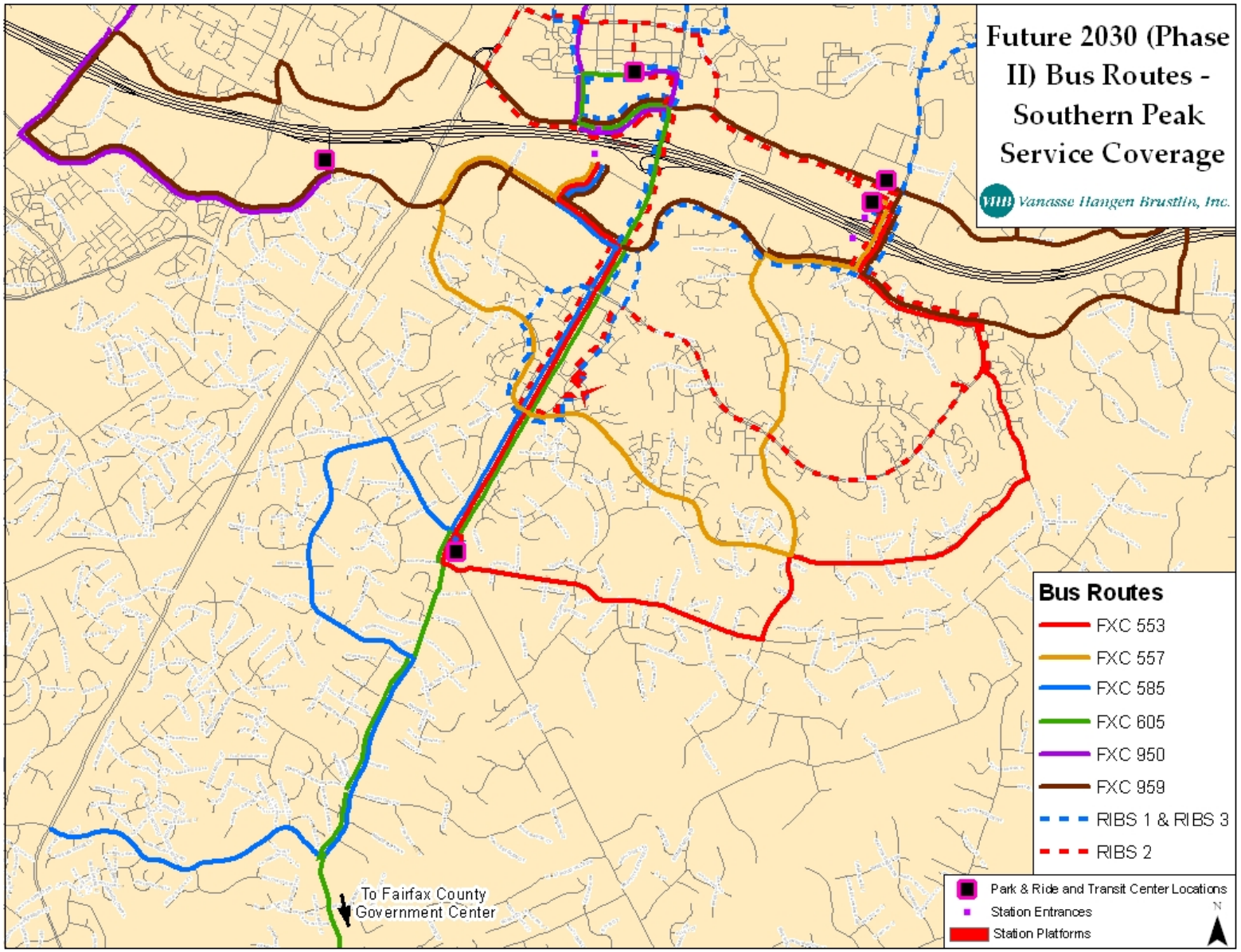


Figure ES - 3: Recommended Peak Period Transit Route Structure - South



Estimates of total bus ridership in the Reston area was developed as part of the FEIS. These ridership levels in addition to field observations of land use patterns were used to determine the necessary service frequencies on each of the recommended routes. Routes with higher ridership levels were recommended to operate at higher frequencies in order to provide adequate capacity. Bus frequencies were set as multiples of seven minutes (train frequencies) so that the buses would be able to match the arrivals of passengers on the Metrorail trains.

Estimates for the number of vehicles, drivers, mechanics and supervisory staff needed to operate this new system were developed based on the existing service, the estimated traffic speeds in 2030 and the necessary headways. It is estimated that an additional 14 buses will be necessary in 2030, which will require a corresponding increase in operational and maintenance staffing levels. The recommended service is estimated to cost an estimated $15.2 million to operate for the year 2030 (in 2007 dollars).

D. Integrated Priorities

An integrated and prioritized list of all the recommendations developed during the course of this study for all potential modes. This includes a discussion of the major tradeoffs and potential future solutions for some of the remaining unsolved issues. Travel Demand Management (TDM) strategies, which encourage travelers to switch from single-occupancy-vehicles (SOV) to another mode of travel, are also discussed. While prioritizing projects in order of importance, this chapter also discusses the reality of implementation which dictates that some projects will be long-term solutions that cannot be implemented without significant study and analysis.

The recommended program is divided into three groups based on the date of implementation. The first group (shown in Figure ES - 4) includes all projects that are required at the opening of the Wiehle Avenue station. All of the roadway projects around the Wiehle Avenue station that were part of the ROD mitigation efforts are included in this group. In addition, the proposed Soapstone Connector is included in this group as additional connection across the DIAAH into the Wiehle Avenue station. Local transit service should also be transitioned to the system proposed in this report as part of this group.

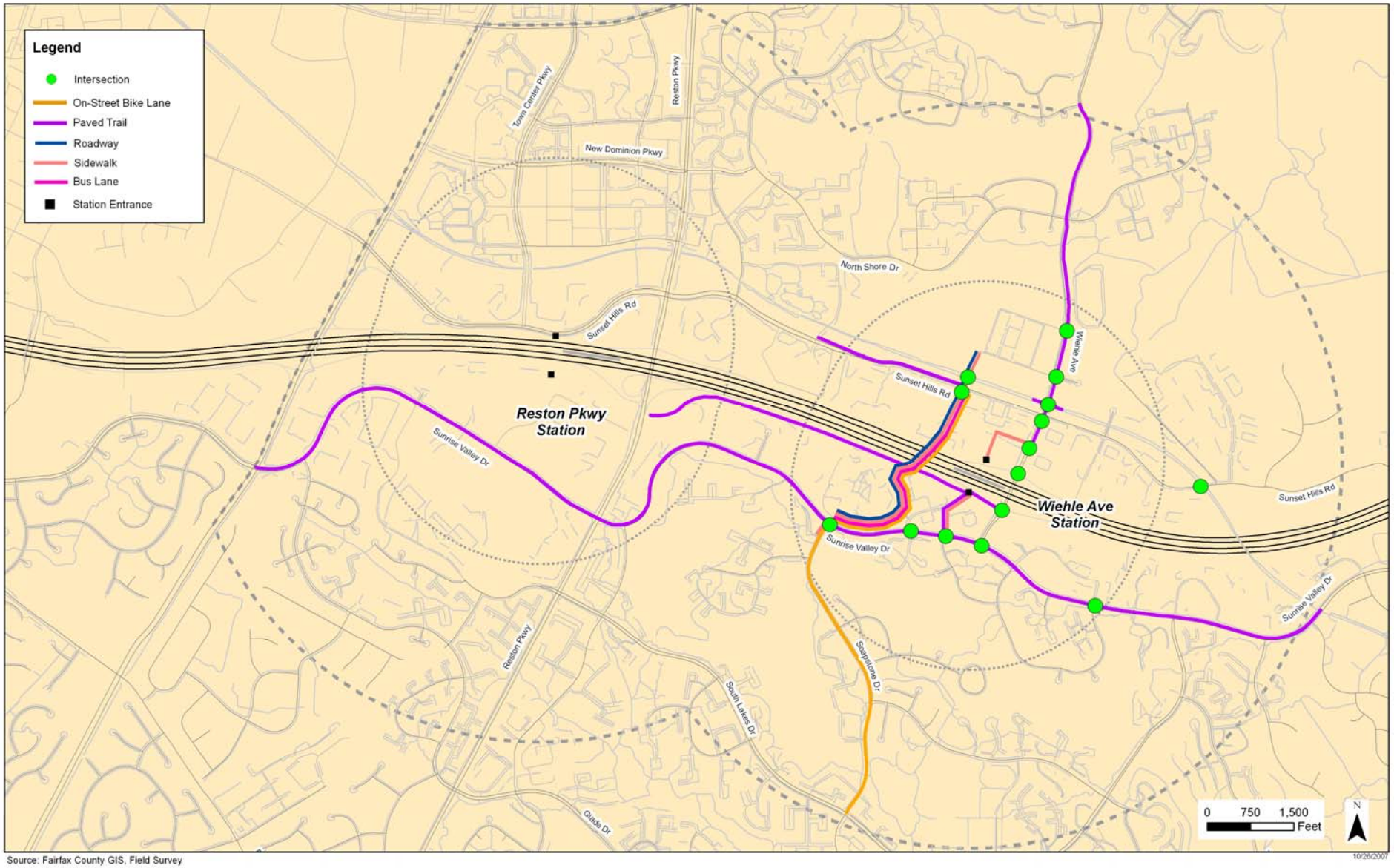
The second group of projects includes all projects that are required for access to the Reston Parkway station and should be constructed by the start of Phase II service. The projects are shown in Figure ES - 5 and include an array of pedestrian and bicycle improvements including sidewalks, trail connections and bike lanes.

The third group of projects, shown in Figure ES - 6, are all projects that are not strictly required for access to either station but are recommended to improve overall accessibility in the station areas. This group includes many of the large-scale projects that require major right-of-way acquisition of other major investments. Each project in this group should be completed as soon as an opportunity becomes available, whether before or after the opening of either Metrorail station. The major projects in this group are the dedicated bus lanes on Sunset Hills Rd and the construction or expansion of several internal streets including Michael Faraday Ct, Isaac Newton Square S and Roger Bacon Drive.

Implementation strategies for the recommended actions are also extremely important to the ultimate success of this project. At the present date, funding for the Dulles Rail project is not certain, and the future, including the start of service date, is relatively unsure. Many of the recommendations in this report will be necessary regardless of the existence of Metrorail stations in Reston as the area continues

to grow. For example, because only a small portion of the vehicle trips projected for the area in 2030 will be caused directly by the presence of the Metrorail station, many of the roadway enhancement projects will be necessary anyway by 2030. Additionally, many of the bicycle and pedestrian facilities are recommended for implementation as soon as possible and will help to enhance the existing pedestrian orientation of the Reston community. Despite the obstacles presented to the Dulles Rail extension as a project, many of the projects detailed in this report should still be pursued by Fairfax County.

Figure ES - 4: Wiehle Avenue Station Projects



Source: Fairfax County GIS, Field Survey

Figure ES - 5: Reston Parkway Station Projects

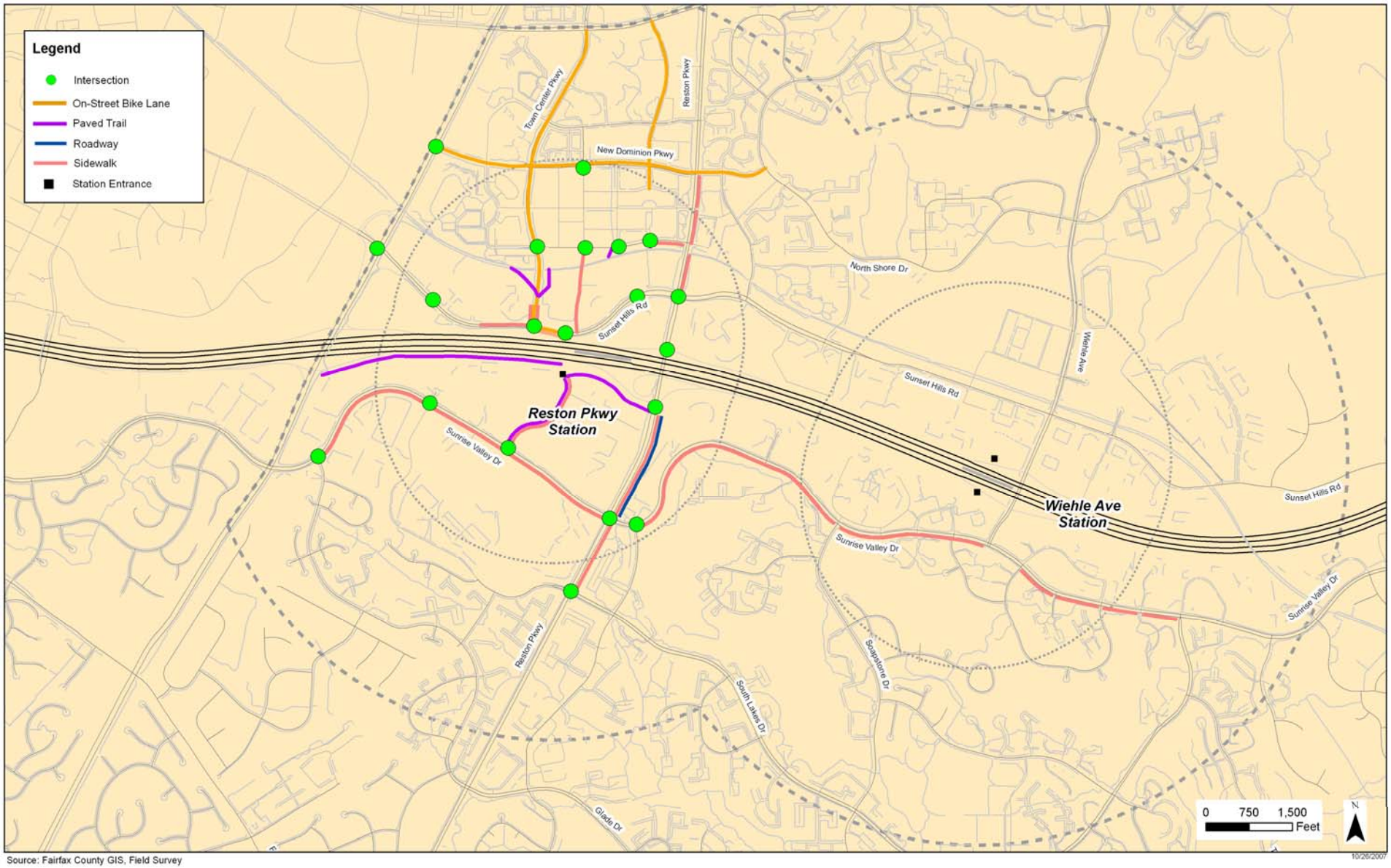
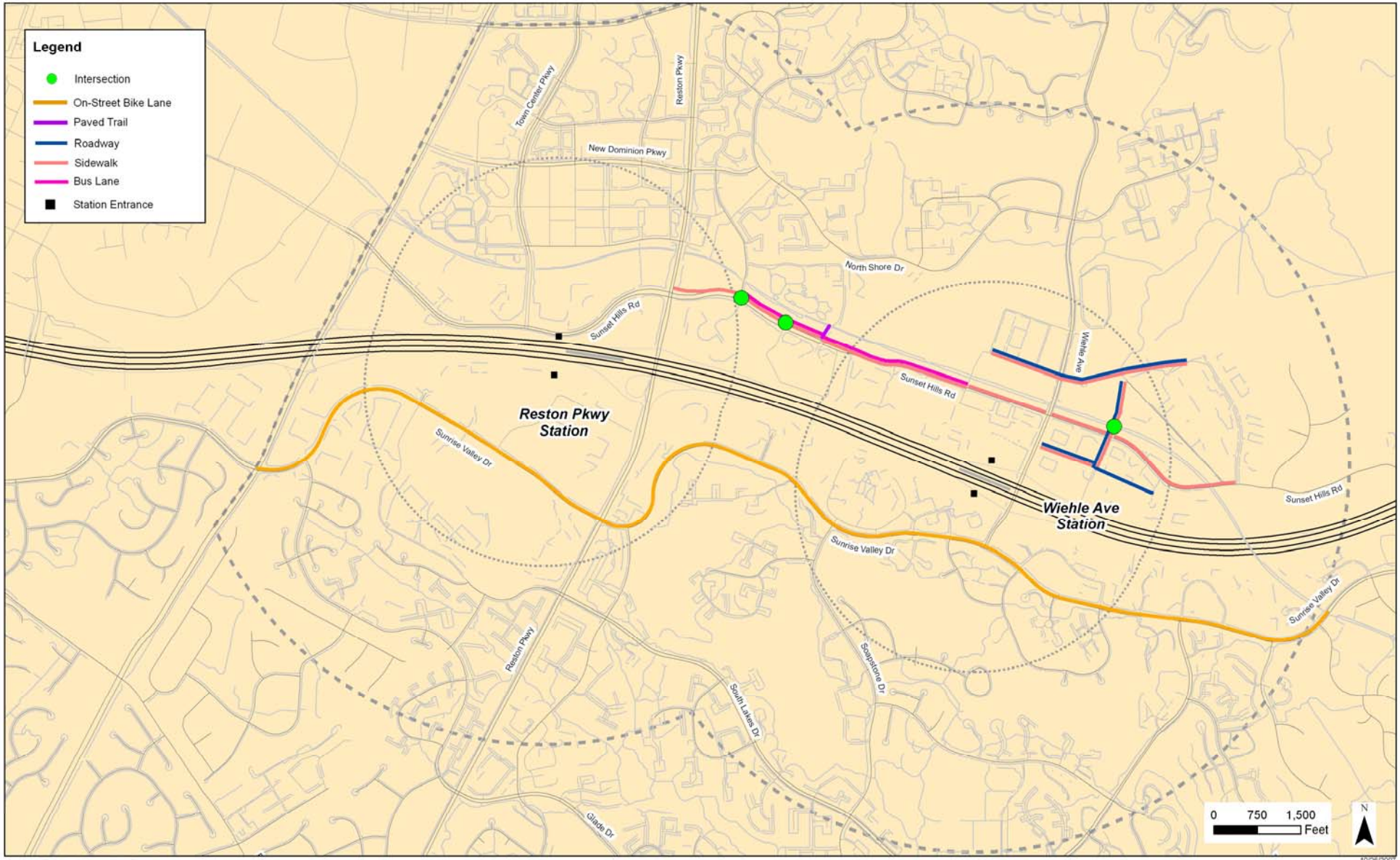


Figure ES - 6: Other Recommended Projects



Source: Fairfax County GIS, Field Survey

1. Introduction

In mid-2006, with the expectation that the initial phase of Metrorail service from West Falls Church to Tysons Corner, Reston, Dulles Airport and Loudoun County would open for revenue service as early as 2011, Fairfax County recognized that there would be the need for detailed analyses to determine the appropriate improvements to support access to and from the rail stations. The County initiated the Wiehle Avenue/Reston Parkway Station Access Management Plans study to consider the current status and future needs in the vicinity of the two stations to provide pedestrian and bicycle access, to provide effective bus feeder service, and to deal with traffic projected in the area of the stations. A project team headed by Vanasse Hangen Brustlin, working closely with County staff and the Reston Metrorail Access Group (RMAG), a citizens group appointed by Supervisor Cathy Hudgins, conducted inventories of existing facilities, examined forecasts of the projected modal demands for 2030, identified current and projected deficiencies, developed principles for the priority to be given to each mode in developing solutions, and developed a prioritized program of recommended actions.

The County and the project team have worked for over a year to analyze the existing and projected future conditions for the Reston area with the introduction of Metrorail service that is anticipated. This report details the analysis and findings of the project team, the RMAG and the citizens who attended and participated in the public meetings. The recommendations and findings presented in this report are a continuation of the work presented in the Existing Conditions Report which was completed in June of 2007.

A. Purpose of the Study

The Station Access Management plan detailed in this report was developed to help accommodate new transportation patterns and volumes that are projected for Reston in the future. The primary goal of this plan is to provide access to and from the two Metrorail stations that are proposed for the Reston area at Reston Parkway and Wiehle Avenue. The Wiehle Avenue station is planned to be the last stop in the first phase of the rail line development which is currently planned for completion in 2013. The second phase of the rail project, which would extend the Metrorail line past Dulles Airport, will include the station at Reston Parkway. Once construction commences, the time period between these two phases is predicted to be small; only a few years by some estimates. However, in order to account for potential delays in construction of either phase of the rail line, this project uses a planning horizon of 2030, when both stations will be fully operational as mid-line stations. This project has the additional benefit of highlighting infrastructure improvements that are necessary or desired by community members throughout Reston. Many of the elements in the plan will benefit residents and employees of Reston regardless of the existence of Metrorail stations and should be considered for implementation on their own merits.

The introduction of two Metrorail stations in the Reston area will create new travel options for residents and employees of the area. The presence of the stations is expected to attract some people from outside of Reston who want to use Metrorail to access other regional destinations. The new service will contribute to a change in the travel patterns in the area as higher volumes of people seek access to Reston on a daily basis by any available mode. Commuter travel will play a large role in these changes as residents of the immediate and surrounding areas will be able to use Metrorail to access major employment centers in downtown Washington, DC and Tysons Corner. Employees in Reston will also be able to access their jobs on a daily basis from these Metrorail stations. Occasional use of the Metrorail

station for shopping, entertainment and other reasons will also be important during off peak hours. The changes in the transportation network will cause residents and employees of Reston to make their work trips using different routes and different modes in 2030 than they currently do, primarily due to the introduction of Metrorail service.

However, much of the change in travel patterns projected for 2030 will be unrelated to the new Metrorail stations, as population and employment levels in the Reston area and the Washington metropolitan region as a whole continue to increase over the next 25 years. The burden on the transportation network is expected to increase dramatically as improved accessibility and mobility in Reston is also likely to cause a change in the land uses in the areas around the new stations. As more people will find these areas highly desirable as residential and commercial locations, density of both residences and offices is likely to increase in the areas closest to the stations. As the whole region (and particularly Loudon County) continues to grow, travel through the Reston area is also projected to increase.

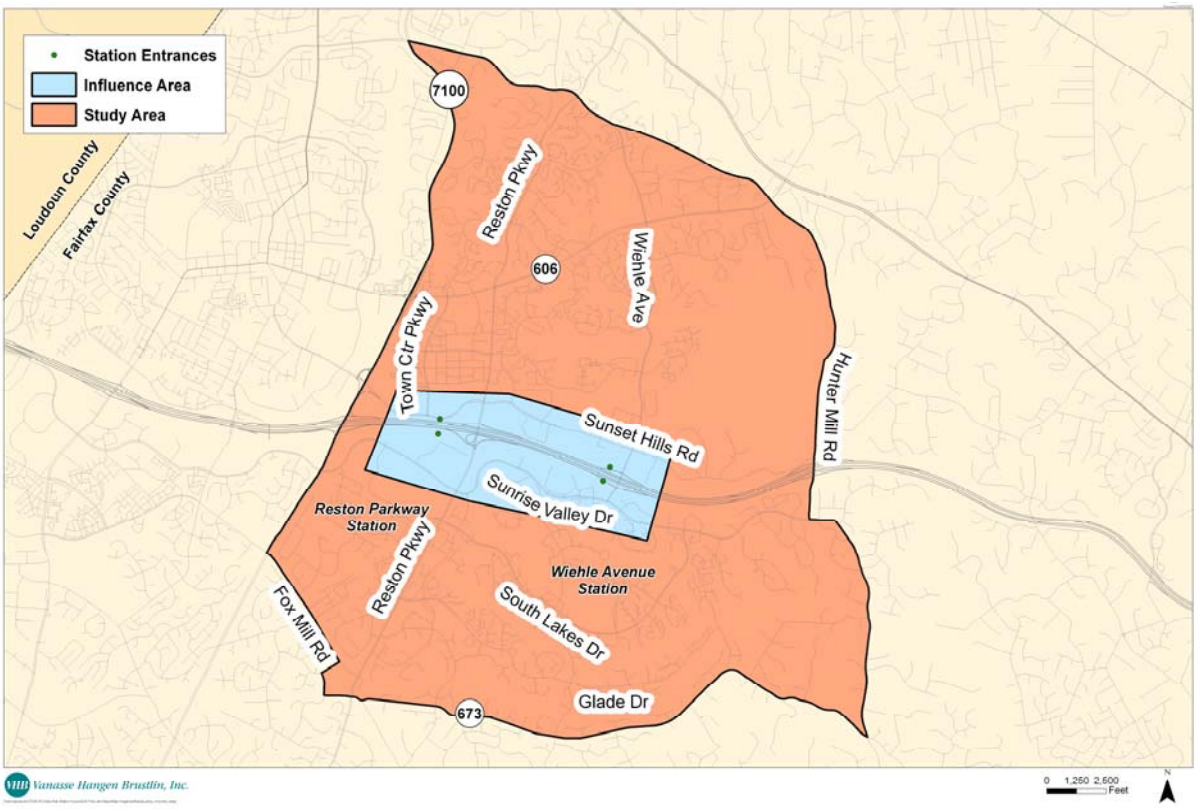
Congestion and safety for all modes of transportation will be major issues in the Reston area for 2030 unless a set of comprehensive actions are implemented to accommodate the projected growth in travel demand. This report details an array of strategies and projects that can be used to improve conditions for all travelers, residents and employees in Reston. Increased roadway capacity, travel demand management (TDM) strategies, additions to the network of pedestrian paths and spot safety improvements are all represented in these recommendations. The implementation of these recommendations will help ease congestion, improve safety and increase mobility and accessibility for Metrorail passengers and local residents and employees.

B. Scope of the Study

The Wiehle Avenue/Reston Parkway Metrorail Station Access Management Study was designed with the intention of providing access to the new Metrorail stations and around the station areas for all modes of transportation including private vehicles, buses, pedestrians and bicyclists. The study area for each of these modes is slightly different because people are able to access the stations from varying distances based on their selected mode of travel. For example, a pedestrian is typically willing to walk up to ½ mile to access a Metrorail station, while a driver may be willing to travel many miles to access the same service. A study area for this project was developed that includes the furthest extent of all of the travel modes, as shown in Figure 1-1. A more detailed analysis was conducted in the areas closest to the stations, as the transportation network in this Influence Area will have the highest travel volumes of all modes.

Four modes of travel will be competing for limited space, capacity and resources in the areas around the Reston stations. The strategies that would be ideal for each mode are often at odds with each other and projects will certainly have to compete for funding at the county and state level. For example, vehicular traffic congestion can often be mitigated by adding additional lanes and turn bays at intersections. However, these expanded intersections necessitate longer and more dangerous crossings for pedestrians. In an area with high levels of pedestrian traffic, longer crossings necessitate additional signal time devoted to the pedestrian phase. This in turn takes time away from the aforementioned congested roadways. In a busy community with significant levels of traffic in multiple modes like Reston, roadway widening must be weighed against the needs of other modes in order to develop solutions that provide a workable network for all system users.

Figure 1-1: Study Area and Influence Area



In order to arrive at the best set of solutions for each community a delicate balance between each of the modes must be established by evaluating the tradeoffs between specific recommendations. The project team has worked extensively on this issue with the appointed Reston Metrorail Access Group (RMAG) since the start of the project. Through a series of meetings, the RMAG and the general public worked with the project team to determine the community's priorities for improvements and how these tradeoffs should be considered. The ultimate decision, which has received significant support from community members is that in the station areas priority should be given as follows:

1. Pedestrians
2. Bicyclists
3. Transit Users (buses)
4. Private Vehicles (drivers and carpools)

Each recommendation included in this report has considered the needs of each of these four groups, such that the ultimate recommendations provide the highest level of accessibility to pedestrians and bicyclists and minimizes the effects of roadway improvements on the other groups. In effect, this prioritization methodology recognizes that some level of vehicular congestion in the area is unavoidable and that the safety and convenience of the other modes (especially the non-motorized modes) should be considered more important than reducing the level of congestion. Walking, bicycling and transit use are encouraged in Reston in 2030.

The recommendations included in this report represent the study team's best effort to accommodate the needs of all of the different modes. Where tradeoffs were apparent, the priorities developed by RMAG and the community were used to determine the best set of solutions. The recommendations are divided by mode in the report for ease of reference, however the complete set of solutions reflect the

priorities of the community. The final chapter integrates all of the different modal recommendations into one comprehensive plan.

C. Contents of the Report

This report contains sections on each of the potential station access modes: vehicular traffic, pedestrians and bicyclists, and transit. Different analysis methods were used to determine the recommended set of improvements for each mode; however each recommended action was considered from the perspective of all of the modes and weighed according to the priorities determined by the Reston community and RMAG.

a. Roadways

Chapter 2 includes the analysis of roadways in the study area that expands on the analysis conducted for the Existing Conditions Report. Projected travel demand in the study area was evaluated by investigating the estimated growth in residents, jobs and other travel in the region. The project team utilized a traffic micro-simulation tool called VISSIM that accounted for the complex interactions of traffic flow between different intersections when analyzing the vehicular traffic in Reston. The tool also accounts for the needs of pedestrians and buses by including them during simulation.

By 2030, the existing transportation network will not be able to accommodate all of the unconstrained projected peak-hour demand for vehicle travel at all intersections in the study area. Many more vehicles will want to use the roadways than can be accommodated using the existing facilities. Additional capacity, where compatible with current development and other community goals, may be desirable in order to mitigate gridlock and congestion. The analysis looks at the series of roadway improvements called for in the Environmental Impact Statement (EIS) in addition to a series of supplemental improvements designed to improve traffic throughput at the most congested intersections in the Influence Area. The effects of each of these potential improvements were analyzed using the simulation tool and the effects on pedestrians, bicyclists and transit passengers were also considered. Based on this work, a series of roadway projects is recommended including:

A. New signal and turn lanes on Sunset Hills Road for access into the proposed Reston Parkway Metrorail station
B. New left turn lane for westbound left turning movement at the intersection of Sunset Hills Road/Isaac Newton Square W
C. Add a second left turn lane for northbound traffic at the intersection of Wiehle Avenue and the Station Entrance (between Sunset Hills Road and the Dulles International Airport Access Highway [DIAAH]) and provide a second inbound lane
D. Add an additional left turn lane on the eastbound DIAAH ramps at Wiehle Avenue
E. Improve the existing right turn lane for the eastbound Sunset Hill Road at Wiehle Avenue
F. Improve the existing right turn lane for the westbound Sunrise Valley Drive at Wiehle Avenue
G. Add northbound through lane on Reston Parkway from Sunrise Valley Drive to the on-ramp for eastbound DIAAH
H. Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Drive
I. Provide a new connection over the DIAAH between Soapstone Drive and Isaac Newton Square W.
J. Construct dedicated bus lanes on Sunset Hills Rd from Old Reston Avenue to Wiehle Avenue
K. Isaac Newton Square West from Isaac Newton Square South to the station as an extension of the proposed Soapstone Connector.

L. The Station Entrance (already planned for improvements as part of station construction) should be extended across Wiehle Avenue to the Private Driveway as far east as Samuel Morse Dr.
M. Michael Faraday Court extension from the new roadway described in (L) north to the extended Roger Bacon Dr described in (N)
N. Extension/improvements to Isaac Newton Square South from Isaac Newton Square West to Wildlife Center Drive.

Projects A-H are mitigation efforts listed in the Record of Decision (ROD) for the rail project. Projects K-N are expansions of extensions of existing private streets that will create an internal grid of streets in the Wiehle Avenue station area and relieve some of the congestion on the major roadways. The need for dedicated bus facilities is also addressed because the projected level of congestion in Reston will slow transit vehicles if they are forced to travel in general purpose lanes. Providing dedicated bus lanes during peak periods where possible will allow the buses to travel faster and will encourage more people to use transit instead of their private vehicles.

Planning level cost estimates have been developed for each of these projects. The total cost, including an allowance for right-of-way acquisition and other contingencies, is estimated to be almost $70 million in 2007 dollars.

Even with these recommended actions, the areas immediately surrounding the stations will experience heavy congestion during peak periods. The full demand will not be accommodated and many travelers, particularly those who do not have an origin or destination within the study area, will find it desirable to change their route, their mode of travel or their time of travel. Policies and programs that encourage other modes of travel, including a comprehensive TDM program will be a key element in accommodating residents, employees and visitors in Reston.

b. Pedestrians and Bicyclists

Chapter 3 includes the construction projects and policy improvements that are recommended to improve pedestrian and bicyclist access to the proposed Metrorail stations. The recommended physical improvements are based on the extensive survey that was conducted in the area as part of the Existing Conditions Report. A set of general recommendations has been developed that should be applied to all roadways and intersections in the whole study area.

The level of pedestrian traffic estimated for the area was developed based on the mode share forecasts developed as part of the FEIS[2]. Based on the origins and destinations of these pedestrians, the project team was able to develop a series of paths that connect these points of interest and estimates of the number of pedestrians and bicyclists who would be using each facility during the peak period. Based on the proposed roadwork network developed in the previous chapter, intersection infrastructure deficiencies and missing links in the pedestrian and bicycle networks along these paths were identified and recommended improvements were highlighted. Thirty-three intersections and six trail crossings were analyzed in detail with specific recommendations developed for each. In addition, missing trail segments and sidewalk sections were identified and the recommendations reflect the desire to complete the network of pedestrian and bicycle facilities in Reston. Bike lanes, currently absent in Reston, were also recommended for inclusion on several roadways.

[2] *Final Environmental Impact Statement and Section 4(f) Evaluation*, December 2004. < http://www.dullesmetro.org/community/impact_report.cfm>

Pedestrian and bicycle recommendations were developed to improve circulation and safety throughout the Reston community, not only for people accessing the stations directly. Internal trips within the Reston community are expected to account for a large portion of pedestrian and bicycle traffic. Access to and around the Reston Town Center was addressed, in addition to pedestrian and bicycle access across the DIAAH. In total, these recommendations are estimated to cost over $27 million to construct.

Estimated costs were developed for each of the recommended pedestrian and bicycle improvements. Several features of each intersection including user safety, distance to the Metrorail stations and community input were used to prioritize these recommendations. Many of these recommended actions would be appropriate and necessary regardless of whether or not Metrorail comes to Reston, as pedestrian activity is still likely to grow in the area and should be encouraged to avoid intolerable congestion.

c. Transit and Feeder Bus

Chapter 4 addresses the need for expanded bus service to feed the new Metrorail stations and provide local access around Reston. This section details changes to the existing bus route structure that would provide better service to more residents and employees in Reston. The project team worked very closely with FAIRFAX CONNECTOR and Fairfax County staff to determine the new bus routings and developed a set of thirteen routes that connect the community to the new Metrorail stations. In addition to the needs of commuters, local bus service was also retained and expanded for those residents and employees who utilize the bus to make local trips within Reston. The proposed routes were discussed with the RMAG and modified as deemed appropriate.

Estimates of total bus ridership in the Reston area were developed as part of the FEIS. These ridership levels in addition to field observations of land use patterns were used to determine the necessary service frequencies on each of the recommended routes. Routes with higher ridership levels were recommended to operate at higher frequencies in order to provide adequate capacity. Bus frequencies were set as multiples of seven minutes (train frequencies) so that the buses would be able to match the arrivals of passengers on the Metrorail trains.

Estimates for the number of vehicles, drivers, mechanics and supervisory staff needed to operate this new system were developed based on the existing service, the estimated traffic speeds in 2030 and the necessary headways. It is estimated that an additional 14 buses will be necessary in 2030, which will require a corresponding increase in operational and maintenance staffing levels. The recommended service is estimated to cost an estimated $15.2 million to operate for the year 2030 (in 2007 dollars). Capital costs are also estimated for 2030 including the purchase of new vehicles and the additional garage space that they will require. Improvements will also be necessary for many bus stops throughout the area.

d. Integrated Priorities

Chapter 5 includes an integrated and prioritized list of all the recommendations developed during the course of this study for all potential modes. The prioritization methodology that was used groups projects based on when they need to be completed: before the opening of the Wiehle Avenue station, before the opening of the Reston Parkway station or as soon as an opportunity becomes available. While prioritizing projects in order of importance, this chapter also discusses the reality of

implementation which dictates that some projects will be long-term solutions that cannot be implemented without significant study and analysis.

Implementation strategies for the recommended actions are also extremely important to the ultimate success of this project. As of this writing, funding for the Dulles Rail project is not certain, and the future, including the start of service date, is unsure. Many of the recommendations in this report will be necessary regardless of the existence of Metrorail stations in Reston as the area continues to grow. For example, because only a small portion of the vehicle trips projected for the area in 2030 will be caused directly by the presence of the Metrorail station, many of the roadway enhancement projects will be necessary anyway by 2030. Additionally, many of the bicycle and pedestrian facilities are recommended for implementation as soon as possible and will help to enhance the existing pedestrian orientation of the Reston community. Despite the obstacles presented to the Dulles Rail extension as a project, many of the projects detailed in this report should still be pursued by Fairfax County. Some implementation strategies, including potential funding sources are included in Chapter 5.

2. Roadways

This chapter presents and discusses the results of the traffic analysis completed for the horizon year 2030. The analyses continue from the previous work performed for the Existing Conditions Report. An analysis of the growth of population, employment and travel in the study was conducted and is detailed in this chapter. The analyses examine the baseline conditions of implementing the recommended EIS mitigation strategies, as well as pedestrian improvements, and then identify additional measures to improve traffic conditions. A series of roadway improvements are recommended and prioritized for implementation. Cost estimates for construction are also estimated.

A. Existing Conditions

VHB previously completed an analysis of existing conditions in the study area and the results were presented in the *Wiehle Avenue/Reston Parkway – Station Access Management Plans: Profile of Existing Conditions*, dated June 22, 2007 which can be found at http://www.fairfaxcounty.gov/fcdot/pdf/wr_sam/existing_conditions_june22.pdf. This Existing Conditions Report also presented information relative to the roadway classification of the roadways within the Study Area.

Current traffic operations were analyzed using the simulation tool Synchro (version 6), with input files obtained from the Virginia Department of Transportation (VDOT). The intersection measures of effectiveness (MOEs) such as Level of Service (LOS) and delay were summarized by producing reports in the Highway Capacity Manual (HCM) format that were provided in the Existing Conditions Report. The analysis had shown that most intersections perform at a LOS of "C" or better during the AM and PM peak hours. There are only a handful of the intersections that were examined that performed at an LOS of "D" or worse.

These results raised several issues with respect to the application of the HCM methodology to quantify intersection MOEs. This methodology examines each intersection in isolation; it does not account for metering from upstream intersections, nor does it account for intersection spillback from downstream intersections. For example, the LOS of the intersection of Reston Parkway and Sunset Hills was computed as LOS E in the AM peak hour; however, the intersection of Reston Pkwy and the westbound DIAAH ramps operate at LOS F, and often spills back into this intersection, preventing vehicles from leaving the intersection of Reston Pkwy/Sunset Hills. The actual performance of this intersection is therefore worse than predicted by the HCM methodology, which does not account for queue spillback.

The second issue that was identified in the analysis was that the counts that VDOT provided within their Synchro files do not reflect full demand. The counters that fed information into the Synchro files only reflect intersection throughput, rather than demand, as the intersection cannot process everyone due to capacity constraints or downstream intersection congestion. Thus, when counts from oversaturated conditions are used, intersection MOEs reported by the HCM methodology tend to understate congestion levels and show better operating conditions than actual network performance.

For the reasons described above, the study team applied a much more sophisticated traffic operations analysis software program for future conditions: VISSIM. This program accounts for queue spillback effects and produces more accurate measures of system operational performance.

B. Projected Land Use and Travel Demand Growth

This section summarizes projected land use and travel demand for 2030. As shown in Figure 1-2, the boundaries of the study area include the Fairfax County Parkway to the west, Hunter Mill Road to the east, Fox Mill Road and Lawyers Road to the south, and Wiehle Avenue to the north. In addition, a station influence area that refers to the area immediately surrounding the two proposed stations was identified as a way to focus on the stations in the station access management plans.

a. Land Use Growth

The Metropolitan Washington Council of Governments (MWCOG) Round 7.0 cooperative land use forecasts were used to calculate future 2030 travel demand. Figure 2-1 shows the 2030 projected population around the Reston area. Every zone within the study area will have some level of residential population in 2030. Figure 2-1 shows percent population change from 2005 to 2030 in this area. The total projected population in the study area in 2030 is approximately 82,000, which increases approximately 28% from the 2005 total population. Compared to 2005, the areas that are expected to increase the most in population by 2030 include the station influence area directly adjacent to the stations as well as the residential areas along Route 28, with more than 200% growth.

Figure 2-1: 2030 Study Area Population

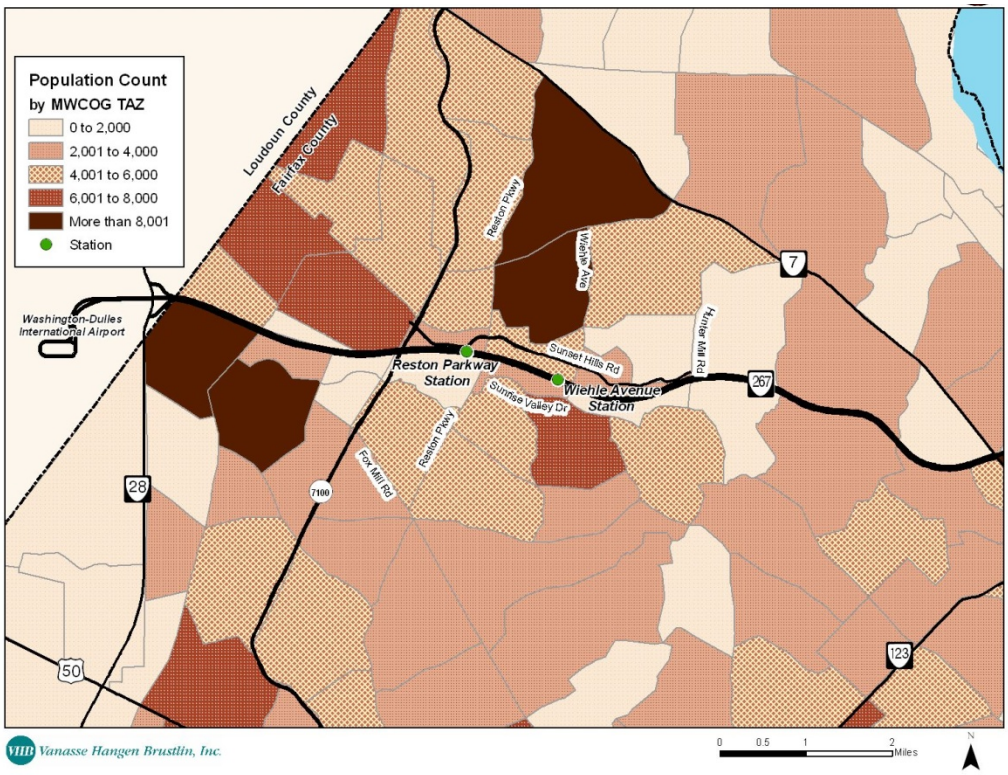


Figure 2-2: 2005 to 2030 Study Area Percent Population Change

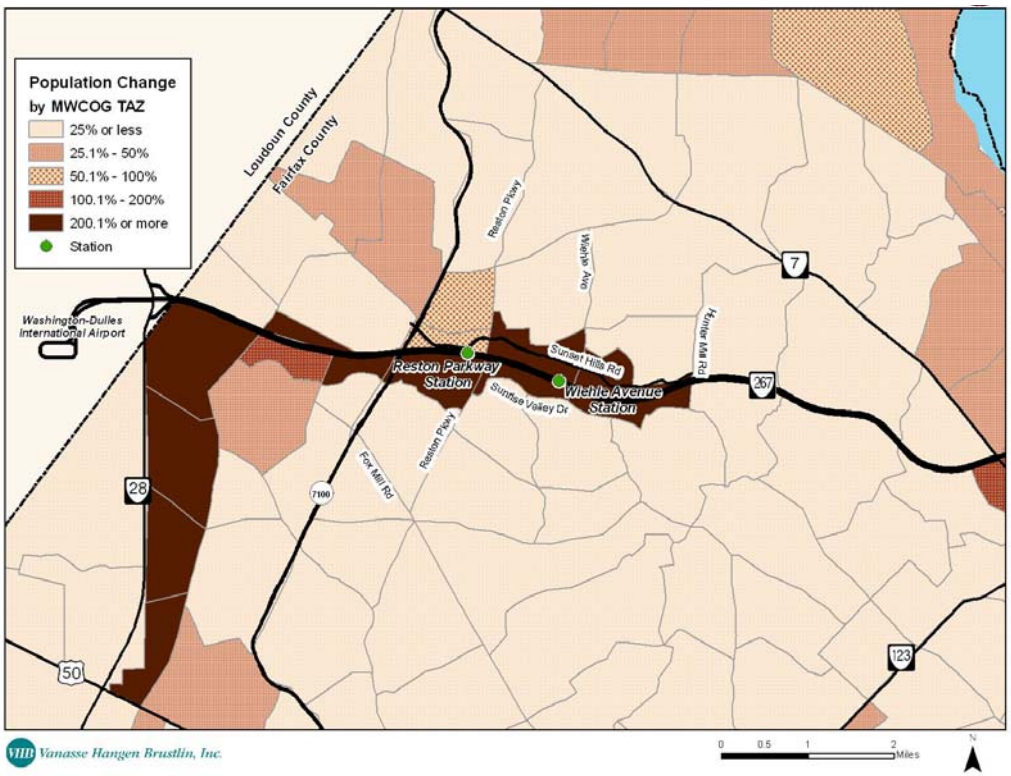


Figure 2-3 shows 2030 projected employment around the Reston area. Although employment will be clustered, all zones in the study area will have some level of employment. Figure 2-4 shows the percent employment change from 2005 to 2030. The total employment in the study area in 2030 is approximately 80,000, an increase of approximately 27% over the total employment in 2005. The total employment in the station area in 2030 is approximately 62,000, also an increase of approximately 27% compared to 2005 total employment. Unlike the population growth pattern, the station area experiences only moderate employment growth, between 25% and 50%.

Figure 2-3: 2030 Study Area Employment Projection

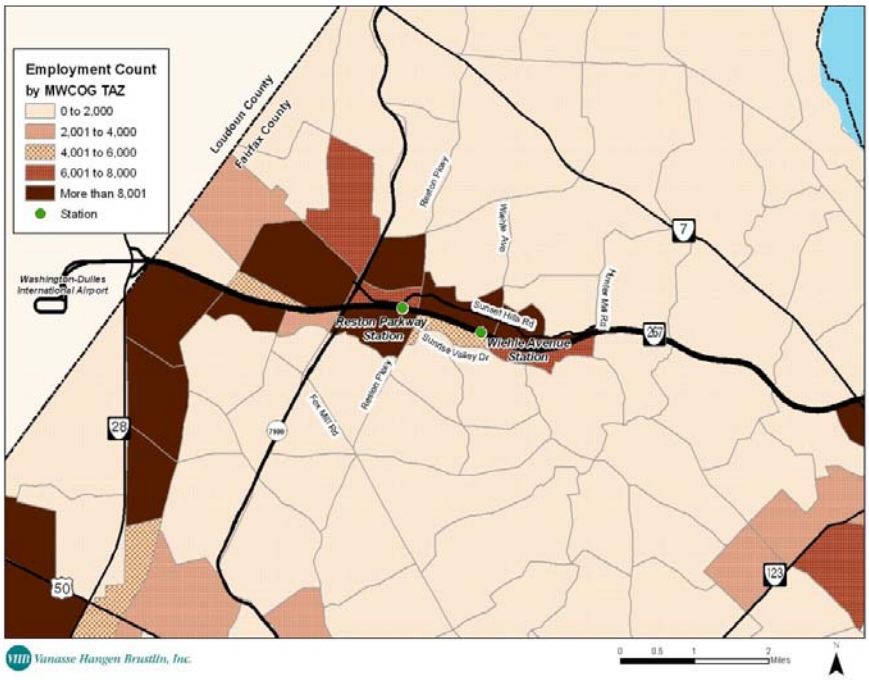
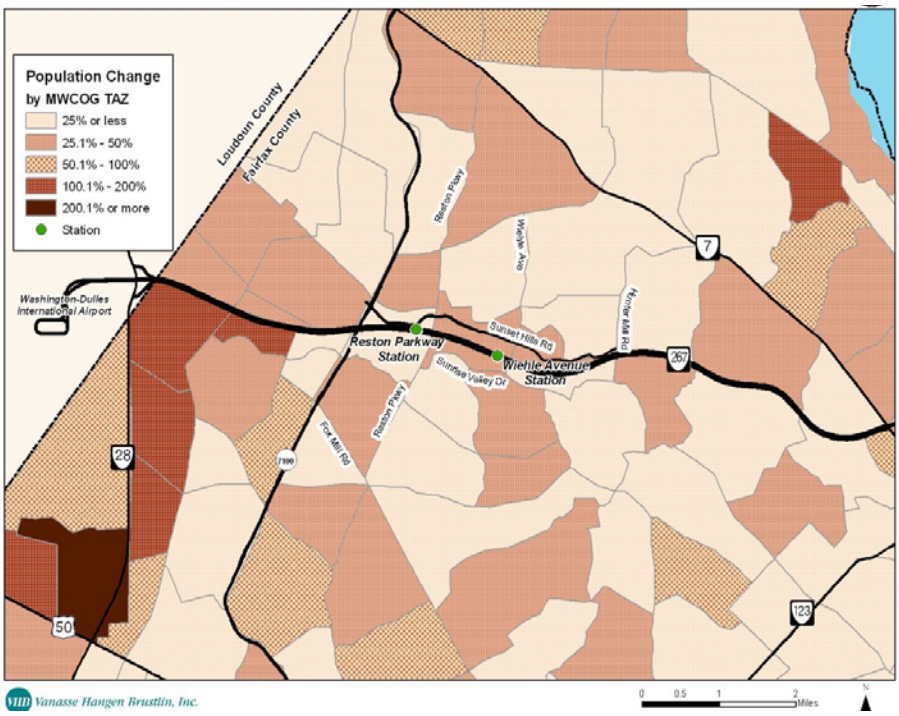


Figure 2-4: 2005 to 2030 Study Area Percent Employment Change



b. Travel Demand Growth

Future travel demand, including automobile, bus and pedestrian modes, was forecast using two primary sources: 1) the Fairfax County regional travel demand model and 2) outputs of the Northern Virginia Major Investment Study Model (NVMISM) that was used for the Dulles Corridor Rapid Transit EIS. The Fairfax County model was used to forecast vehicular demand, not including buses; while NVMISM model outputs were used to forecast bus passenger and pedestrian demand for access to the new Metrorail stations. Automobile demand for the planned park-and-ride structure at the Wiehle Station was forecast independently of the two models based on the assumption that this structure would be operating at capacity by 2030.

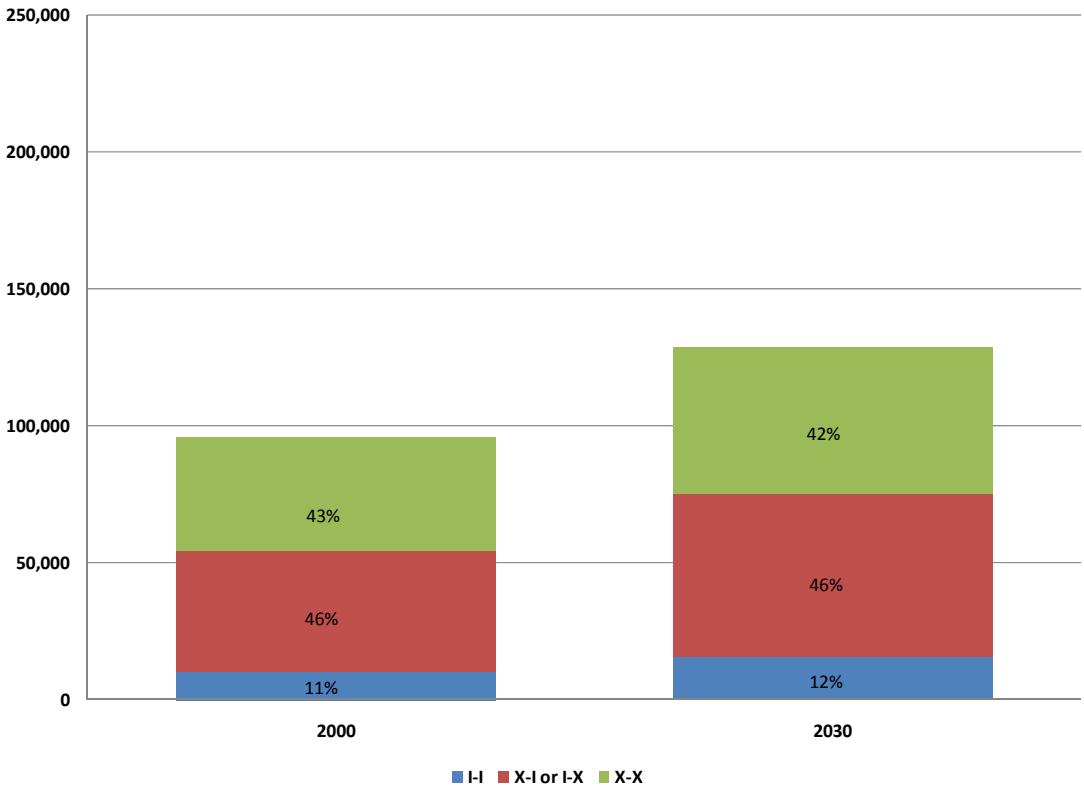
The Fairfax County model is a modified version of the MWCOG regional travel demand model, with a more detailed zone system within Fairfax County. Two sets of refined models were provided to VHB for this study: 1) year 2000 was used as a base year and 2) year 2030 Constrained Long Range Plan (CLRP) network model was used as the future scenario. The modeling periods included the AM peak period from 6 AM to 9 AM and the PM peak period from 4 PM to 7 PM.

A sub-area modeling technique was employed for both the study area and station influence area in order to focus on the trips in the area of interest, as opposed to the whole region. The travel forecasting results for different scenarios were evaluated based on the following three trip types:

- Internal to Internal (I-I): I-I trips are those trips which start and end inside the study area.
- External to Internal (X-I) or Internal to External (I-X): X-I trips are those trips that start outside the study area and end inside the study area. I-X trips are those trips that start inside the study area and end outside the study area.
- External to External (X-X): X-X trips are those trips that start and end outside the study area. They are also called through trips.

Figure 2-5 shows a comparison of total study area trips between 2000 and 2030 for the AM peak period. Overall, the split of the three trip types in 2030 remains almost the same as the base year split. Total trips in 2030 are projected to be 128,867, which is 34% greater than the 95,848 total trips in 2000. I-I trips increase the most of the three types with 55% growth.

Figure 2-5: Comparison of Study Area AM Peak Period Total Trips

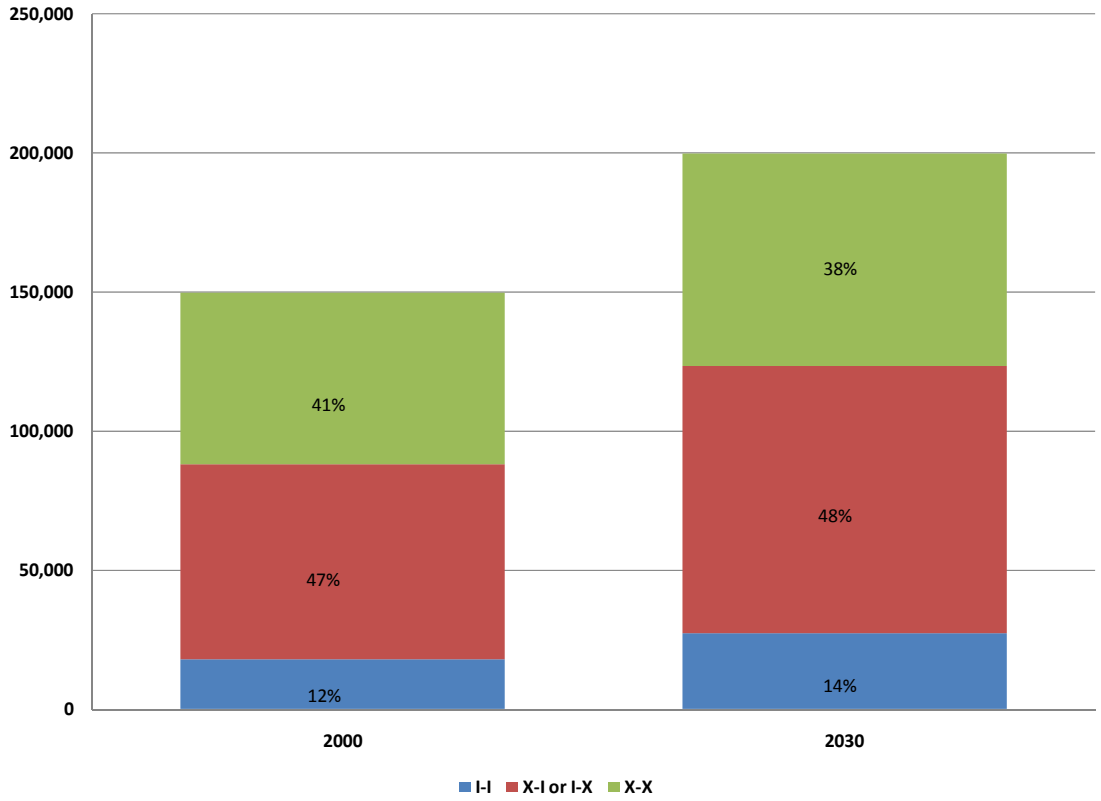


	Year 2000	Year 2030	%Growth
I-I	10,129	15,651	55%
I-X or X-I	44,170	59,633	35%
X-X	41,549	53,583	29%
Total	95,848	128,867	34%

"I-I" are internal to internal trips
"X-I" are external to internal trips
"I-X" are internal to external trips
"X-X" are external to external or through trips

Figure 2-6 shows a comparison of total trips in the study area between 2000 and 2030 for the PM peak period. Overall, total trips in the PM peak period are approximately 55% greater than AM peak period trips in both 2000 and 2030. The split of three trip types in 2030 changes slightly from the base year split. While the X-I or I-X trip split remains almost unchanged, 2-3% of trips would be shifted from X-X trips to I-I trips in 2030. There are 199,415 total trips in 2030, which is 33% greater than the 149,470 total trips in 2000. I-I trips increase the most with growth of 55% over the 30-year period, as in the AM peak period.

Figure 2-6: Comparison of Study Area PM Peak Period Total Trips

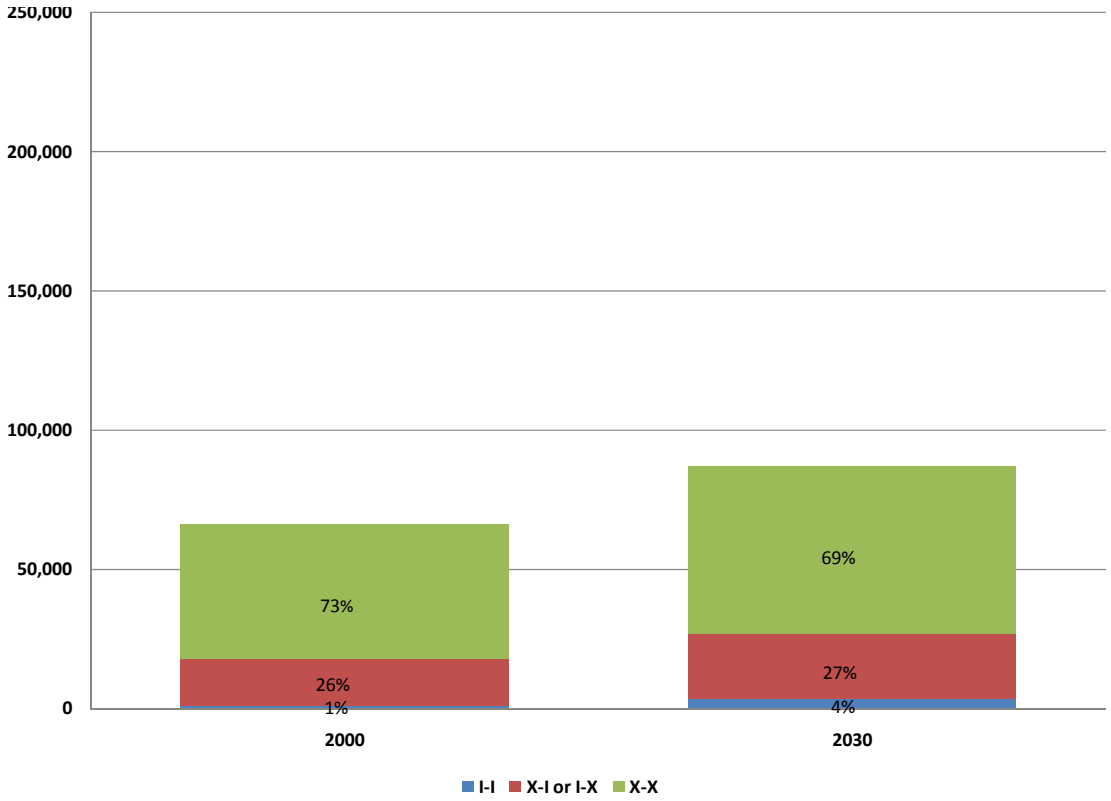


	Year 2000	Year 2030	%Growth
I-I	17,708	27,417	55%
I-X or X-I	70,457	95,591	36%
X-X	61,305	76,407	25%
Total	149,470	199,415	33%

"I-I" are internal to internal trips
"I-X" are internal to external trips
"X-I" are external to internal trips
"X-X" are external to external or through trips

Figure 2-7 shows a comparison of total trips in the station influence area in 2000 and 2030 for the AM peak period. In contrast to travel patterns in the study area, the split of the three trip types in 2030 changes from the base year split. 3-4% of trips would be shifted from X-X trips to I-I trips in 2030. There are 87,379 total trips in 2030, which is 32% greater than the 66,039 total trips in 2000. I-I trips increase the most with 227% growth.

Figure 2-7: Comparison of Station Influence Area AM Peak Period Total Trips



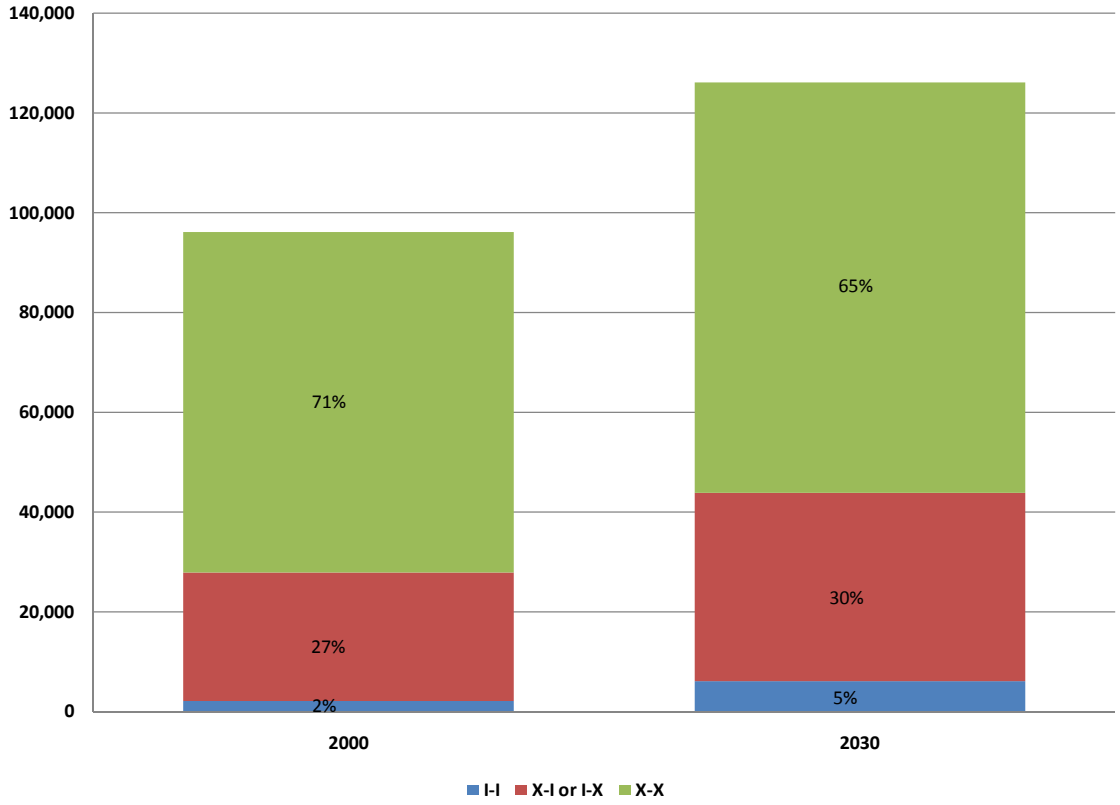
	Year 2000	Year 2030	%Growth
I-I	948	3,100	227%
I-X or X-I	17,008	23,929	41%
X-X	48,083	60,350	26%
Total	66,039	87,379	32%

"I-I" are internal to internal trips
"I-X" are internal to external trips
"X-I" are external to internal trips
"X-X" are external to external or through trips

Figure 2-8 shows a comparison of total trips in the station influence area between 2000 and 2030 for the PM peak period. Overall, total trips in the PM peak period are approximately 45% greater than AM peak period trips in both 2000 and 2030. The split of the three trip types in 2030 all change from the base year split. Both the X-I or I-X trip split and I-I trip split would increase by 3% while the X-X trip split would drop by 6% in 2030. There are 125,888 total trips in 2030, which is 31% greater than the 96,064 total trips in 2000. I-I trips increase the most with 211% growth.

The impact of the proposed stations is more prominent in the station influence area. More trips would be generated with origins and/or destinations that are inside the influence area.

Figure 2-8: Comparison of Station Influence Area PM Peak Period Total Trips



	Year 2000	Year 2030	%Growth
I-I	1,898	5,902	211%
I-X or X-I	25,801	37,925	47%
X-X	68,365	82,061	20%
Total	96,064	125,888	31%

"I-I" are internal to internal trips "I-X" are internal to external trips
"X-I" are external to internal trips "X-X" are external to external or through trips

The DIAAH has a large number of trips that pass through the Reston area without leaving the facility. Table 2-1 shows DIAAH through trips for the study area and station influence area in 2000 and 2030. The volume of trips during the AM peak period in 2030 is projected to be 26%-33% greater than the volume of trips in 2000, while the corresponding growth is projected to be 4%-9% for the PM peak period. One interesting finding is that there are fewer future year AM peak period trips than PM peak period trips in the base year. This indicates that demand is currently approaching or exceeding roadway capacity on the DIAAH during the PM peak period, but not during the AM peak period.

Table 2-1: DIAAH Through Trips

		Year 2000	Year 2030	%Growth
Study Area	AM Peak Period	15,085	19,055	26%
	PM Peak Period	21,716	22,481	4%
Station Influence Area	AM Peak period	15,865	21,054	33%
	PM Peak Period	23,295	25,492	9%

Excluding these DIAAH through trips, study area and station influence area trips for both AM and PM peak periods were compared between 2000 and 2030 (see Table 2-2and Table 2-3). Since the DIAAH trips were counted as X-X trips, the trips for the other two trip types remain unchanged. Figure 2-9 and Figure 2-10 show the trip type proportions - excluding DIAAH through trips - for the study area and station influence area, respectively. The extraction of DIAAH trips results in an increase in the proportion of I-I trips and the proportion of X-I or I-X trips, and a reduction in the proportion of X-X trips when compared to the proportions when DIAAH through trips are included. In the study area, the proportion of I-I, X-I and I-X trips will drop by 2% from 2000 to 2030 for the AM peak period while the proportion will decrease by 1% for the PM peak period. In the station influence area, the proportion of I-I, X-I and I-X trips will drop by 3% from 2000 to 2030 for the AM peak period, while the proportion will also decrease by 3% for PM peak period. This represents a reduction in study and influence area through trips associated with regional roadways in the future, which indicates that the growth in locally-oriented trips is displacing regional through trip demand.

Table 2-2: Comparison of Study Area Trips Excluding DIAAH Through Trips

		Year 2000	Year 2030	%Growth
AM Peak Period	I-I	10,129	15,651	55%
	I-X or X-I	44,170	59,633	35%
	X-X	26,464	34,528	30%
	Total	80,763	109,812	36%
PM Peak Period	I-I	17,708	27,417	55%
	I-X or X-I	70,457	95,591	36%
	X-X	39,589	53,926	36%
	Total	127,754	176,934	38%

Table 2-3: Comparison of Station Influence Area Trips Excluding DIAAH Through Trips

		Year 2000	Year 2030	%Growth
AM Peak Period	I-I	948	3,100	227%
	I-X or X-I	17,008	23,929	41%
	X-X	32,218	39,296	22%
	Total	50,174	66,325	32%
PM Peak Period	I-I	1,898	5,902	211%
	I-X or X-I	25,801	37,925	47%
	X-X	45,070	56,569	26%
	Total	72,769	100,396	38%

Figure 2-9: Study Area Trip Purpose Split Excluding DIAAH Through Trips

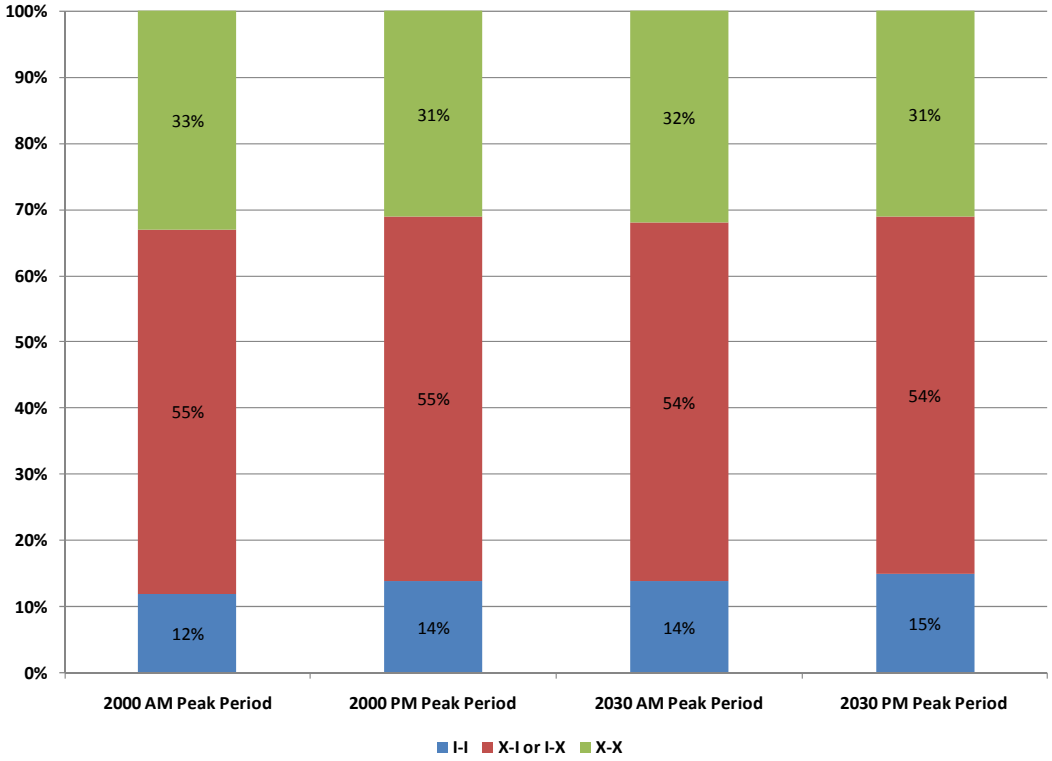
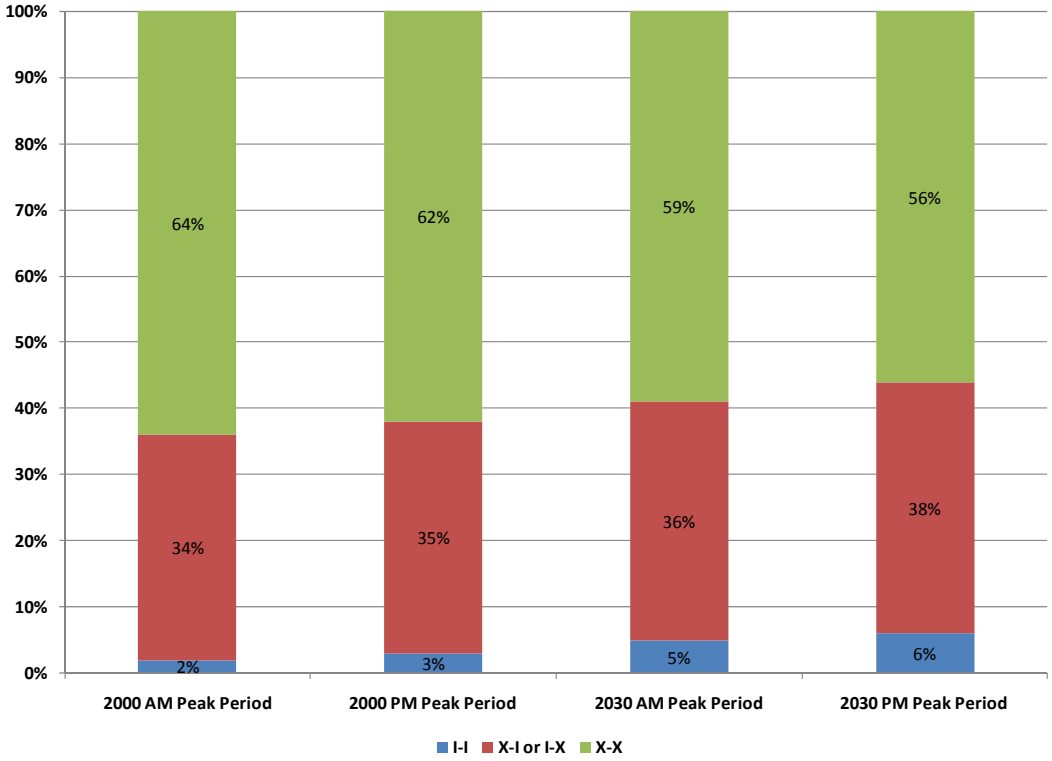


Figure 2-10: Station Influence Area Trip Purpose Split Excluding DIAAH Through Trips



"I-I" are internal to internal trips
"X-I" are external to internal trips
"I-X" are internal to external trips
"X-X" are external to external or through trips

c. 2030 Traffic Projections

Future 2030 traffic projections were developed for the AM and PM peak periods, as opposed to only the AM and PM peak hours. This is due to the fact that since the peak hours are projected to be heavily congested, which will force the peak demand to spread outside of the peak hours. When this occurs, the evaluation of potential roadway improvements should focus on measures that address demand over peak periods. The VISSIM simulation model allowed for this type of extended period analysis.

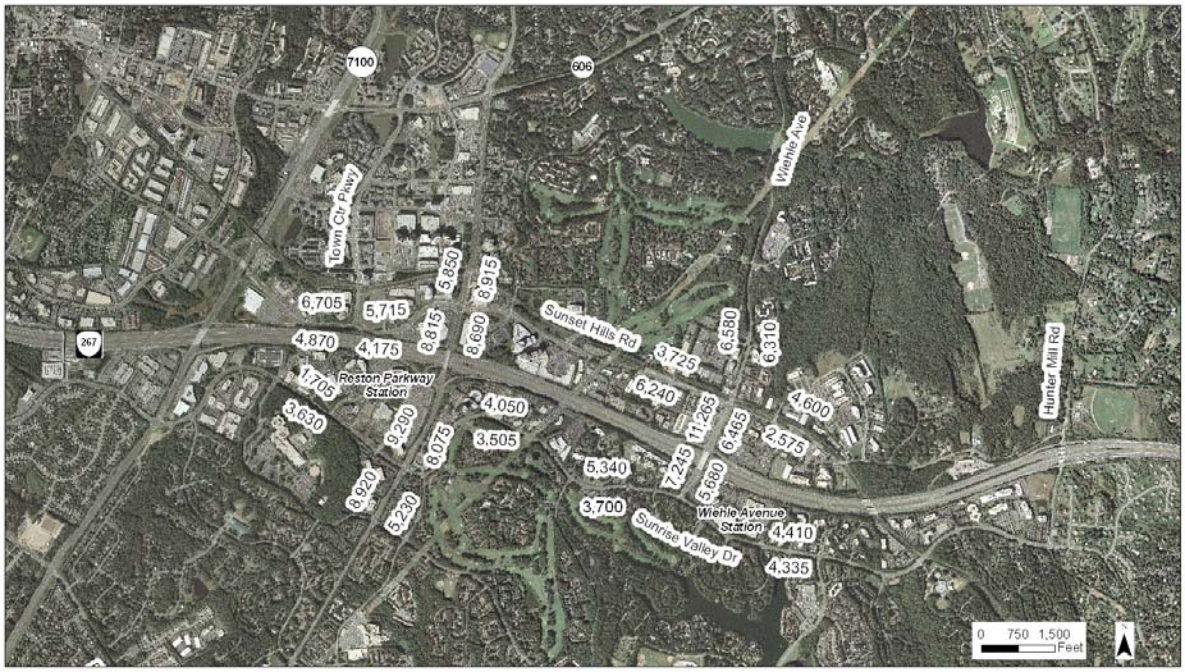
It is also important to note that the 2030 traffic projections used for this study maintained consistency with 2030 traffic projections developed in a previous study of the area around the Wiehle Station[3].

Figure 2-11 and Figure 2-12 present the AM Peak Period and the PM Peak Period volumes, respectively, that were used for the analyses.

Figure 2-11: AM 3- hour Peak Period Roadway Link Volumes within the Station Influence Area (2030)

[3] *Dulles Corridor Metrorail Project, Traffic Operational Analysis – Phase 2*, Cambridge Systematics, Inc., March 12, 2007.

Figure 2-12: PM 3- hour Peak Period Roadway Link Volumes within the Station Influence Area (2030)



C. Roadway Capacity Additions

For the 2030 analysis, a set of roadway capacity additions (roadway actions) were included with the baseline assumptions, and then additional improvements were included under a more "robust" system. The baseline roadway capacity additions are the actions that were identified in the Dulles Rail FEIS as appropriate mitigation measures.

There is a need to balance the roadway improvements with improvements for other modes, to reflect the fact that access to the stations will need to focus on transit and pedestrian modes, as well as vehicular modes. In fact, the Reston Metrorail Access Group (RMAG) that helped guide this study identified pedestrian, bicycle and transit access as priorities over automobile access. For example, widening a roadway from 4 to 6 lanes will improve road capacity and the ability to process more vehicles; however, this type of improvement could potentially hinder pedestrian movements, especially at larger intersections, as it increases the crossing distance for pedestrians.

There are three groupings of roadway actions that were analyzed for 2030 conditions: 1) those actions for roadways that provide immediate Metro access, 2) general roadway actions and 3) robust actions that would be intended to mitigate congestion on a long-term scale, including proposed connectors over the DIAAH.

a. Metro Access Actions

The actions discussed in this section will provide increased capacity in the immediate vicinity of the Metrorail stations on roadways that provide direct access into the stations. These actions include:

1. New signal and turn lanes on Sunset Hills Road for access into the proposed Reston Parkway Metrorail station.

2. New left turn lane for westbound left turning movement at the intersection of Sunset Hills Road/Isaac Newton Square W, which would replace the shared left-through lane by providing a dedicated turn lane.
3. Additional (second) left turn lane for northbound traffic at the intersection of Wiehle Avenue and the station entrance (between Sunset Hills Road and the DIAAH) and provide a second inbound lane.

These roadway actions would improve direct vehicular access into the two proposed Metrorail stations by providing increased turning capacity. This could reduce the potential for traffic volumes that exceed the turn bay capacity and block the through lanes during periods of high demand.

b. General Roadway Actions

In addition to the actions for direct access to the Metrorail stations, other roadway actions would increase intersection capacity, thereby improving operational performance and reducing delay. These actions can range from simply adding a turn bay at an intersection to widening a roadway to provide extra through lanes. The actions analyzed in this category include:

4. Add an additional left turn lane on the eastbound DIAAH off-ramp at Wiehle Avenue.
5. Improve the right turn lane for the eastbound Sunset Hills Road at Wiehle Avenue.
6. Improve the right turn lane for the westbound Sunrise Valley Drive at Wiehle Avenue.
7. Add a northbound through lane on Reston Parkway at Sunrise Valley Drive, continuing this lane to the ramp for eastbound on-ramp to the DIAAH.
8. Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Drive.

These actions are part of the EIS mitigation projects listed in the amended record of decision. Some additional roadway actions have been identified beyond the EIS recommendations that are identified in the following section.

c. Robust Road Actions/Connectors

The baseline traffic analysis identified the need for additional roadway capacity along Wiehle Avenue, as well as additional connections between Sunset Hills Road and Sunrise Valley Drive. Additional projects were developed that would help alleviate these issues. These improvements, considered for the "robust" analysis, include:

9. Add a second right turn lane on the northbound Wiehle Avenue approach at Sunset Hills Road.
10. Add a second right turn lane on the southbound Wiehle Avenue approach at Sunrise Valley Drive.
11. Add an additional left turn lane on the eastbound Sunrise Valley Drive approach at Wiehle Avenue.
12. Provide two new connections over the DIAAH to provide new links to connect Sunset Hills Road and Sunrise Valley Drive:
    i. Connection between Town Center Parkway and Edmund Halley Drive.
    ii. Connection between Soapstone Drive and Isaac Newton Square W.

D. Traffic Analysis Results

The traffic software used for the 2030 analysis was VISSIM, a micro-simulation program. The advantage of using such a program is that it permits analysis of roadway networks that are oversaturated (i.e., congested) and accounts for queue spillbacks affecting upstream intersections and reduction of

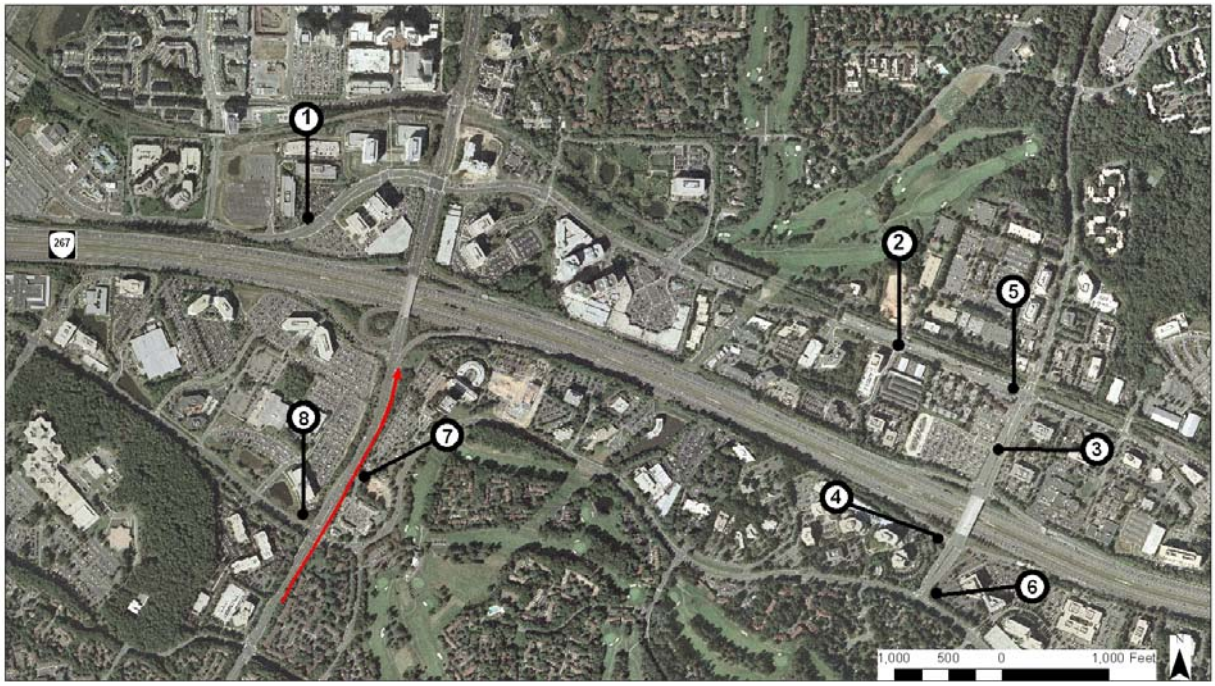
throughput. The VISSIM software, by micro-simulating the network, is able to determine the intersection-throughput on a location-by-location basis in congested conditions. Macroscopic programs such as the Highway Capacity Manual Software (HCS) and Synchro can only analyze intersections in an isolated fashion; they do not account for queue spillback from downstream intersections.

The analysis began by examining baseline conditions, which include the EIS improvements, and included pedestrian improvements. Based on the analysis of the baseline conditions, additional roadway actions were developed to improve vehicular flow.

a. Baseline Alternative

The Baseline Alternative included the roadway improvements indentified above and shown in Figure 2-13. (The numbers in the figure correspond to the numbered projects listed on pages 19-20.) In addition to those roadway actions, pedestrian improvements identified by the Pedestrian-Bike Team (and detailed in Chapter 3) were also incorporated. These actions improve the crossing conditions at many intersections for pedestrians by adding pedestrian crosswalks, pedestrian signals and/or pedestrian refuge islands that shorten the crossing distance. Bicycle lanes (while recommended in Chapter 5 for some locations) were not included for the roadway analysis, the primary purpose of which was to evaluate intersection roadway actions, including the effects due to pedestrians.

Figure 2-13: Locations of Roadway Actions for Baseline Conditions

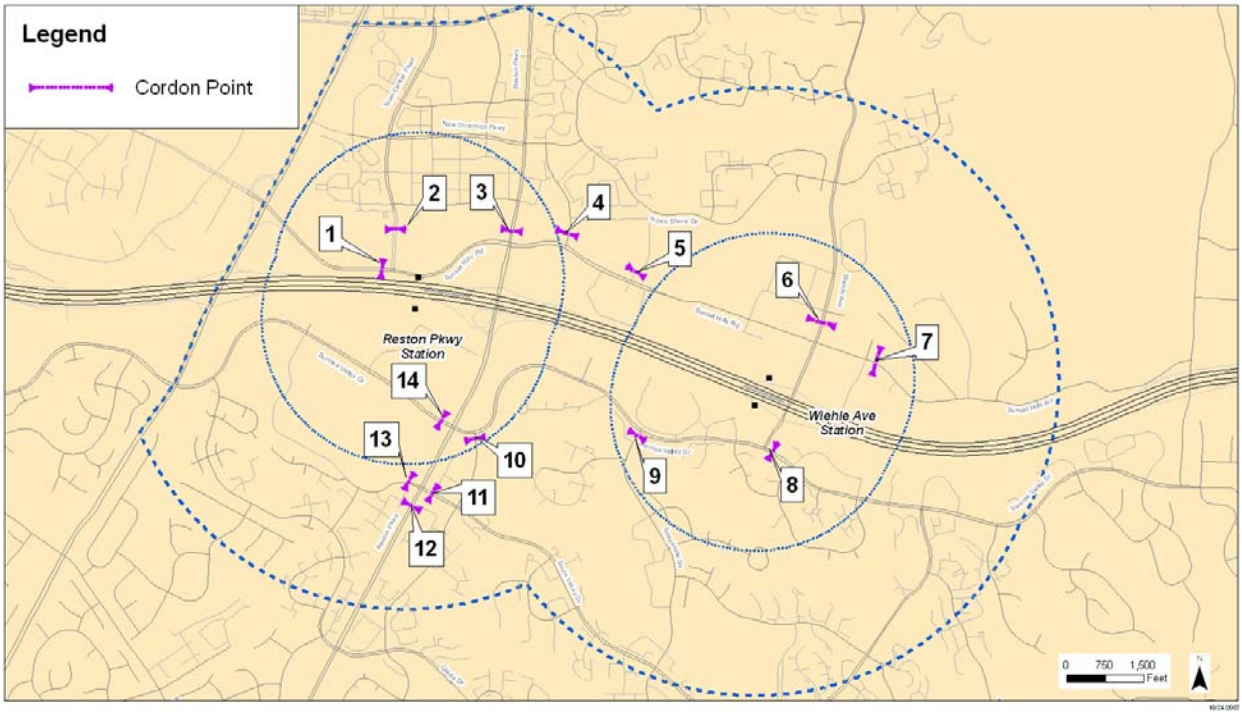


In order to assess the ability of the roadway system to handle the forecasted demand, a Volume-to-Capacity (V/C) calculation was completed for the cordon points to the Station Influence Area (shown in Figure 2-14). This process compared the demand for the link versus the roadway capacity of that link. The V/C calculations were performed on a peak hour and peak period basis for both the AM and PM peaks and are presented in Table 2-4. The assumed roadway capacities at the cordon points were taken from the Fairfax County travel demand model and the volumes are those used in the VISSIM model.

Table 2-4: 2030 Volume to Capacity Ratio at Cordon Points for the Detailed Study Area for AM and PM Peaks – Baseline Alternative

	Cordon Point	Location	Direction	AM Peak Hour			AM Peak Period			PM Peak Hour			PM Peak Period		
				Volume	Capacity	V/C	Volume	Capacity	V/C	Volume	Capacity	V/C	Volume	Capacity	V/C
1	Sunset Hills Rd	west of Town Center Pkwy	In	2,660	2,800	0.95	6,650	8,400	0.79	1,802	2,800	0.64	4,870	8,400	0.58
			Out	1,215	2,300	0.53	3,038	6,900	0.44	2,480	2,300	1.08	6,703	6,900	0.97
2	Town Center Pkwy	north of Sunset Hills Rd	In	760	1,150	0.66	1,900	3,450	0.55	930	1,150	0.81	2,514	3,450	0.73
			Out	1,260	2,800	0.45	3,150	8,400	0.38	821	2,800	0.29	2,219	8,400	0.26
3	Reston Pkwy	north of Sunset Hills Rd	In	2,474	3,825	0.65	6,185	11,475	0.54	2,164	3,825	0.57	5,849	11,475	0.51
			Out	2,028	4,800	0.42	5,070	14,400	0.35	3,299	4,800	0.69	8,916	14,400	0.62
4	Old Reston Ave	north of Sunset Hills Rd	In	625	850	0.74	1,563	2,550	0.61	619	850	0.73	1,673	2,550	0.66
			Out	617	850	0.73	1,543	2,550	0.60	681	850	0.80	1,841	2,550	0.72
5	Salliemae Dr	north of Sunset Hills Rd	In	132	7,000	0.02	330	21,000	0.02	431	7,000	0.06	1,165	21,000	0.06
			Out	407	7,000	0.06	1,018	21,000	0.05	127	7,000	0.02	343	21,000	0.02
6	Wiehle Ave	north of Sunset Hills Rd	In	2,715	3,150	0.86	6,788	9,450	0.72	2,434	3,150	0.77	6,578	9,450	0.70
			Out	2,001	3,700	0.54	5,003	11,100	0.45	2,324	3,700	0.63	6,281	11,100	0.57
7	Sunset Hills Rd	east of Michael Farraday Dr	In	641	2,400	0.27	1,603	7,200	0.22	1,380	2,400	0.58	3,730	7,200	0.52
			Out	2,216	2,400	0.92	5,540	7,200	0.77	819	2,400	0.34	2,214	7,200	0.31
8	Sunrise Valley Drive	east of Wiehle Ave	In	2,179	1,550	1.41	5,448	4,650	1.17	1,633	1,550	1.05	4,414	4,650	0.95
			Out	2,083	3,200	0.65	5,208	9,600	0.54	1,603	3,200	0.50	4,332	9,600	0.45
9	Soapstone Dr	south of Sunrise Valley Dr	In	952	1,150	0.83	2,380	3,450	0.69	1,355	1,150	1.18	3,662	3,450	1.06
			Out	191	3,100	0.06	478	9,300	0.05	1,092	3,100	0.35	2,951	9,300	0.32
10	Colts Neck Rd	south of Sunrise Valley Dr	In	890	1,700	0.52	2,225	5,100	0.44	461	1,700	0.27	1,246	5,100	0.24
			Out	271	1,700	0.16	678	5,100	0.13	883	1,700	0.52	2,386	5,100	0.47
11	South Lakes Dr	east of Reston Pkwy	In	1,214	1,700	0.71	3,035	5,100	0.60	841	1,700	0.49	2,273	5,100	0.45
			Out	628	2,800	0.22	1,570	8,400	0.19	1,447	2,800	0.52	3,911	8,400	0.47
12	Reston Pkwy	south of South Lakes Dr	In	2,512	3,150	0.80	6,280	9,450	0.66	1,939	3,150	0.62	5,241	9,450	0.55
			Out	1,224	3,150	0.39	3,060	9,450	0.32	3,372	3,150	1.07	9,114	9,450	0.96
13	South Lakes Dr	west of Reston Pkwy	In	413	850	0.49	1,033	2,550	0.40	1,194	850	1.40	3,227	2,550	1.27
			Out	870	850	1.02	2,175	2,550	0.85	521	850	0.61	1,408	2,550	0.55
14	Sunrise Valley Drive	west of Reston Pkwy	In	920	1,700	0.54	2,300	5,100	0.45	1,343	1,700	0.79	3,630	5,100	0.71
			Out	2,150	2,800	0.77	5,375	8,400	0.64	630	2,800	0.23	1,703	8,400	0.20

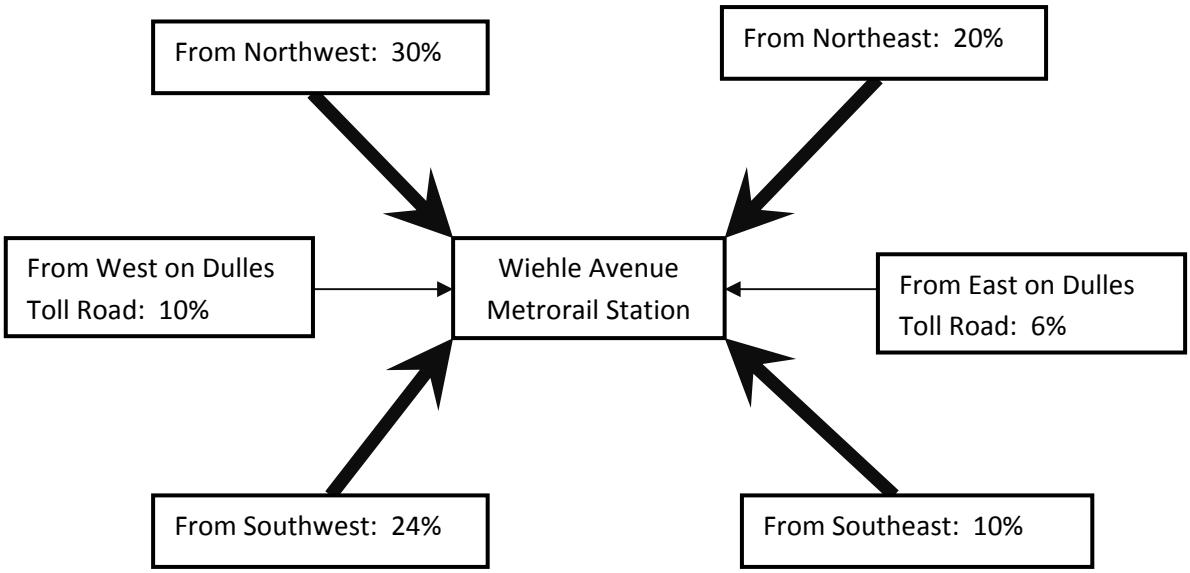
Figure 2-14: Detailed Study Area Cordon Points



Based on the V/C calculations, the demand volumes for most of the cordon points do not exceed the capacity of the roadway links. A few points do exceed capacity, but marginally. V/C calculations were performed on both the peak hour and the peak period because the volume (or the demand) is not constant across each of the three hours in the peak period; rather the peak hour volume is higher than either of the shoulder hours. In several cases, the volume exceeds the capacity during the peak hour, but not during the peak period. Thus, it can be expected that higher congestion levels will occur during the peak hour with lower levels of congestion in the hours before and after the peak hour. This illustrates the fact that the cordon points themselves are not the constraining factor of the system. Thus, virtually all of the demand can enter and exit the Station Influence Areas; however, congestion at the key intersections within the Station Influence Area will act as a constraint to traffic mobility.

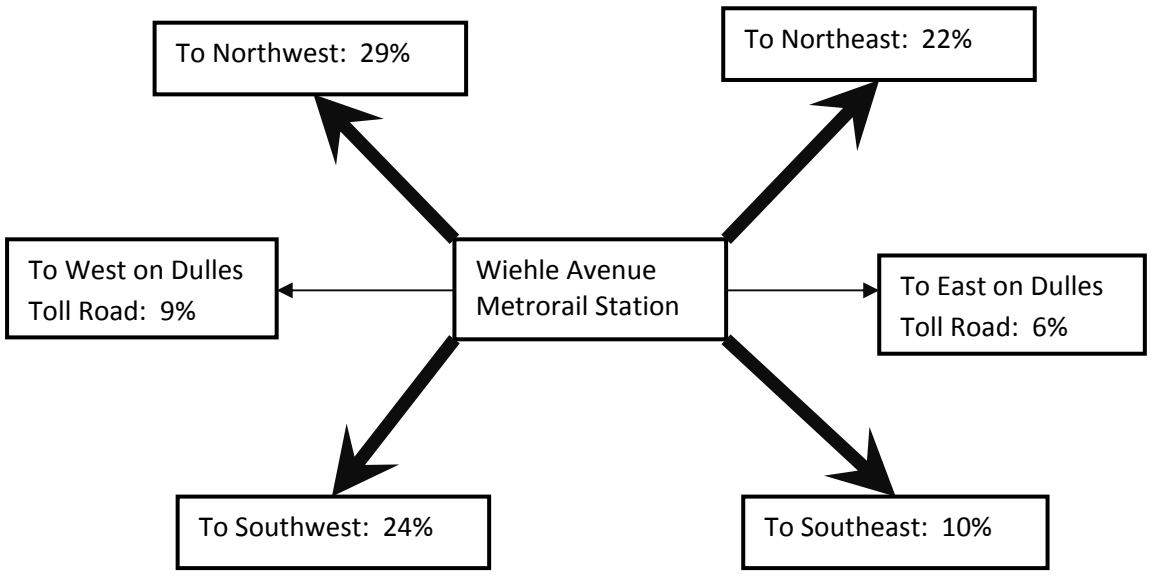
Figure 2-15 and Figure 2-16 present the distribution of vehicle trips to and from the Wiehle Avenue Station in the AM Peak Period (3-hours) and from the Wiehle Avenue Station in the PM Peak Period (3-hours). Approximately 50 percent of trips are to/from the north of the DIAAH, 35 percent are to/from the south of the DIAAH and 15 percent of the trips are to/from the DIAAH.

Figure 2-15: Distribution of Ingress Trips to the Wiehle Avenue Metrorail Station



Source: VHB (2007)

Figure 2-16: Distribution of Egress Trips from the Wiehle Avenue Metrorail Station



Source: VHB (2007)

The analysis was conducted using the VISSIM model for the peak periods, a total of three hours, to examine how the roadway network operates in the shoulder hours before and after the peak hour. The key measure of effectiveness that was used was vehicular throughput at seven key intersections. This gives a measure of how well the demand is being served by the baseline roadway network. Table 2-5 and Table 2-6 present AM and PM peak period throughput summaries at seven key locations within the station influence area.

Table 2-5: AM Peak Period Throughput Summary at Key Intersections – Baseline Alternative (2030)

Intersection	EB Total	WB Total	NB Total	SB Total	Intersection Total Approach
Town Center Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	4,868	1,776		1,873	8,517
AM Pk Pd Demand	6,650	2,940		1,900	11,490
AM Pk Pd Throughput %	73.2%	60.4%		98.6%	74.1%
Reston Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	3,907	1,226	3,916	1,770	10,819
AM Pk Pd Demand	4,925	3,175	8,710	6,190	23,000
AM Pk Pd Throughput %	79.3%	38.6%	45.0%	28.6%	47.0%
Isaac Newton Square / Sunset Hills Rd					
AM Pk Pd Throughput	3,892	3,801	770	549	9,012
AM Pk Pd Demand	4,030	5,810	755	555	11,150
AM Pk Pd Throughput %	96.6%	65.4%	102.0%	98.9%	80.8%
Wiehle Ave / Sunset Hills Rd					
AM Pk Pd Throughput	3,016	2,077	5,998	4,475	15,566
AM Pk Pd Demand	3,065	2,025	11,060	6,790	22,940
AM Pk Pd Throughput %	98.4%	102.6%	54.2%	65.9%	67.9%
Wiehle Ave / Sunrise Valley Dr					
AM Pk Pd Throughput	3,073	3,302		3,153	9,528
AM Pk Pd Demand	6,645	5,475		5,085	17,205
AM Pk Pd Throughput %	46.2%	60.3%		62.0%	55.4%
Soapstone Dr / Sunrise Valley Dr					
AM Pk Pd Throughput	2,141	1,604	1,788	140	5,673
AM Pk Pd Demand	4,555	3,875	2,370	150	10,950
AM Pk Pd Throughput %	47.0%	41.4%	75.4%	93.3%	51.8%
Reston Pkwy / Sunrise Valley Dr					
AM Pk Pd Throughput	742	1,584	5,171	3,433	10,930
AM Pk Pd Demand	2,300	3,400	6,880	8,138	20,718
AM Pk Pd Throughput %	32.3%	46.6%	75.2%	42.2%	52.8%
				Overall Throughput	70,045
				Overall Demand	117,453
			AM Peak Pd Throughput as % of Demand		59.6%

Note: Peak period traffic demand projections were based on MWCOG Cooperative Forecasts of Jobs and Housing and developed using the Fairfax County Travel Demand Model. Peak period throughput estimates were developed using the VISSIM traffic simulation model.

Table 2-6: PM Peak Period Throughput Summary at Key Intersections – Baseline Alternative (2030)

Intersection	EB Total	WB Total	NB Total	SB Total	Intersection Total Approach
Town Center Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	1,369	1,716		816	3,901
AM Pk Pd Demand	4,870	5,715		2,515	13,100
AM Pk Pd Throughput %	28.1%	30.0%		32.4%	29.8%
Reston Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	809	2,492	2,343	2,467	8,111
AM Pk Pd Demand	4,945	8,680	8,690	5,850	28,165
AM Pk Pd Throughput %	16.4%	28.7%	27.0%	42.2%	28.8%
Isaac Newton Square / Sunset Hills Rd					
AM Pk Pd Throughput	635	904	624	1,081	3,244
AM Pk Pd Demand	5,235	3,725	2,305	1,440	12,705
AM Pk Pd Throughput %	12.1%	24.3%	27.1%	75.1%	25.5%
Wiehle Ave / Sunset Hills Rd					
AM Pk Pd Throughput	779	1,019	2,297	1,292	5,387
AM Pk Pd Demand	6,240	4,600	6,465	6,580	23,885
AM Pk Pd Throughput %	12.5%	22.2%	35.5%	19.6%	22.6%
Wiehle Ave / Sunrise Valley Dr					
AM Pk Pd Throughput	1,568	1,894		1,383	4,845
AM Pk Pd Demand	3,700	4,410		7,245	15,355
AM Pk Pd Throughput %	42.4%	42.9%		19.1%	31.6%
Soapstone Dr / Sunrise Valley Dr					
AM Pk Pd Throughput	1,386	1,332	754	529	4,001
AM Pk Pd Demand	3,105	5,885	850	985	10,825
AM Pk Pd Throughput %	44.6%	22.6%	88.7%	53.7%	37.0%
Reston Pkwy / Sunrise Valley Dr					
AM Pk Pd Throughput	1,039	1,287	3,600	3,192	9,118
AM Pk Pd Demand	3,630	4,055	5,230	9,291	22,206
AM Pk Pd Throughput %	28.6%	31.7%	68.8%	34.4%	41.1%
				Overall Throughput	38,607
				Overall Demand	126,241
				PM Peak Pd Throughput as % of Demand	30.6%

Note: Peak period traffic demand projections were based on MWCOG Cooperative Forecasts of Jobs and Housing and developed using the Fairfax County Travel Demand Model. Peak period throughput estimates were developed using the VISSIM traffic simulation model.

For both peak periods, the internal roadway network is congested. A number of intersections cannot process the demand, which causes queue spillback to adjacent upstream intersections. For the AM peak period, 60% of the demand would be served – meaning that of all the vehicles that would like to drive through the key intersections during the AM peak period, only 60% of those will be able to. Congestion of this type will lead to changes in travel behavior; at least four responses are likely:

- Change time of travel, in which the peak period will extend beyond the traditional 3-hours.
- Change path of travel, through trips will find other routes to avoid the area.
- Change mode of travel, some travelers will choose to use transit or walk/bike.
- Not make the trip at all.

For the PM peak period, 43% of the demand is served. This would cause an even longer lengthening of the peak period compared to the demand of the AM peak period.

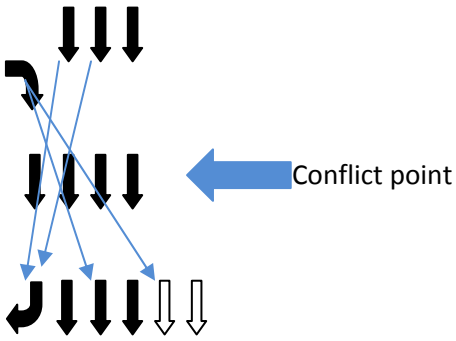
The findings of both models are that projected traffic demand for the Wiehle Avenue corridor is the cause of much of the forecast congestion and delay in the station influence area. There are several components of projected traffic along Wiehle Avenue: external trips, external-internal trips and internal trips. Critical sections of Wiehle Avenue include:

1. Southbound segment of Wiehle between Sunset Hills Road and the DIAAH.
2. Intersection of Wiehle at Sunrise Valley Drive
3. Intersection of Wiehle at Sunset Hills Road

The first bottleneck will cause congestion spillover to adjacent intersections within the station influence area, including extending the queues over to Reston Parkway, which affects north-south travel on that arterial. The latter two locations are likely to have heavy congestion, due in part to the problems caused by the former. Congestion along Reston Parkway is projected to be at a lower level than Wiehle Avenue.

The heavy traffic coming out of the Wiehle metro station during the PM peak period will cause weaving conditions between all travel lanes on the southbound segment of Wiehle Avenue between Sunset Hills Road and the DIAAH, as they come out of the metro station. Most vehicles are not destined to the west, so they must weave over at least one lane. If a vehicle is destined to the eastbound DIAAH ramp, they must weave across 4 lanes to enter into the turn bays. It is only 320 feet from the Wiehle metro station access to the intersection with the westbound ramps, and a further 500 feet to the intersection for the eastbound ramps. This weaving causes turbidity as vehicles force their way over between the travel lanes to reach the lane they desire to reach their destination. Most vehicles that turn right when they exit the Wiehle Avenue metro station entrance will likely be destined to Sunrise Valley Drive and points south and thus would have to weave across at least one lane. Figure 2-17 illustrates this weaving phenomenon.

Figure 2-17: Illustration of Weaving on Wiehle Avenue with Metro Egress



Note: hollow arrows illustrate the lanes that are part of the turn bay at the next signal beyond this intersection

The other bottlenecks along Wiehle Avenue are at the intersections with Sunset Hills Road and Sunrise Valley Drive. The lack of turn lanes for the significant movements adds to the delays at these intersections.

The current roadway network provides for two crossings of the DIAAH; traffic traveling within the area, to and from the rail stations; and entering and leaving the DIAAH all will compete for the same road space on Wiehle Avenue and Reston Parkway. Providing alternative routing paths, such as new

connectors over the DIAAH, would permit internal trips and some traffic to and from the rail stations to avoid both Reston Parkway and Wiehle Avenue.

b. "Robust" Alternative

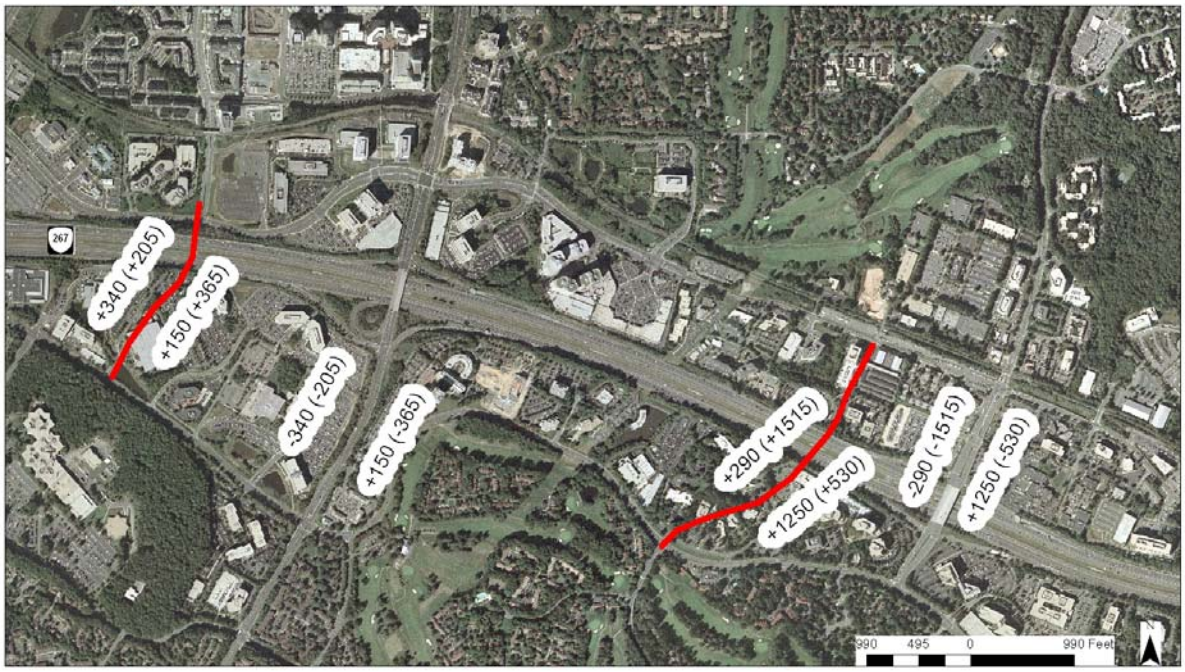
A series of roadway actions, beyond those recommended in the EIS and assumed for the future baseline analysis, were developed to address the bottlenecks along Wiehle Avenue. These improvements would increase intersection capacity and provide alternate routing choices for vehicles. Connectors across the DIAAH would provide north-south alternatives to the congested Reston Parkway and Wiehle Avenue. Intersection modifications, such as adding turn lanes can also reduce traffic delay at intersections. The roadway actions that could be considered to reduce forecast delay at bottlenecks on Wiehle Avenue and Reston Parkway are illustrated in Figure 2-18 and include:

9. Add a second right turn lane for the northbound Wiehle Avenue approach at Sunset Hills Road.
10. Add a second right turn lane for the southbound Wiehle Avenue approach at Sunrise Valley Drive.
11. Add an additional left turn lane for the eastbound Sunrise Valley Drive approach at Wiehle Avenue.
12. Providing two new connections over the DIAAH to provide new links to connect the major east-west roadways: Sunset Hills Road and Sunrise Valley Drive:
    i. Connection between Town Center Parkway and Edmund Halley Drive
    ii. Connection between Soapstone Drive and Isaac Newton Square

The proposed connectors would divert vehicles from the major north-south roadways within the station influence area. These connectors would be grade-separated facilities from the DIAAH and would not include ramps to/from the DIAAH as exemplified by the Monroe Street connector to the west, which passes over the DIAAH without a ramp connection. For example, a trip from Soapstone Drive to the Wiehle Metrorail Station could use one of these connectors and avoid the traffic on Sunrise Valley Drive and Wiehle Avenue, by accessing the Station directly. The potential for trips diverting from Reston Parkway and Wiehle Avenue were estimated manually and assigned on the new routes. Figure 2-19 presents the estimated number of trips expected to make this diversion during the AM and PM peak periods. It should be noted that the Fairfax County Parkway lies outside the station influence area, so there could be potential for trip diversion from that facility to the Town Center Parkway and Edmund Halley Drive connector.

Figure 2-18: Locations of Roadway Actions assumed for the Robust Alternative

Figure 2-19: Estimated Trip Diversion due to Proposed Connectors (2030)



Note: AM (PM) volumes presented here are peak period (3-hour) volume)

The actions incorporated in the robust concept were added to the baseline roadway network in VISSIM, and the trips were reassigned. The actions are projected to have a greater effect in the PM peak period, as the combined throughput at the seven key intersections is projected to increase by approximately

36% compared to the baseline. The increase would be almost 10% in the AM peak period. Table 2-7 and Table 2-8 present AM and PM Peak period throughput summaries for the seven key intersections.

Table 2-7: AM Peak Period Throughput Summary at Key Intersections – "Robust" Alternative (2030)

Intersection	EB Total	WB Total	NB Total	SB Total	Intersection Total Approach
Town Center Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	5,677	2,029	163	1,814	9,683
AM Pk Pd Demand	6,650	2,890	150	1,905	11,595
AM Pk Pd Throughput %	85.4%	70.2%	108.7%	95.2%	83.5%
Reston Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	4,256	1,432	3,931	5,494	15,113
AM Pk Pd Demand	4,690	3,175	8,565	6,190	22,620
AM Pk Pd Throughput %	90.7%	45.1%	45.9%	88.8%	66.8%
Isaac Newton Square / Sunset Hills Rd					
AM Pk Pd Throughput	4,018	3,243	622	520	8,403
AM Pk Pd Demand	4,015	4,875	1,680	555	11,125
AM Pk Pd Throughput %	100.1%	66.5%	37.0%	93.7%	75.5%
Wiehle Ave / Sunset Hills Rd					
AM Pk Pd Throughput	2,567	1,847	6,359	3,428	14,201
AM Pk Pd Demand	2,870	2,025	10,130	6,790	21,815
AM Pk Pd Throughput %	89.4%	91.2%	62.8%	50.5%	65.1%
Wiehle Ave / Sunrise Valley Dr					
AM Pk Pd Throughput	3,893	2,800		2,862	9,555
AM Pk Pd Demand	5,390	5,480		4,790	15,660
AM Pk Pd Throughput %	72.2%	51.1%		59.7%	61.0%
Soapstone Dr / Sunrise Valley Dr					
AM Pk Pd Throughput	4,177	1,337	2,033	426	7,973
AM Pk Pd Demand	4,555	3,595	2,365	430	10,945
AM Pk Pd Throughput %	91.7%	37.2%	86.0%	99.1%	72.8%
Reston Pkwy / Sunrise Valley Dr					
AM Pk Pd Throughput	1,486	1,341	3,937	5,063	11,827
AM Pk Pd Demand	2,150	3,400	6,875	7,801	20,226
AM Pk Pd Throughput %	69.1%	39.4%	57.3%	64.9%	58.5%
				Overall Throughput	76,755
				Overall Demand	113,986
				AM Peak Pd Throughput as % of Demand	67.3%

Note: Peak period traffic demand projections were based on MWCOG Cooperative Forecasts of Jobs and Housing and developed using the Fairfax County Travel Demand Model. Peak period throughput estimates were developed using the VISSIM traffic simulation model.

Table 2-8: PM Peak Period Throughput Summary at Key Intersections – "Robust" Alternative (2030)

Intersection	EB Total	WB Total	NB Total	SB Total	Intersection Total Approach
Town Center Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	1,250	2,314	146	827	4,537
AM Pk Pd Demand	4,865	5,700	365	2,515	13,445
AM Pk Pd Throughput %	25.7%	40.6%	40.0%	32.9%	33.7%
Reston Pkwy / Sunset Hills Rd					
AM Pk Pd Throughput	813	3,619	2,549	2,433	9,414
AM Pk Pd Demand	5,095	8,673	8,320	5,850	27,938
AM Pk Pd Throughput %	16.0%	41.7%	30.6%	41.6%	33.7%
Isaac Newton Square / Sunset Hills Rd					
AM Pk Pd Throughput	786	1,326	1,162	1,381	4,655
AM Pk Pd Demand	5,245	3,325	2,595	1,445	12,610
AM Pk Pd Throughput %	15.0%	39.9%	44.8%	95.6%	36.9%
Wiehle Ave / Sunset Hills Rd					
AM Pk Pd Throughput	1,174	1,362	4,167	2,251	8,954
AM Pk Pd Demand	5,265	4,595	6,040	6,580	22,480
AM Pk Pd Throughput %	22.3%	29.6%	69.0%	34.2%	39.8%
Wiehle Ave / Sunrise Valley Dr					
AM Pk Pd Throughput	2,640	3,387		2,241	8,268
AM Pk Pd Demand	3,175	4,415		5,730	13,320
AM Pk Pd Throughput %	83.1%	76.7%		39.1%	62.1%
Soapstone Dr / Sunrise Valley Dr					
AM Pk Pd Throughput	2,706	1,934	867	1,819	7,326
AM Pk Pd Demand	3,090	4,365	850	2,430	10,735
AM Pk Pd Throughput %	87.6%	44.3%	102.0%	74.9%	68.2%
Reston Pkwy / Sunrise Valley Dr					
AM Pk Pd Throughput	1,130	1,500	3,232	3,317	9,179
AM Pk Pd Demand	3270	4055	5230	9080	21635
AM Pk Pd Throughput %	34.6%	37.0%	61.8%	36.5%	42.4%
				Overall Throughput	52,333
				Overall Demand	122,163
				PM Peak Pd Throughput as % of Demand	42.8%

Note: Peak period traffic demand projections were based on MWCOG Cooperative Forecasts of Jobs and Housing and developed using the Fairfax County Travel Demand Model. Peak period throughput estimates were developed using the VISSIM traffic simulation model.

The action that would have the greatest effect in the increase of throughput for the AM peak period is the new Soapstone Drive to Isaac Newton Square W connector. This connector would divert trips away from Wiehle Avenue, including those vehicles that would otherwise result in heavy volumes of left turning vehicles into the Metro Station access points. This connector also reduces the amount of traffic exiting from the proposed Wiehle Avenue Metrorail Station onto Wiehle Avenue, thereby reducing the demand as well as reducing the volume of traffic that is weaving from the Metro access and the DIAAH ramps. This connector would provide relief to the congestion that would otherwise likely be found on Wiehle Avenue.

The proposed Soapstone Connector also plays a key role as an addition to the bus network in Reston by providing direct access across the DIAAH and to the station without requiring travel on Wiehle Avenue. In order to ensure that this direct access is available to transit vehicles, dedicated bus lanes should be

included as part of this facility. As proposed, the facility would include pedestrian facilities and two travel lanes in each direction: one for general traffic and one dedicated lane for use by bicyclists and buses. This connection could significantly speed bus operations into and around the Wiehle Avenue station and should be considered in detail as redevelopment around the Wiehle Avenue station occurs.

Even with the Soapstone Connector in place, the forecasts suggest that heavy congestion along Wiehle Avenue will continue to exist. To reduce this congestion and resulting delay, it would be necessary to further widen roadways, or to encourage a larger shift to non-automobile modes. An aggressive program of Travel Demand Management (TDM) will help to encourage the modal shift that will be necessary to reduce traffic congestion in the station areas.

The other actions listed above do improve operations of the key intersections, though these actions would provide only marginal benefit. Additional testing was completed to see if any of the specific actions were not required. For example, additional testing showed that adding a second southbound right turn lane from Wiehle Avenue to westbound Sunrise Valley Drive action would not result in a significant benefit to traffic operations, but would make pedestrian travel more difficult at this intersection.

c. Dedicated Bus Facilities

The analysis has illustrated that traffic speeds in the area will be significantly slower in the future as traffic growth continues in the area. Cars and buses both will have to travel in the same traffic, and bus speeds are expected to be significantly slower in 2030 than they are in 2007. Without dedicated lanes, bus travel time will be no better than SOV and there will be a lower probability of promoting the desired shift from SOV into buses. This has the effect of requiring more vehicles and more drivers to operate a recommended level of service, increasing the cost of the system. One alternative that could relieve some of the increase in operating costs, driver staff and fleet requirements would be to implement bus-only lanes that allow for free flow traffic conditions for transit vehicles. These lanes could be used only during peak hours and would function as traditional travel lanes during the off-peak periods. These lanes would have the dual benefits of increasing bus speeds (and in turn significantly decreasing the operational costs and the number of new vehicles required) while simultaneously attracting more passengers to the transit system and away from their cars, thus alleviating traffic congestion.

The roads expected to have the worst congestion problems in 2030 are Wiehle Avenue and Reston Parkway. Bus lanes on these roads, and potentially at major intersections with these roads (like Sunset Hills and Wiehle Ave) would probably have the most beneficial effects for transit riders. A careful study of the implications of bus lanes on these roads should be undertaken to determine if this solution would benefit the residents of Reston. Implementation of bus lanes in the immediate vicinity of either of the stations along these roadways would present many challenges in right-of-way acquisition, operations and enforcement and would require the reconstruction and expansion of the bridges across the DIAAH.

However, there are locations in Reston where bus lanes might be both possible and beneficial. Sunset Hills Rd is included as a six-lane facility in the Fairfax County Transportation Plan, and this expansion is included in the Fairfax County Comprehensive Long Range Plan (CLRP). The roadway expansion could be completed by constructing the additional lanes as peak-hour dedicated bus facilities between (at least) Old Reston Avenue and Wiehle Avenue. These facilities would provide a congestion-free east-west route in the heart of Reston for transit vehicles. Significant right-of-way acquisition and construction

costs would be associated with this project, however a detailed study would be necessary in order to determine the exact quantitative benefits of the bus lanes.

d. Internal Street Network

The transportation network around the Wiehle Avenue station is comprised primarily of major thoroughfares (i.e. Wiehle Avenue, Sunset Hills Road and Sunrise Valley Drive) and much smaller streets and driveways that provide access to individual buildings and developments. Because of this, most vehicles traveling in the area must use one of the major congested routes or intersections. The potential exists to develop additional roadway connections as a way for local travel to avoid the more congested major roadways.

Much of the infrastructure that would be necessary to develop this internal grid of streets already exists in the form of small access road and driveways. Some of these existing facilities could be expanded along with intersection improvements at the access points to ease traffic congestion and vehicle delays. These connector streets would have the added benefit of providing more direct connection to pedestrians and bicyclists, a subject that will be discussed further in Chapter 4.

The previously discussed Soapstone Connector would provide additional connections through the "back door" to the Wiehle Avenue station. Extending this roadway across Sunset Hills Road onto Isaac Newton Square W provides further connections. Likewise, Isaac Newton Square S/Roger Bacon Dr can provide an east-west connection north of Sunset Hills Rd. Other private driveways in the station area could also be upgraded to carry local through traffic.

E. Findings and Discussion of Needs

The analyses of the Baseline and "Robust" Alternatives provided insight into the roadway actions needed to handle the projected demand. The actions identified for the Baseline roadway should all be implemented, and a select few from the "Robust" Alternative should also be included. The listing of recommended projects, illustrated on Figure 2-20, is as follows:

A. New signal and turn lanes on Sunset Hills Road for access into the proposed Reston Parkway Metrorail station
B. New left turn lane for westbound left turning movement at the intersection of Sunset Hills Road/Isaac Newton Square W, this would replace the shared left-through lane by providing a dedicated turn lane.
C. Add a second left turn lane for northbound traffic at the intersection of Wiehle Avenue and Metro Access (between Sunset Hills Road and the DIAAH) and provide a second inbound lane
D. Add an additional left turn lane on the eastbound DIAAH off-ramp at Wiehle Avenue
E. Improve the existing right turn lane for the eastbound Sunset Hill Road leg at Wiehle Avenue
F. Improve the existing right turn lane for the westbound Sunrise Valley Drive approach at Wiehle Avenue leg
G. Add northbound through lane for the Reston Parkway at Sunrise Valley Drive, continuing the lane to the ramp for eastbound DIAAH
H. Improve the right turn lane for the southbound Reston Parkway leg at Sunrise Valley Drive
I. Provide a new connection over the DIAAH to connect the major east-west roadways: Sunset Hills Road and Sunrise Valley Drive. The connection would be between Soapstone Drive and Isaac Newton Square W and would include one shared bus/bike lane in each direction.

J. Expand Sunset Hills Road between Wiehle Avenue and Old Reston Avenue to six lanes. Additional lanes will be operated as dedicated bus lanes in peak periods.

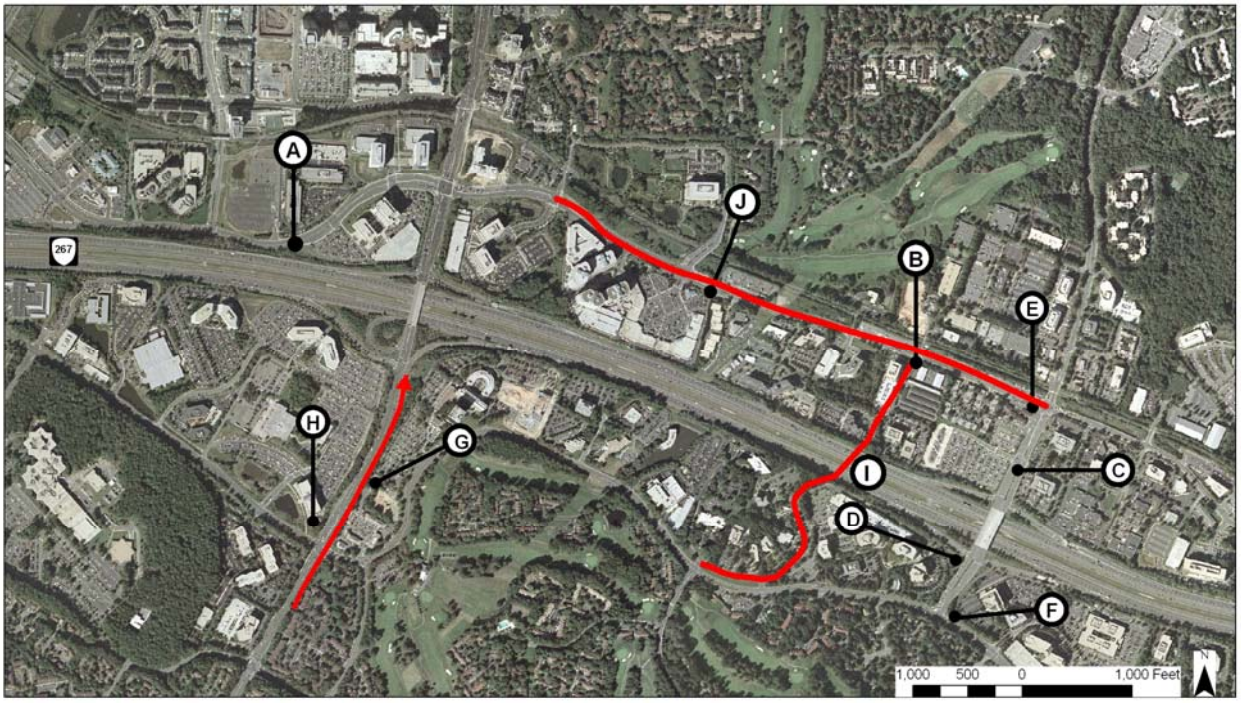


Figure 2-20: Locations of Recommended Roadway Actions

Actions 9, 10, 11 and 12 (i), previously identified for the "Robust" Alternative, are not recommended. These projects were as follows:

9. Adding a second right turn lane for the northbound Wiehle Avenue at Sunset Hills Road.
10. Adding a second right turn lane for the southbound Wiehle Avenue leg at Sunrise Valley Drive.
11. Add an additional left turn lane for the eastbound Sunrise Valley Drive leg at Wiehle Avenue.
12. (i) Providing a connection between Sunset Hills Road and Sunrise Valley Drive via Town Center Parkway and Edmund Halley Drive.

It should be noted that even with implementation of all the roadway actions, the peak period demand for both the AM and PM periods cannot be served within the three hour peak period. Lengthening of the peak period should be expected.

The north-south thoroughfares are heavily travelled, but the east-west routes are as important to overall mobility in the area. Currently, both Sunrise Valley Drive and Sunset Hills Road are considered minor arterials according to the Fairfax County Comprehensive Transportation Plan. The numbers of lanes on both facilities vary depending on location. For the most part, Sunrise Valley Drive is a 4-lane facility, except near Hunter Mill Road, where it is a 2-lane roadway. Sunset Hills Road varies between 2 to 6 lanes depending on the section. The major factor of impedance to east-west mobility is the conflict for green time with north-south arterials like Fairfax County Parkway, Reston Parkway and Wiehle Avenue. These north-south arterials carry more traffic than the former. If green time were increased for the east-west arterials where they cross the major north-south arterials, then it would come at the expense of north-south mobility.

The other means to improve east-west mobility in this area is to provide more travel lanes east-west. However, there is limited potential to implement this option due to the right-of-way constraints that exist at some segments along the roadway. The County's Comprehensive Transportation Plan shows Sunset Hills Road as a complete 6-lane facility from Fairfax County Parkway to Wiehle Avenue, and a 4-lane facility to Hunter Mill Road. The latter would likely require improvements to Hunter Mill Road at the DIAAH interchange. This would improve traffic operations, but would not be able to satisfy the demand for this facility. There are not currently any plans to widen Sunrise Valley Drive, however the addition of peak-period dedicated bus lanes is recommended as a long term solution to congestion. Intersection improvements along this Sunrise Valley Drive, such as adding or lengthening turn bays, would provide more storage to accommodate turning traffic that would not block the through lanes.

Another project that could occur on the edge of the Study Area is a traffic calming project on Hunter Mill Road. The Hunter Mill Road Traffic Calming Study, a study conducted by the Northern Virginia Regional Commission, "offers a number of innovative approaches to improve safety along Hunter Mill Road, provide for the high volume of traffic, all the while improving the level of service". The report outlines "context sensitive solutions" such as roundabouts and splitter islands at a cost lower than or equal to traditional expansion of highways.

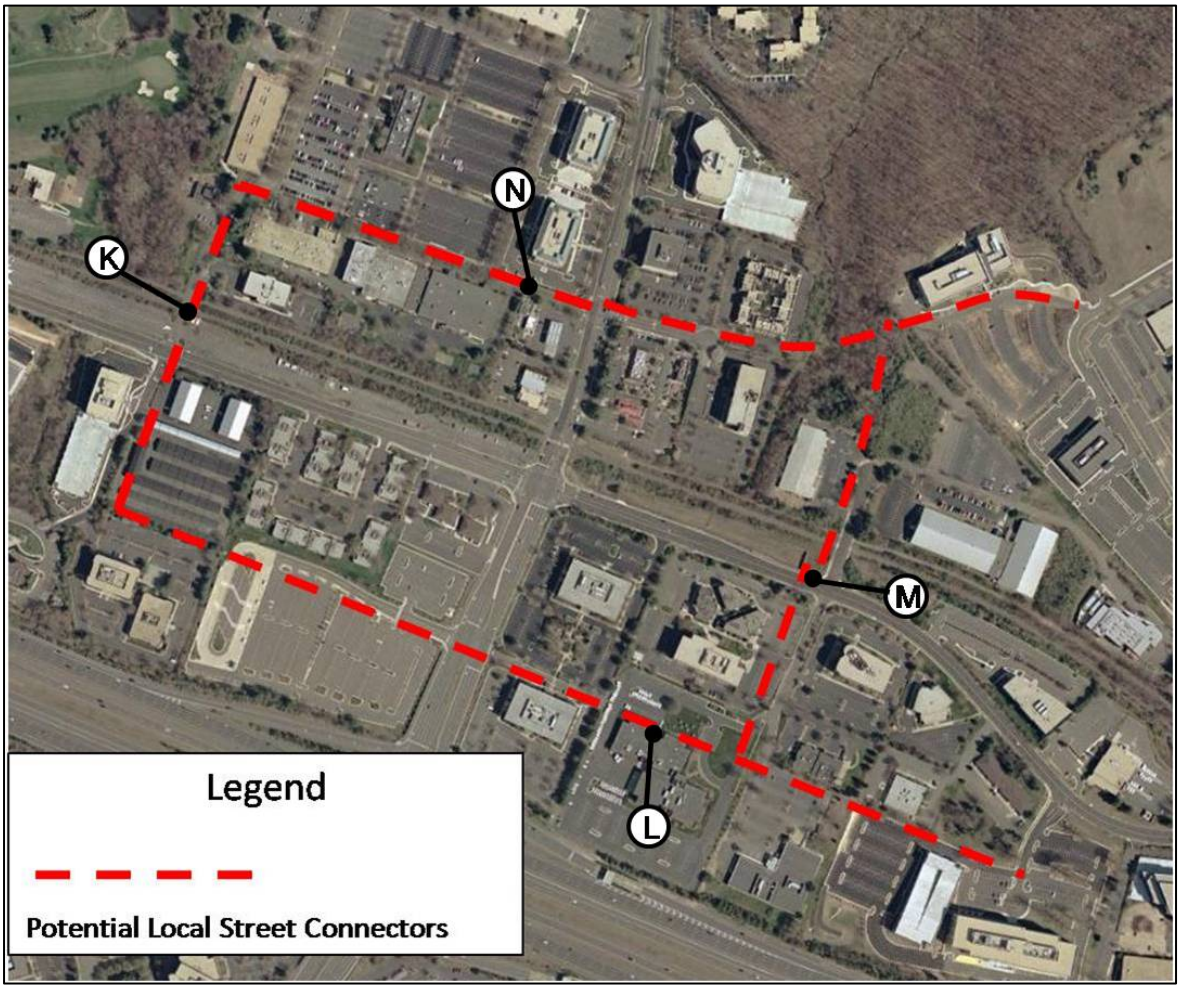
Other means of improving circulation within the station influence area would be to improve private parcel access (ingress and egress) driveways by combining these access points at locations with signalized intersections. By providing separate turn lanes for the left turn and right turn movement on these driveways, rather than a single lane, it would reduce the necessary green-time for the minor legs, which in turn provides for more green-time for the main thoroughfare. An example would be the north leg of Isaac Newton Square W at the intersection with Sunset Hills Road.

Finally, it is recommended that as redevelopment occurs in the Wiehle station area, local street connectors be provided as a way for local travel to avoid the more congested major roadways. Four connectors of this type are recommended to help create an internal grid of streets around the Wiehle Avenue station as illustrated in Figure 2-21. The four connectors include:

K. Isaac Newton Square West from Isaac Newton Square South to the station as an extension of the proposed Soapstone Connector.
L. The Station Entrance (already planned for improvements as part of station construction) should be extended across Wiehle Avenue to the Private Driveway as far east as Samuel Morse Dr.
M. Michael Faraday Court extension from the new roadway described in (L) north to the extended Roger Bacon Dr described in (N)
N. Extension/improvements to Isaac Newton Square South from Isaac Newton Square West to Wildlife Center Drive.

It may be possible to construct or expand several of these new connectors as part of the development process as the area surrounding the Wiehle Avenue station redevelops. Proffers and other development tools can be used to minimize the expense to the County of these facilities. Depending on the scale and pattern of redevelopment in the area, the sections of completely new roadway that would connect to Wildlife Center Drive may still require a significant County investment.

Figure 2-21: Potential Local Connectors



F. Suggested Policies and Programs

As the Study Area continues to grow, actions to the roadway network will be needed to help accommodate the projected growth. The fourteen (14) roadway actions identified in the previous section are recommended, as well as the pedestrian improvements indentified in Chapter III and the bus service enhancements described in Chapter IV. The full set of improvements will help to improve mobility for all travelers in the station areas regardless of their mode of travel. Improvements to the pedestrian, bicycle and transit networks are necessary to help divert trips away from SOVs to other modes. To support this mode choice shift, this section recommends some policies that should be encouraged in the vicinity, including Travel Demand Management and Intelligent Transportation Systems.

a. Travel Demand Management

By 2030, congestion in the Reston area will be a significant problem. Roadway expansion and improvement projects will not be able to provide the capacity to accommodate all of the vehicle demand during the peak periods. Travel Demand Management (TDM) strategies are programs and

policies established with the goal of reducing the number of vehicle trips made during the peak periods. TDM strategies have been implemented successfully in areas throughout the Washington region, including the newly revitalized urban area around Silver Spring, MD. Successful TDM actions will encourage the traveler to take one or more of the following actions:

- Change time of travel.
- Change path of travel, such that trips not destined to the area find other routes and avoid the congestion.
- Change mode of travel, some travelers will choose to use transit, share a ride or walk/bike.
- Not make the trip at all.

The increased congestion expected in the Reston area by 2030 will force many commuters to carefully consider their transportation options to find the best solution for them. It is necessary to provide a wide array of transportation options so that each individual can find the solution that works best for them while simultaneously reducing the level of congestion experienced during the peak periods. Transit, bicycling and walking must be made viable options wherever possible, as detailed in Chapters 3 and 4. TDM policies and programs supported by Fairfax County and local interests in Reston may include any of the following:

- Transit fare subsidies;
- Parking fees at office buildings;
- Preferential parking for carpools;
- Flexible work schedules;
- Telecommuting opportunities;
- On-site sales of transit fare media;
- Guaranteed Ride Home programs;
- Ride-matching programs;
- Transit information on-site;
- On-site TDM coordinator;
- Car-sharing;
- Vanpool Support; and
- On-site shower facilities for bicyclists.

When marketed and administered appropriately, the combined effects of all of these programs can have a significant impact on the number of SOV trips that are made during a peak period. For example, in studies recently conducted for the Tysons Corner area[4], it has been estimated that an aggressive TDM program will be important in achieving a non-SOV mode share of 20% in the area.

b. Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) use technology to improve the travel experience by providing additional information, removing delays or creating a more comfortable environment for the trip. The full range of applications of ITS is still being developed and may change significantly by 2030. However, some applications that will be useful in the Reston community may include the following:

- Real time bus locators;
- Real time bus arrival information for transit passengers;

[4] *Fairfax County Comprehensive Plan, 2007 Edition.* <http://www.fairfaxcounty.gov/dpz/comprehensiveplan/area2/tysons1.pdf>

- Signal priority for transit vehicles; and
- Real time traffic information.

An additional study would be necessary to determine the best applications and locations for these and other forthcoming technologies.

G. Implementation

This chapter has detailed many projects and policies that are recommended for the areas surrounding the Wiehle Avenue and Reston Parkway Metrorail stations. These actions will help ease traffic congestion in the area, improve circulation for all modes of travel and provide easier access and egress to the stations themselves. Each of these projects must compete with each other and with the other improvements recommended in later chapters of this report for scarce resources, including time and funding. Detailed engineering analysis has not been performed on any of the recommended projects, however planning level cost estimates have been developed based on similar projects that have been completed in the area.

Timing will be a key issue in implementation of these recommended actions, as there is a lot of work to be done in a limited timeframe. Based on the phased opening of the two stations in this study, some of the improvements will be necessary for access to the Wiehle Avenue station (scheduled to open first) and others will be required for the opening of the Reston Parkway station. Still other projects will be necessary in the long run to ease expected congestion in the area. The sections below provide cost estimates for each of the proposed actions and a list of priorities for the roadway projects. Integrated priorities between all of the different modes can be found in Chapter 5.

a. Cost

Fourteen roadway improvement projects have been identified in this chapter that will improve accessibility around the proposed Wiehle Avenue and Reston Parkway Metrorail stations. Cost will play an important role in the implementation of these projects, as funding must be assured before any design or construction can begin. Potential funding sources for projects recommended throughout this report can be found in Chapter 5. Rough cost estimates have been developed for each of the recommended projects in this chapter. These estimates are in 2007 dollars and prices are expected to increase annually.

Table 2-9 shows the estimated cost for each type of roadway improvement, the quantity of each recommended in the study area and the total estimated construction cost. These costs include the construction costs for each item and a substantial contingency for right-of-way costs, engineering work and other potential expenses, however actual costs may be more or less depending on the circumstances encountered at each location. Major utility relocation is not included, as information on existing utilities is not known. Utility relocation can be expensive. Annual costs for maintenance and operation have not been included in these estimates.

If all of the recommended projects were constructed in 2007, the total cost would be approximately $70 million dollars. Almost half of that total (49%) is associated with the various contingencies and right-of-way costs that cannot be ascertained at this time. By far the most expensive item in the recommended roadway program is the construction of the Soapstone Connector over the DIAAH, with a total estimated cost of $32 million for the bridge itself and an additional $10 million for other roadway construction, which is more than half of the total program cost. The roadway widening associated with

the internal street grid is estimated to cost an additional $11 million, while the bus lanes on Sunset Hills Rd are expected to cost approximately $8.1 million.

Table 2-9: Estimated Roadway Improvement Costs

Road Actions	Units	Quantity	Unit Cost	Contingency Per Unit	TOTAL
New Signal Installation	EA.	4	$319,500	$431,300	$3,003,200
Install new, or improve existing turn bay	EA.	8	$213,000	$287,600	$4,004,800
New travel lane on Reston Parkway	mile	0.38	$1,863,800	$2,516,100	$1,659,100
Add internal roadway links	mile	1.28	$3,727,500	$5,032,100	$11,212,300
Improve/Widen roadway from 2 to 4 lanes	mile	0.66	$8,413,500	$6,478,400	$9,871,500
New bridge over DIAAH	sq ft	56,000	$320	$250	$31,920,000
Bus Lanes on Sunset Hills Rd	mile	1.86	$1,863,800	$2,516,100	$8,146,600
TOTAL					**$69,817,500**

Appendix A includes the total estimated cost for each of the fourteen improvements (A-N) recommended in this chapter.

b. Prioritization

Each of the roadway projects that are recommended in this chapter is important in order to provide the best possible access to the Wiehle Avenue and Reston Parkway Metrorail stations. Some improvements provide a greater increase in accessibility than others, and are therefore prioritized more heavily. Additionally, as the rail line is scheduled to be opened in Reston in two phases, the first priority must be placed on providing access to the Wiehle Avenue station, which will be opening in the first phase. Table 2-10 below shows the fourteen recommended roadway projects according to the priority for providing improved accessibility in the immediate station vicinities. This prioritization table recognizes that importance does not always match with ease of implementation and that some of the very important, high priority projects (such as the Soapstone Connector) are large scale projects that will take significantly longer than smaller projects to plan, engineer and construct. Still others may be lower priority small projects, or projects that can be completed in association with redevelopment projects in the area. When opportunities arise to implement these actions they should not be passed by simply because they are lower on the priority listing.

Table 2-10: Roadway Improvement Priorities

	Project	Priority	Included in Record Of Decision	Comments
B	New left turn lane for westbound left turning movement at Sunset Hills Rd & Isaac Newton Sq. This would replace the shared left-through lane by providing a dedicated turn lane.	1st Priority	Yes	
C	Add a second left turn lane for northbound traffic at Wiehle Ave & Metro Access (between Sunset Hills Rd & DIAAH) and provide a second inbound lane.	1st Priority	Yes	
D	Add an additional left turn lane on the eastbound DIAAH ramp at Wiehle Ave	1st Priority	Yes	
E	Improve the existing right turn lane on eastbound Sunset Hills Rd at Wiehle Ave	1st Priority	Yes	

	Project	Priority	Included in Record Of Decision	Comments
F	Improve the existing right turn lane for westbound Sunrise Valley Dr at Wiehle Ave	1st Priority	Yes	
I	Provide a new connection over the DIAAH between Soapstone Rd and Isaac Newton Sq W, to connect the major east-west roadways: Sunset Hills Rd & Sunrise Valley Dr.	1st Priority	No	Long-term improvement
K	Isaac Newton Square West from Isaac Newton Square South to the station as an extension of the proposed Soapstone Connector.	1st Priority	No	
A	New signal and turn lanes on Sunset Hills Rd for access into the proposed Reston Parkway Metrorail station	2nd Priority	Yes	
G	Add northbound though lane on Reston Parkway at Sunrise Valley Dr, continuing the lane to the ramp for eastbound DIAAH	2nd Priority	Yes	
H	Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Dr	2nd Priority	Yes	
J	Provide bus lanes on Sunset Hills Rd from Wiehle Ave to Old Reston Ave	3rd Priority	No	Long-term improvement
L	The Station Entrance (already planned for improvements as part of station construction) should be extended across Wiehle Avenue to the Private Driveway as far east as Samuel Morse Dr.	3rd Priority	No	To be constructed (if possible) in association with redevelopment
M	Michael Faraday Court extension from the new roadway described in (L) north to the extended Roger Bacon Dr described in (N)	3rd Priority	No	To be constructed (if possible) in association with redevelopment
N	Extension/improvements to Isaac Newton Square South from Isaac Newton Square West to Wildlife Center Drive.	3rd Priority	No	To be constructed (if possible) in association with redevelopment

All of the recommended projects that were included in the Record of Decision (ROD) are mitigation efforts required as part of the construction of the rail project. These projects will not be paid for by Fairfax County and should all be constructed in conjunction with Phase I of the rail project. Based on this study, those ROD projects that are directly adjacent to the Wiehle Avenue station are designated as first priority because this station will open first. In addition, the Soapstone Connector and its extension across Sunset Hills Rd to Isaac Newton Square are also ranked as 1st priority project for the same reasons. Second priority projects are those which improve access primarily to the Reston Parkway station. The third priority grouping is reserved for projects that will help relieve some of the congestion that is expected on a long-term basis in the station areas.

A multi-modal priority listing that incorporates the above priorities and also includes all of the modes studied in this plan is the main subject of Chapter 5.

3. Pedestrian and Bike Facilities

The areas surrounding the proposed Metrorail stations at Reston Parkway and Wiehle Avenue have or will have many potential origins and destinations that can be reached by walking or biking. These locations include residential neighborhoods of varying densities, office buildings, commercial centers and hotels. Access to and from these locations will drive the success of these Metrorail stations and ultimately the Dulles Metrorail Extension, as travelers will be more likely to switch to using Metro if the whole trip is easy, safe and comfortable. Fairfax County has recognized the importance of comprehensive pedestrian and bicycle system planning in the proposed station areas.

This plan addresses the needs of pedestrians and bicyclists who wish to access Metrorail in the areas surrounding the Reston Parkway and Wiehle Avenue stations. The distance that people are generally willing to walk to access a rail transit station is approximately ¼ of a mile, although some people are willing to walk up to ½ of a mile or more. Bicyclists are generally willing to ride much further to access transit; distances of well over a mile can be easily and quickly traversed by a bicyclist if appropriate facilities are provided. In the study area, the cycling distance may be greatly increased by the existence of the W&OD Trail, which serves as a major arterial for bicyclists accessing the stations from the east or the west.

The station area has been divided into four quadrants for ease of discussion; each quadrant corresponds to a proposed station entrance. Within the spheres of influence – ¼ to ½ of a mile for pedestrians and one mile for bicyclists – the potential destinations and origins were identified. "Desire lines" that link these locations within the community with the closest station entrance represent the shortest path between the two points and indicate where pedestrians and bicyclists would like to go. While it is rarely possible to provide a direct path along this line due to obstructions such as buildings and various engineering constraints, the shortest possible path typically provides the best access. By analyzing each potential path, a comprehensive list of recommended improvements was compiled that identifies the infrastructure and other needs of those accessing Metro by foot or bike.

While this plan deals primarily with the existing land uses, it should be noted that it also accounts for potential re-development and increases in density that may occur in the areas closest to the stations. Significant increases in density for both office and residential uses may be possible in many areas once the rail line is operational, and mixed-use development is encouraged for many of the parcels within walking and biking distance of the stations. This redevelopment is likely to increase the demand for pedestrian and bicycle facilities, in addition to providing Fairfax County with a means of obtaining those improvements with minimum cost (such as proffers from developers). With new developments, the desire lines and available paths will change and evolve, and it is important that the list of improvements and recommendations contained in this report be re-evaluated on a regular basis to determine what changes and additions need to be made.

A. Recommendations

The recommendations presented in the following sections are divided into two user-based categories: pedestrians and bicyclists. Of course, many of the recommended facilities will be used by both groups and should be designed to accommodate the needs of all types of non-motorized users. However, in

situations with high levels of bicycle or pedestrian traffic (as is expected in this area) it is safer for all travelers if the different modes are separated as much as possible to avoid conflicts and crashes.

Furthermore, the recommendations presented in this document are intended to establish targets for a safe and convenient network for bicyclists and pedestrians. As time and conditions change there may be opportunities for other measures that can enhance mobility and safety for pedestrians and bicyclists. This report details the specific major projects that are recommended in the study area in addition to highlighting general recommendations for the entire area. Implementation of these general recommendations may require additional small construction projects and some additional cost.

a. Pedestrians

To serve the community and make transit a success in Reston, pedestrians should be provided with safe and convenient places to walk. In general, improvements to the pedestrian network will follow these principles:

- Increase connectivity of existing paths.
- Provide more direct access.
- Minimize exposure of pedestrians to moving vehicles.
- Increase visibility of pedestrians.

To accomplish these goals, a wide array of modifications, additions and improvements are recommended for the pedestrian network. These are illustrated in Figure 3-3 and detailed in Appendix B. These findings were based on an inventory of existing facilities, geometric, traffic, and crash data, and quantitative evaluation techniques (e.g., the intersection safety indices) described in the Existing Conditions Report.

One of the major goals of the Reston community in general and the RMAG in specific has been to obtain "four-corner access" to each of the stations. This ideal, which would provide four entrances to each station requires the fewest street crossings and therefore promotes pedestrian safety. Providing additional entrances to the Metrorail stations beyond those recommended in the ROD was beyond the scope of this study, and as such they are not recommended in this report. However, the recommendations found in this report seek to provide the best and safest access possible to each of the stations from the entrances laid out in the ROD.

By providing high-quality surface-facilities of an urban nature, it will be possible to create safe and pleasant walking conditions such that additional entrances are no longer a priority.

Two general types of improvements are recommended to enhance travel conditions for pedestrians: intersection improvements and sidewalk improvements. Intersection improvements deal with improvements to intersection geometry, crosswalk placement or design, signalization, curb-ramps and signage. In general, the following items are recommended for use at intersections:

- All crosswalks within a ½ a mile of any station should be painted block-style for maximum visibility (continental or ladder type markings).
- All traffic signals within ½ a mile of any station should include pedestrian countdowns.

- Median refuges should be used where possible to assist pedestrians in crossing wide, busy intersections. Refuge should be at least 5 feet wide (6 feet is preferred). Wider refuges are necessary at W&OD Trail crossings in order to accommodate groups of users.
- All curb ramps within the study area should be compliant with the Americans with Disabilities Act (ADA).
- Wider lanes are not always better! Eleven-foot lanes should be sufficient on most roads (except major arterials) to help control traffic speeds and reduce crossing times and exposure for pedestrians.
- There should be a marked crosswalk within 250 feet of all bus stops on major streets.
- Turning radii should be designed to urban design standards (the only exception may be major arterials with significant truck volumes) to encourage slower right turn movements and reduce crossing times and exposure for pedestrians.
- Right-turn slip lanes (also known as right turn channelized islands or pork chops) should be designed to slow turning vehicles and provide drivers with a clear view of crossing pedestrians (see Figure 3-1).
- Wayfinding signing should be used extensively to direct pedestrians along the shortest routes to major destinations.
- All street crossings should include adequate lighting to improve pedestrian visibility.

These general recommendations should be implemented at all intersections within a ½ to 1 mile radius of all station entrances. In addition, thirty-three intersections and six at-grade trail crossings were analyzed in detail as part of the study area, as shown in Figure 3-2. (The numbers in the figure are reference numbers that are referred to throughout the text and in the appendices.) Based on the existing conditions at these locations, the expected development patterns in the area and the estimated pedestrian and vehicular traffic levels, a wide range of intersection improvements were recommended, as shown in Table 3-1. Conceptual designs for many of the recommended intersection actions are included in the following sections and Appendix B, and care was taken to ensure that the concepts could be executed in the space available with little to no additional right-of-way required. However, these designs are not engineering designs, and all recommendations should be thoroughly analyzed to ensure the safety of drivers, bicyclists and pedestrians.

Figure 3-1: Pedestrian Friendly Right-Turn Slip Lane Design

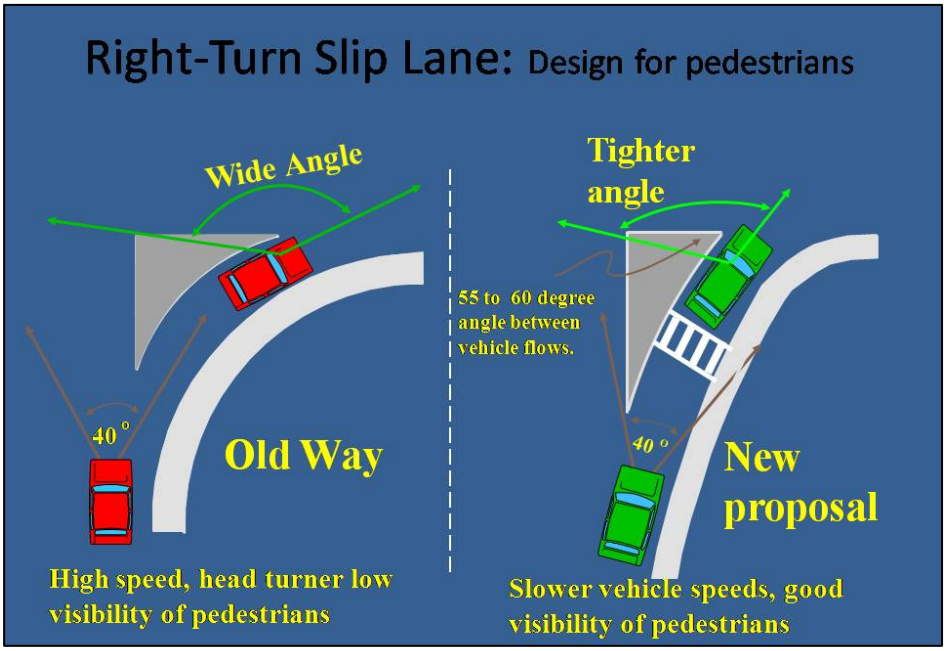


Table 3-1: Recommended Intersection Improvements by quadrant

Quadrant	Pedestrian Countdown Signal	Upgrade curb ramps	Construct Curb Ramps	Improved Crosswalk	Median Refuge	Channelized Right Turns	Warning Signage	Decrease Crossing Dist	Decrease Curb Radius	New Crosswalk
Reston Parkway - North	27	41	11	22	18	0	4	7	8	16
Reston Parkway - South	24	21	13	15	10	3	3	5	4	11
Wiehle Ave - North	19	27	3	16	7	2	4	6	6	10
Wiehle Ave – South	7	16	5	5	6	1	3	3	4	7
Total	77	105	32	58	41	6	14	21	22	44

Figure 3-2: Pedestrian Study Intersection Locations

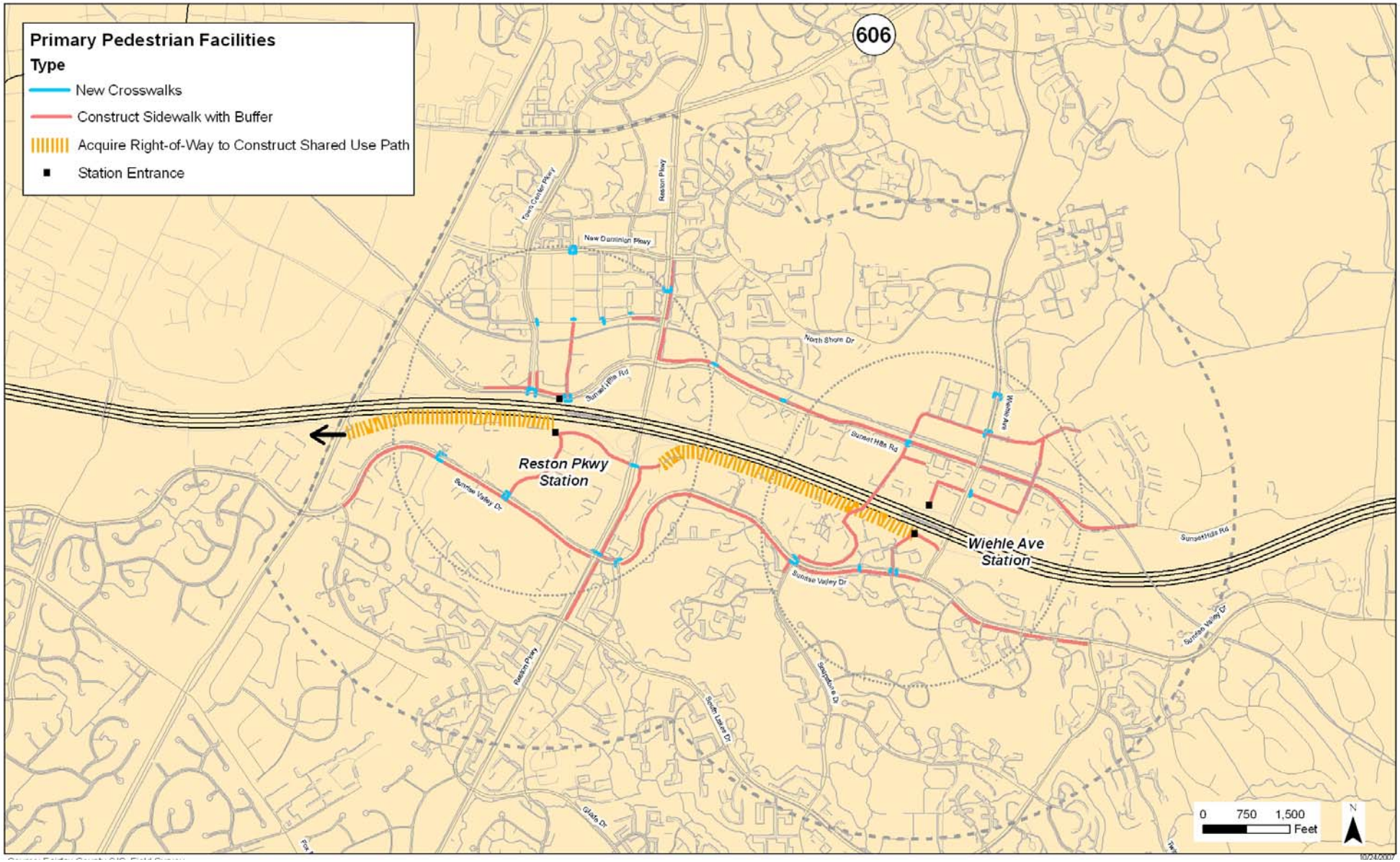
The sidewalk recommendations in this report include improvements and guidelines to help pedestrians move around the area safely and easily. Throughout the pedestrian sphere of influence (between ¼ and ½ of a mile from the station entrance) the following recommendations can generally be expected:

- Wherever possible, there should be sidewalks on both sides of major thoroughfares.
- Sidewalks on major paths should be at least 6-feet wide wherever possible and 8 feet on major pedestrian pathways including sidewalks adjacent to commercial frontage zones (5-foot minimum clear width). Wider paths are necessary where bicyclists are expected to share the trail. These recommendations are minimums, and wider facilities should be considered wherever warranted by volumes.
- Sidewalks should be separated from the roadway by a landscaped buffer of at least four feet wherever possible.
- All pedestrian pathways should have adequate, continuous lighting. Wherever high levels of pedestrians are expected, pedestrian-scale lighting elements should be included that provide good visibility for pedestrians.
- Sidewalks and trails should connect to adjacent communities wherever possible to provide additional connectivity throughout the region, not just within Reston.

In order to promote the use of sidewalks and trails in the Reston of 2030, the study team has developed a set of recommendations that are "urban" in their character. Pedestrians and bicyclists do not need to be separated from the activities of daily life; trails and sidewalks should be built on street level with access to the businesses, residences and other elements of the Reston community. These more urban roadway cross sections provide a safe and vibrant atmosphere for pedestrians and bicyclists, and encourage these users to use the facilities on a regular basis.

Information about the exact right-of-way widths for most of the necessary roadways was not available, so each segment where sidewalk construction is recommended must be analyzed for right-of-way issues before design and implementation. Figure 3-3 illustrates the locations where additional sidewalks are recommended in the study area. In total, over 49,000 linear feet – or about nine miles – of sidewalks are recommended in this plan.

Figure 3-3: Pedestrian Network Recommendations



b. Bicyclists

Bicyclists form a vital component of any community and will greatly increase the reach of Metro throughout the community. To achieve this objective, improvements to the bicycle network should be based on the following principles:

- Increase connectivity of existing paths.
- Provide more direct access.
- Ensure that vehicle speeds are compatible with bicycle travel.

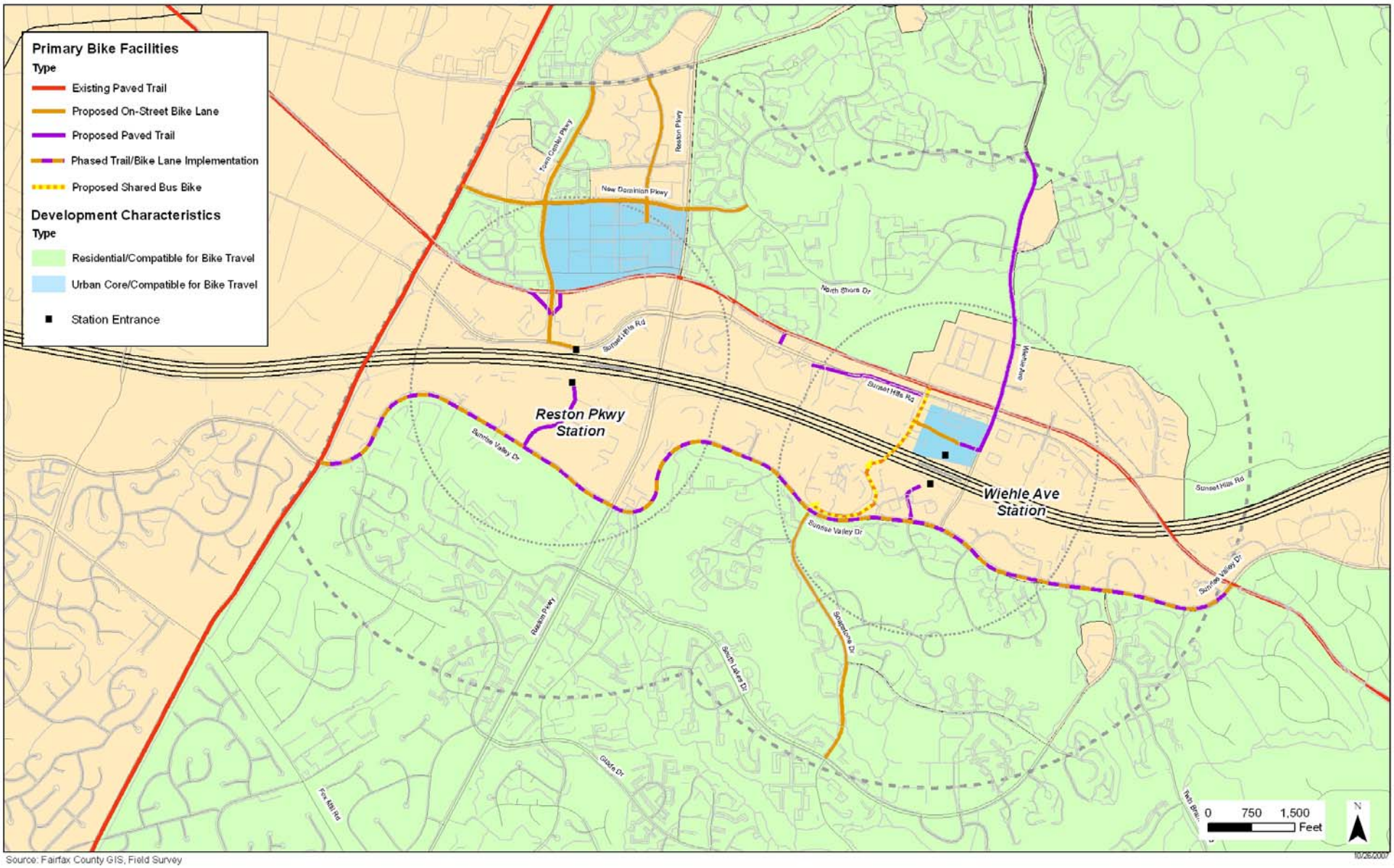
Bicycle recommendations were made for two general types of locations: trail crossings and network segments. Trail crossings (locations where a major off-street bike trail crosses a roadway) are approached on a case-by-case basis with the major goal of improving safety for bicyclists and removing unnecessary conflicts between bicycles and automobiles. Recommendations at these locations typically include elements similar to pedestrian intersection improvements. Improvements to improve the connectivity of the bicycle network typically include one or more of the following:

- On-street bike lanes in both directions (4 feet wide).
- Off-street bike trail (10 feet wide).
- Off-street shared use path (10 feet wide).
- On-street combined bike and bus lanes.

More specifics are provided for each intersection and roadway section of interest in the following sections. The recommended additions to the bicycle network are shown in Figure 3-4. The addition of approximately 32,000 linear feet – or about six miles – of dedicated bicycle and shared use trails is recommended. Additionally, another 73,000 linear feet – or almost 14 miles – of dedicated bicycle lanes are recommended in this plan.

It is critical that bicyclists be informed of new routes so they can choose the most convenient route. This information should be provided in area maps showing biking facilities and wayfinding signing to direct bicyclists along the shortest routes to major destinations.

Figure 3-4: Bicycle Network Recommendations



Intersections at trail crossings along both the W&OD and the Fairfax County Parkway Trails were also evaluated in this study. Those crossing major roads were studied in greater detail and described later in the report. Four at-grade crossings of the W&OD Trail were investigated near the Wiehle Avenue station and several grade separated crossings were investigated near the Reston Parkway station. In general, the at-grade crossings of the W&OD Trail were well-marked with signage and pavement markers for both bicyclists and drivers. Sight distance and heavy traffic volumes are the major issues encountered at these locations. The grade-separated crossings provide safe and fast access for bicyclists traveling through Reston, but suffer from a lack of connectivity with the surface street network. The recommended improvement measures are presented later in this report.

The Fairfax County Parkway Trail provides a key north-south connection in the study area, and the trail includes sufficient capacity and width for the expected bicycle demand. Insufficient sight-distance and advanced warning for drivers near at-grade crossings and intersections make bicycling along the trail difficult and unsafe and should be improved. Detailed recommendations are presented for two locations at at-grade crossings of the Fairfax County Parkway Trail later in this report.

Generally, all at-grade trail crossing locations should have a similar set of standard treatments to improve safety of bicyclists including:

- Advanced warning signage for vehicles as dictated by the current Manual on Uniform Traffic Control Devices (MUTCD), shown in Figure 3-5.
- Warning signage for bicyclists.
- Highly visible crosswalk facilities including countdown pedestrian signals where appropriate.
- Improved sight distance for the both vehicles and bicyclists at trail crossings.

Figure 3-5: Warning signage recommended for trail crossings. (Source: MUTCD)

A standard set of treatments provides a more familiar situation to both drivers and bicyclists; safety is improved when drivers and bicyclists know what to expect near at an at-grade crossing. Where necessary, additional measures can be taken to improve the visibility of bicyclists crossing major roadways.

c. Estimated Pedestrian Volumes

Determining the number of pedestrians likely to be using a specific pedestrian facility 25 years in the future is a difficult exercise that cannot be completed with absolute accuracy. However, it is important to know that recommended infrastructure improvements will be used and that they can accommodate the future pedestrian volumes. The number of transit passengers accessing the proposed Metrorail stations by foot can be used to estimate the number of commuters that will require pedestrian facilities at specific intersections. Additionally, internal pedestrian trips can be estimated based on the population and employment levels of the study area.

i. Pedestrians Accessing Metrorail

Based on the analysis conducted as part of the FEIS process, estimates of the number of pedestrians accessing each of the Reston area stations were developed. This estimate was divided into two categories: people beginning their trip in Reston and walking to either the Reston Parkway or Wiehle Avenue stations or using Metrorail to access one of the two stations and walking to their final destination in Reston. The FEIS produced numbers for the morning peak period; afternoon peak numbers were estimated by assuming symmetry in the AM and PM pedestrian patterns. The results are shown below in Table 3-2.

Table 3-2: Estimated Peak Period Walk Trips to/from Stations

AM Peak Period Walk Trips	From Zones to Station	From Station to Zones
Wiehle Ave Station	600	963
Reston Parkway Station	555	545
PM Peak Period Walk Trips		
Wiehle Ave Station	963	600
Reston Parkway Station	545	555

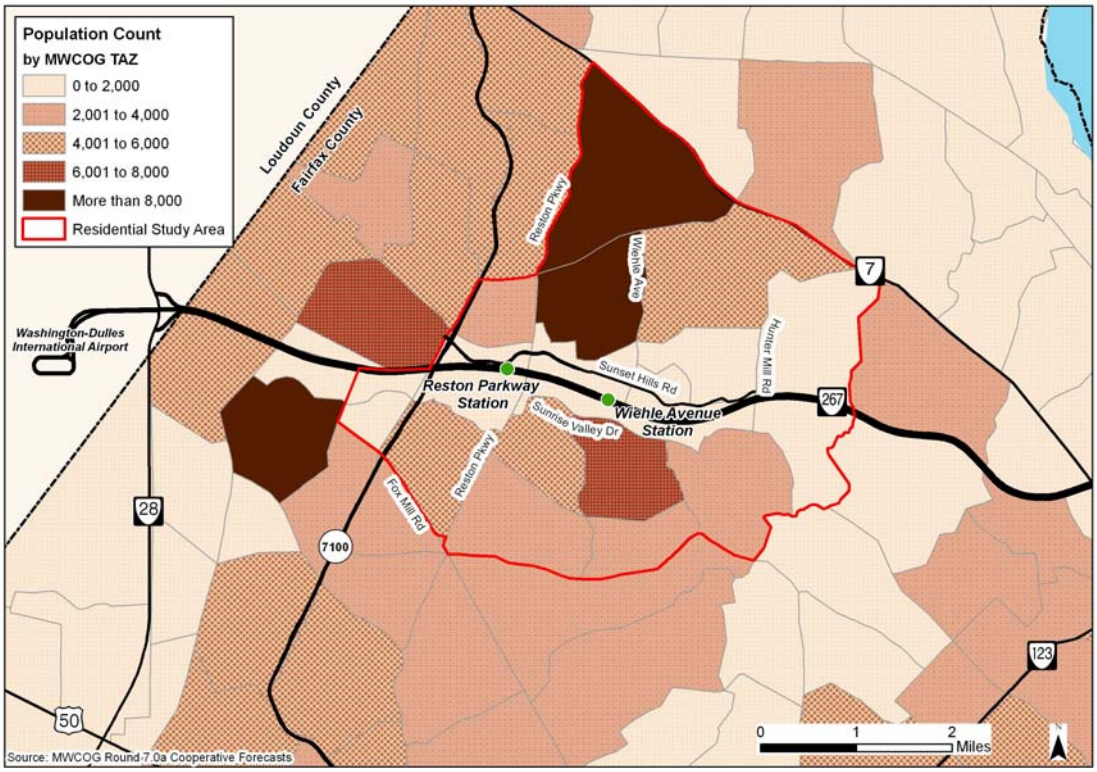
The pedestrian destinations were split by Traffic Analysis Zone (TAZ) for each station. Based on this information, the pedestrians were then assigned to paths according to their ultimate destinations. Where multiple paths to the same destination exist, the pedestrians were split according to the relative lengths of the paths, so that longer paths were assigned a smaller portion of the pedestrians making that trip.

Even along a specific path, it is impossible to know exactly what route a pedestrian will take, especially when crossing at an intersection. For example, a pedestrian on the southeast corner of an intersection who needs to get to the northwest corner can cross either the eastern and northern crosswalks or the southern and western crosswalks to reach their destination with the same amount of time and effort. Their choice is most likely to depend on which direction has a green signal when they reach the intersection. Therefore, estimates of pedestrian volumes at these locations are not estimates of actual traffic, but estimates of the maximum number of potential pedestrians on any particular crosswalk. Both the AM and PM peak period trips were assigned.

ii. Local Pedestrian Trips

In addition to Metrorail passengers, local pedestrian trips will also be generated from the land uses in Reston. In general, the number of local pedestrian trips will be substantially outweighed by the number of pedestrians accessing the Metrorail stations. Residential, commercial and office development will all generate some level of pedestrian travel as residents and employees run errands and make other local trips around their community. However, higher density areas are likely to produce more of these pedestrian trips than lower density ones. Estimating the exact number of pedestrians making local trips is difficult, but the number of trips is generally related to the number of employees and residents in an area. The existing pedestrian levels in the community were used to determine the appropriate level of pedestrian activity for each zone. The existing population for each TAZ in the area was determined, as shown in Figure 3-6.

Figure 3-6: 2005 Population near Proposed Metrorail Stations



The number of residential pedestrian trips produced by each TAZ was estimated based on the 2005 population levels as follows:

- TAZ with population under 2000 will produce 2 trips/square mile
- TAZ with population between 2000 and 4000 will produce 4 trips/square mile
- TAZ with population between 4000 and 6000 will produce 8 trips/square mile
- TAZ with population between 6000 and 8000 will produce 12 trips/square mile
- TAZ with population over 8000 will produce 16 trips per square mile

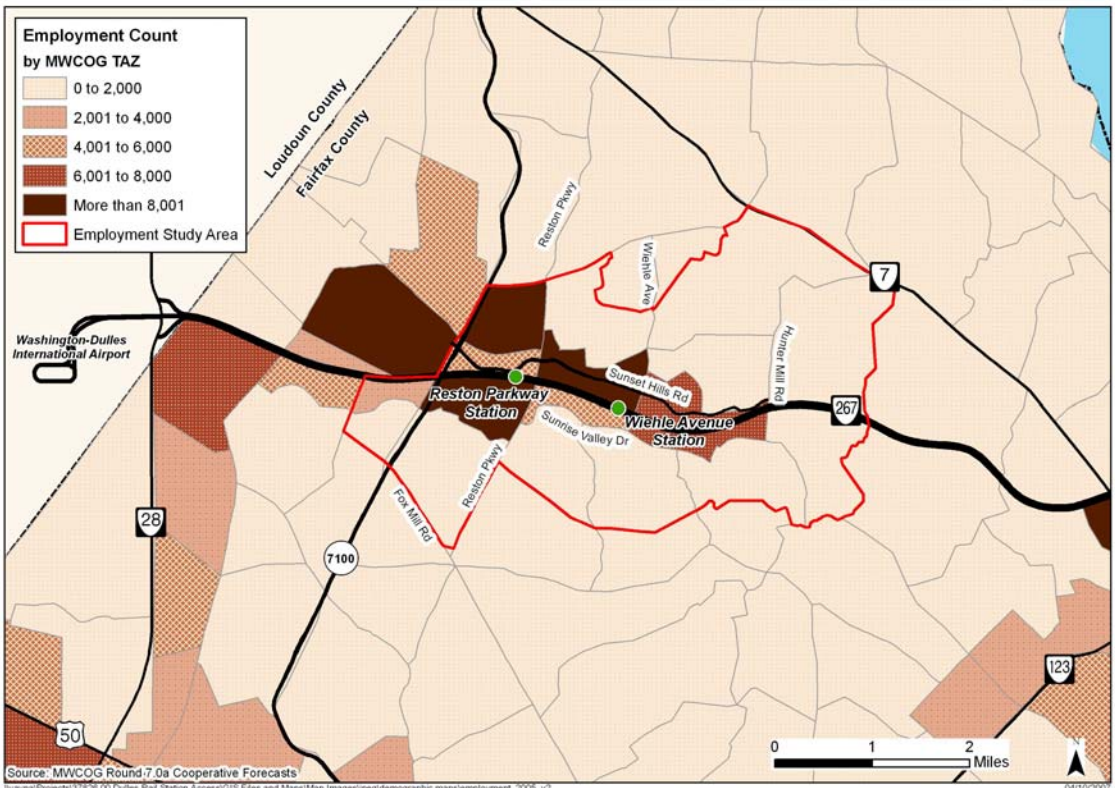
These rates are not exact, but provide a level of magnitude estimate of the number of pedestrian trips expected in each zone. The resulting pedestrian trips were then assigned as potential pedestrians on any intersections located in or adjacent to the TAZ.

The same type of calculation was conducted for employees, based on the 2005 employment levels in each TAZ, shown in Figure 3-7. A different scale was used for the local employee trips produced:

- TAZ with employment under 2000 will produce no trips
- TAZ with employment between 2000 and 4000 will produce 2 trips/square mile
- TAZ with employment between 4000 and 6000 will produce 4 trips/square mile
- TAZ with employment between 6000 and 8000 will produce 8 trips/ square mile
- TAZ with employment over 8000 will produce 16 trips/square mile

These rates provide an order-of-magnitude level estimate for the number of local pedestrian trips made by local employees, not exact trip estimates. Again, the trips produced by each TAZ were assigned as potential pedestrian trips to any intersections located in or adjacent to that TAZ.

Figure 3-7: 2005 Employment Levels near Proposed Metrorail Stations



The total number of potential peak period commuter pedestrians, local residential pedestrians and local employee pedestrians were summed on each crossing at every intersection to estimate the total potential pedestrian demand for each crossing facility. These numbers are included in Appendix C for reference.

B. Reston Parkway Station – North

This section addresses issues for pedestrians and bicyclists accessing the Reston Parkway Metrorail station from the north. The northern entrance to the station is located on the south side of Sunset Hills Road one block east of the intersection with Town Center Parkway. The major points of interest in this quadrant are located in the Reston Town Center, but access is also addressed for the office buildings south of the W&OD trail and the parcels immediately east of Reston Parkway. Most of the destinations in this area are located to the north of Sunset Hills Rd, requiring most pedestrians to cross this busy street. In some locations, Sunset Hills Rd is already 10 lanes wide, a daunting barrier for any pedestrian to cross. Without well-designed crossing facilities located along the length of the road, Sunset Hills Road can function as a major barrier to pedestrians, deterring people from using the Metrorail system and the sidewalks for their daily travel. Some internal circulation issues are also addressed. Bicycle access to the areas north of the Reston Town Center core and the W&OD trail are analyzed as well.

a. Pedestrians

The major generator of all types of traffic in this quadrant – but especially pedestrian traffic - is the Reston Town Center. The Town Center consists of high-density residential units, high-rise office space, and the busiest commercial center in the area. Also in the Town Center is the Reston Town Center Transit Station (RTCTS), a bus facility that accommodates passenger transfers and vehicle layovers and will be served by almost all of the bus routes in the area before and after the opening of the Reston Parkway Metro station. Pedestrian generators within ½ mile of the station entrance are shown in Figure 3-8, including:

A. Reston Town Center
B. Office and residential buildings east of Reston Parkway
C. Office buildings and shopping west of Town Center Parkway

Figure 3-8: Pedestrian destinations in Reston Parkway - North

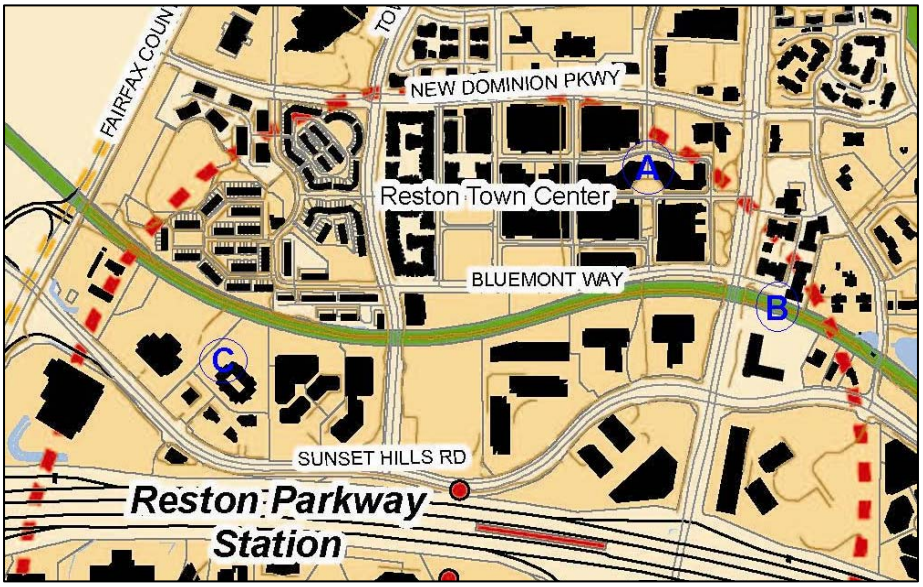


Table 3-3 details the major intersection actions recommended for this quadrant, while Table 3-4 details necessary additions to the sidewalk system. Note that this analysis deals only with the major routes and intersections and other necessary improvements may be required on residential streets or roadways and driveways that access individual buildings. Details of proposed intersection actions can be found in Appendix B.

Table 3-3: Intersection Improvements for Reston Parkway - North

No.	Location	Airline Distance to Station Entrance (ft)	Max. Pedestrian ISI[5]	Recommendations
I1	Sunset Hills @ Station Entrance	90	4.3	**East**: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; **West**: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; **South:** High visibility crosswalk, pedestrian countdown signal, curb ramps; **North**: high visibility crosswalk, pedestrian countdown signal
I2	Bluemont Way & Discovery St @ Pedestrian Bridge	1,800	--	**West**: High visibility crosswalk, pedestrian countdown signal, raised median refuge island; **North:** High visibility crosswalk, construct curb ramp (east)
I3	Sunset Hills & Town Center Pkwy	700	3.3	**All Approaches:** High visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, construct curb ramps
I4	Town Center Pkwy & Bluemont Way	1,500	--	**North:** Extend median to include pedestrian refuge; **South:**, extend median to include pedestrian refuge, decrease right turn radius; **All Approaches:** Upgrade curb ramps, high visibility crosswalk, re-align crosswalk
I5	Explorer St & Bluemont Way	1,400	--	**North**: High visibility crosswalk & upgraded curb ramps
I6	Library St & Bluemont Way	1,500	--	**North:** Upgraded curb ramps; **East:** Median pedestrian refuge, pedestrian warning and knockdown signs; **West:** Median pedestrian refuge, pedestrian warning and knockdown signs; **All Approaches:** High visibility crosswalk
I7	Reston Pkwy & Sunset Hills Rd	1,600	4.8	**East:** Realign right turn channelization; **South:** Realign right turn channelization, extend median to include pedestrian refuge; **West:** Realign right turn channelization, extend median to include pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, decrease right turn radius, upgrade curb ramps
I8	Sunset Hills & Old Reston Ave	2,500	4.0	**North:** High visibility crosswalk, pedestrian countdown signal, upgrade/construct curb ramps; **South**: Pedestrian countdown signal, upgraded curb ramps, high visibility crosswalk; **East:** Re-align high visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, upgrade/construct curb ramps
I9	Sunset Hills @ Target Driveway	2,100	3.9	**All approaches**: High visibility crosswalks, countdown signals, upgraded curb ramps; **East**: Extend medians to include pedestrian refuge, re-align crosswalk
I10	Explorer St & New Dominion Pkwy	2,600	3.1	**All approaches**: High visibility crosswalks, upgraded curb ramps, decrease curb radii, potential signal with pedestrian phase; **East**: Extend median island to include pedestrian refuge; **West:** Pedestrian median refuge

[5] PISI (Pedestrian Intersection Safety Index) measures the safety of pedestrians at street crossings based on traffic control devices, number of lanes, vehicle speeds, land use and vehicular traffic levels. Ped ISI values are calculated for each approach on an intersection. Blank entries are locations where traffic levels were not available and the calculation could not be performed. The maximum Ped ISI is used to show the least safe crossing condition at each intersection.

No.	Location	Airline Distance to Station Entrance (ft)	Max. Pedestrian ISI[5]	Recommendations
I11	Reston Pkwy & Market St	2,600	4.0	**South:** High visibility crosswalk, pedestrian countdown signal, curb ramps, pedestrian median refuge; **West**: pedestrian countdown signal, high visibility crosswalk, curb ramps; **East:** pedestrian countdown signal, high visibility crosswalk, upgrade curb ramps; ****Intersection currently under construction to implement improvements****
I29	Sunset Hills Rd & Discovery Sq/ Northrup Grumman E Entrance	1,000	4.0	**East:** Median pedestrian refuge; **West:** Median pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps
I30	Reston Pkwy & Westbound DIAAH ramps	1,200	4.0	**North:** Realign pedestrian refuge island, decrease right turn radius; **West:** Realign crosswalks, high visibility crosswalks, pedestrian countdown signal, upgrade curb ramps

Table 3-4: Sidewalk Improvements for Reston Parkway - North

No.	Side	Street	From	To	Recommendations
S1	N	Sunset Hills Rd	Station Entrance	Target Driveway	Construct 6' sidewalk with 4' buffer and associated curb ramps where needed
S2	E	Reston Pkwy	Sunset Hills Rd	New Dominion Pkwy	Complete Sidewalk
S3	N	Sunset Hills Rd	Reston Pkwy	Business Center Dr	Construct 6' sidewalk with 4' buffer and associated curb ramps
S4	S	Bluemont Way	Reston Pkwy	Discovery St	Construct 6' at grade sidewalk to connect with Reston Pkwy and bus stop on Bluemont Way
S5	Both	Town Center Pkwy	W&OD Trail	Sunset Hills Rd	Complete 6' sidewalk with 4' buffer to intersection of Town Center Pkwy & Sunset Hills Rd
S16	New	Path	Sunset Hills Rd @ Station Entrance	Bluemont Way @ Explorer St	Construct 10' shared-use path to Bluemont Way to include at-grade crossing of the W&OD Trail

i. Metro Station to Reston Town Center

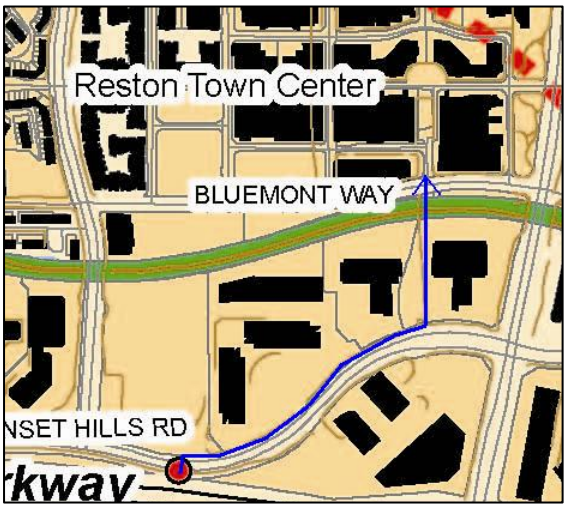
In this quadrant, the primary flow of pedestrians will be between the Metro station and Reston Town Center. Two hundred commuter pedestrians are expected to walk from the Metro station to the core of Reston Town Center (the area defined by New Dominion Pkwy, Town Center Pkwy, Bluemont Way and Reston Pkwy.) Another 300 are projected for areas north and west of this core. Walking is likely to occur throughout the day as employees enter Reston Town Center in the mornings, residents return in the evenings and visitors arrive throughout the day – especially during lunchtime and in the evening. On a straight line, these two locations are less than 2000 feet apart (using the intersection at Market St & Library St as the center of Reston Town Center) and three primary potential paths exist between them:

1. An eastern route utilizing an existing bridge over the W&OD trail,
2. A western route along Town Center Parkway, and
3. A central route on a new crossing of the W&OD trail on the "Gateway Property"

Depending on the specific destination of a pedestrian, any of these paths may be faster and more direct. Due to the large number of potential destinations in Reston Town Center and the large number of pedestrians estimated to be walking along this desire line, the actions associated with all of these routes are recommended for implementation as part of this plan.

1) Eastern Route

Figure 3-9: Eastern Route to Reston Town Center



The eastern route between the proposed station and the Town Center is currently used by many pedestrians during the day as they come from the offices south of Bluemont Way to eat in the restaurants in Reston Town Center. Pedestrians walk along Sunset Hills Rd, on a path between two office buildings (called Discovery Sq) and over a pedestrian bridge that crosses the W&OD trail just to the west of Reston Parkway, as shown in Figure 3-9. This route provides the most direct pedestrian access to the eastern portion of Reston Town Center, including the RTCTS. By 2030, over 300 pedestrians are estimated to use this route to access their destinations in Reston Town Center from the Reston Parkway Metrorail station. This path from the proposed station to Bluemont Way is over 2000 feet long and requires pedestrians to cross Sunset Hills Rd and Bluemont Way. Including time for crossing intersections, this would be about a 12-minute trip for the average pedestrian[6]. Improvements are needed at several intersections in order to provide safe and easy access along this high volume pedestrian path, including:

- Sunset Hills Rd @ Station Entrance (I1): High visibility crosswalks, countdown pedestrian signals and ADA compliant curb ramps for all approaches; Median refuge islands for Sunset Hills Rd approaches (see Figure 3-20 for proposed cross-section details).
- Sunset Hills Rd & Discover Sq (I29): High visibility crosswalks, pedestrian countdown signals and upgraded curb ramps on all approaches. Median pedestrian refuges should be constructed on both crossings of Sunset Hills Rd.
- Bluemont Way @ pedestrian bridge (I2): High visibility crosswalk, median refuge island and potential pedestrian signal across Bluemont Way (dependent on signal warrant); Crosswalk across Discovery St.
- All driveways along Sunset Hills Rd should include high visibility crosswalks, countdown pedestrian signals and ADA-compliant curb ramps. Median refuge islands should be included across Sunset Hills Rd wherever possible.

[6] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

2) Western Route

Pedestrians can also travel along Sunset Hills Rd, Town Center Parkway and Bluemont Way to access the Reston Town Center as shown in Figure 3-10. This path is about 2100 feet long from the station to Bluemont Way and requires crossing Sunset Hills Rd. Including crossing intersections, this would be about an 11-minute trip for most pedestrians[7]. Approximately 50 pedestrians are expected to use this route each day to access Reston Town Center. To make this path safe and hospitable to pedestrians, significant infrastructure improvements will be necessary including:

Figure 3-10: Western route to Reston Town Center

- Sunset Hills Rd & Town Center Pkwy (I3): High visibility crosswalks, pedestrian countdown signals, ADA-compliant curb ramps and median refuge islands for all approaches.
- 6-foot sidewalk and 4-foot buffer along the north side of Sunset Hills Rd west of the station entrance (S1).
- Completion of the 6-foot sidewalk on the west side of Town Center Parkway between the W&OD trail and Sunset Hills Rd (S5).
- Extend sidewalks to reach the northwestern corner of the intersection of Sunset Hills Rd & Town Center Pkwy.
- Bluemont Way & Town Center Pkwy (I4): Realigned high visibility crosswalks and ADA compliant curb ramps on all approaches and extended median refuge islands on the Town Center Parkway approaches.

3) Central Route

Clearly, the two routes described above should be options to pedestrians and may be the preferred route for some pedestrians based on their origin/destination within Reston Town Center. However, a more direct route would be desirable for pedestrians destined for the central areas of Reston Town Center including the RTCTS, as the eastern and western routes are both relatively long and may discourage Metro ridership. Therefore, a more direct route through the "Gateway parcel" (owned by Boston Properties) is desirable. This tract of land is currently undeveloped, although a plan for an office park with a parking garage has already been approved. Therefore time is of the essence. Ideally, a new plan would entail a pedestrian and bicycle connection on the east side of the parcel between Sunset Hills Road and the W&OD Trail as shown in Figure 3-11. There would need to be an at-grade crossing of the W&OD Trail and the path would continue north to cross Bluemont Way and

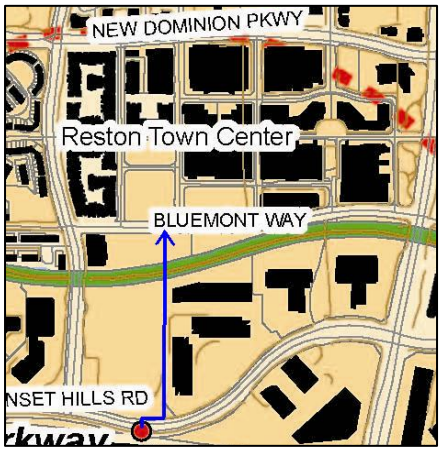


Figure 3-11: Central Route to Reston Town Center

[7] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

into Reston Town Center (S16). Grading and ADA compliance must all be considered when engineering design is being completed for this project. This path is approximately 1400 ft long to Bluemont Way and would require an 8-minute walk for the average pedestrian[8]. An estimated 225 pedestrian trips each day are projected for this path.

ii. Metro Station to locations east of Reston Parkway

The Reston Parkway station will also be the primary stop for employees at several large office and residential complexes to the east of Reston Parkway, on both sides of Sunset Hills Rd. Several major employers have offices in this area which will be prime candidates for utilizing the new Metrorail system, and over 300 pedestrian trips per day are projected for this area. In the area between the station entrance and Reston Parkway, Sunset Hills Rd can serve as the primary access route for pedestrians and bicyclists. For those destinations to the east of Reston Parkway, two potential routes exist including a northern route along Sunset Hills Rd and a southern route that parallels the DIAAH. Because almost all of the buildings and complexes in this area front directly onto Sunset Hills Rd, this southern route would provide only a limited benefit for pedestrians accessing these locations. In addition, because of the higher construction costs and difficulty obtaining right-of-way, the southern route is not a recommended path.

1) Northern Route

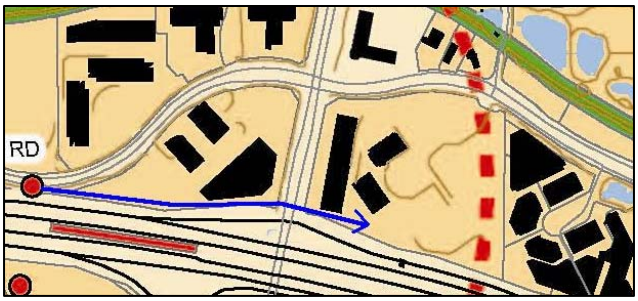
The northern route utilizes existing infrastructure on Sunset Hills Rd to provide access to the areas east of Reston Parkway. The route is approximately 2100 feet long and requires several street crossings at small intersections along Sunset Hills Rd in addition to the major crossing at Sunset Hills and Reston Pkwy. Significant pedestrian actions are required in this area including:

- Sunset Hills Rd & Discovery Sq/eastern Northrup Grumman entrance (I29): High visibility crosswalks, pedestrian countdown signals, upgraded curb ramps on all approaches and median pedestrian refuges on Sunset Hills approaches.
- Sunset Hills Rd & Reston Pkwy (I7): High visibility crosswalks, pedestrian countdown signals, decreased right turn radii and upgraded curb ramps at all approaches. The right-turn slip lanes should be re-aligned according to the policy presented earlier in the report on the eastern, southern and western approaches. The medians on the southern and western approaches should be extended into the crosswalk to include pedestrian refuge islands.
- Complete a 6-foot sidewalk with 4-foot buffer on the east side of Reston Pkwy between Sunset Hills and New Dominion Pkwy (S2).
- Direct sidewalk connections from the eastern corners of the intersection of Sunset Hills Rd & Reston Pkwy to the private developments next to it.
- 6-foot sidewalk with 4-foot buffer along the north side of Sunset Hills Rd east of Reston Pkwy as far as Plaza America or Business Center Dr(S3).

[8] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

- Sunset Hills Rd & Old Reston Ave (I8): Crossings of Sunset Hills Rd will not be encouraged on the western approach and no crosswalk should be provided at that location. Crossings should be concentrated on the east side of the intersection where the high-visibility crosswalk should be re-aligned and the median extended to provide a pedestrian refuge island. Pedestrian countdown signals and ADA-compliant curb ramps should be installed on the remaining three approaches. High visibility crosswalks are necessary on the northern and southern approaches.

2) Southern Route



One other potential route between the Metro Station and the office park south of Sunset Hills Rd (and potentially beyond to Plaza America) would be to travel along the DIAAH and requires only the crossing of Reston Parkway near the access ramps. This route would be approximately 1600 feet long instead of the 2100 feet required by the northern route along surface streets, which provides an approximate times savings of just over 2 minutes. All of the development in this area is distinctly oriented towards Sunset Hills Road, and the area behind Plaza America is particular inhospitable for pedestrians and bicyclists. Obtaining right of way may be a challenge and construction costs would certainly be significant for this path, in addition to the complications arising from a crossing of Reston Parkway at this location. Infrastructure improvements that would be necessary to implement this route include:

- Shared-use (pedestrian and bicycle) pathway along the north side of the DIAAH from the station entrance east at least as far as Plaza America.
- Reston Parkway @ westbound DIAAH ramps (I30): High visibility crosswalk, pedestrian countdown signal, ADA-compliant curb ramps and a pedestrian median refuge on the northern approach.
- Access sidewalks from the new path to private developments along Sunset Hills Rd

Due to the constraints already mentioned and the small time savings anticipated for pedestrians, this route and the associated improvements are not recommended at this time. As redevelopment occurs in the area, it may eventually become practical and appropriate to construct a shared-use path in this location.

iii. Metro Station to areas west of Town Center Pkwy

Several developments west of Town Center Parkway are also within walking distance of the Metro station including proposed and existing office buildings, major retail facilities (a Target near Fairfax County Pkwy and Sunset Hills Rd), a hotel and several restaurants. Approximately 150 daily pedestrian trips to these areas have been projected for 2030. Access to these destinations is best provided by Sunset Hills Rd, which will require several infrastructure actions, including:

- Improvements previously mentioned for the intersection of Sunset Hills Rd and Town Center Pkwy (I3).
- Completion of the sidewalk and associated ADA-compliant curb ramps along the north side of Sunset Hills Rd between Town Center Pkwy and the Fairfax County Pkwy (S1).

- Sunset Hills Rd & Target Driveway (I9): High visibility crosswalks, pedestrian countdown signals and upgraded curb ramps are needed on all approaches. On the eastern approach the crosswalk should be re-aligned and the median extended to include a pedestrian refuge.

iv. Access to and around Reston Town Center

Reston Town Center is currently a pleasant place to walk, and the introduction of Metrorail service and increased bus service will help to increase the level of pedestrian activity occurring in the area as a whole, not just to and from the Metro station. Pedestrian travel in and around Reston Town Center should be accommodated and encouraged by providing the facilities necessary for safe, easy and convenient pedestrian travel. In order to achieve this goal, several other pedestrian actions are recommended in this area including:

- Explorer St & New Dominion Pkwy (I10): High visibility crosswalks and upgraded curb ramps should be installed on all four approaches. The curb radii should be decreased (where possible) to 25 feet to slow turns and decrease pedestrian crossing distances. The medians on both approaches on New Dominion Pkwy should be extended into the crosswalk to create a pedestrian refuge. A signal warrant should be conducted to determine of a traffic signal with a pedestrian phase is needed at this location.
- Provide sidewalk at street level along the south side of Bluemont Way from the RTCTS to Reston Parkway (S4). This is in addition to or in place of the temporary grade-separated asphalt path the currently exists in order to provide access to the bus stop and the RTCTS from areas east of Reston Pkwy (See Figure 3-12).
- Reston Parkway & westbound DIAAH on-ramp (I30): Realign the pedestrian right-turn slip lane on the northern approach according to the design presented earlier in this report and decrease the turning radius. Across the on-ramp, the high visibility crosswalks should be added on a different (shorter) alignment, a pedestrian countdown signal should be added across the longer leg of the crossing and the curb ramps should be upgraded.
- Reston Pkwy & Market St (I11): Crosswalk, pedestrian countdown signal, ADA-compliant curb ramps and pedestrian median refuge across Reston Pkwy (construction is complete).
- Upgraded ADA-compliant curb ramps at all intersections along Town Center Pkwy, Reston Pkwy and New Dominion Pkwy (approximately 23 ramps).
- Bluemont Way & Explorer St (I5): High visibility crosswalk and ADA-compliant curb ramps across Explorer St.
- Bluemont Way & Library St (I6): High visibility crosswalks on northern and eastern approaches, median refuge islands on eastern and western approaches (minimum 5 feet wide) with pedestrian knock-down signs and ADA-compliant curb ramps on the northern approach.

Figure 3-12: Missing sidewalk on Bluemont Way near Reston Parkway.

b. Bicycle Access

Bicyclists can use many of the same facilities as vehicles and pedestrians; however it is often advisable to provide separate pathways to ensure the safety of all travelers, especially in areas with high volumes of bicyclists or pedestrians. The Reston Parkway station area is expected to experience heavy volumes of bicycle traffic due to the nature of the surrounding community in Reston Town Center and the station's proximity to the W&OD Trail and the Fairfax County Parkway Trail, both major regional bicycle facilities. Two types of bicycle trips should be accommodated and encouraged by the infrastructure in the area: local trips to, from and around Reston Town Center and commuter trips to and from the Metrorail station. Encouraging people to make local trips by bicycle can help reduce traffic congestion as cars are removed from the roads for shopping and entertainment trips. This requires that all of the major trip generators in the area be served by bicycle facilities. Access to the Metrorail station specifically must be provided from major residential, commercial and office developments and the W&OD and Fairfax County Parkway trails, which allow residents of a larger region to access the Metrorail system on their bicycles. Table 3-5 shows the major recommended bicycle facility improvements. Bicycle trails intersect with Reston area streets at several locations in the station area, and easy and safe access to and from both the W&OD and Fairfax County Parkway trails is necessary at each of these locations. Table 3-6 shows the recommended improvements to at-grade trail crossings in the area.

Table 3-5: Bicycle Recommendations for Reston Parkway - North

	Side	Street	From	To	Recommendations
B1	Both	Town Center Pkwy	Sunset Hills	Baron Cameron Ave (potential extension further north)	4-foot bike Lanes on both sides of the street
B2	Both	Sunset Hills	Town Center Pkwy	Station Entrance	4-foot bike Lanes connecting to bike lanes on Town Center Pkwy, acquire necessary right-of-way
B3	Both	New Dominion Pkwy	Fairfax County Pkwy	Reston Pkwy (potential extension to North Shore Dr)	4-foot bike lanes on both sides of the street
B4	Both	Fountain Dr	Freedom Dr	Baron Cameron Ave (potential extension further north)	Bike lanes to be constructed in conjunction with redevelopment: Spectrum development to include maximum 4-lane cross section with 4-foot bike lanes
B9	Both	NEW Connectors	Town Center Pkwy	W&OD trail	**East:** Pave and formalize existing at grade access ramp **West:** Construct pave access ramp to W&OD trail
B13		New Connector	Reston Town Center Transit Station	W&OD trail	Construct formal, ADA compliant connection

Table 3-6: Trail Crossing Recommendations for Reston Parkway - North

No.	Location	Existing Condition	Recommendations
X5	Sunset Hills Rd @ Fairfax County Pkwy Trail	At-Grade	Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage, redesign ramp, warning flashers with automatic detection
X6	New Dominion Pkwy @ Fairfax County Pkwy Trail	At-Grade	Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage

i. W&OD Trail to Metro Station

The W&OD trail is the major bicycle facility in the area and provides east-west access north of the DIAAH and from the Fairfax County Parkway Trail to the west. Many bicyclists will access the Metro Station from this trail. The trail is closest to the Reston Parkway station when it crosses Town Center Parkway, which is a grade separated crossing. Based on engineering constraints, direct connections between Town Center Parkway and the W&OD trail should be formalized to allow easy access for bicyclists traveling in either direction along the trail to the Metrorail station as shown in Figure 3-13 and Figure 3-14. Further, a dedicated bicycle facility should be provided that connects the trail seamlessly with the station entrance. Due to the width of the existing surface roads, the proposed development in the area and the high traffic volumes of all modes expected in the area, dedicated bike lanes are recommended as the best solution. The infrastructure actions that will be necessary to provide safe and efficient access include:

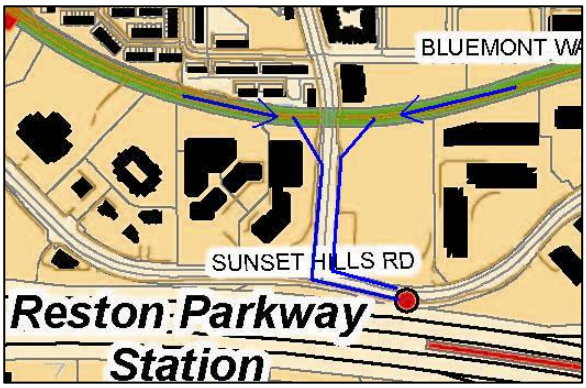


Figure 3-13: Proposed connection to W&OD Trail at Reston Parkway Station

- Formalized ramp connections to Town Center Parkway from the W&OD trail (B9):
  - East: Pave and formalize the existing at-grade access ramp.
  - West: construct paved access ramp to trail (may need to be located west of Centennial Executive Center office building to meet grade requirements).
- Town Center Parkway from the W&OD trail to Sunset Hills Rd (B1): Dedicated four-foot bike lanes on both sides of the street with good connections to the new ramps.
- Sunset Hills Rd from Town Center Pkwy to the station (B2): Dedicated four-foot bike lanes on both sides of street will direct access into station area.

Figure 3-14: Informal gravel connection to W&OD trail east of Town Center Pkwy

Potential roadway cross-sections have been analyzed which indicate that bike lanes would be a viable option in this area without significant road widening, as shown in Figure 3-20 later in the report.

ii. W&OD Trail to Reston Town Center

As a major destination in the region, a bicycle connection between the W&OD Trail and Reston Town Center is an important link in the bicycle network. The trail is directly adjacent to the Reston Town Center Transit Station (RTCTS) on Bluemont Way, although the two are separated by a substantial grade differential. Many informal trails and "goat paths" have been indentified in this area, indicating a significant demand for the connection by both bicyclists and pedestrians. A formal connection would be difficult due to the design requirements of the ADA (e.g. maximum 5% slope), but should be pursued through coordination with the Northern Virginia Regional Parks Authority (B13). The improved connection at Town Center Parkway recommended in the previous section (B9) may be a possible alternative for bicyclists; however pedestrians using the trail will still create demand for a direct connection at Bluemont Way and Library St.

Figure 3-15: Informal "goat paths" near the RTC Transit Station

iii. Fairfax County Parkway Trail Connections

The Fairfax County Parkway Trail intersects with three important facilities in the station area: Sunset Hills Rd, the W&OD Trail and New Dominion Parkway. After the implementation of the recommendations in this report, bicycle access to the Metrorail station will be provided by transferring to the W&OD Trail and then utilizing the bike lanes on Town Center Parkway and Sunset Hills Rd. The station can also be accessed directly by Sunset Hills Rd, however no dedicated facilities are recommended for this roadway west of Town Center Parkway because bicyclists from the south will be able to use the facilities recommended for Sunrise Valley Dr. New Dominion Parkway will also provide direct access to Reston Town Center via the proposed bike lanes, and a direct connection from the Trail must be provided. In addition, all trail intersections with roadway facilities must be redesigned in order to provide safer conditions for bicyclists including:

- More visible crosswalks.
- Additional warning signage.
- Changes in intersection geometry.
- Additional wayfinding.

These types of changes should be investigated for all crossings of the Fairfax County Parkway Trail in the area. Two crossings of the trail were studied in some detail as part of this study: Sunset Hills Rd (X5) and New Dominion Parkway (X6). At Sunset Hills Rd, the trail crosses what is essentially an on-ramp from Fairfax County Parkway to Sunset Hills Rd. Vehicle speeds are fairly high, visibility is low and there is no traffic control device that requires vehicles to stop making this a very dangerous crossing for bicyclists, as shown in Figure 3-16. A re-design of this ramp will be necessary in order to improve safety in addition to other treatments:

- Widen waiting area for bicycles.
- Widen curb ramps.
- Pedestrian countdown signals.
- High visibility crosswalk.
- Warning signage and flashers with automatic detection.

Figure 3-16: Fairfax County Parkway Trail crossing at Sunset Hills Rd.

The crossing of the Fairfax County Parkway Trail at New Dominion Parkway is a more traditional street crossing, as shown in Figure 3-17. Visibility is still low and very little has been done to make the trail crossing safer for bicyclists. This intersection also has the potential for some limited pedestrian activities, and some actions should be taken to ensure the safety of all users, including:

- Widen waiting area on both sides of the crossing.
- Widen curb ramps.
- Pedestrian countdown signal.
- High visibility crosswalk.
- Warning signage.

Figure 3-17: Fairfax County Parkway Trail crossing at New Dominion Pkwy

iv. Neighborhoods to Metrorail Station

The residential neighborhoods that will use the northern entrance of the Reston Parkway station to access the Metrorail system are primarily located to the north and north-east of the station. Major residential neighborhoods include Reston Town Center itself, areas north of Baron Cameron Ave and areas along North Shore Dr east of Reston Parkway. Many of these neighborhoods are within easy bicycling distance of the future station, and bicycle connections to these areas are important to provide Metrorail access to Reston residents.

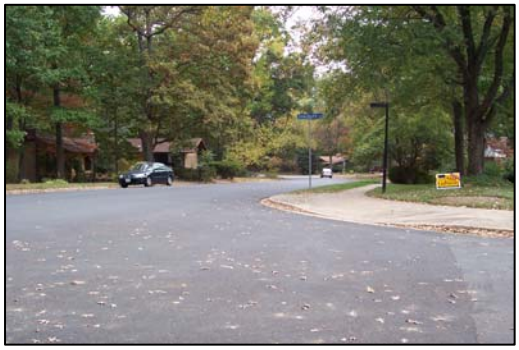


Figure 3-18: Residential streets can accommodate bicycle traffic

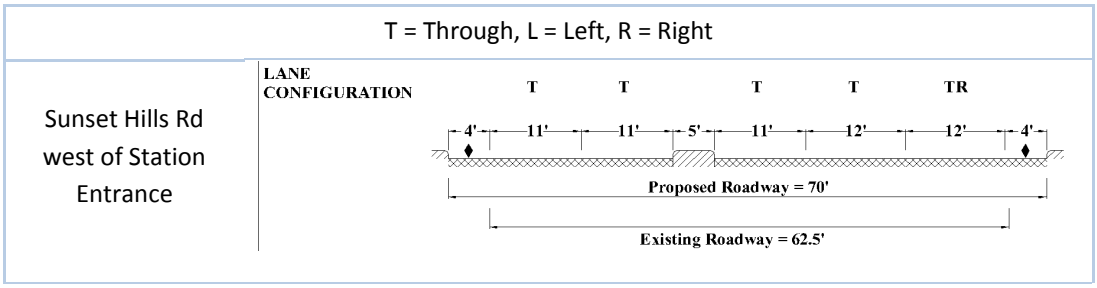
On the local neighborhood streets, bicycling is easily accommodated by the existing street network with wide streets, slow vehicle speeds and existing sidewalks and off-street trails as shown in Figure 3-18. However, it is the distance between the neighborhood streets and the station that require additional bicycle facilities as traffic volumes and speeds are significantly higher on these larger arterial and collector roadways. In Reston Town Center, traffic volumes are higher, but the layout and design of the street network which encourages low vehicle speeds and high levels of non-motorized travel also provides a good environment for bicycling without additional dedicated facilities (see Figure 3-19).

Figure 3-19: Street design in Reston Town Center accommodates bicyclists

In order to provide access to, from and around the major residential neighborhoods that are within biking distance of the station, several dedicated facilities are recommended:

- Town Center Pkwy from W&OD trail to Baron Cameron Ave (B1): Dedicated four-foot bike lanes on both sides to connect to the residential North Point neighborhood (possible extension to Stevenage Rd).
- New Dominion Pkwy from Fairfax County Pkwy & North Shore Dr (B3): Dedicated four-foot bike lanes on both sides to connect to North Shore Dr and Lake Anne neighborhoods. The connection between the trail on Fairfax County Pkwy and these lanes must be improved as well.
- Fountain Dr from Freedom Dr to Baron Cameron Ave (B4): Dedicated four-foot bike lanes on both sides to connect northern neighborhoods directly to Reston Town Center (possible extension to Stevenage Rd).

Figure 3-4 shows the recommended bicycle network for the study area, with connections to all of the major destinations. In order to include dedicated bike lanes on these facilities, it will be necessary to alter the cross-section of the roads by changing lane widths, narrowing the median strip and in some cases widening the road slightly. Based on the existing curb-to-curb pavement widths (not right-of-way widths), some analysis was done to determine what scale the necessary improvements would take at various locations throughout the study area. These typical cross-sections are shown below in Figure 3-20 and indicate that widening the roadway is only likely to be necessary at the location closest to the Metrorail station. In addition, high levels of bicycle demand in Reston Town Center suggest the need for additional bicycle storage facilities throughout the area, specifically in the core.



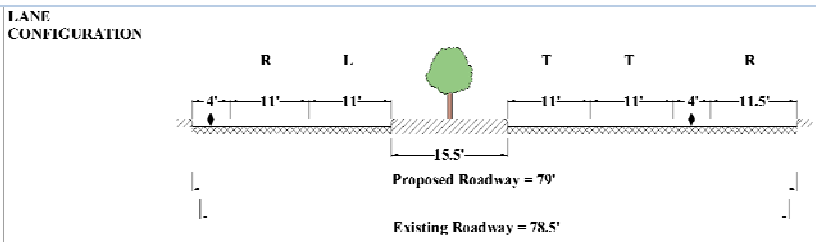
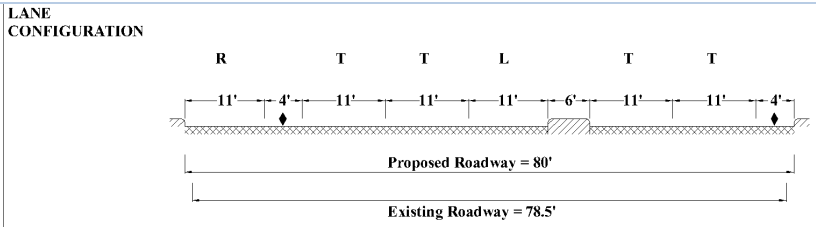
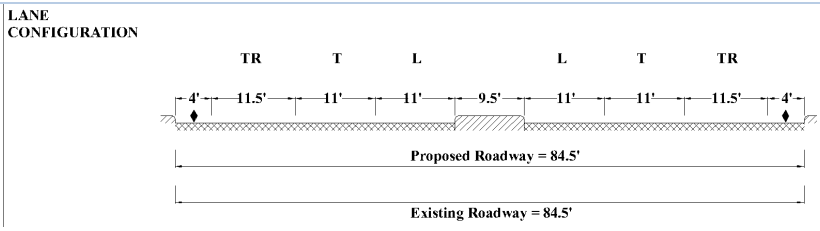
Town Center Pkwy north of Sunset Hills Rd	
Town Center Pkwy north of Bluemont Way	
New Dominion Pkwy east of Explorer St	

Figure 3-20: Potential cross-sections with bicycle lanes in Reston – North

C. Reston Parkway Station – South

The southern entrance to the Reston Parkway station is located just south of the eastbound DIAAH exit ramp at the northern end of Edmund Halley Dr. The Reston Parkway station area has a lower density of pedestrian and bicycle destinations south of the DIAAH than in the areas near Reston Town Center. The primary destinations in this quadrant are office complexes located along Sunrise Valley Dr, including the Reston International Center and the US Geological Survey Facility (USGS). Residential areas located south of Sunrise Valley Dr and USGS are also within walking or biking distance of the station area. The lower density of both office and residential destinations in this area may result in somewhat lower volumes of pedestrians than on the north side of DIAAH, but significant levels of bicyclists may be still expected. This is because residents and employees in the area must travel a longer distance to reach the station in the south than in the northern portion of the station area, which may make walking less attractive.

In the residential neighborhoods south of Sunrise Valley Dr, pedestrian and bicycle connectivity is augmented by a comprehensive network of off-street trails. These trails connect neighborhoods and provide shortcuts between Reston's many streets and cul-de-sacs, allowing for more direct access to major roadways. The recommendations for dedicated bicycle and pedestrian facilities will be focused on these major roadways, while connectivity in the individual neighborhoods will be provided by the local streets and the existing network of off-street trails. As such, these enhancements provide much needed links between the neighborhoods and commercial areas.

The major barrier to bicyclists and pedestrians accessing the Reston Parkway station from the south is Sunrise Valley Dr. Currently, there are only four marked crossings of this street between Fairfax County Parkway and Roland Clarke Pl (spaced an average of 1650 feet apart) and no sidewalks on the south side of the street. To help pedestrians and bicyclists access the station without making long detours to a marked crossing or crossing unsafely at an unmarked locations, five additional crossings are recommended for this stretch of Sunrise Valley Dr for an average distance of approximately 700 feet between marked crossings.

Several areas of office buildings (on both sides of Reston Parkway) and a major residential area will need pedestrian and bicycle access. In addition, access should be provided to the W&OD Trail and the Fairfax County Parkway Trail for bicyclists traveling to the area from more distant locations around the region.

a. Pedestrians

As shown in Figure 3-21, within a half-mile radius of the southern station entrance several destinations will need pedestrian access:

A. Office complexes west of Reston Parkway station
B. Office complexes east of the station but west of Reston Parkway
C. Development east of Reston Parkway (International Center)
D. Areas south of Sunrise Valley Dr
    1. USGS facility
    2. A residential neighborhood further south on
E. Access across the DIAAH should be provided to allow pedestrians to make use of Reston Town Center.

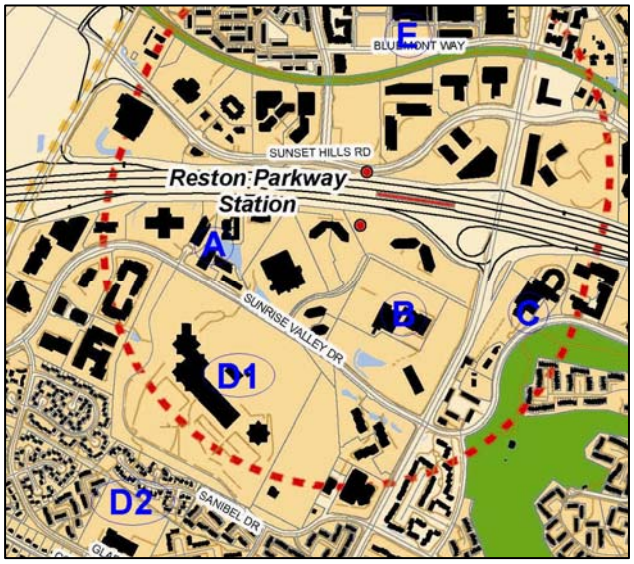


Figure 3-21: Pedestrian Destinations in Reston Pkwy - South

Table 3-7 highlights the major intersection improvements recommended for improved pedestrian safety and accessibility, while Table 3-8 highlights the necessary sidewalk improvements.

Table 3-7: Intersection Improvements for Reston Parkway - South

No	Location	Airline Distance to Station Entrance (ft)	Max. Pedestrian ISI[9]	Recommendations
I12	Sunrise Valley Dr & Mercator Dr	2,900	3.3	**North:** High visibility crosswalk, upgrade curb-ramps, pedestrian countdown signal; **West:** High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge, upgrade/construct curb ramps, decrease right turn curb radius; **South:** High visibility crosswalk, construct curb-ramps, pedestrian median refuge, pedestrian countdown signal
I13	Sunrise Valley & Reston Pkwy	2,000	4.3	**North:** Channelized right turns; **West:** Re-align crosswalk; **South:** Re-align crosswalk; **East:** Re-align crosswalk, channelize right turns, decrease right turn radius; **All Approaches:** high visibility crosswalks, pedestrian countdown signals, upgrade curb-ramps
I14	Sunrise Valley & Colts Neck	2,100	2.9	**West:** Re-align stop bar, upgrade curb ramps; **North:** Upgrade 1 curb ramp; **East:** Extend median to include pedestrian refuge; **All approaches:** pedestrian countdown signals, high visibility crosswalks
I15	Sunrise Valley & Edmund Halley Dr	2,200	2.9	**North:** Upgrade curb ramps; **East:** construct/upgrade curb ramps; **West:** construct/upgrade curb ramps; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge
I16	Reston Pkwy & South Lakes	3,200	3.8	**All Approaches:** Upgrade curb-ramps, high visibility crosswalks, pedestrian countdown signals
I17	Sunrise Valley & Glade Dr	4500	3.3	**East:** Pedestrian median refuge, upgrade/ construct curb ramps; **South:** Re-align crosswalk, construct/upgrade curb ramps; **West:** Re-align crosswalk, pedestrian median refuge, upgrade curb ramps; **North:** Reduce right turn radius/ remove acceleration lane, upgrade curb ramps; **All approaches:** High visibility crosswalk, pedestrian countdown signal
I31	Reston Pkwy & Eastbound DIAAH ramps	800	3.3	**West:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps, warning signage at unsignalized crossing, decrease right turn radius; **South:** Pedestrian median refuges, high visibility crosswalk, pedestrian countdown signal, construct curb ramps, stop bar for eastbound on ramp

Table 3-8: Sidewalk Improvements for Reston Parkway - South

	Side	Street	From	To	Recommendations
S7a	S	DIAAH	**Stage 1:** Edmund Halley Dr	**Stage 1:** International Center	**Stage 1:** Construct a shared-use path along the south side of the DIAAH (including a crossing of Reston Pkwy) 10-feet wide with 8-foot buffer, marked

[9] Pedestrian ISI (Intersection Safety Index) measures the safety of pedestrians at street crossings based on traffic control devices, number of lanes, vehicle speeds, land use and vehicular traffic levels. Ped ISI values are calculated for each approach on an intersection. Blank entries are locations where traffic levels were not available and the calculation could not be performed. The maximum Ped ISI is used to show the least safe crossing condition at each intersection.

	Side	Street	From	To	Recommendations
S7b			**Stage 2:** Fairfax County Pkwy	**Stage 2:** Wiehle Ave	**Stage 2:** As redevelopment occurs, acquire right-of-way to continue the path to provide access to office buildings
S8	N	Sunrise Valley Dr	Fairfax County Pkwy	W&OD Trail	Phased development of pedestrian and bicycle facilities (see S9 and B5) Widen existing sidewalk to and 10-foot wide shared use path to accommodate pedestrians and occasional cyclists
S9	S	Sunrise Valley Dr	Glade Dr	South Lakes Dr	Phased development of pedestrian and bicycle facilities (see S8 and B5) Construct 6-foot wide sidewalk with 4-foot buffer and associated curb ramps (to closely follow implementation of recommendation S8)
S10	E	Reston Pkwy	DIAAH access ramps (near new crossing)	South Lakes Dr	Construct sidewalk and associated curb ramps

i. Northwest Quadrant Office Buildings

Many office buildings west of the station entrance and north of Sunrise Valley Drive are within walking distance of the new Metrorail station (labeled (A) in Figure 3-21). Approximately 100 pedestrian trips each day are projected for these complexes. As an example, the main office building on Mercator Dr is about 2000 feet on a straight line from the station entrance. Two potential paths could be used to access this building and the other nearby offices:

1. A southern route approximately 3200-feet long, primarily along Sunrise Valley Dr and Edmund Halley Dr
2. A northern route approximately 2100-feet long requiring a new path that parallels the DIAAH

1) Southern Route

The southern pedestrian route follows existing streets including Edmund Halley Dr and Sunrise Valley Dr and requires pedestrians to walk approximately 3200 feet, 160% of the airline distance. Because this route is so much longer than a straight-line route would be, it is unlikely that pedestrians will use it. Those pedestrians who still wish to access the buildings in this area will likely walk through the parking lots and landscaping to make their walk shorter. Providing a more direct, formalized route would encourage more pedestrians to use the Metrorail station to access these buildings.

Plans for the station developed as part of the rail projects' FEIS and the Record of Decision (ROD) include the extension and expansion of Edmund Halley Dr to include pedestrian and bicycle facilities from the station entrance south to Sunrise Valley Dr (S6). Small streets (like Mercator Dr) and private office driveways and access roads should also have sidewalks to provide direct access to the buildings,

although these facilities may need to be provided by the individual parcel owners. Updated curb ramps and improved, high-visibility crosswalks at all roadway and driveway intersections along the north side of Sunrise Valley Dr will be required for this route (approximately two new crosswalks and six upgraded curb-ramps). Additionally, a pedestrian countdown signal should be installed on the northern approach at the intersection of Sunrise Valley Dr and Mercator Dr (I12).

2) Northern Route

A more direct route to access these same office buildings would require the construction of a 10-foot wide shared use path parallel to the DIAAH from the station entrance as far west as Fairfax County Parkway (S7b). This path (just 2100-feet long to the offices on Mercator Dr) would provide access to the rear sides of most of the office buildings in this area. Connections from the path to the buildings themselves would be necessary, and a significant amount of right-of-way would need to be acquired. No street crossings would be necessary due to the location of the path; however safety measures would be necessary for pedestrians and bicyclists very close to a major highway facility. Despite the projected cost (in both construction and right-of-way) of this improvement, this path is recommended as the preferred option because of the drastic improvement in travel time provided to pedestrians and bicyclists (over 5 minutes saved in the example used here.)

ii. Northeast Quadrant Office Buildings

Figure 3-22: Parking lots near the southern entrance to the Reston Parkway station.

Access to the office buildings closest to the station entrance (those between Edmund Halley Dr and Reston Parkway) requires pedestrians to walk through vast expanses of parking lots as shown in Figure 3-22. A dedicated pedestrian walkway through this flat and uninteresting scenery would improve pedestrian safety by creating one consolidated and highly visible path for employees in the area to use. Where pedestrian flows would intersect internal roadways and driveways with high levels of traffic, signage - including warnings and stop signs - may be necessary to provide safe passage. In addition, pedestrian access between parcels must be provided where it is currently impeded by landscaped barriers. Direct access to the southern parcels in this area would eliminate the need for long detours around landscaped obstacles and treks through trees or shrubs.

iii. East of Reston Parkway

To the East of Reston Parkway, but still within ½ mile of the station, are several office buildings, restaurants, stores and a hotel clustered together at the Reston International Center, approximately 2000 feet from the station entrance (airline distance). These parcels are owned by JBG and a large-scale

redevelopment is currently planned for this area. Additionally, substantial residential development exists in the area south o Sunrise Valley Dr and east of Colt's Neck Rd. Two primary potential paths exist that are drastically different in length and infrastructure requirements:

1. An approximately 5400-foot long southern route along Sunrise Valley Dr
2. An approximately 2100-foot long northern route requiring new paths and a new crossing of Reston Parkway

1) Southern Route

This route follows existing streets on Edmund Halley Dr and Sunrise Valley Dr and is over one mile long (approximately 5400 feet) as shown in Figure 3-23 and would take the average pedestrian approximately 27-minutes. Sidewalks will be necessary on both sides of Sunrise Valley Dr including new construction on the south side of the street (S9). Three major intersections will require infrastructure actions in order to improve pedestrian safety and accessibility along this route, including:

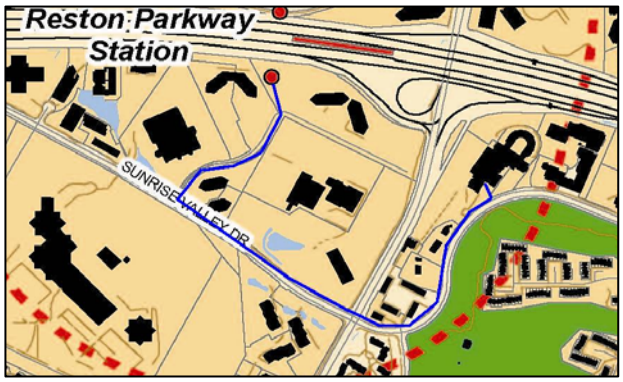


Figure 3-23: Southern Route to Reston International Center

- Sunrise Valley Dr & Edmund Halley Dr (I15): High visibility crosswalks, pedestrian countdown signals and pedestrian median refuges should be added to all approaches. In addition, ADA-compliant curb ramps will need to be constructed at all four corners of the intersection.
- Sunrise Valley Dr & Reston Pkwy (I13): has been noted as one of the most unsafe intersections in the study area. High visibility crosswalks, pedestrian countdown signals and upgraded curb-ramps are necessary on all approaches at this intersection. Channelized right turns with a pedestrian island should be constructed for the east and north approaches. All of the existing crosswalks should be re-aligned to provide shorter crossing distances for pedestrians, and a crosswalk needs to be added on the northern approach. In addition, the radius of the right turn lane on the eastern approach needs to be decreased substantially by extending the curb.
- Sunrise Valley Dr & Colts Neck Rd (I14): pedestrian countdown signals and high visibility crosswalks are necessary for all approaches of this intersection and the curb-ramps should be upgraded where necessary. With the addition of a crosswalk on the western approach, the stop bar should be re-aligned to protect crossing pedestrians. The median on the eastern approach should be extended to include a pedestrian refuge.

In addition, a small section of the sidewalk on the north side of Sunrise Valley Dr between Reston Parkway and Colt's Neck Rd (which is currently incomplete) will need to be completed (S8).

2) Northern Route

A more direct route could be provided by constructing a pedestrian path alongside the DIAAH ramps to and across Reston Parkway. A 10-foot shared use path parallel to the access ramps with an 8-foot buffer is recommended for this route (S7a). Construction of a new crossing of Reston Parkway would be required, and the most likely location is near the entrance to the DIAAH (I31). This route would shorten the walking distance to about 1900 feet and decrease the walking time by approximately 17 minutes as

compared with the southern route. This facility is already included on the Fairfax County Trails Plan[10]. Several obstacles would need to be overcome in order to construct a crossing at this location including:

1. Heavy traffic volumes moving in many directions
2. Elevation differences between Reston Parkway and the surrounding parcels
3. New right in/right out lane under construction on the west side of Reston Pkwy in this immediate vicinity
4. Right-of-way acquisition

The on/off ramps for the DIAAH are located in this area, which requires complicated signal phasing to accommodate high traffic volumes. Implementing a pedestrian crossing at this location would require a pedestrian signal phase as well, which could substantially increase the total cycle time and cause additional delays and backups for drivers. In order to minimize these effects, a two-stage crossing is recommended at this location that only requires traffic to be stopped in one direction at a time. The elevation difference between Reston Parkway and the surrounding parcels would require significant stairs and ramps to adhere to ADA design guidelines while providing access to an at-grade crossing of Reston Parkway. The infrastructure improvements at this intersection (I31) include:

- Western approach:
  - Eastbound on-ramp: high visibility crosswalk, warning signage, and upgraded curb ramps should be installed.
  - Eastbound off-ramp: pedestrian countdown signal and upgraded curb ramps should be installed. The right turn radius should be significantly decreased in order to slow vehicle speeds and decrease the crossing distance for pedestrians.
- Southern approach: A crossing of Reston Parkway will require three high visibility crosswalks, two pedestrian median refuges and a two-stage pedestrian countdown signal that stops traffic on northbound Reston Parkway and the eastbound on-ramp.

There is some potential, and also some community support for a grade separated crossing at this location. Previous experience and significant research have shown that pedestrians are unlikely to use grade separated crossings unless they do not have to go out of there way at all; there are no significant grade changes; and there are activities at the crossing level on both sides of the crossing. The development of a grade separated crossing at this location, whether a bridge or a tunnel, should meet all of the appropriate requirements before such a facility is designed. Further discussion of this crossing and potential partnering opportunities with local developers can be found in Appendix G.

Additionally, sidewalk facilities in the area of the ramps need to be improved. Safety improvements, including buffers, guardrails, warning signage and pavement markings should be considered carefully in the entire area. Sidewalks should be constructed on the east side of Reston Pkwy from Sunrise Valley Dr to the new crossing at the DIAAH ramps (S10), however they currently will not be continued across the DIAAH. Therefore all pedestrians attempting to cross the DIAAH on Reston Parkway will have to walk on the western side of the street until such time as the Reston Parkway bridge is reconstructed to include

[10] *Countywide Trails Map*, Fairfax County Department of Planning and Zoning. Approved July, 2002. <www.fairfaxcounty.gov/dpz/comprehensiveplan/maps/trailsplanmap.pdf>

pedestrian facilities on both sides. Clear and prominent signage on the eastern sidewalk facility should be included that indicates the need for northbound pedestrians to cross Reston Parkway at this intersection so that no one continues north on the east side where no sidewalk exists.

iv. Southern Office and Residential

Several office buildings south of Sunrise Valley Dr are within walking distance of the station entrance, including the US Geological Survey (USGS) facility. Beyond the office buildings, south of South Lakes Dr, are residential communities that may produce pedestrian trips if safe, convenient facilities are available.

1) Office Buildings

Accessing the office buildings in this area requires paths on both sides of Sunrise Valley Dr, including the construction of new sidewalks on the south side of the street (S9) and the widening of the sidewalk to a 10-foot wide multi-use trail on the north side (S8). In addition, crossing opportunities should be provided at multiple locations including Edmund Halley Dr (I15), Mercator Dr (I12) and near any major driveways. Sidewalks will also be necessary along USGS Drive and other driveways all the way to the building entrances. These pathways on private property will most likely have to be provided by the property owners.

Figure 3-24: Two alternative paths to the USGS facility

A shorter alternative (the blue dashed line in Figure 3-24) would be to provide pedestrian pathways connecting on a more direct route from Sunrise Valley Dr to the USGS buildings. Also necessary would be the crossing improvements at Sunrise Valley & Edmund Halley Dr (I15) including crosswalks, pedestrian countdown signals, ADA-compliant curb ramps and median refuge islands previously discussed. Walking distance to the USGS facility could be decreased by over 500 feet by the provision of this type of direct path, shortening walking time by more than two minutes. Safety and security on these types of off-street paths through non-populated areas should be a primary concern, and consistent lighting and clear sightlines should be incorporated into any design. Because of these concerns and the cost of right-of-way acquisition, this path may not be feasible and the alternate path should be improved.

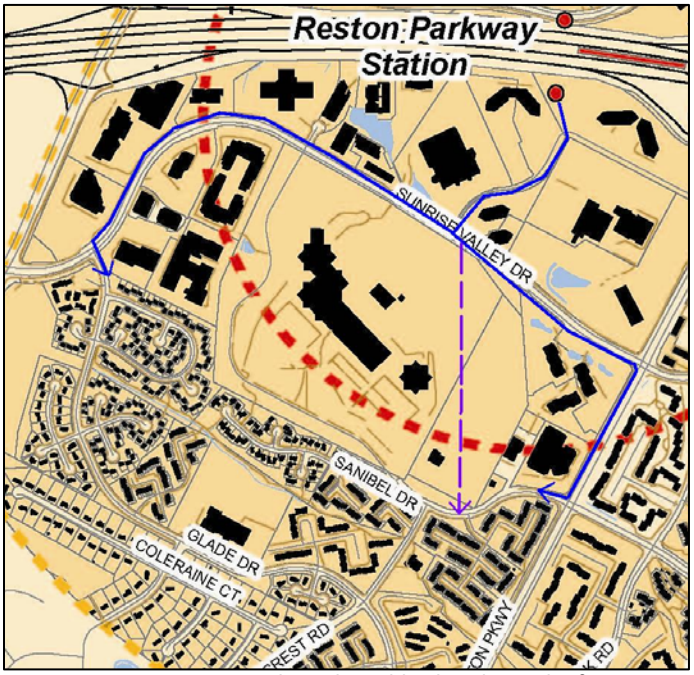


Figure 3-25: Routes to residential neighborhoods south of Reston Parkway station

2) Residential Neighborhoods

Three primary routes could provide access the residential neighborhoods south of the USGS facility. Two paths would utilize the existing street network, while one would require the

construction of a new off-street path through the grounds of the USGS facility. Reston Parkway provides access to the eastern portion of the neighborhoods, while Sunrise Valley Dr provides access to neighborhoods to the west (see Figure 3-25). Pedestrian improvements along these routes would be primarily on local residential streets, and will not be addressed specifically in this report. However, additional improvements on the major streets would be necessary.

The eastern route along Reston Parkway is approximately 4800 feet long to access the closest residential area and would require a 24-minute walk[11]. It would take longer to access homes further from Reston Parkway. The following improvements are required along this route:

- Reston Pkwy from Sunrise Valley Dr to South Lakes Dr (S10): Construct sidewalk on the east side of Reston Pkwy.
- All of the intersection and crossing improvements previously discussed for the intersection of Sunrise Valley Dr & Reston Pkwy (I13).
- Reston Pkwy & South Lakes Dr (I16): Upgrade curb-ramps and install high visibility crosswalks and pedestrian countdown signals at all approaches.
- Construct sidewalk on the south side of Sunrise Valley Dr between Glade Dr and Reston Pkwy (S9).

The western route along Sunrise Valley Dr is about 5500 feet long and to access the closest residential neighborhood on Glade Dr and would require a walk of at least 28 minutes for residents. This route requires some of the same infrastructure improvements, but requires additional improvements at Sunrise Valley Dr & Glade Dr (I17):

- Install high visibility crosswalks and pedestrian countdown signals and upgrade/construct curb ramps on all approaches.
- Pedestrian median refuges should be constructed on both the eastern and western approaches.
- The southern and western crosswalks should be re-aligned to shorten the crossing distance for pedestrians.
- On the northern approach, the right turn radius should be substantially decreased by removing the existing acceleration lane.

Neither of these paths is likely to experience very heavy volumes, however the facilities should be provided to encourage pedestrian activity and ensure the safety of pedestrians and bicyclists.

Accessing the residential neighborhoods south of the USGS facility directly would require the construction of a pedestrian path from at least Sunrise Valley Dr to South Lakes Dr (the dashed purple line in Figure 3-25**.** This path requires only one street crossing at Sunrise Valley Dr and Edmund Halley Dr (I15) and the construction of sidewalks along all neighborhood streets wherever they are currently absent. This direct path is approximately 3900 feet long to the closest neighborhoods is substantially shorter than paths utilizing the existing street network. However, it would involve significant right-of-way acquisition and may not be well used due to the low (or non-existent) level of activity that occurs along the path. Security and safety are always a concern on these types of off-street pedestrian paths.

v. Southern Access to Reston Town Center

The DIAAH acts as a major barrier between the north and south sides of Reston today, with only four existing crossing locations in the two-mile stretch between Fairfax County Parkway and Hunter Mill Rd.

[11] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

Access across this highway, especially for pedestrians and bicyclists is essential to provide a continuous network of pathways. Especially important is access to Reston Town Center, which should be accessible on foot to residents and employees south of the DIAAH. Two potential routes for this connection exist in the Reston Parkway Station area:

- Reston Parkway: Sidewalks only on west side of the street across the DIAAH.
- Metro Station: during service hours, the station walkways will serve as a path across the DIAAH without requiring fare payment.

The Reston Parkway path includes sidewalks only on the West side of the street, with no possibility of expansion on the east side without the very costly reconstruction of the existing bridge across the DIAAH. (The bridge is planned for eventual reconstruction, and should be constructed to include pedestrian and bicycle facilities on both sides.) The improvements previously discussed for the intersection of Reston Parkway and the access ramps (I31) should be implemented including high visibility crosswalks, warning signage and ADA-compliant curb ramps.

During Metrorail's service hours (between 19 and 22 hours per day) both entrances to the Reston Parkway station will be open. A mezzanine area within the station will connect the bridges from either station entrance without requiring payment of a fare. This connection allows pedestrians and bicyclists to cross the DIAAH on a safe, well-lit and monitored path during most hours of the day. This crossing opportunity provided by the rail project should not be overlooked, as the construction of an additional grade-separated crossing of the DIAAH in the station area would cost millions of dollars and not provide significant increases in connectivity. Additional discussion of pedestrian and bicycle crossings of the DIAAH can be found in Appendix G.

b. Bicycle Access

Bicycles are a vital access mode for people who live beyond walking distance from the Metro station, which is the case for much of the residential area south of the proposed Reston Parkway station. Additional bicyclists are expected to use the existing W&OD trail and the Fairfax County Parkway trail to access the Metrorail system. Dedicated facilities in the form of off-street paths and on-street bike lanes can provide access to homes that would otherwise have to use private cars for their travel. Bicycle access should be provided from four major areas to the Metrorail station: the W&OD trail, the Fairfax County Parkway Trail, the office buildings and the residential neighborhoods. Table 3-9 highlights the major bicycle improvements recommended for this quadrant.

Table 3-9: Bicycle Improvements for Reston Parkway - South

	Side	Street	From	To	Recommendations
B5	Both	Sunrise Valley Dr	W&OD Trail	Fairfax County Pkwy	Phased development of pedestrian and bicycle facilities (see S8 and S9) Construct 4-foot bike lanes (to be complemented in conjunction with recommendation S9)
B6	both	Edmund Halley Dr	Station Entrance	Sunrise Valley	Construct 10-foot shared use path on one side as part of the construction of the station

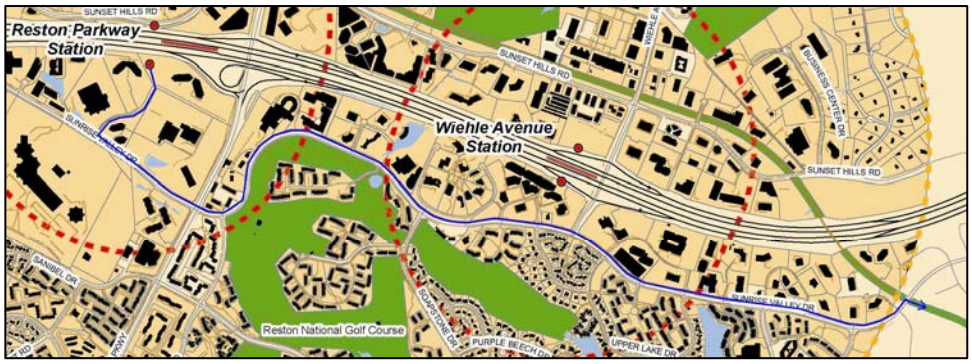
i. Southern Access to Trails

As the primary bicycle facility in the Reston area, bicyclists should be able to access the W&OD trail from the areas south of the DIAAH. Several opportunities to cross this barrier exist in the immediate station vicinity, including:

- Fairfax County Parkway: existing off-street bike path on the east side on the street.
- Reston Parkway: no dedicated facility, narrow sidewalk on west side of street.
- Metro Station: during operating hours, bicyclists would also be able to cross the DIAAH through the Metro Station without paying a fare.

Additionally, for eastbound bikers, no crossing of the DIAAH would be necessary as access to the W&OD Trail via an at-grade crossing is available on Sunrise Valley Dr east of Cross School Rd. Currently, sidewalk exists only on the north side of Sunrise Valley Dr. To encourage bicycle access, a dedicated bicycle facility is necessary from the W&OD trail at least to Edmund Halley Dr, as shown in Figure 3-26. Based on the demand for pedestrian and bicycle facilities along this route, a phased implementation of facilities is recommended for this route. The first phase requires the widening of the existing sidewalk on the north side of Sunrise Valley Dr to a 10-foot wide shared use path to accommodate pedestrians and occasional bicyclists (S8). The existing sidewalk is paved asphalt and is wider than five feet in some sections; therefore little additional right of way may be required for this path. The second phase of this project (to be completed shortly after the first phase) would be to construct a 6-foot wide sidewalk on the south side of Sunrise Valley (S9) and then on-street bike lanes (B5) on both sides of the street.

Figure 3-26: Proposed location for a dedicated bicycle facility on Sunrise Valley Dr



Some initial analysis of the existing design of Sunrise Valley Dr has been conducted as shown in Figure 3-27.

T = Through, L = Left, R = Right

	LANE CONFIGURATION
Sunrise Valley Dr east of Glade Dr	T T L T T R 4' 11' 11' 6' 11' 11' 11' 4' 11' Proposed Roadway = 80' Existing Roadway = 75'

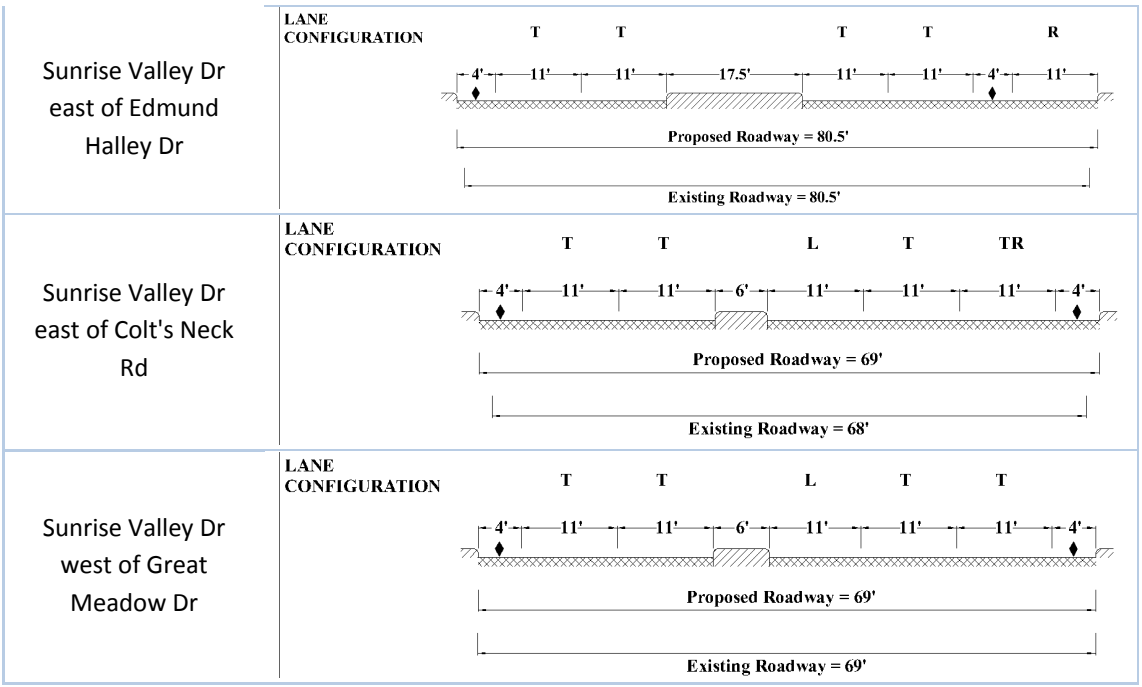


Figure 3-27: Potential Cross Sections of Sunrise Valley Dr with Bicycle Lanes

This analysis indicates that some portions of this proposal could be conducted with minor (or no) modifications to the cross-section of the street. Figure 3-28 shows that along the whole section of Sunrise Valley Dr under consideration only minor modifications to the street width would be necessary except for a few locations (primarily near major intersections) where significant widening of the pavement (more than two feet) would be necessary. In addition to providing access to the W&OD trail for residents on the south side of Reston, these facilities would also provide and east-west bicycle link across the south side of the study area and connect the Fairfax County Parkway Trail to the Reston Parkway Metrorail station. A direct connection from this trail to the bike lanes and shared use path on Sunrise Valley Dr should be provided as part of this improvement.

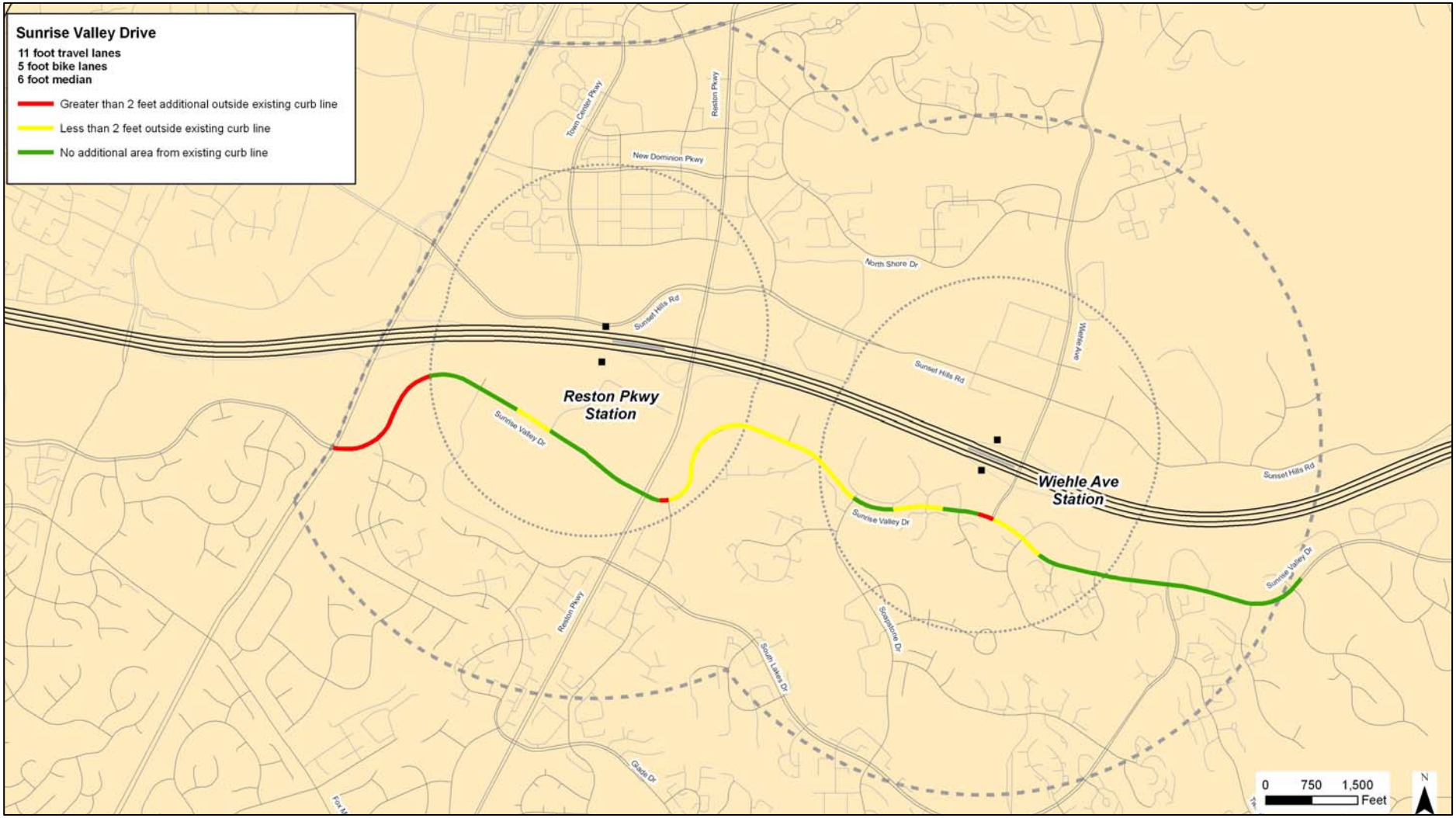
ii. Metro Station to Office Buildings

The office complexes in this area are primarily located along Sunrise Valley Dr. Bicycle facilities will be required on both Sunrise Valley Dr and Edmund Halley Dr. A shared use path on one side of Edmund Halley Dr is already planned as part of the mitigation efforts described in the FEIS and ROD. The shared use path and bike lanes described in the previous section (S8, S9 and B5) would provide sufficient access to all of the office complexes in the area.

iii. Residential Neighborhoods

Bicycle access to the southern residential neighborhoods is available using the same routes as for pedestrians: Reston Parkway or Sunrise Valley Dr. On Reston Parkway, no dedicated bicycle facility exists and high levels of vehicle traffic and constrained geometry make construction of a dedicated facility very difficult. However, bicyclists can use the sidewalks on both sides of Reston Parkway. On Sunrise Valley Dr, extending the recommended bike lanes and shared use paths (S8, S9 and B5) to Fairfax County Parkway would provide the necessary access.

Figure 3-28: Street width required to include bike lanes on Sunrise Valley Dr



D. Wiehle Avenue Station – North

The area north of the Wiehle Avenue Metrorail station is populated mainly by office buildings, most of which are surrounded by parking lots. The major existing origins/destinations in this area include Isaac Newton Square, Plaza America, some residential neighborhoods and the W&OD Trail. The buildings in Isaac Newton Square, just north of Sunset Hills Rd, share a common parking lot and access points and have high potential for redevelopment to higher density, mixed use development. To the north, within one mile of the station are the residential neighborhoods of Tall Oaks and Lake Anne. To the west, the Plaza America shopping center is the biggest retail draw in the area with substantial retail and office space. The W&OD trail also travels through the station area, with several at-grade crossings very close to the station entrance.

a. Pedestrians

The major pedestrian destinations in this area will be Isaac Newtown Square and Plaza America as shown in Figure 3-29.

A. Isaac Newton Square development
B. Plaza America
C. Office complexes east of Wiehle Avenue

In addition, the new mixed-use development that is proposed for the existing Park-and-Ride lot will generate many pedestrian trips and the internal pathways in this development must be considered during the design process. Many other office buildings are located within a short walk of the Metro Station entrance which may also be candidates for future redevelopment, and will also require pedestrian access regardless of if they are redeveloped or not. Plaza America, the major retail draw in the area is also a potential pedestrian destination as both employees and shoppers might use Metro to access this retail center. Individual office buildings located in various locations within ½ mile of the station entrance should also be accessible to pedestrians. Table 3-10 highlights the major intersection improvements recommended for this quadrant and Table 3-11 highlights major sidewalk improvements.

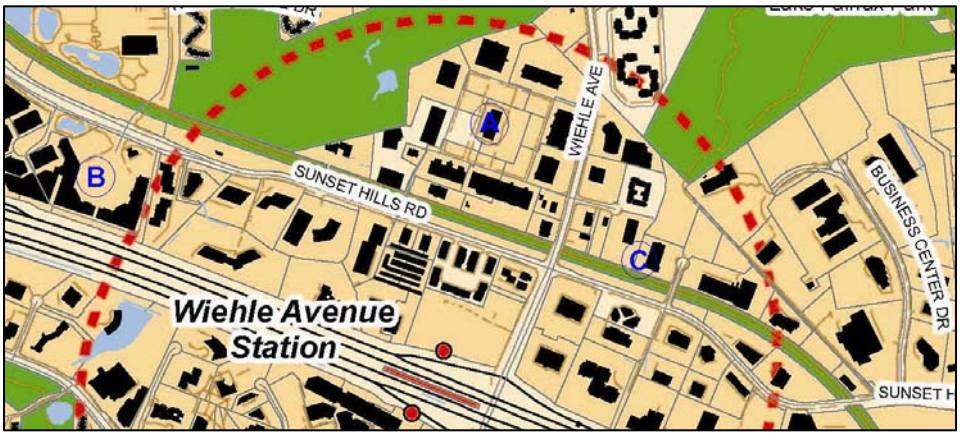


Figure 3-29: Pedestrian destinations in Wiehle Avenue - North

Table 3-10: Intersection Improvements for Wiehle Ave - North

No	Location	Airline Distance to Station Entrance (ft)	Max. Pedestrian ISI[12]	Recommendations
I18	Wiehle Ave & Station Entrance	500	4.4	**North:** Extend median to include pedestrian refuge; **South:** Extend median as much as possible, wide curb lanes to accommodate bikes; **All approaches:** Upgrade curb-ramps, pedestrian countdown signals, high visibility crosswalk
I19	Wiehle Ave & Isaac Newton Sq N	2,300	5.0	**South:** Potential infill of striped lane area; **East:** Upgrade curb ramps, high visibility crosswalk; **North:** Channelize right turns, median pedestrian refuge, high visibility crosswalk, pedestrian warning signs, pedestrian knockdown signs; **West:** High visibility crosswalk, upgrade curb ramp
I20	Wiehle Ave & Isaac Newton Sq S	1,600	3.0	**South:** pedestrian median refuge; **All approaches:** upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals
I21	Wiehle Ave & Sunset Hills Rd	1,000	4.0	**North:** Decrease right turn radius; extend median to include pedestrian refuge; **East:** Raised median; **South:** Decrease right turn radius; **West:** Channelize right turns, decrease right turn radius; **All Approaches:** Upgraded curb ramps, re-align crosswalks, high visibility crosswalks, pedestrian countdown signals
I22	Sunset Hills Rd & Isaac Newton Sq W	1,300	2.6	**East:** Upgrade curb ramps, decrease right turn radius; **North:** Decrease right turn radius, upgrade/construct curb ramps; **West:** Construct curb ramps; **South:** Construct/upgrade curb ramps; **All Approaches:** High visibility crosswalks, pedestrian countdown signals
I23	Sunset Hills Rd & Plaza America	3,300	4.0	**East:** Re-align crosswalk, high visibility crosswalk, pedestrian countdown signal, extend median to include pedestrian refuge; **North:** High visibility crosswalk, pedestrian countdown signal; **All Approaches:** upgraded curb ramps
I32	Wiehle Ave & Westbound DIAAH ramps	500	4.7	**West:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps

Table 3-11: Sidewalk Improvements for Wiehle Ave - North

	Side	Street	From	To	Recommendations
S3	N	Sunset Hills	Reston Pkwy	Business Center Dr	Construct 6' sidewalk with 4' buffer and associated curb ramps
S11	Both	Isaac Newton Sq W	Station Entrance	Isaac Newton Sq S	Construct 6' sidewalk with 4' buffer with access to Isaac Newton Sq and W&OD trail
S13	Both	Isaac Newton Sq S	Wiehle Ave	Isaac Newton Sq W	Construct 6' sidewalk (in conjunction with redevelopment of Isaac Newton Sq if possible) and 4' buffer
S14	New	Inter-parcel Connection	Roger Bacon Dr	Business Center Dr	Construct 6' wide sidewalks with 4' buffer along with new roadway construction

[12] Pedestrian ISI (Intersection Safety Index) measures the safety of pedestrians at street crossings based on traffic control devices, number of lanes, vehicle speeds, land use and vehicular traffic levels. Ped ISI values are calculated for each approach on an intersection. Blank entries are locations where traffic levels were not available and the calculation could not be performed. The maximum Ped ISI is used to show the least safe crossing condition at each intersection.

i. Metro Station to Isaac Newton Square

Isaac Newton Square, located only 1900 feet north of the station entrance north of the W&OD Trail and west of Wiehle Ave, is the largest concentration of offices and associated services in the immediate station vicinity. More than 500 pedestrian trips are expected to access this development on a daily basis in 2030. Two primary potential pedestrian routes exist to reach this area: an eastern route along Wiehle Avenue or a western route along Isaac Newton Sq W.

Figure 3-30: Eastern route to Isaac Newton Square

1) Eastern Route (Wiehle Ave)

This route requires pedestrians to walk north on Wiehle Ave and then onto Isaac Newton Sq S or N to access the office buildings as shown in Figure 3-30. At approximately 3000-feet long, it requires a walk of approximately 16 minutes[13] for the average pedestrian and is projected to be the path for approximately 125 pedestrians each day. The first element of this route (and a key element in providing pedestrian access to the whole station area) is the development of a separated pedestrian path from the station entrance to Wiehle Avenue that provides protection from the high levels of automobile and bus traffic that are expected at the station. In addition, six-foot wide sidewalks along both sides of Isaac Newton Sq S will be necessary (S13), which may need to be provided by the landowner as redevelopment occurs or in conjunction with the reconstruction of Isaac Newton Square S/ Roger Bacon Drive recommended in Chapter 2 in order to avoid the need for right-of-way acquisition. Other intersection improvements will also be necessary at the following locations:

- Wiehle Ave & Station Entrance (I18): Upgrade all curb ramps and install pedestrian countdown signals and high visibility crosswalks on all approaches. The median on the northern approach should be extended into the crosswalk to create a pedestrian refuge. If possible, the right-hand lanes on Wiehle Ave should be designed as wide curb lanes to accommodate bikes.
- Wiehle Ave & Sunset Hills Rd (I21): The curb ramps should be upgraded, the crosswalks should be re-aligned and replaced with high visibility crosswalks and pedestrian countdown signals should be installed on all approaches. The right turn radii should be decreased on the northern, southern and western approaches. The median on the northern approach should be extended into the crosswalk to include a pedestrian refuge. On the eastern approach, the paved median should be raised to provide a potential safe place for crossing pedestrians to wait. Eastbound right turns should be channelized according to the design presented at the beginning of this report.
- Wiehle Ave & Isaac Newton Sq S (I20): upgrade curb ramps and install high visibility crosswalks and pedestrian countdown signals on all approaches. Additionally, the median on the southern approach should be extended into the crosswalk to create a pedestrian refuge.

[13] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

- Wiehle Ave & Isaac Newton Sq N (I19): To shorten the crossing distance for pedestrians, the curb area should be extended to fill in the striped lane area on the southern approach. The curb ramps should be upgraded and a high visibility crosswalk should be installed on the eastern approach. Southbound right turns should be channelized according to the design presented at the beginning of this report. Also on the northern approach, a high visibility crosswalk and pedestrian median refuge should be constructed with pedestrian warning and knockdown signage. Upgraded curb ramps and a high visibility crosswalk should be installed on the western approach.

2) Western Route

The western route is slightly more direct (especially to the western buildings) and is only about 2500 feet long, requiring a walk of approximately 12 minutes for the average pedestrian. This route requires the construction of a direct pedestrian connection between the station entrance and Sunset Hills Rd as shown in Figure 3-31. Along with construction of the station, the private driveway south of Sunset Hills Rd and opposite Isaac Newton Sq W is scheduled to be expanded and improved to accommodate additional traffic including bikes, pedestrians and buses. Six-foot wide sidewalks (at a minimum) should be included on both sides of this new facility. This connection requires pedestrians to cross Sunset Hills Rd and the W&OD trail along Isaac Newton Sq W. Other infrastructure improvements that would be required include:

- 6'-wide sidewalks with 4' buffer along the north side of Sunset Hills Rd from at least Wiehle Ave to Isaac Newton Sq W (S3).
- Sunset Hills Rd & Isaac Newton Sq W (I22): High visibility crosswalks and pedestrian countdown signals should be installed on all approaches, in addition to upgraded or newly constructed ADA-compliant curb ramps. Decrease the right turn radius on both the eastern and northern approaches.
- Isaac Newton Sq W (S11): Construct 6'-wide sidewalks on the both sides of the roadway from at least Sunset Hills Rd to Isaac Newton Sq S. The street is currently a privately owned street that should be brought up to VDOT standards and accepted into the public street system including sidewalks, possibly during redevelopment of the Isaac Newton Sq development as described in Chapter 2. The addition of sidewalks will also provide increased sight distance and visibility at the W&OD Trail crossing (X4).

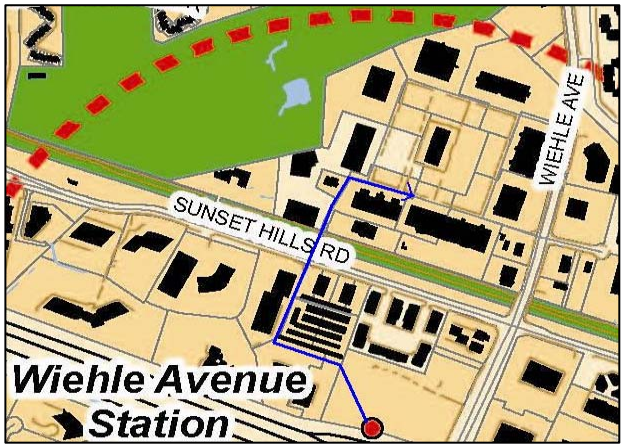


Figure 3-31: Western route to Isaac Newton Square

ii. Metro Station to Plaza America

Plaza America is distinctly oriented toward Sunset Hills Rd, which necessitates pedestrian access from Sunset Hills as shown in Figure 3-32. Up to 200 pedestrians may utilize this path each day. A path paralleling the DIAAH south of the shopping center would not provide appropriate access and should not be considered for reasons already discussed. Necessary infrastructure improvements along the Sunset Hills Rd route include:

- 6'-wide sidewalks along the north side of Sunset Hills Rd from at least Wiehle Ave to Plaza America (S3). See Figure 3-33.
- Sunset Hills Rd & Plaza America Entrance (I23): All curb ramps at the intersection should be upgraded to meet ADA design standards. The median on the eastern approach should be extended into a re-aligned high visibility crosswalk in order to provide a pedestrian refuge to shorten the crossing distance for pedestrians. Pedestrian countdown signals should be installed across the northern and eastern approaches. A high visibility crosswalk is also recommended for the northern approach. Crossings should be discouraged on the western approach.

Figure 3-32: Pedestrian route to Plaza America

Figure 3-33: Missing sidewalk along the north side of Sunset Hills Rd.

The individual office buildings located just south of Sunset Hills Rd and the Fannie Mae facility at Sunset Hills Rd and American Dream Way can be served by these same facilities, with the addition of sidewalks along at least one side of the minor streets and private driveways which access the buildings.

iii. Eastern Office Buildings

In 2030 over 800 pedestrians are expected to access the Metrorail station from the office buildings to the east of Wiehle Ave each day. Access is provided primarily by Sunset Hills Rd; however more direct connections are possible. Figure 2-21 in the previous chapter illustrates potential roadway extensions that would enhance the street grid in the area. Pedestrian facilities should be constructed in conjunction with each of these roadway projects. Development of inter-parcel pedestrian connections between the office buildings from this driveway would provide the most direct, shortest and cheapest connections to the office buildings south of the W&OD Trail, as shown in Figure 3-34.

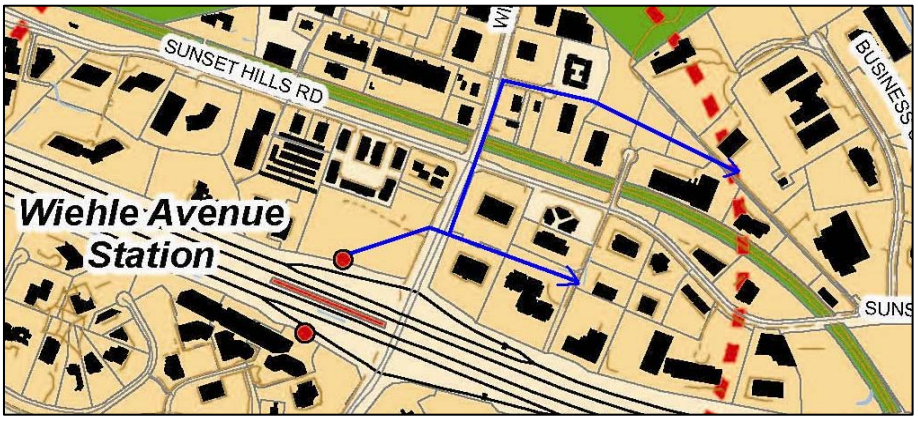


Figure 3-34: Recommended Inter-parcel pedestrian connections in Wiehle Ave - North

iv. Access around the Station Area

Access around the station area in this quadrant will be provided primarily by the improvements that have already been detailed in this section. The second major source of pedestrian connections will have to be private landowners building sidewalks, paths, and inter-parcel connectors along private roads, driveways and parking lots as benefits for their tenants who desire pedestrian access to the Metrorail system. Redevelopment will provide the county with the opportunity to ensure that these pedestrian elements are built in the future. The development of new roadways which include pedestrian facilities which connect minor streets will help to create a more complete street grid and allow for more direct and therefore shorter, pedestrian travel throughout the station area.

An additional element needed to ensure full pedestrian connectivity in this quadrant is access from the destinations in the northern half of the station area to those destinations south of the DIAAH. Access across this barrier will be available at three locations:

- Wiehle Ave: existing sidewalks on the west side of the street.
- Metrorail Station: during hours of operation, pedestrians can use the Metro Station walkways to cross the DIAAH without paying a fare.
- W&OD Trail: Limited number of access points makes using this path only convenient for pedestrians traveling to/from locations directly adjacent to an access point. Unlit at night.

The only one of these facilities available and adequately lit at all times is Wiehle Ave. In order to ensure safety of pedestrians using this facility, especially at night, a high visibility crosswalk, a pedestrian countdown signal and upgraded curb ramps are needed across the westbound on ramps on Wiehle Ave (I32).

b. Bicyclists

The range of potential origins and destinations in the Wiehle Avenue station area for bicyclists is significantly larger than for pedestrians. Both Isaac Newton Square and Plaza America are potential destinations, in addition to bicyclists accessing the station from neighborhoods located to the north of the station along Wiehle Ave. In addition, any number of neighborhoods are accessible via the W&OD trail.

Table 3-12 indicates the major right-of-way improvements recommended for bicycle access to the Wiehle Avenue Station in this quadrant. There are also several at-grade crossings of the W&OD trail in this quadrant, and safety issues for bicyclists in these areas must be addressed with the recommendations listed in Table 3-13.

Table 3-12: Bicycle Improvements for Wiehle Ave - North

	Side	Street	From	To	Recommendations
B7	E	Wiehle Ave	Station Entrance	Fairway Dr	Construct 10-foot bike trail with 4-foot buffer
B11	Both	Private Rd opposite Isaac Newton Sq W	Sunset Hills Rd	Station entrance	Wide curb lanes
B15	S	Sunset Hills	Plaza America	Isaac Newton Sq W	Widen existing sidewalk to and 10-foot wide shared use path to accommodate pedestrians and occasional cyclists

	Side	Street	From	To	Recommendations
B16		New Connector	W&OD Trail	Near Plaza America at existing goat trail	Formalize existing goat trail connection to W&OD trail near Plaza America with a paved asphalt trail

Table 3-13: Trail Crossings for Wiehle Ave - North

No.	Crossing Street	Existing Condition	Recommendations
X1	Wiehle Ave	At-Grade	**Stage 1:** Yield lines, yield signage, potential user-activated flasher, improved median refuge; move crossing to intersection with Sunset Hills Rd **Stage 2:** Grade-separated crossing
X2	Sunset Hills Rd	At-Grade	Raised 10-foot median refuge, upgraded curb ramps
X3	Michael Faraday Ct	At-Grade	High visibility crosswalk, upgrade curb ramps, warning signage
X4	Isaac Newton Sq W	At-Grade, stop controlled	High visibility crosswalk, warning signage

i. Plaza America

Figure 3-35: Shared-use trail west of Plaza America

As previously noted, access to Plaza America from the Metro Station is provided by Sunset Hills Rd and along the W&OD Trail. The path along the south side of Sunset Hills Rd is an asphalt shared-use path to the west of Plaza America (see Figure 3-35) but is only a 5-foot sidewalk between the shopping center and Wiehle Ave (see Figure 3-36). In order to provide bicycle access to Plaza America, the existing sidewalk on the south side of Sunset Hills Rd should be widened to a 10-foot shared-use asphalt path between Plaza America and Isaac Newton Square W (B15). This trail will provide access both to the Metrorail station via the northern entrance to the station area and to the W&OD Trail. This entrance (directly opposite Isaac Newton Square W) is already planned for an expansion that should include shared bus/bike lanes (B11).

Figure 3-36: Sidewalk east of Plaza America

Figure 3-37: Existing informal connection from W&OD Trail near Plaza America.

The closest W&OD Trail access points from Plaza America are at Old Reston Ave and Isaac Newton Square, which are each more than ¼ mile from the shopping center. American Dream Way, directly opposite the main entrance to Plaza America, is grade-separated when it crosses the W&OD Trail and there is a steep grade differential that would make construction of access ramps at this point difficult. However, slightly west of the main entrance, is a flat area that shows evidence of use as an informal access point, as shown in

Figure 3-37. In order to provide the most direct connections possible for bicyclists accessing Plaza America, it is recommended that this "goat trail" be formalized into a paved connection (B16). This trail access would connect with the proposed recommended sidewalk on the north side of Sunset Hills Rd and allow bicyclists and pedestrians to cross directly to Plaza America. The existing path on the south side of the road and the recommended 6-foot wide sidewalk on the north side (S3) should provide sufficient access for bicyclists if supplemented by additional access directly from the W&OD trail, including the at-grade crossing at Old Reston Ave and the ramp connection at American Dream Way. Bicycle access to and from the station directly to Sunset Hills Rd should be provided on the northern station entrance.

ii. Lake Anne & Tall Oaks Residential Neighborhoods

Bicycle access should be provided to the two closest residential neighborhoods to the station, which are both located to the north of the station off of Wiehle Ave. Lake Anne, which includes single family homes and townhouses, in addition to the Hidden Creek Country Club and the Lake Anne Village Center is located along North Shore Dr between one mile and 1.5 miles from the station. Tall Oaks, with more multi-family units and additional retail at the Tall Oaks Village Center is located east of Wiehle Ave approximately one mile from the station.

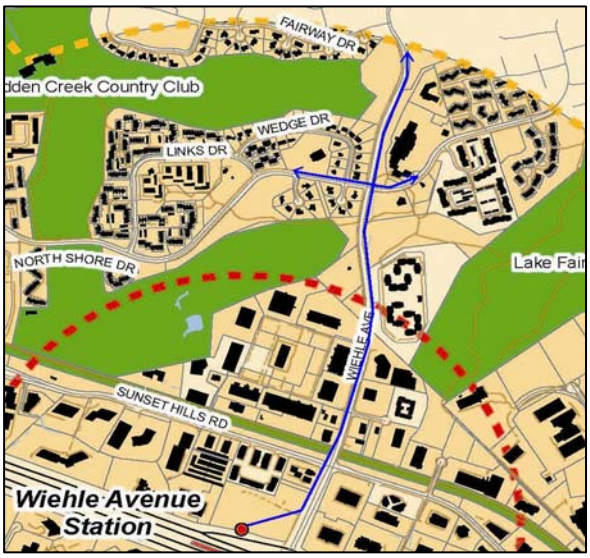
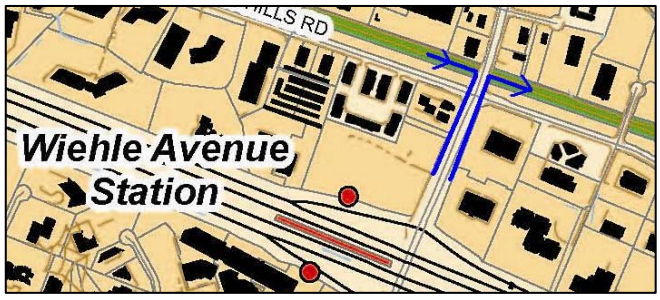


Figure 3-38: Bicycle access to Lake Anne & Tall Oaks

In order to provide bicycle access from these northern neighborhoods (and potential employment sites near them) a dedicated bicycle facility will be necessary along Wiehle Ave as shown in Figure 3-38. In combination with the existing sidewalk on the east side of Wiehle Ave, a ten-foot wide off-street bike path on the east side of the street (B7) should provide sufficient capacity for cyclists in the area. This path and associated curb-ramp improvements would be necessary from the station entrance north to Fairway Dr. Once this trail has been constructed, Wiehle Avenue will have a shared-use trail on the east side and the existing sidewalk on the west side.

iii. W&OD Trail

The most direct bicycle access between the W&OD Trail and the Wiehle Ave Metrorail Station is at the crossing of the trail and Wiehle Ave. This crossing is currently an at-grade crossing; however, it is recommended in this section that the trail ultimately be raised to provide grade separation (X1). While the trail crossing with Wiehle Ave remains an at-grade crossing, a bicycle path connection from the trail to the station entrance will be needed. The sidewalks along Wiehle Ave between the station entrance and the connection to the W&OD Trail should be wider than in other areas to accommodate



larger numbers of bicyclists. Once grade separation of the trail crossing occurs, access between the W&OD Trail and the Wiehle Ave station should occur primarily at the Isaac Newton Square W crossing, with no access point at Wiehle Avenue. This will help divert bicyclists away from the very busy and potentially dangerous intersection of Wiehle Avenue and Sunset Hills Rd.

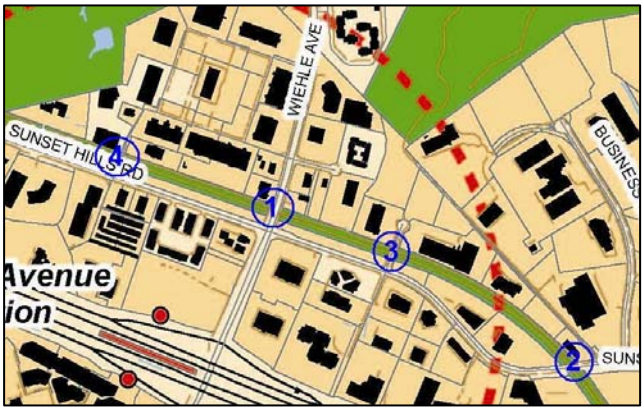


Figure 3-39: Trail Crossings in Wiehle Ave - North

iv. Trail crossings

There are four major at-grade crossings of the W&OD Trail within the area surrounding the station: Wiehle Avenue, Sunset Hills Rd, Michael Faraday Ct and Isaac Newton Sq W. Different traffic levels and site conditions make each of these crossings different; while all include a crosswalk, none of them include signals and all pose potential safety risks to both bicyclists and drivers.

1) Wiehle Avenue

The at-grade crossing at Wiehle Ave occurs less than 100 feet north of Sunset Hills Rd and may be the most dangerous in the Reston area (see Figure 3-40). A crosswalk and a few warning signs are the only safety features of this crossing; there is no signal because of the close proximity to Sunset Hills Rd to the south and the firehouse immediately to the north. Signage along the trail requires bicyclists to stop for traffic, and a small median (not ADA-compliant and barely large enough for a single bike) is included on Wiehle Ave. Large volumes of automobile traffic, turning movements at the nearby intersection, queuing of vehicles along Wiehle Ave and occasional interactions with the firehouse make crossing Wiehle Ave difficult, dangerous and can often take a long time to accomplish safely.

Figure 3-40: W&OD Trail Crossing at Wiehle Ave

A grade-separated crossing is the best potential solution for the dangerous situation at the Wiehle Ave crossing (X1-Stage 2). This will most likely involve raising the trail over the roadway and will eliminate conflicts between bicyclists and vehicles, allow bicyclists to travel through Reston without stopping at this crossing and improve safety for all modes of travel at Wiehle Ave and Sunset Hills Rd. Construction costs, especially considering the presence of the overhead high-tension power lines, will be a major obstacle to overcome. It will take a significant amount of time to plan, design and construct the recommended grade-separated crossing. In the meanwhile, there are several infrastructure actions that can be undertaken on a more immediate timescale in order to improve the safety of bicyclists now (X1-Stage 1):

- Yield lines to create a buffer around the crossing.
- Addition yield signage.
- Potentially a user-activated flasher to increase the visibility of crossing bicyclists.

- Improved and expanded median refuge that meets ADA design criteria with sufficient capacity for multiple bikes.
- Modified signal timing at Wiehle Ave & Sunset Hills Rd that might coordinate right-turn-on-red movements with the presence of bicyclists at this crossing or eliminate them altogether.

Fairfax County is currently studying some of these options separately from this project. It is anticipated that some actions will be made prior to moving forward on plans for creating a grade-separated crossing. If this grade-separated crossing is implemented, no connections to Wiehle Avenue should be constructed. The main access route between the Wiehle Avenue station and the W&OD should be at the crossing of Isaac Newton Sq W, which is discussed in the section 4 below.

2) Sunset Hills Road

Figure 3-41: Existing at-grade crossing at Sunset Hills Rd (X2)

The at-grade crossing of the W&OD Trail and Sunset Hills Rd is located just over ½ mile from the station, west of Clay Lane. Vehicle traffic along this portion of Sunset Hills Rd is lighter than closer to the station; however vehicle speeds are slightly higher. The mid-block crossing is indicated only by a standard crosswalk and no signals, signage or lighting indicate that the location is different. Two travel lanes and a wide paved median tend to cause speeding through this area during uncongested periods. Due to the lower vehicle volumes and the surrounding land uses, a grade-separated crossing is not recommended at Sunset Hills Rd. However, in order to improve the safety and visibility of bicyclists on the W&OD trail, several actions are recommended at this location (X2), including:

- Upgrading the curb-ramps on both sides of Sunset Hills Rd.
- Additional signage or reflective lighting to increase the visibility of the crosswalk.
- Construction of a 10-foot wide raised pedestrian/bicyclist median refuge.

3) Michael Faraday Ct

This at-grade crossing of the W&OD Trail is located just north of Sunset Hills Rd (X3). Michael Faraday provides access to several office buildings and a school in the immediate station vicinity and has low levels of vehicle traffic traveling at generally low speeds. During off-peak times, traffic volumes are extremely low. For these reasons, a grade-separated crossing is not appropriate and a signal is unnecessary. Visibility and safety are still concerns at this crossing, and therefore a high-visibility crosswalk, warning signage for both bicyclists and drivers and ADA-compliant curb ramps should be installed. Should Michael Faraday be expanded as part of the development of a street-grid network scheme and converted into a through street with higher traffic volumes, the needs of this crossing should be reexamined.

4) Isaac Newton Square W

This at-grade crossing of the W&OD Trail has been identified as one of the least safe in the Reston area, and is located just north of the intersection of Sunset Hills Rd and Isaac Newton Sq W. The roadway is privately owned, and does not meet VDOT design standards. The crossing is stop-controlled, and both vehicular and bicycle traffic is required to stop at the crossing, however sight distance for both bicycles and vehicles is still an issue.

Figure 3-42: Existing W&OD crossing at Isaac Newton Sq W (X2)

The Northern Virginia Regional Parks Authority (NVRPA) would like to improve this trail crossing by bringing Isaac Newton Sq W up to VDOT standards and accepted into the public street network and it is recommended for expansion as part of the internal street grid detailed in Chapter 2. The addition of sidewalks with a buffer on both sides of this street will help improve sight distance at the crossing. Improved warning signage should also be included. Other traffic calming devices may prove beneficial at this location to slow vehicles and draw driver attention to the crossing bicyclists. A speed table might be a good option to slow vehicles down while increasing the visibility of bicyclists. These actions will help control traffic speeds and will provide the safest and fastest access to the station from the W&OD Trail. Once the crossing at Wiehle Avenue is grade separated, this will become the primary access point for bicyclists traveling to the Wiehle Ave station.

E. Wiehle Avenue Station – South

The area south of the Wiehle Ave station has not been densely developed and mostly comprises individual office buildings and the parking lots that surround them. Also in this area are several residential neighborhoods of single family homes; these neighborhoods will be closer to a Metrorail station than any others in Reston and may be the source of many riders at the Wiehle Ave station.

The major barrier to bicyclists and pedestrians accessing the Reston Parkway station from the south is Sunrise Valley Dr. Currently, there are only four marked crosswalks in the 1.3 mile stretch between Soapstone Rd and Barton Hill Rd, and no sidewalks on the south side of the street. To help pedestrians and bicyclists access the station without making long detours to a marked crossing or crossing unsafely at an unmarked locations, five additional crossings are recommended for this stretch of Sunrise Valley Dr for an average distance of approximately 750 feet between marked crossings.

a. Pedestrians

There are four potential areas that are likely to produce pedestrian traffic in this area shown in Figure 3-43**,** including:

A. Office buildings west of Wiehle Ave
B. Office buildings east of Wiehle Ave
C. Residential neighborhoods south of Sunrise Valley Dr
D. Northern Wiehle Ave station area

Figure 3-43: Pedestrian destinations in Wiehle Ave - South

These destinations primarily require actions along Sunrise Valley Dr, Wiehle Avenue and local neighborhood streets, however some alternatives would require additional infrastructure. Table 3-14 highlights the major pedestrian intersection improvements that are recommended for this quadrant, while Table 3-15 highlights the major sidewalk improvements.

Table 3-14: Intersection Improvements for Wiehle Ave - South

No	Location	Airline Distance to Station Entrance (ft)	Max. Pedestrian ISI[14]	Recommendations
I24	Sunrise Valley Dr & Commerce Park Dr	1,100	4.7	**North:** upgraded curb ramps, high visibility cross walk; **West:** upgrade curb ramps, high visibility crosswalk, pedestrian warning and knockdown signs, pedestrian median refuge;
I25*	Sunrise Valley Dr & Wiehle Ave	700	3.4	**East:** Reduce right turn radius; **North:** Re-align right turn channelization, reduce right turn radius; **North & West:** upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals
I26*	Sunrise Valley Dr & Soapstone Rd	2,200	3.3	**East:** Extend median to include pedestrian refuge; **West:** Extend median to include pedestrian refuge; **South:** Construct curb ramps, decrease right turn radius; **North:** Median pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps
I27	Sunrise Valley Dr & Great Meadow Dr	800	4.7	**East:** High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; **West:** High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; **South:** High visibility crosswalk; **All Approaches:** update curb ramps
I28	Sunrise Valley Dr & Upper Lake Dr	2,400	4.7	**North:** crosswalk, upgrade curb ramps
I33	Wiehle Ave & Eastbound DIAAH ramps	600	4.7	**West:** Decrease right turn radius, high visibility crosswalk, upgrade curb ramps, pedestrian countdown signal

[14] Pedestrian ISI (Intersection Safety Index) measures the safety of pedestrians at street crossings based on traffic control devices, number of lanes, vehicle speeds, land use and vehicular traffic levels. Ped ISI values are calculated for each approach on an intersection. Blank entries are locations where traffic levels were not available and the calculation could not be performed. The maximum Ped ISI is used to show the least safe crossing condition at each intersection.

Table 3-15: Sidewalk Improvements for Wiehle Ave - South

	Side	Street	From	To	Recommendations
S7a	S	DIAAH	**Stage 1:** Edmund Halley Dr	**Stage 1:** International Center	**Stage 1:** Construct a shared-use path along the south side of the DIAAH (including a crossing of Reston Pkwy) 10-feet wide, marked
S7b			**Stage 2:** Fairfax County Pkwy	**Stage 2:** Wiehle Ave	**Stage 2:** As redevelopment occurs, acquire right-of-way to continue the path to provide access to office buildings
S8	N	Sunrise Valley Dr	Fairfax County Pkwy	W&OD Trail	Phased development of pedestrian and bicycle facilities (see S9 and B5) Widen existing sidewalk to and 10-foot wide shared use path to accommodate pedestrians and occasional cyclists
S9	S	Sunrise Valley Dr	Glade Dr	South Lakes Dr	Phased development of pedestrian and bicycle facilities (see S8 and B5) Construct 6-foot wide sidewalk with 4-foot buffer and associated curb ramps (to closely follow implementation of recommendation S8)
S12	W	Soapstone Rd	Sunrise Valley Dr	Hunter's Green Ct	Construct sidewalk
S15	New	Inter-parcel Connection	Wiehle-S Station Entrance	Sunrise Valley Dr	Construct dedicated path from the station entrance

i. Western Office Buildings

Several office buildings are located west of Wiehle Avenue within ½ mile of the proposed Metrorail station and are estimated to attract 500 pedestrian trips each day. The southern station entrance will open directly into the parking lot of the buildings located on Golf Course Sq, and other buildings on Commerce Park Dr can be reached via the network of parking lots. However, these paths are not safe, comfortable or direct enough for pedestrians, and new, pedestrian-oriented infrastructure needs to be built that connects each of these buildings to the station entrance by a dedicated pathway. Safe, direct and clearly marked pathways through the parking lots and between parcels will be an essential element of the pedestrian network in this quadrant in order for people to access other, more distant areas. Because these roadways and parking lots are on private property, it may be necessary to wait until redevelopment occurs to ensure that the land owners build the necessary infrastructure or else Fairfax County will be required to acquire the right-of-way to do so.

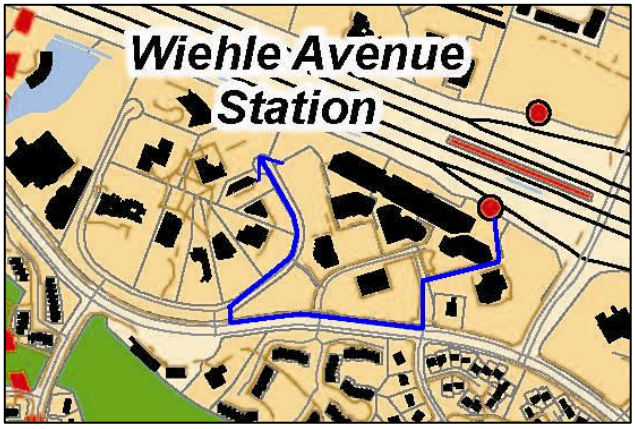
Further to the west are additional office buildings along Association Dr. There are two primary potential paths that exist to access these offices:

1. A southern route along Sunrise Valley Dr that uses the existing street network.
2. A northern route that requires the construction of a new pedestrian pathway along the south side of the DIAAH to provide more direct access to buildings in this area.

1) Southern Route (Sunrise Valley Dr)

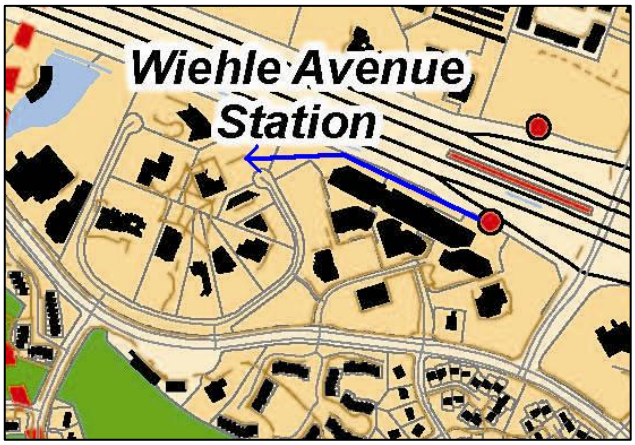
To access the westernmost buildings with ½ mile of the station along Sunrise Valley Dr, a pedestrian connection will be necessary from the station entrance to Sunrise Valley Dr (S15). This pathway will likely need to be a dedicated pathway through existing parking lots and is likely to see considerable

pedestrian traffic. The existing sidewalk along the north side of Sunrise Valley Dr will need to be upgraded to include ADA-compliant curb ramps and high visibility crosswalks at all of the intersections and driveways, especially the intersections of Centennial Park Dr (I27), Commerce Park Dr (I24) and Association Dr (I26). Sidewalks would also be necessary along both sides of Association Dr and any other driveways in the area in order to provide direct access to each of the office buildings. This route can be as long as 3500 feet to reach the furthest buildings and require an approximately 18-minute walk for the average pedestrian[15].



2) Northern Route

To provide more direct access to the many office buildings built backing onto the DIAAH between Reston Parkway and Wiehle Avenue, the construction of a pedestrian and bicycle shared-use path has already been suggested (S7b). This path would run between the two stations parallel to the DIAAH and provide direct access to many office buildings that could prove to be major generators of pedestrian and bicycle traffic. In the future, many of these parcels may be the site of more intense development that may spur additional demand for this type of pedestrian facility, and their designs could encourage non-motorized access by accommodating this recommended pathway. To access the same office buildings along this path would be approximately 1800 feet, less than half the length of the southern route requiring only about a 9-minute walk. Again, acquisition of the right-of-way necessary to complete this project will be difficult but should be pursued due to the benefits and time savings it will provide to pedestrians and bicyclists.



ii. Eastern Office Buildings

Many additional office buildings are located within ½ mile of the station entrance to the east of Wiehle Ave, primarily along Campus Commons Dr, a distance of approximately 1800 feet. Over 600 daily pedestrian trips are projected to access these buildings in 2030. Access to these offices (and those beyond along Preston White Dr) can be provided primarily via Sunrise Valley Dr. Access to these office buildings requires several infrastructure actions, including:

- A pedestrian connection between the station entrance and Wiehle Ave, near the intersection of Sunrise Valley Dr (S7b.)

[15] Estimates of walking time are based on 3.5 ft/sec walking speed and an additional 1 minute delay at each street crossing.

- Wiehle Ave and Sunrise Valley Dr (I 25): Decrease the right turn radius on the northern and eastern approaches and realign the existing right turn channelization. Upgrade all curb ramps and install high visibility crosswalks and pedestrian countdown signals at the western and northern approaches.
- The existing sidewalk along the north side of Sunrise Valley should be complemented by crosswalks and ADA-compliant curb ramps at each driveway and intersection.
- Sidewalks will also be necessary along Campus Commons Dr and any other streets or driveways that access the office buildings.

This route would be approximately 2100 feet long and require an 11-minute walk for the average pedestrian.

iii. Residential Neighborhoods

Several residential neighborhoods are within walking distance of the Wiehle Ave Station south of Sunrise Valley Dr between Soapstone Rd and South Lakes Dr and are projected to create 50 pedestrian trips each day. Pedestrian access to these neighborhoods again requires a connection from the station entrance to Sunrise Valley Dr (S15). Sidewalks along both sides of Sunset Valley Dr will be necessary, which will include the construction of a sidewalk on the south side of the street including ADA-compliant curb ramps at all intersections and the expansion of the north-side sidewalk (as recommended inS8 and S9). Frequent crossings of Sunrise Valley Dr will be necessary as pedestrians access neighborhoods along the entire length of the road. Intersection actions will be necessary at several locations, including:

- Wiehle Ave & Sunrise Valley Dr (I25): pedestrian improvements as detailed above.
- Centennial Park Dr & Sunrise Valley Dr (I27): The eastern and western crossings will both require high visibility crosswalks, pedestrian median refuges, pedestrian warning and knockdown signs, flashing beacons and upgraded curb ramps. The southern approach will also need a high visibility crosswalk and upgraded curb ramps.
- Commerce Park Dr (I24): The northern approach requires upgraded curb ramps and a high visibility cross walk. The western approach requires upgraded curb ramps, a high visibility crosswalk, pedestrian warning and knockdown signs and pedestrian median refuge.
- Soapstone Dr & Sunrise Valley Dr (I26): All four approaches will require high visibility crosswalks, pedestrian countdown signals and upgraded curb ramps. On the eastern, western and northern approaches, the medians should be extended into the crosswalk to include pedestrian refuges. On the southern approach ADA-compliant curb ramps should be constructed and the right turn radius should be decreased. The improvements will be even more necessary with the extension of Soapstone Dr across the DIAAH into the northern station area.
- Upper Lake Dr & Sunrise Valley Dr (I28): On the northern approach the curb ramps should be upgraded and a high visibility crosswalk should be installed.

The pedestrian facilities along Soapstone Rd will also require some upgrades including ADA-compliant curb ramps and crosswalks at Golf Course Sq, Durand Dr and Purple Beech Dr. Many of the smaller neighborhood streets in the area will also need to be provided with sidewalks on at least one side of the street. Many actions will be necessary to provide direct access to these residential neighborhoods, specifically including:

- 6-foot wide sidewalks on the south side of Sunrise Valley Dr from Indian Ridge Rd to South Lakes Dr (S9)
- Sidewalk on the west side of Soapstone Rd from Sunrise Valley Dr to Hunter's Green Ct (S12)
- Crosswalks and ADA-compliant curb ramps along Sunrise Valley Dr across:
    - Soapstone Rd (south side only)
    - Association Dr (both sides)
    - Commerce Park Dr (south side)
    - Great Meadow Dr (south side)
    - Campus Commons Dr (north side)
    - Headlands Circle (south side)
    - Upper Lake Dr (north side)

iv. Access across the Dulles International Airport Access Highway

As redevelopment occurs in the Wiehle Avenue station area, especially the joint development planned for the existing park-and-ride lot adjacent to the northern station entrance, pedestrian access across the DIAAH will be necessary. Access across this barrier can be provided at several locations in the station area:

- Wiehle Ave: Includes sidewalks on the western side of the roadway.
- Metrorail Station: During Metro hours of operation, the station walkways can be used to cross the DIAAH without requiring payment of a fare.
- Soapstone Rd extension: A proposed roadway extension of Soapstone Rd north across the DIAAH should include dedicated pedestrian facilities on both sides of the street, in addition to shared bus/bike lanes for bicycle access (B12).

The only one of these facilities that currently exists is the Wiehle Avenue sidewalk. Improved facilities are required at the intersection with the eastbound DIAAH exit ramps (I33) in order to ensure the safety of pedestrians crossing the ramp. Improvements include:

- Decrease right turn radius for exiting vehicles.
- Install a high visibility crosswalk.
- Upgrade curb ramps.
- Install a pedestrian countdown signal.

b. Bicyclists

There are a wide range of residential and office locations located with bicycling distance of the station entrance. The major destinations for bicyclists in this quadrant are the office buildings along Sunrise Valley Dr and the residential neighborhoods to the south. Table 3-16 highlights the major bicycle improvements recommended for this general area.

Table 3-16: Bicycle Recommendation for Wiehle Ave - South

	Side	Street	From	To	Recommendations
B5	Both	Sunrise Valley Dr	W&OD Trail	Fairfax County Pkwy	Phased development of pedestrian and bicycle facilities (see S8 and S9) Construct bike lanes (to be complemented in conjunction with recommendation S9)
B10		NEW Connector	Sunrise Valley Dr	Wiehle Ave Station Entrance	Construct bike path
B12	Both	Soapstone Connector	Sunrise Valley Dr	Sunset Hills Rd	Construct shared bus/bike lanes on the proposed roadway extension
B17	Both	Soapstone Rd	Sunrise Valley Dr	South Lakes Dr	Construct bike lanes

Figure 3-44: Bicycle access along Sunrise Valley Drive

i. Sunrise Valley Offices

Many office buildings are located along Sunrise Valley Dr between Fairfax County Pkwy and Hunter Mill Rd. Access to these offices for bicyclists is limited, as the main bicycle facility in the area (the W&OD trail) runs primarily north of the DIAAH, although there is an at-grade crossing of the trail east of the station on Sunrise Valley Dr. A dedicated bicycle facility is necessary along this entire length to provide an east-west bicycle connection on the south side of Reston as shown in Figure 3-44. As recommended previously in this report, both an off-street shared used path and on-street bike lanes should be implemented on Sunrise Valley Dr in phases. The first phase would require the widening of the existing sidewalk on the north side of the street to at least a 10-foot shared use path (S8). Shortly thereafter, in conjunction with the construction of sidewalk along the south side of the street (S9), on street bike lanes should be constructed on both sides of Sunrise Valley Dr between the W&OD Trail crossing and the Fairfax County Parkway Trail (B5). This combination of facilities will ensure the speed and visibility of bicyclists, limit conflicts with pedestrians and accommodate requests by community members.

ii. Residential Neighborhoods

There are many residential neighborhoods within the range of bicyclists from the Wiehle Ave station, both via the W&OD Trail and the surface street network. The construction of the shared-use path and the bike lanes recommended in this section will provide access to the majority of neighborhoods in the area. Two other minor arterials, Soapstone Rd and South Lakes Dr are potential access routes for

bicyclists accessing the Metrorail station. Bike lanes are recommended for the proposed Soapstone Connector, which would provide a link to the station from the south side of Reston. In conjunction with the construction of this facility, bike lanes should also be installed on both sides of the existing Soapstone Rd from Sunrise Valley Dr to South Lakes Dr. These bike lanes will provide a north-south link for bicyclists and a seamless bicycle connection from the neighborhoods to the Metrorail station. As the volume of bicyclists grows, off-street bicycle facilities, specifically shared-use trails, may need to be provided along South Lakes Dr as well.

The major link necessary to create a complete bicycle network with access to the Metrorail station will be a dedicated bicycle connection from Sunrise Valley Dr to the station entrance. This path would be in addition to any pedestrian pathway built in this location, and would necessarily travel on private property, creating some significant right-of-way issues that must be worked out with the land owners. Again, redevelopment in the immediate station vicinity could provide an excellent opportunity for developing this important bicycling link.

F. Implementation

This chapter has recommended a number of actions at many locations throughout the study area that will improve safety and accessibility for pedestrians and bicyclists. Each of these projects must compete with each other and with the recommended roadway and transit improvements for scarce resources including time and funding. Many of the recommendations which concern the immediate safety of bicyclists and pedestrians should be implemented as soon as possible, well in advance of the coming of Metrorail service. Many of these improvements can benefit the current residents and employees of Reston and should be constructed regardless of whether or not the Dulles Metrorail Extension continues forward. Some of the recommendations need not be completed until the start of Metrorail service. A few of the recommendations should be pursued as redevelopment in the area occurs and opportunities become available. The following sections deal with how the recommendations included in this report should be implemented. First the estimated cost of the recommended improvements is addressed, as funding often determines the implementation schedule. Finally, the recommendations are prioritized based on the values expressed by the community and other quantifiable measures. A full multi-modal prioritization of recommendations can be found in Chapter 5.

a. Cost

In reality, cost plays a very important role in the actual implementation of transportation improvements as funding is typically the scarcest resource. Based on the projects recommended in the previous sections, rough cost estimates were developed for each of type of recommendation. These estimates are in 2007 dollars, and prices can be expected to increase annually. Table 3-17 shows the estimated cost for each type of intersection improvement, the quantity of each recommended in this report and the total estimated cost. These costs include the capital construction and installation costs for each item, but annual budgets will also need to include monies for maintaining (and in some cases operating) these facilities.

Table 3-17: Estimated Intersection Improvement Costs

Improvement	Quantity	Cost per Unit	Contingency & ROW (50%) per Unit	Total Cost
Pedestrian Countdown Signal	77	$ 8,000	$ 4,000	$ 924,000
Upgrade curb ramps	105	$ 1,000	$ 500	$ 157,500
Construct Curb Ramps	32	$ 2,000	$ 1,000	$ 96,000
Improved Crosswalk	58	$ 1,200	$ 600	$ 104,400
Median Refuge	41	$ 25,000	$ 12,500	$ 1,537,500
Channelized Right Turns	6	$ 100,000	$ 50,000	$ 900,000
Warning Signage	14	$ 300	$ 150	$ 6,300
Decrease Curb Radius	22	$ 15,000	$ 7,500	$ 495,000
New Crosswalk	44	$ 600	$ 300	$ 39,600
New Signal	1	$ 300,000	$ 150,000	$ 450,000
Signal Timing	15	$ 15,000	$ 7,500	$ 337,500
Automatic Flashers	1	$ 20,000	$ 10,000	$ 30,000
Other Costs				$ 306,000
Total				**$ 5,383,800**

If each of the more than 400 intersection improvements that were recommended in this report were constructed today in 2008, the total project cost would be approximately $3.6 million. The largest portion of this cost would be devoted to new signals for vehicles and pedestrians and the realignment and construction of channelized right turn lanes. Additionally, some right-of-way acquisition will be necessary for some of these projects. Since right-of-way was not studied in detail as part of this project it is impossible to determine right-of-way costs with any certainty. Overall, a 50% contingency is provided for pedestrian projects to account for right-of-way costs, utilities work, traffic control during construction and other unforeseen items. This adds an additional $1.8 million, for a total intersection improvement cost of approximately $5.4 million. Appendix D includes the total estimated cost for each of the 33 intersections and 6 trail crossings that were analyzed in detail.

There are also numerous actions that were recommended for sidewalks, trails and bike lanes for many locations within the study area. Table 3-18 shows the length of the recommended sidewalk, trail and bike lane improvements and their unit costs. Again, the costs are expected to escalate over time due to inflation and general price increases in the construction industry.

These improvements, if constructed in 2008 would cost an estimated total of $13.4 million, the majority of which would be for over 9 miles of new sidewalks. Again, including a 50% contingency for right-of-way and other costs requires an additional $6.7 million, for a total pathway and bike lane cost of just over $20 million. For the recommended intersection, pathway and bike lane actions to be implemented would require over $25.4 million for pedestrian and bicycle improvements, including more than $8.5 million for contingencies.

Table 3-18: Estimated Pathway and Bike Lane Improvements

Improvement	Length (ft)	Unit Cost	Unit Contingency & ROW (50%)	Total Estimated Cost
Sidewalks	49,100	$150	$75	$11,047,500
Bike Paths	31,600	$120	$60	$5,688,000
Bike Lanes	48,800	$20	$10	$1,464,000
Bike Lanes- curb changes	24,400	$50	$25	$1,830,000
Total				**$20,029,500**

One additional pedestrian/bicycle recommendation that was made in this report has not been included in these cost calculations. Grade-separation of the W&OD Trail at Wiehle Ave is a highly recommended project that would substantially improve safety for bicyclists and drivers in this congested area. Based on similar projects that have been constructed previously, this bridge crossing is estimated to add an additional $2 million to the total project cost. This brings the total cost of all of the recommended pedestrian and bicycle actions to $27.4 million.

b. Prioritization

Each of the pedestrian and bicyclist projects that are recommended in this chapter is important in order to provide the best possible access to the proposed Metrorail stations and around the station areas. Prioritization of these projects is necessary as it would be impossible to construct all $27 million worth of projects at once. Many considerations have gone into the prioritization of the various recommendations to create an implementation plan that addresses the areas of highest concern first.

A prioritized list of intersection actions has been developed that includes each of the 33 intersections and 6 trail crossings that were studied in detail in this report. These 39 locations were prioritized based on the following criteria:

- Distance to the station (Closer projects were prioritized higher)
- Pedestrian/bicyclist safety (as identified by the PISI calculation)
- Community Input including
  - RMAG Members
  - Public Meeting comments
  - "Reston on Foot" Report[16]

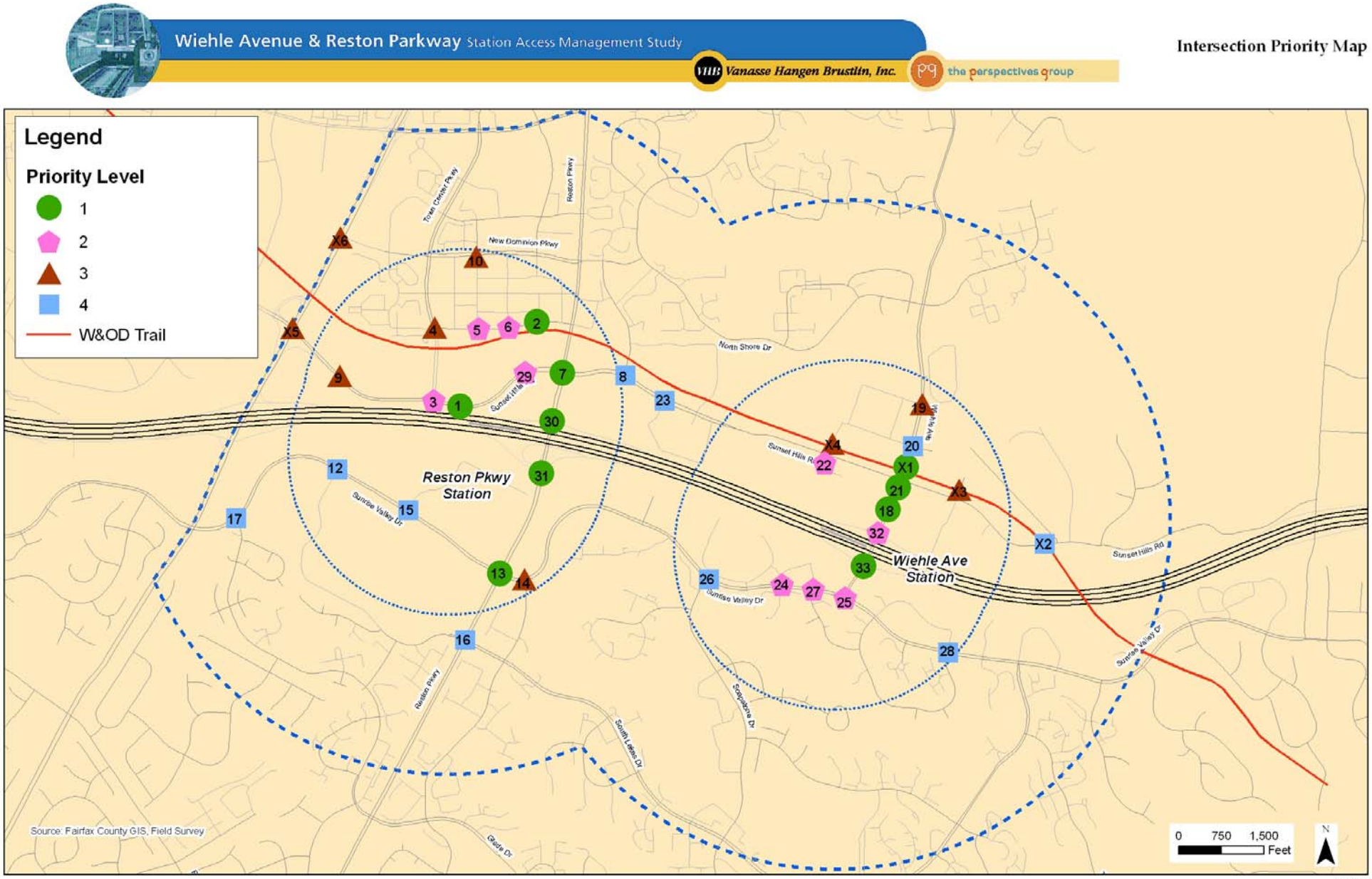
Based on these elements, each of the recommended intersection actions have been assigned to one of four priority groups. Table 3-19 and Figure 3-45 shows these priority groups, which are based primarily on measures of importance and safety, not based on implementation dates. (A multi-modal prioritized listing that includes an implementation timeline can be found in Chapter 5.) Some of the 1st priority recommendations are projects that will take substantial levels of resources to complete, and may not be able to be constructed immediately. Other projects in lower priority groups may be able to be implemented quite quickly; their priority should not prohibit this. Each of these recommended projects is important and should be completed as soon as the resources become available to do so. This prioritization simply provides guidance on where to start.

[16] *DRAFT Reston on Foot: Completing the Pathway and Sidewalk System.* March, 2007. Reston Association.

Table 3-19: Intersection Prioritization

No	Location	Cost	Priority	Comments
2	Bluemont Way & Discovery St @ Pedestrian Bridge	$505,200	1st Priority	Conduct signal warrant before construction
31	Reston Pkwy & Eastbound Dulles Toll Rd ramps	$319,650	1st Priority	In conjunction with DIAAH path
7	Reston Pkwy & Sunset Hills Rd	$230,700	1st Priority	
30	Reston Pkwy & Westbound Dulles Toll Rd ramps	$44,100	1st Priority	
13	Sunrise Valley & Reston Pkwy	$405,300	1st Priority	
1	Sunset Hills @ Station Entrance	$146,700	1st Priority	
33	Wiehle Ave & Eastbound Dulles Toll Rd ramps	$39,300	1st Priority	
18	Wiehle Ave & Station Entrance	$120,300	1st Priority	
21	Wiehle Ave & Sunset Hills Rd	$316,200	1st Priority	
X1	Wiehle Ave & W&OD Trail	$39,750	1st Priority	Stage 1: Immediate implementation; Stage 2: See B14
5	Explorer St & Bluemont Way	$3,900	2nd Priority	
6	Library St & Bluemont Way	$81,600	2nd Priority	
24	Sunrise Valley Dr & Commerce Park Dr	$46,650	2nd Priority	
27	Sunrise Valley Dr & Great Meadow Dr	$83,700	2nd Priority	
25	Sunrise Valley Dr & Wiehle Ave	$228,600	2nd Priority	
3	Sunset Hills & Town Center Pkwy	$191,700	2nd Priority	
29	Sunset Hills Rd & Discovery Sq/Northrup Grumman E Entrance	$157,800	2nd Priority	
22	Sunset Hills Rd & Isaac Newton Sq W	$132,000	2nd Priority	
32	Wiehle Ave & Westbound Dulles Toll Rd ramps	$16,800	2nd Priority	
10	Explorer St & New Dominion Pkwy	$153,600	3rd Priority	
X4	Isaac Newton Sq W @ W&OD Trail	$2,250	3rd Priority	
X3	Michael Faraday Ct @ W&OD Trail	$5,250	3rd Priority	
X6	New Dominion Pkwy @ Fairfax County Pkwy Trail	$20,250	3rd Priority	
14	Sunrise Valley & Colts Neck	$122,400	3rd Priority	
9	Sunset Hills @ Target Driveway	$98,700	3rd Priority	
X5	Sunset Hills Rd @ Fairfax County Pkwy Trail	$350,250	3rd Priority	
4	Town Center Pkwy & Bluemont Way	$132,300	3rd Priority	
19	Wiehle Ave & Isaac Newton Sq N	$217,650	3rd Priority	
16	Reston Pkwy & South Lakes	$61,200	4th Priority	
15	Sunrise Valley & Edmund Halley Dr	$182,700	4th Priority	
17	Sunrise Valley & Glade Dr	$184,800	4th Priority	
12	Sunrise Valley Dr & Mercator Dr	$170,700	4th Priority	
26	Sunrise Valley Dr & Soapstone Rd	$202,500	4th Priority	
28	Sunrise Valley Dr & Upper Lake Dr	$3,900	4th Priority	
8	Sunset Hills & Old Reston Ave	$111,000	4th Priority	
23	Sunset Hills Rd & Plaza America	$92,700	4th Priority	
X2	Sunset Hills Rd @ W&OD Trail	$42,300	4th Priority	
20	Wiehle Ave & Isaac Newton Sq S	$119,400	4th Priority	

Figure 3-45: Priorities of Intersection Actions



The remaining recommendations in this chapter include sidewalks, trails and bike lanes. These facilities have been prioritized based primarily on the level of pedestrian and bicyclist activity expected for each one. Therefore, those projects that are on a main route to a major destination in the station area have been grouped as 1st priority projects. Because fewer bicyclists and pedestrians are expected at locations further from the stations, projects that are close to the stations generally tend to be prioritized higher than those that are far from the stations. Table 3-20 shows the groups for each of the recommended sidewalk, pathway and bike lane projects. Again, implementation of any of these projects should not be solely reliant on this list, and projects should be completed whenever opportunities become available to do so. Redevelopment may provide funding opportunities for some of these projects though proffers or other means. An important step in ensuring that each of these projects can be completed is to include them in the Fairfax County Trails Plan.

Table 3-20: Sidewalk, Trail and Bike Lane Prioritization

No	Recommendation	Cost	Priority	Comments
B1	Bike lanes on Town Center Pkwy from Sunset Hills Rd to Baron Cameron Ave	$411,660	1st Priority	
B10	Construct bike path from southern Wiehle Ave station entrance to Sunrise Valley Dr	$139,680	1st Priority	
B12	Construct shared bus/bike lanes on the proposed Soapstone connector	$253,800	1st Priority	
B13	Construct bike connection from W&OD trail to Bluemont Way at the Reston Town Center Transit Station	$19,440	1st Priority	
B14	Grade Separation of W&OD Trail over Wiehle Ave	$2,016,000	1st Priority	
B2	Bike lanes on Sunset Hills Rd from Town Center Pkwy to Station Entrance	$44,370	1st Priority	
S15	Construct sidewalk from southern Wiehle Ave station entrance to Sunrise Valley Dr	$290,475	1st Priority	
S16	Construct dedicated path through "Gateway Property" for direct connection from Sunset Hills Rd to Bluemont Way	$274,500	1st Priority	To be completed in conjunction with redevelopment
S6	Construct sidewalk along Edmund Halley Dr from the Station entrance to Sunrise Valley Dr	$353,025	1st Priority	
S8	Widen existing sidewalk on N side of Sunrise Valley Dr to 10-foot shared use path	$3,300,840	1st Priority	
B16	Formalize existing goat trail connection to W&OD trail near Plaza America with a paved asphalt trail	$34,380	2nd Priority	
B17	Construct bike lanes on Soapstone Rd from Sunrise Valley Dr to South Lakes Dr	$419,220	2nd Priority	
B3	Bike lanes on New Dominion Pkwy from Fairfax County Pkwy to North Shore Dr	$449,370	2nd Priority	
B4	Bike lanes on Fountain Dr from Freedom Dr to Baron Cameron Ave	$235,260	2nd Priority	
B9	Pave and formalize existing at-grade access ramp to W&OD Trail on E side of Town Center Pkwy; construct a connection on the W side of Town Center Pkwy	$138,600	2nd Priority	
S1	Sidewalk along N side of Sunset Hills Rd from the Station Entrance to Target	$263,700	2nd Priority	
S10	Construct sidewalk on E side of Reston Pkwy from DIAAH ramps to South Lakes Dr	$666,450	2nd Priority	
S11	Construct sidewalk on both sides of Isaac Newton Sq W from Station Entrance to Isaac Newton Sq S	$243,900	2nd Priority	

No	Recommendation	Cost	Priority	Comments
S2	Complete sidewalk on E side of Reston Pkwy from Sunset Hills Rd to New Dominion Pkwy	$388,575	2nd Priority	
S3	Construct sidewalk on N side of Sunset Hills from Reston Pkwy to Business Center Dr	$1,917,000	2nd Priority	
S5	Complete sidewalk along Town Center Pkwy from W&OD Trail to Sunset Hills Rd	$261,450	2nd Priority	
S7a	Construct shared use path along S side of DIAAH from Edmund Halley Dr to International Center	$325,620	2nd Priority	
S7b	Complete shared use path along S side of DIAAH from Fairfax Cty Pkwy to Wiehle Ave	$1,643,940	2nd Priority	
S9	Construct sidewalk on S side of Sunrise Valley Dr from Fairfax County Pkwy to W&OD Trail	$2,760,300	2nd Priority	After implementation of S8
B11	Shared bus/bike lanes on the private roadway opposite Isaac Newton Sq W into the station entrance	$81,540	3rd Priority	By opening of Wiehle Ave station
B15	Widen existing sidewalk on S side of Sunset Hills Rd from Plaza America to Isaac Newton Sq to 10-foot shared use path	$384,120	3rd Priority	
B5	Bike lanes along Sunrise Valley Dr from W&OD Trail to Fairfax County Pkwy	$1,650,420	3rd Priority	After implementation of S9
B6	Bicycle path along Edmund Halley Dr from Sunrise Valley Dr to Station Entrance	$282,420	3rd Priority	By opening of Reston Pkwy station
B7	Construct bike trail on E side of Wiehle Ave from Station Entrance to Fairway Dr	$939,420	3rd Priority	
S12	Construct sidewalk on W side of Soapstone Rd from Sunrise Valley Dr to Hunter's Green Ct	$40,950	3rd Priority	
S13	Construct sidewalk along Isaac Newton Sq S	$530,550	3rd Priority	May be constructed in coordination with redevelopment
S14	Construct sidewalks along with new roadway extension of Roger Bacon Dr	$324,000	3rd Priority	May be constructed in coordination with redevelopment
S4	Construct sidewalk on S side of Bluemont Way from Reston Pkwy to Discovery St	$115,425	3rd Priority	

4. Transit and Feeder Bus

The area surrounding the future Wiehle Avenue and Reston Parkway Metrorail stations is currently served by several bus routes. The purpose of these routes varies. FAIRFAX CONNECTOR operates both circulator routes that provide service in and around Reston and Herndon, as well as feeder routes that connect with the West Falls Church, Pentagon and Crystal City Metrorail stations. The Connector currently operates 54 bus routes throughout Fairfax County, providing connections to Arlington County; the cities of Alexandria, Falls Church, Vienna and Fairfax; and the Herndon area. Of the 54 Connector routes, 25 operate within the area of the Wiehle Avenue and Reston Parkway stations. These routes are divided into Reston-based routes and Herndon-based routes. Routes serving Reston are numbered in the 500s, routes serving Herndon are in the 900s, while four RIBS routes circulate throughout the Reston-Herndon area. The standard fare is $1.00 for local routes and $3.00 for express routes, though discounts or complimentary service are provided for passengers with rail-to-bus transfers, seniors, persons with disabilities, MetroAccess customers and young children. In addition to the FAIRFAX CONNECTOR, both the Washington Metropolitan Area Transit Authority (WMATA) and Loudoun County provide a limited number of express regional routes that travel from points in Loudoun and Fairfax counties to Washington, DC.

With the planned completion of Phase I of the Dulles Corridor Rapid Transit Project in 2013, which will terminate at the Wiehle Avenue Metrorail station and of Phase II in 2015, which terminates at Route 772 in Loudoun County, existing regional routes, feeder rail services and other bus routes will need to be modified. An existing bus conditions report has been developed by VHB[17]. In addition, VHB staff closely coordinated with FAIRFAX CONNECTOR staff and the Reston Metrorail Access Group (RMAG) to review and modify the proposed feeder bus routes developed in the Final Environmental Impact Statement (FEIS). This draft report describes the preliminary bus system proposed by VHB to serve the Wiehle Avenue and Reston Parkway station areas for the design year of 2030. It is important to note that feeder buses serving the additional future stations, such as the Herndon-Monroe, Route 28 and the four Tysons Corner stations are not included in this study.

A. Operating Plan

FAIRFAX CONNECTOR will continue to provide both feeder and circulator bus services throughout the Reston Area. Currently routes serving Reston are numbered in the 500s, while routes serving Herndon are in the 900s. (Some do serve both, and often have a number in the 900s.) A subset of the Reston routes that serve as internal circulators are called the Reston Internal Bus System (RIBS) routes and are designated by small numbers (1 through 4.) Routes that primarily serve areas north of the DIAAH are given even route numbers, while routes that serve areas primarily south of the DIAAH are given odd route numbers. The numbers shown below can be altered if necessary to better conform to the CONNECTOR's numbering conventions. The following sections detail the proposed routes, the estimated costs for operating them, staff increases for the FAIRFAX CONNECTOR system and ridership estimates.

[17] See "Wiehle Avenue/Reston Parkway Station Access Management Plans: Profile of Existing Conditions" submitted to Fairfax County and finalized in June, 2007.

a. Current Operations

The routing, frequency and service span recommendations presented in this report are based on the existing service and the impending need for additional transit service as Metrorail begins to operate in the Reston community. In fiscal year 2007, the FAIRFAX CONNECTOR delivered over 7.1 million revenue miles of service between its two divisions: the Reston-Herndon Division provided 54% of that service and the Huntington Division provided the remaining 46%. The routes serving the two station areas around Wiehle Avenue and Reston Parkway comprise approximately 45% of the service provided by the Reston-Herndon division. This percentage is expected to increase slightly in the future once all three of the local Metrorail stations (Wiehle Ave, Reston Pkwy and Herndon-Monroe) are operational.

Table 4-1 provides an overview of the current weekday FAIRFAX CONNECTOR operation in the Reston area by route. The 15 bus routes in the area operate just over 6,000 revenue miles and 275 revenue hours of service on an average weekday. A revenue mile and hour are the distance and time a bus is in operation on a scheduled route and accepting passengers. In a year, these routes operate service for over 1.77 million revenue miles and 82,500 revenue hours. The number of vehicles required to operate the system varies by route length and service frequency, although most are able to operate with only two buses. The 15 routes that currently operate in the service area require a total of 32 vehicles. Overall, the FAIRFAX CONNECTOR system operates with a spare ratio of 19.7%, indicating that 6 vehicles would be available for service during the peak periods in case of mechanical failure or other issues.

Table 4-1: Estimated Current FAIRFAX CONNECTOR Operating Statistics by Route

Route	Description			Estimated Daily Service		Estimated Annual Service		Estimated Vehicle Requirements	
	Frequency (min)	First Run Time	Last Run Time	Revenue Miles	Revenue Hours	Revenue Miles	Revenue Hours	Vehicles	Type
505	30	5:00 AM	midnight	1330	35	423,700	11,805	4*	40-foot
551	30	4:45 AM	9:00 PM	520	19	132,300	4,904	3	40-foot
552	30	5:45 AM	8:15 PM	270	10	68,100	2,520	2	40-foot
553	30	5:45 AM	8:45 PM	300	10	75,400	2,609	2	40-foot
554	30	5:30 AM	7:30 PM	220	7	56,200	1,867	2	40-foot
556	30	5:15 AM	8:45 PM	110	13	28,600	3,392	0*	40-foot
557	30	5:45 AM	8:30 PM	310	11	79,200	2,780	3	40-foot
585	20	5:30 AM	8:15 PM	320	9	81,200	2,418	3	40-foot
595	30	5:30 AM	7:30 PM	270	9	69,400	2,226	4	
597	30	6:00 AM	6:45 PM	320	9	81,200	2,232	3	
605	60	6:00 AM	10:15 PM	630	27	195,300	8,568	2	SLF‡
RIBS1	30	5:00 AM	1:00 AM	350	30	114,700	9,550	2	SLF‡
RIBS2	30	5:00 AM	1:00 AM	320	29	105,800	9,313	2	SLF‡
RIBS3	30	5:00 AM	1:00 AM	360	29	119,200	9,213	2	SLF‡
RIBS4	30	6:00 AM	11:00 PM	420	28	140,200	9,288	2	SLF‡
Total				**6050**	**275**	**1,770,500**	**82,685**	**32**	

* Routes 505 and 556 combined require 4 buses

‡ SLF is Super Low Floor Vehicle

b. Proposed Operations

The proposed routes are based on the existing FAIRFAX CONNECTOR routes that operate around the two stations, including the RIBS routes. Based on the FEIS, VHB's experience in the community, detailed discussions with FAIRFAX CONNECTOR staff and input from the RMAG advisory group and members of the public, the proposed routes provide service to Reston's neighborhoods, office parks, medical facilities and Metro Stations. These routes function both as commuter routes between neighborhoods and the Metro Station and as shuttle routes between major destinations in the service area. A significant increase in service delivered will be necessary to serve the two Metrorail stations. An increased service span (until 3 am on some nights), increased frequency to account for projected ridership and new routes providing service to underserved areas all contribute to the increase in service. The recommended frequencies were based on projected ridership, perceived demand for transit service and operational considerations. All frequencies are in 7-minute intervals to allow the buses to meet the arriving Metrorail trains. If ridership in the future proves to be significantly higher or lower than projected in this report, the frequencies should be adjusted accordingly.

i. Route Structure

The essential structure of service in Reston has been maintained, however each individual route has been modified to better serve the neighborhoods. Some new routes have been added to augment the existing service and provide service to important destinations in the area. Below, each route is described and includes its major destinations, service span and frequency. Table 4-2 presents the full system and complete route maps can be found in Appendix E and Appendix F. The service spans were determined in order to meet the Metrorail trains and to match, whenever possible, the Metrorail span of service. The service frequencies for each route were determined by the neighborhood land use characteristics and the ridership projections[18]. Changes in the ridership projections could result in different frequency recommendations, and therefore different vehicle and staffing requirements.

FXC 552

Proposed: Route provides service to and from the Wiehle Avenue station and the high-density residential neighborhoods along North Shore Drive.

- Service days: Monday – Friday
- Service hours: Peak only – Meet first inbound Metrorail train
- Service frequency: 14-minutes
- Direction: peak

FXC 553

Proposed: Route operates between Reston Parkway station and Wiehle Avenue station with a stop at the Reston South Park-and-Ride. Service is provided from Edmund Halley Dr, along Reston Parkway, Lawyers Rd, Soapstone Rd, Glade Dr, Twin Branches Pkwy, South Lakes Dr and Sunrise Valley Dr.

- Service days: Monday – Friday
- Service hours: Peak only – Meet first inbound Metrorail train
- Service frequency: 14-minutes (peak)
- Direction: both directions

[18] AECOM Consult developed mode split and bus ridership estimates for the Phase I FEIS for the areas around the Wiehle Ave station and Reston Town Center Transit Station.

FXC 556a

Proposed: Route provides service between the Reston Parkway station and residential neighborhoods north of the Reston Town Center via Town Center Parkway, Walnut Branch Rd, Fairfax County Pkwy, Lake Newport Rd, N Village Rd and Bennington Woods Rd.

- Service days: Monday-Friday
- Service hours: Peak only – Meet first inbound Metrorail train
- Service frequency: 21-minutes
- Direction: peak

FXC 556b

Proposed: Route provides service between the Reston Parkway station and residential neighborhoods north of the Reston Town Center. Service is provided on Town Center Pkwy/Bennington Woods Rd, Reston Parkway, Wiehle Ave, Center Harbor Rd, North Village Rd and Lake Newport Rd.

- Service days: Monday-Friday
- Service hours: Peak only – Meet first inbound Metrorail train
- Service frequency: 28-minutes
- Direction: peak

FXC 557

Proposed: Service is operated between the south side of the Reston Parkway station and the Wiehle Avenue station. Service is provided to neighborhoods along Sunrise Valley Dr, Glade Drive, Soapstone Rd and Sunrise Valley Dr.

- Service days: Monday-Friday
- Service hours: Peak only – Meet first inbound Metrorail train
- Service frequency: 14-minutes
- Direction: both directions

FXC 585

Proposed: Route provides service primarily between the Reston South Park-and-Ride and the Reston Parkway station. Provides stops along Franklin Farm Rd, Reston Parkway, Viking Dr, Pinecrest Rd and Fox Mill Rd and terminates at the south side facility of the Reston Parkway station at Edmund Halley Dr. During the midday period, this route will travel only between the Reston Parkway Metrorail Station and the Reston South Park-and-Ride lot.

- Service days: Monday – Friday
- Service hours: Peak/midday – Meet first inbound Metrorail train
- Service frequency: 21-minutes (peak); 56-minutes (midday)
- Direction: peak

FXC 605

Proposed: FXC 605 provides service from Reston Town Center to the Fairfax Government Center, making stops at the Reston Parkway station, the Reston South Park-and-Ride, Fair Oaks Hospital, Fair Lakes Shopping Center and Fair Oaks Mall.

- Service days: 7 days
- Service hours: Meet first and last Metrorail train
- Service frequency: 21-minutes (peak); 42-minutes (off-peak)
- Direction: both directions

RIBS 1

Proposed: RIBS 1 provides circulator service in a loop around Reston in the clockwise direction, from the Reston Parkway station and the Reston Town Center Transit Station, along North Shore Dr, Wiehle Ave, Sunrise Valley Dr, Colts Neck Rd, Glad Dr and Reston Parkway. Stops are made at Reston Town Center, Wiehle Ave station, Reston Parkway station and Tall Oaks Village Center.

- Service days: 7 days
- Service hours: Meets first and last Metrorail trains
- Service frequency:
  - Weekdays: 28-minutes (peak and midday); 56-minutes (evening)
  - Saturday: 28-minutes (peak and midday); 56-minutes (evening)
  - Sunday: 56-minutes
- Direction: clockwise

RIBS 2

Proposed: RIBS 2 provides circulator service around Reston seven days a week, connecting the Reston Town Center and new Metrorail stations with the single-family residential neighborhoods south of the DIAAH, along New Dominion Pkwy, Sunrise Valley Drive, South Lakes Drive and Reston Parkway. This route makes stops at the Reston Town Center Transit Station, Reston Parkway station, Wiehle Avenue station and Kaiser Permanente and Target on Sunset Hills Rd.

- Service days: 7 days
- Service hours: Meets first and last Metrorail trains
- Service frequency:
  - Weekdays: 28-minutes (peak and midday); 56-minutes (evening)
  - Saturday: 28-minutes (peak and midday); 56-minutes (midday)
  - Sunday: 56-minutes
- Direction: both directions

RIBS 3

Existing: RIBS 3 provides circulator service in a loop around Reston along the same route as RIBS 1. However, while RIBS 1 travels in the clockwise direction, RIBS 3 travels in the counterclockwise direction to the Reston Town Center Transit Station and the Reston Parkway rail stations, along Reston Parkway, Glade Dr, Colts Neck Rd, Sunrise Valley Drive, Wiehle Avenue, North Shore Drive and Bowman Town Dr. Stops are made at Reston Town Center, Reston Parkway station, Wiehle Avenue station and Tall Oaks Village Center.

- Service days: 7 days
- Service hours: Meets first and last Metrorail trains
- Service frequency:
  - Weekdays: 28-minutes (peak and midday); 56-minutes (evening)
  - Saturday: 28-minutes (peak and midday); 56-minutes (evening)
  - Sunday: 56-minutes
- Direction: counterclockwise

RIBS 4

Proposed: RIBS 4 provides circulator service from the Reston Town Center to neighborhoods along Sunset Hills Rd, Herndon Parkway, Baron Cameron Ave, Bracknell Dr and Bennington Woods Rd. Stops at the Reston Town Center Transit Station and the Reston Parkway station.

- Service days: 7 days
- Service hours:
- Weekdays: Meets first and last Metrorail trains
- Service frequency:
    - Weekdays: 28-minutes (peak and midday); 56-minutes (evening)
    - Saturday: 28-minutes (peak and midday); 56-minutes (evening)
    - Sunday: 56-minutes
- Direction: both

FXC 950

Proposed: Route operates between the Herndon-Monroe and Reston Parkway stations with a stop at the Reston Town Center Transit Station. The route serves neighborhoods along Sunrise Valley Dr, Monroe St, Baron Cameron Ave and Town Center Parkway.

- Service days: 7 days
- Service hours: Meets first and last Metrorail trains
- Service frequency: 28-minutes
- Direction: both directions

FXC 959

Proposed: Route provides circulator and feeder service in a loop along Sunset Hills Road and Sunrise Valley Drive. The route stops at the Herndon-Monroe, Reston Parkway and Wiehle Avenue stations.

- Service days: 7 days
- Service hours: Meets first and last Metrorail trains
- Service frequency: 14-minutes (peak, lunchtime); 28-minutes (off-peak)
- Direction: both directions

Table 4-2: Proposed Route Summary

Number	Route	Headway (peak/off-peak)	Direction	Service Span (days/time)
FXC552	Wiehle Ave Station - North Shore Dr	14	Peak	Weekdays Peak Hours
FXC553	Wiehle Ave Station - Glade Rd - Lawyers Rd - Reston South Park-&-Ride - Reston Pkwy Station	14	Both	Weekdays Peak Hours
FXC556a	Reston Pkwy Station - Town Center Pkwy - Bennington Woods Rd – Fairfax County Pkwy - Lake Newport Rd – N Village Rd	21	Peak	Weekdays Peak Hours
FXC556b	Reston Pkwy Station – Town Center Pkwy – Bennington Woods Rd – Reston Pkwy – Wiehle Ave – Center Harbor Rd – N Village Rd	28	Peak	Weekdays Peak Hours
FXC557	Reston Pkwy Station - Glade Rd - Soapstone Rd - Wiehle Ave Station	14	Both	Weekdays Peak Hours
FXC585	Franklin Farm Rd - Viking Dr - Reston Pkwy - Reston Pkwy Station	21/56	Peak/Both	Weekdays Peak/ mid- day
FXC605	Reston Town Center - Reston Pkwy Station - Reston Pkwy - Fair Oaks Mall (shortened during the midday)	21/42	Both	7 days All day
RIBS1	Reston Pkwy Station - Reston Town Center - North Shore Dr - Wiehle Ave Station - Sunrise Valley Dr - Colts Neck Rd - Reston Pkwy	28/56	Clockwise	7 days All day
RIBS2	Reston Town Center - Reston Pkwy Station – New Dominion Pkwy - Reston Pkwy - South Lakes Dr - Wiehle Ave Station - Sunset Hills Rd	28/56	Both	7days All day
RIBS3	Reston Pkwy Station - Reston Town Center - North Shore Dr - Wiehle Ave Station - Sunrise Valley Dr - Colts Neck Rd - Reston Pkwy	28/56	Counter-clockwise	7days All day
RIBS4	Reston Pkwy Station - Sunset Hills Rd - Herndon Pkwy - Baron Cameron Ave - Bennington Woods Rd	28/56	Both	7days All day
FXC950	Herndon-Monroe Station - Sunrise Valley Dr - Baron Cameron Ave - Town Center Pkwy	28	Both	7 days All day
FXC959	Loop along Sunset Hills Rd & Sunrise Valley Dr - Stops at Herndon-Monroe Station, Reston Pkwy Station & Wiehle Ave Station	14/28	Both	7 days All day

ii. Operating Costs

The thirteen proposed routes continue to provide service to all locations that were previously served, in addition to providing new service and increased frequency. Some routes have been eliminated, although with the proposed route modifications and the start of Metrorail service all of the locations that currently have transit service will still be served in 2030. Routes 505, 595 and 597 provide express service to non-Reston Metrorail stations and will no longer be needed after Metrorail stations open locally. Service from the existing routes 551 and 554 will be shifted to other routes in order to improve operational efficiency. The recommendations listed in Table 4-2 will require significant increases in both revenue miles and revenue hours and will have a large impact on the operating costs of the system.

Table 4-3 below shows the operating requirements for the routes recommended in the previous section. These service estimates were developed based on the estimated roadway speeds developed as part of the traffic modeling and simulation for this project. Service characteristics were estimated without the implementation of the exclusive bus lanes recommended in Chapter 2. Significantly worse or better traffic conditions (as would be possible with this exclusive facility) could have a drastic impact on the number of vehicles and the number of revenue hours that would be required to operate the proposed service.

Table 4-3: 2030 Operating Characteristics

Route	Description			Projected Daily Service		Projected Annual Service		Estimated Vehicle Requirements
	Frequency (min)	Start Time	Last Run Time	Revenue Miles	Revenue Hours	Revenue Miles	Revenue Hours	
552	14	5:00 AM	7:30 PM	290	23	73,500	5,880	3
553	14	5:00 AM	7:30 PM	530	65	134,400	16,560	4
556a	21	5:00 AM	7:30 PM	140	12	36,000	2,990	2
556b	28	5:00 AM	7:30 PM	130	10	34,200	2,470	2
557	14	5:00 AM	7:30 PM	430	47	109,800	11,960	3
585	21	5:00 AM	7:30 PM	310	39	79,800	9,940	3
605	21	5:00 AM	Midnight	1030	157	324,000	48,220	7
950	28	5:00 AM	Midnight	570	83	205,400	29,830	3
959	14	5:00 AM	Midnight	1940	155	648,500	49,800	6
RIBS1	28	5:00 AM	Midnight	580	39	195,400	12,570	3
RIBS2	28	5:00 AM	Midnight	740	63	250,100	20,850	2
RIBS3	28	5:00 AM	Midnight	580	39	195,400	12,440	3
RIBS4	28	5:00 AM	Midnight	410	31	137,900	10,110	3
Total				7680	763	2,424,400	233,620	44

The proposed bus system will operate almost 7,700 revenue miles and over 760 revenue hours of service on an average weekday as shown in Table 4-3. That translates into more than 2.4 million annual revenue miles and 233,000 revenue hours each year. This represents a 36.9% increase in daily revenue miles and a 182.6% increase in revenue hours. These seemingly incongruous increases are explained by replacing routes with long express portions (i.e. Along the DIAAH to the West Falls Church Metro station) which operate only during peak periods with shorter, local routes with much more frequent service and a longer span of service to meet the Metrorail trains. The lengthened span of service, the improved service frequency and the slower traffic speeds predicted for the Reston area in 2030 require an expanded fleet of vehicles during the peak periods, a 37.5% increase from 32 vehicles to 44 vehicles.

Based on the available data regarding both on street traffic speeds and projected bus ridership, a fleet of 44 buses plus two additional spare vehicles will be required to meet the demand for transit in the year 2030.

Operations of the FAIRFAX CONNECTOR are currently contracted out to a private company. Under this contract service the FAIRFAX CONNECTOR pays the service provider for each revenue hour of service provided. In 2007, the contract rate is $65.27 per revenue hour.[19] Based on the 182.6% increase in revenue hours required in the proposed system, a proportional increase in operational costs is expected. Operational costs for the new system at the current contract rates would be over $15.2 million per year, as shown in Table 4-4. All costs are in 2007 dollars.

Table 4-4: Estimated Annual Costs by Route

Route	Annual Costs – Existing System				Estimated Annual Costs for Proposed System		
	Revenue Miles	Revenue Hours	Cost		Revenue Miles	Revenue Hours	Cost
505	423,700	11,805	$770,496		0	0	$0
551	132,300	4,904	$320,077		0	0	$0
552	68,100	2,520	$164,477		73,500	5,885	$384,114
553	75,400	2,609	$170,286		134,400	16,561	$1,080,936
554	56,200	1,867	$121,856		0	0	$0
556	28,600	3,392	$221,391		0	0	$0
556a	0	0	$0		36,000	2,994	$195,418
556b	0	0	$0		34,200	2,474	$161,478
557	79,200	2,780	$181,447		109,800	11,955	$780,303
585	81,200	2,418	$157,819		79,800	9,942	$648,914
595	69,400	2,226	$145,288		0	0	$0
597	81,200	2,232	$145,680		0	0	$0
605	195,300	8,568	$559,221		324,000	48,222	$3,147,450
950	0	0	$0		205,400	29,830	$1,947,004
959	0	0	$0		648,500	49,798	$3,250,315
RIBS1	114,700	9,550	$623,315		195,400	12,568	$820,313
RIBS2	105,800	9,313	$607,847		250,100	20,849	$1,360,814
RIBS3	119,200	9,213	$601,320		195,400	12,442	$812,089
RIBS4	140,200	9,288	$606,215		137,900	10,108	$659,749
Total	**1,770,500**	**82,685**	**$5,396,735**		**2,424,400**	**233,628**	**$15,248,900**

Note: All costs are in 2007 dollars.

Also of interest is the average cost per revenue mile, which is $3.05 in 2007. As has already been noted, the proposed system requires a very large increase in revenue hours without a correspondingly large increase in revenue miles due to the increase in service span and the removal of the express portions of most routes. This results in a significant increase in cost per revenue mile. In 2007 dollars, the cost to operate the proposed system is $6.29 per revenue mile, a 106% increase over the current cost per mile.

[19] Based on $63.46 per revenue hour cost in 2006 as reported by Fairfax County staff and a 2.85% inflation rate reported by the CPI calculator at http://www.bls.gov/data/.

iii. Staffing Needs

Improving the level and quality of service in addition to accommodating the expected growth in ridership associated with the availability of Metrorail service in Reston will require increasing FAIRFAX CONNECTOR's operational and administrative staff. The vast majority of the operational and administrative staff for the system is currently contracted out to private companies; this arrangement is expected to continue through 2030. However, as the contracts are re-negotiated to accommodate the necessary increase in service recommended in this plan, the staffing levels in many areas will need to be increased. Expanding the CONNECTOR's current staff will provide the agency with the capacity to operate more service and properly support the system.

Table 4-5 shows the 2007 staffing for the Reston-Herndon division of the FAIRFAX CONNECTOR, which operates all of the routes in the Reston area. As previously noted, the routes serving the Wiehle Avenue and Reston Parkway Metrorail station areas account for approximately 45% of the service operated by the Reston-Herndon division. It is therefore assumed that 45% of each staffing category is devoted to the operations serving the two stations of interest. The table below also indicates the staffing levels for just the routes serving the Reston area.

In 2006, six part-time employees and 186.5 full-time employees are devoted to the operation of the Reston-Herndon division of the FAIRFAX CONNECTOR employed. Several of the high-level positions are shared between the two divisions, and only ½ of their time is devoted to either division. (As is the case for the Regional General Manager, who oversees the whole system.) The vast majority of employees are drivers (almost 75%) while only a small portion (only 5%) are dedicated administrative staff. Just over 84 employees are devoted to bus operations in Reston, including 3 part-time employees.

1) Operational Staffing Recommendations

Based on the increases in service recommended for 2030, FAIRFAX CONNECTOR will need to substantially increase some portions of its staff. Primarily, additional bus operators to accommodate the increased service and mechanical staff to service the expanded vehicle fleet will be needed. The service currently operates approximately 83,000 revenue hours per year. These recommendations call for service to increase to over 233,000 annual revenue hours in 2030, a 183% increase over 24 years. Based on the current ratio of revenue hours to drivers, a total of 175 full-time drivers and 8 part-time drivers will be necessary to operate the Reston routes.

Table 4-5: Existing and Recommended Staffing Levels

Positions	2006 Staffing Levels[20]		Estimated 2030 Staffing Levels	
	Reston-Herndon Division	Reston Area Only	Reston-Herndon Division	Reston Area Only
Regional General Manager	0.5	0.25	0.5	0.25
Operations Manager	1	0.50	1	0.50
Regional Maintenance Manger	0.5	0.25	0.5	0.25
Assistant Maintenance Manager	1	0.50	1	0.50
Transit Analyst	0.5	0.25	0.5	0.25
Regional Safety Manager	0.5	0.25	0.5	0.25
Regional HR Manager	0.5	0.25	0.5	0.25

[20] Fiscal Year 2007 data provided by Fairfax County staff (Working TNB Statistics).

Positions	2006 Staffing Levels[20]		Estimated 2030 Staffing Levels	
	Reston-Herndon Division	Reston Area Only	Reston-Herndon Division	Reston Area Only
Trainer	2	1	6	2.50
Payroll Specialist	1	0.50	1	0.50
Safety Manager	1	0.50	1	0.50
Customers Count/Marketing Mgr	1	0.50	1	0.50
Drivers - FT	138	62	390	175
Drivers - PT	6	2.75	17	8
Chief Supervisor	1	0.50	1	0.50
Supervisors	19	8.5	54	24
Shop Foreman	3	1.25	5	2
Mechanics	13	5.75	18	8
Parts Clerk	1	0.50	1	0.50
Maintenance Clerk	1	0.50	1	0.50
Utility Workers	1	0.50	1	0.50
Total	192.5	87.00	501.5	225.5

With the increase in driver staff, FAIRFAX CONNECTOR will need to increase its capacity to support and supervise a larger and more robust driver workforce by increasing its supervisory staff and driver trainers. Currently, there is one supervisor for every 7.6 drivers. Keeping this ratio constant will require 24 supervisors in 2030. Currently there are two trainers assigned to the Reston-Herndon division, one of whom is likely sufficient to oversee the routes in the Reston area. Based on the 182% increase in the number of drivers and the re-designing of most of the routes, additional training will be necessary for both new and existing staff members. A corresponding increase in the training staff would require two or three trainers for the Reston routes. Additional trainers may be necessary during the transition when drivers are learning new routes and procedures.

Table 4-5 shows the necessary operating staffing levels for 2030 based on the recommendations in this report. Access management planning for the Herndon-Monroe station has not yet begun, and therefore the full amount of bus service that will be operated in the Reston-Herndon division remains unknown. However, if we continue to assume that the Reston routes make up 45% of the service provided by the Reston-Herndon division, estimates for division-wide staffing can be developed. The staffing estimates for the Reston-Herndon division may be high if the amount of service in Herndon does not increase at the same rate as the Reston area service.

2) Maintenance Staffing Recommendations

The size of the bus fleet is expected to increase by 12 vehicles by 2030, to a total of 44 buses. The required 37.5% increase in the size of the vehicle fleet will require a corresponding increase in

maintenance staff to ensure that the vehicles remain in good working order. Currently, there is one mechanic for every 5.3 buses in the peak operating fleet. Keeping this ratio constant will require approximately eight mechanics in 2030. In addition, there is currently one shop foreman for every 4.3 mechanics. In order to maintain this level of supervision, the Reston-Herndon division will need to increase its staff of shop foremen from three to five, with two of them devoted to the Reston routes.

3) Transit Planning and Administrative Recommendations

The size of the administrative and managerial staff in contract with the FAIRFAX CONNECTOR should not need to increase to accommodate the recommended 2030 service levels. The tasks required of most of the high level managers will not have changed substantially, and new staff in these areas will not be necessary.

4) Marketing and Customer Service Recommendations

With the reorganization of most of the bus routes serving the Reston area and the introduction of Metrorail service into the area, a large-scale marketing effort will be necessary. Existing customers will need to be made aware of the routing changes, when they will occur and what routes they will need to use in the future. Residents and employees in the area, even those who do not currently use FAIRFAX CONNECTOR service should be made aware of the new transit opportunities in the area and should be provided with maps, schedules and help using the system if necessary. This marketing effort should resemble in scale and quality the marketing campaign used by FAIRFAX CONNECTOR to promote the Dulles Corridor service expansion. This effort can be managed in house with existing Fairfax County marketing resources. However, if the county decides to have the contractor develop and distribute the materials, the efforts of an additional full-time marketing person will be required for the Reston-Herndon division. This would increase the marketing staff from one full-time employee for the division to two full-time employees.

The FAIRFAX CONNECTOR call center, which is also operated under a private contract, provides information and help to current and potential Connector riders. The service changes recommended in this report are substantial, and a substantial increase in the number of calls received by the call center should be anticipated during the period of the changeover. (This period may last for up to a year on either side of the change.) Additional staff may be necessary during this time in order to provide the best customer service possible. In addition, the bus system's hours of operations will be extended to match Metrorail hours, which may amount to a 5-hour extension on some routes. The call center should be open at all times when the bus system is operational, and additional shifts and staff will be necessary to accommodate the new hours.

c. Projected Ridership

The service improvements planned for the Reston area and the advent of Metrorail service will substantially improve FAIRFAX CONNECTOR's service and offer increased opportunities for Reston residents and employees to use transit. By providing more and better transit service the system will attract new and more frequent riders. In addition, increased regional congestion and costs of driving may also contribute to a significant increase in bus riders over the next several decades. Based on the service recommendations and the employment and residential levels projected for the station areas, ridership estimates have been developed that demonstrate how these changes will affect ridership for the 2030 planning year.

i. Existing Ridership and Growth

The current FAIRFAX CONNECTOR ridership for the routes serving the Reston station areas is shown in Table 4-6 below. The average daily and weekly ridership show which of the routes are heavily used and which routes are not. Route 554 is the best performing route on the weekdays, and also on average during the whole week with an average of 33.8 passengers per trip. The best weekend performance is on the RIBS 2, which averages 17 passengers per trip on Saturday, 21.8 passengers per trip on Sundays and 22.7 passengers per trip over the whole week. Route 556 and 505, which are operated together, have the poorest ridership with 5.8 and 9.7 average passengers per trip respectively. Route 505 also has the worst weekend ridership, with only 4.5 average passengers per trip on both weekend days.

Table 4-6: 2006 FAIRFAX CONNECTOR Ridership by Route

Route	Weekday		Saturday		Sunday		Weekly	
	Avg. Daily Ridership	Avg. Riders per Trip	Avg. Daily Ridership	Avg. Riders per Trip	Avg. Daily Ridership	Avg. Riders per Trip	Avg. Weekly Ridership	Avg. Riders per Trip
505	973	9.7	318	4.5	272	4.5	5,454	8.7
551	792	26.4					3,959	26.4
552	425	25.0					2,124	25.0
553	206	12.9					1,029	12.9
554	473	33.8					2,364	33.8
556	117	5.8					585	5.8
557	379	25.3					1,897	25.3
585	353	14.7					1,765	14.7
595	333	25.6					1,666	25.6
597	289	28.9					1,446	28.9
605	366	12.2	266	10.2	204	9.3	2,299	11.6
RIBS1	664	19.5	302	9.7	211	14.0	3,833	17.7
RIBS2	808	23.8	528	17.0	327	21.8	4,896	22.7
RIBS3	616	18.1	387	12.5	256	17.0	3,724	17.2
RIBS4	320	10.3	293	9.8	151	10.1	2,043	10.2
Total	**7,114**	**16.91**	**2,094**	**9.6**	**1,421**	**10.0**	**39,086**	**15.8**

Bus ridership in Reston has been growing since 2000. Ridership on all of the FAIRFAX CONNECTOR routes serving Reston has increased over the over the past 6 years, with only one exception. Table 4-7 shows the growth in average weekday ridership since 2000. As a system, these 15 routes have experienced more than 125% in ridership growth, only partially due to the introduction of new routes. Many of the local routes have experienced the most substantial growth, especially Route 605 and RIBS 1, 2 & 3 which each more than doubled their ridership. Only Route 585 has lost riders over the last 6 years, with a decrease of more than 7% since 2000. Only one other route in the area, Route 552, had a ridership growth rate of less than 10%. This strong growth is likely to continue into the future, and will be used in the next section to estimate the ridership in 2030.

Table 4-7: FAIRFAX CONNECTOR Ridership Growth by Route

Route	Average Weekday Ridership							Percentage Change
	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	
505/556			700	796	795	1051	1092	56.0%
551	541	689	623	603	651	754	797	47.2%
552	384	457	386	361	458	498	420	9.43%
553	181	197	179	223	178	182	206	13.7%
554	334	394	358	335	406	479	470	40.8%
557	282	370	342	358	343	357	381	35.2%
585	387	380	290	385	366	365	357	-7.72%
595*							333	NA
597*							289	NA
605			99	192	253	309	370	274%
RIBS1	228	303	390	472	443	490	674	196%
RIBS2	296	326	481	832	790	713	810	174%
RIBS3	293	312	481	603	551	546	617	111%
RIBS4	222	193	289	208	221	312	323	45.4%
Total	3148	3621	4618	5368	5455	6056	7140	127%

* Routes 595 and 597 only have data for one year, as they began operation in October 2006.

ii. Estimated Future Ridership

The service improvements recommended in this report will substantially improve the transit service offered in the Reston area and offer increased opportunities for area residents and employees to use transit. In addition, the advent of Metrorail service in Reston is expected to significantly increase bus usage in the communities near the stations. Finally, almost all of the routes have experienced growth over the past six years, and the system as a whole has seen a substantial ridership increase as well. All three of these factors lead to the conclusion that ridership on FAIRFAX CONNECTOR bus routes in the Reston area will be significantly higher in 2030 than they are in 2007. Projections of the number of people accessing the Reston area Metrorail stations by bus in 2030 were developed by a consultant as part of the FEIS process[21].

Many of the existing bus routes are commuter routes that primarily transport people to and from the closest Metrorail station at West Falls Church. With the opening of the Reston Parkway and Wiehle Avenue Metrorail stations, these long routes will no longer be necessary and commuters will be able to travel to a closer station in Reston. The number of commuters using a bus to access each of the stations was developed during the completion of the FEIS for each Traffic Analysis Zone (TAZ). The riders in each TAZ were divided between the appropriate bus routes to estimate ridership on those routes during the peak hour. For those routes with off-peak (midday and evening) service, a small additional percentage (20%) was added to account for local traffic not accessing the Metrorail stations and off-peak trips. Where appropriate for local routes with minimal recommended routing changes, the growth rates prevalent between 2000 and 2006 were extrapolated forward to estimate the ridership in 2030.

[21] AECOM Consult developed mode split and bus ridership estimates for the Phase I FEIS for bus ridership around the Wiehle Ave station and in the area of the Reston Town Center Transit Station.

Table 4-8 shows the ridership estimated for each of the routes in the year 2030, after the opening of both the Reston Parkway and Wiehle Avenue stations based on the data developed for the FEIS. In 2006, the 15 routes that served the station areas had a total average weekday ridership of 7,114. In 2030, the 13 routes that will serve the station areas are projected to have a total average weekday ridership of 15,084, a 112% increase over a 24-year period. The average number of riders per trip is also projected to increase by almost 90% to approximately 32 riders per trip. The highest ridership is expected on Route 959 which operates all day as a shuttle service primarily serving destinations along Sunrise Valley Dr and Sunset Hills Rd. As a shuttle service, shorter trips are expected as passengers will likely not ride the whole length of the route, allowing the route to serve more passengers per trip than a typical commuter route. However, if ridership on Route 959 is greater than the projections estimate, increased frequency along the route may be necessary in order to avoid overcrowding. Ridership on route 605 is also projected to be quite high as residents and employees in the southern portions of Fairfax County access the Metrorail system in Reston. Route 605 also offers local service along Reston Parkway and in the Fair Oaks area, and as such may accommodate more passengers than a typical commuter route. However, if ridership on this route does prove to be higher than estimated, another route that provides access from the southern portion of the county may need to be developed in order to avoid overcrowding.

Table 4-8: Projected 2030 Ridership by Route

Route	Avg. Weekday Ridership	Avg. Riders per Trip
552	1364	37.9
553	968	26.9
556a	865	36.0
556b	600	31.6
557	1064	29. 6
585	944	31.5
605*	1988	51.0
950	515	12.3
959	3030	45.2
RIBS1	1040	28.1
RIBS2	1005	27.2
RIBS3	1028	27.8
RIBS4*	674	18.2
Total	15,084	31.6

An asterisk (*) indicates that the 2030 ridership was projected using the 2000-2006 growth rates.

The two routes with the lowest projected ridership are routes 950 and RIBS4 with 12.3 and 18.2 average riders per trip respectively. Route 950 mostly serves areas west of Reston Town Center in the area of the Herndon-Monroe station. Access planning for the Herndon-Monroe station has not yet begun, and therefore the structure of the bus routes in the area remains unknown. Ridership on this route may be higher or lower depending on the level of bus ridership expected to Herndon-Monroe and the number of bus routes serving the immediate area. The estimate in this report should serve as a baseline, and the projections should be revisited as planning for the Herndon-Monroe Metrorail station commences.

Likewise, the number of local, non-commuter and off-peak trips in the Reston area could affect the ridership level on the RIBS4.

B. Proposed Capital Plan

The proposed Capital Plan presents recommendations on the facilities and equipment required to operate the recommended services described in the Operating Plan. This plan details the specific requirements for effectively implementing the recommendations in the Operations Plan and provides cost estimates for the capital equipment identified.

Equipment and facilities related to the provision of transit require substantial and continuous investment from a transit agency. For the FAIRFAX CONNECTOR, the majority of current capital expenses are related to its bus fleet. Buses are expensive to purchase and need periodic replacing as they reach the end of their useful lives. In addition the increase in the vehicle fleet required by the proposed operating plan may require the construction of a new and expanded bus service garage to accommodate the additional vehicles. There are a number of other capital costs on the horizon for the system including new technology and improved bus stops.

a. Vehicle Requirements

The majority of FAIRFAX CONNECTOR's capital costs are related to its bus fleet. The many recommendations to increase service frequency and extend the span of service will require FAIRFAX CONNECTOR to expand its fleet. The current service requires a maximum of 32 buses to operate during the peak periods. However, due to the increased service proposed for 2030 a maximum of 44 vehicles will be required to operate the new system during the peak periods and an additional 2 spare buses will be necessary. This results in a total increase of fourteen buses. In addition to this increase necessary by 2030, as the vehicles in the existing fleet continue to age they will need to be replaced to ensure that they are safe and reliable. No specific acquisition schedule is presented in this report, as it is difficult to determine the exact dates until construction schedules are finalized on the Metrorail project. Determining the buses required to operate the recommended system requires examining the appropriate type of bus for each route and the number of buses required by each route.

i. Current Vehicle Fleet

Currently, the bus service in the Reston area requires 32 buses to operate 15 routes during the peak periods. In 2006, the Reston-Herndon division of the FAIRFAX CONNECTOR utilized a mix of buses that includes traditional forty-foot buses and super low floor (SLF) vehicles. Forty-foot buses generally have a seated capacity of approximately 40 passengers, with additional capacity for approximately 40 standing passengers. Low floor vehicles generally provide fewer seats than a comparably sized traditional bus (typically just 10% less.) FAIRFAX CONNECTOR's low floor buses are approximately the same length as their other vehicles and have a capacity around 37 seated passengers and an additional 35 standees. The low floor vehicles have several added benefits when compared with traditional vehicles including easier and quicker boardings for passengers. This amenity serves not only those with mobility impairments, but can significantly increase the average speed of a transit vehicle by shortening the time spent loading passengers at every stop. Most of the current SLF vehicles are distinctly branded as RIBS buses, with different paint jobs and a clearly identifiable image.

The vehicle assignments and the average weekday riders per trip for each route are shown in Table 4-9. All of the express routes that provide service to the West Falls Church Metrorail station via the DIAAH

are assigned traditional 40-foot buses. All of the local routes, which includes the four RIBS circulator routes and route 605 (which travels between Reston and Fair Oaks) are assigned the SLF vehicles.

Table 4-9: 2006 Vehicle Assignments[22]

Route	Assigned Vehicle	Avg. Riders per Trip
505	40'	9.7
551	40'	26.4
552	40'	25.0
553	40'	12.9
554	40'	33.8
556	40'	5.8
557	40'	25.3
585	40'	14.7
595		25.6
597		28.9
605	SLF	12.2
RIBS1	SLF	19.5
RIBS2	SLF	23.8
RIBS3	SLF	18.1
RIBS4	SLF	10.3

Because the ridership measure is an average, routes should generally be assigned a vehicle with a seating capacity above the stated riders per trip to accommodate all passengers during busier periods. However, on shorter shuttle-type routes, standing passengers can be accommodated for shorter trips without a significant inconvenience. Standing passengers on the longer express routes that use the DIAAH should be avoided as speeds on the highway can be much higher. None of the routes approach the seated capacity of their assigned vehicle type; Route 554 is the closest with 33.8 riders per trip on a vehicle accommodating approximately 40 people. There are many routes that have been assigned a vehicle that is excessively large for the existing ridership levels. Of particular note are the 505 and 556, which operate together and have 9.7 and 5.8 average passengers per trip respectively. It may be more efficient to operate these and several other routes using vehicles with capacities of 10, 20 or 30 passengers.

ii. Future Vehicle Fleet

The routes recommended in this study require 44 buses to operate 13 routes during the peak period. This increase of 12 buses must be accompanied by an appropriate increase in the number of spare buses maintained in the fleet. In order to be eligible to receive federal grants for capital costs, the system must maintain a spare ratio (ratio of spare buses to peak service buses) of less than 20%. Therefore, in addition to the 12 new vehicles needed to operate peak service, an additional two buses will be needed to add to the pool of spare buses. This results in a total of 14 new buses in order to accommodate the recommended service.

[22] Fiscal Year 2007 data provided by Fairfax County staff (Working TNB Statistics).

The current bus fleet is fairly uniform; all buses are approximately the same length and seat approximately the same number of passengers (+/- 10). By 2030, it is recommended that the whole vehicle fleet incorporate low floor technology in order to speed operations and make the vehicles more accessible. Based on the high levels of ridership projected for 2030 (see Table 4-8) it will be necessary to operate most routes in the Reston area with high capacity vehicles in order to provide most passengers with a seated ride on all trips. As previously noted, routes 959 and 605 are projected to have on average more riders per trip than seats per vehicle. However, on local routes where passengers typically make short trips, it will still be possible to provide seats for most passengers.

Many of the bus routes will be operating on neighborhood streets with a residential character. In this context, it may be appropriate to use smaller buses to provide service in these areas when possible. Depending on the actual ridership levels and the length of the average trip, it may be possible to operate several routes with 30-foot bus with a seated capacity of approximately 30 passengers. These vehicles can be cheaper to purchase and operate and may be more in sync with the residential streets which they will be serving. Potential candidates for a 30-foot vehicle include RIBS 1-4 and route 553. (If all five routes are assigned 30-foot vehicles, then a total of 15 of the 44 buses could be of this type.) Additionally, route 950 is projected to have low ridership, with only 12 riders per trip, although these estimates do not include the full demand for transit service along the portion of the route west of Fairfax County Parkway or the other routes that will be serving that area. However, if ridership on this route remains low through the access planning process for the Herndon-Monroe station, then three more small vehicles (possibly as small as 20-person capacity) would be appropriate for this route. Table 4-10 shows the potential fleet mix indicated by the 2030 ridership projections that includes smaller vehicles where possible for the fleet of 46 vehicles (including 2 spares).

Table 4-10: Estimated Vehicle Requirements by Route

Route	20-foot	30-foot	40-foot
552			3
553		4	
556a			2
556b			2
557			3
585			3
605			7
950	3		
959			6
RIBS1		3	
RIBS2		2	
RIBS3		3	
RIBS4		3	
Spare		1	1
Total	3	16	27

Many of the routes may be operated more efficiently with smaller buses that are more appropriately sized for the residential communities of Reston. Many types of buses can be purchased, and each of the options should be considered carefully to ensure that the best and most appropriate fleet mix is selected based on the following factors:

- Capacity
- Purchase Cost

- Operational Costs
- Ease of maintenance
- Expected vehicle life
- Appearance
- Passenger Comfort
- Safety
- Wheelchair Accessibility

While smaller buses are generally less expensive to purchase and operate than traditional forty-foot buses, they may not be the ideal solution when all of the relevant characteristics are considered. The operations, maintenance and scheduling capabilities of the whole Reston-Herndon Division (if not the whole FAIRFAX CONNECTOR system) should be considered when deciding whether to introduce smaller vehicles to the fleet.

The purchase of these new vehicles represents one of the major capital expenses for the FAIRFAX CONNECTOR in Reston as Metrorail service comes to the area. By 2030 all of the vehicles currently in the fleet will have been replaced at least once (if not twice) by new vehicles and the fleet may be comprised of a different mix of vehicle types than in 2006. It is therefore uncertain which types of buses will need to be purchased in order to provide the desired fleet mix for 2030, or in what year they will need to be purchased. Table 4-11 shows the prices recently paid by FAIRFAX CONNECTOR to purchase a range of different vehicles, in addition to recently ascertained costs for smaller vehicles.

Table 4-11: Approximate Vehicle Purchase Costs

Size	Unit Cost[23]
45-foot	$ 440,453
40-foot	$ 325,975
35-foot	$ 321,344
30-foot	$ 334,500
20-foot	$ 140,000[24]

The total cost for providing the necessary fleet will depend on the individual types of vehicles that must be purchased. If only the least expensive 14 vehicles must be acquired, then capital costs may be as low as $4 million for three 20-foot vehicles and eleven 40-foot vehicles. If the 14 most expensive vehicles must be purchased, then the cost may reach as high as $4.7 million for fourteen 30-foot vehicles. In all likelihood, the cost for these buses will fall somewhere between these two values, in 2007 dollars. The total cost to purchase the full fleet recommended in Table 4-10 would be $14.6 million.

b. Facility Requirements

Although the majority of the FAIRFAX CONNECTOR's capital needs for this plan relate to the acquisition of new buses, the implementation of the recommendations in this plan will require other capital improvements as well. One major expense will be the construction of new garage space to accommodate the larger fleet required to operate the recommended level of service. In addition, the realignment and addition of routes will require new bus stops and associated amenities to be located

[23] Cost in 2007 dollars.
[24] Price shown is the average of several 20-foot vehicles available in 2006.

throughout the service area. Additionally, the FAIRFAX CONNECTOR should consider what types of technology the system would like to have implemented by 2030. For example, the FAIRFAX CONNECTOR system is currently in the process of acquiring Automatic Vehicle Locator (AVL) technology, and further advances should be planned for before 2030.

i. Vehicle Garage

Fairfax County currently operates transit service out of several garages located throughout the county. A new garage, to be shared by FAIRFAX CONNECTOR and WMATA, is currently under construction and planned to open soon. Upon completion, the West Ox Garage will have no excess capacity and will be completely filled by existing operations, although an expansion at this site would be possible. Any additions to the fleet in Reston or elsewhere in the county will require additional garage facilities. The operational plan developed in this report requires the addition of fourteen additional vehicles to the fleet that serves the Reston area. In addition, as Fairfax County continues to develop, the FAIRFAX CONNECTOR is likely to continue to improve operations, expand service and implement other improvements that will increase the required fleet for the county as a whole. Further, the state of the existing garages in 2030 is impossible to ascertain, but replacement of some existing facilities will likely be necessary. Certainly, additional garage space for both storage and maintenance of transit vehicles will be necessary in Fairfax County by 2030.

Access planning for all of the new Metrorail stations has not yet been completed and it is therefore impossible to know how many additional vehicles the FAIRFAX CONNECTOR will require to operate service in the northern portion of the county. Other service improvements that may occur throughout the county are also unknown. Since the size of the garage that will be necessary cannot be determined, it is difficult to ascertain what the cost of such a facility would be. It is estimated[25] that a garage designed to serve 50 or more vehicles will cost approximately $250,000 per bus to construct (in 2007 dollars). Smaller garages will have a higher cost per bus. Therefore, despite the fact that the ultimate size of the new garage facility is unknown, we can estimate that the portion of the construction costs that will be directly related to the improved service in the Reston area at $3.5 million. The rest of the costs to construct new garage space will be associated with other service areas and improvements.

After the Metrorail extension opens, much of the transit service in the county will be focused on bringing passengers to and from Metrorail stations in the northern part of the county. The intensity of transit service in the Dulles Corridor highlights the need for a garage in this area. Finding a suitable garage site in the Dulles Corridor would have the benefit of improving operational efficiency by removing deadhead trips and concentrating vehicles close to their service area.

ii. Bus Stops

The new route structure will change and increase the total number of bus stops in addition to increasing the number of boardings at almost all stops in the area. Each bus stop must be marked with a bus stop sign, and other information as necessary which may include a route schedule and a system map. By 2030, real time information is likely to be standard at all FAIRFAX CONNECTOR bus stops and should be included at stops in the Reston area as well. In addition, to comply with the requirements of the Americans with Disabilities Act (ADA), all bus stops should have a 5-foot by 8-foot concrete pad for bus boardings. Accessible connections to the bus stops from the sidewalk system will also be necessary to

[25] Estimation based on several recent VHB projects in Maryland and Virginia.

comply with ADA. Lighting at bus stops will also be necessary as the service span is extended further into the nighttime hours.

Along with the increase in ridership expected in the Reston area, boardings and alightings at bus stops throughout the area are expected to increase as well. All stops throughout the service area should continue to meet FAIRFAX CONNECTOR's service standards with regards to the amenities installed at each stop, including benches and shelters. The most recent standards[26] available indicate that shelters and benches are required at stops with more than 100 daily boardings (or 50 daily boardings on residential streets.) Of course, these standards may have changed by 2030, but these new amenities should be considered capital costs associated with the improved service.

iii. Dedicated Facilities

Dedicated bus lanes have been recommended for implementation in Reston in Chapter 2 to provide better bus service. These facilities were recommended in two locations: on the proposed Soapstone Connector providing a connection across the DIAAH directly into the Wiehle Avenue station and along Sunset Hills Rd. These recommended facilities will allow transit vehicles to bypass some of the roadways with the worst congestion, increasing travel speeds and improving the level of service provided to customers. These lanes could be used only during peak hours and would have the dual benefits of increasing bus speeds (and in turn significantly decreasing the operational costs and the number of new vehicles required) and attracting more passengers to the transit system and away from their cars, thus alleviating traffic congestion.

The implementation of the recommended dedicated bus lanes will have an effect on the estimated system costs and requirements. Faster road speeds for transit vehicles may decrease the number of vehicles needed to operate the recommended frequency levels. This could decrease both the capital costs (number of total vehicles needed) and the operating costs (number of vehicle-hours operated) of the system. Of course, slower traffic speeds due to increased congestion would have the opposite effect.

The construction of these facilities is highly recommended; without some dedicated facilities, the transit system will have difficulty attracting new passengers away from their automobiles. In fact, any available opportunities to construct additional bus lanes on congested facilities should be pursued. The reconstruction of the Reston Parkway bridge over the DIAAH may present just such an opportunity. A careful study of the implications of bus lanes on these roads should be undertaken to determine if this solution would benefit the residents of Reston. Implementation of bus lanes in the immediate vicinity of either of the stations along these roadways would present many challenges in right-of-way acquisition, operations and enforcement.

C. Conclusion

The opening of the two Metrorail stations in Reston will have a profound impact on bus service in the area. Each of the existing routes will need to be modified so that they better connect the neighborhoods with the Metrorail stations. In addition, new routes are recommended that will provide service to local shopping, medical and recreational destinations around the service area. The

[26] DRAFT Service Design Standards for the FAIRFAX CONNECTOR, May 2007

recommended routing for each of the thirteen routes in Reston is included in Appendix E. In order to serve passengers transferring to and from the Metrorail system, service frequencies should all be improved to seven-minute intervals that coordinate bus and train arrivals, in addition to extending service hours to match Metrorail hours of operation.

All of these improvements will result in an overall increase of 183% increase in the number of revenue hours offered to customers from under 83,000 per year to over 233,000 per year. Due to the restructuring of the routes so that they no longer contain an express segment on the DIAAH, the amount of revenue miles will increase approximately 37%, from 1.8 million per year to 2.4 million per year. The cost of providing this additional service is significant. At the 2007 contract rates, the cost to operate the system would still almost triple to over $15.2 million annually. The increase in service will require an increase in operations and maintenance staffing levels. 139 new employees will be necessary to operate the new service, most of them drivers.

The increase in service frequency and slower average bus speeds in 2030 will require an expanded vehicle fleet to operate the peak period service. An additional fourteen vehicles will be needed to bring the total fleet size up to 46. Ridership projections for each of the routes were established based on the future land use and employment characteristics. Bus ridership in the Reston area is expected to more than double, from 7,000 riders on an average weekday to over 15,000. Based on the ridership levels and the proposed frequencies, an appropriate mix of vehicle types is recommended that includes primarily thirty- and forty-foot vehicles. The new vehicles will have an estimated cost of approximately $4.5 million.

By 2030 the system area will require several new capital investments. A new garage will be needed to store and maintain vehicles serving many areas in the northern portion of the county, including the fleet expansion needed to serve Reston. The total size of the required facility is unknown at this time, but the 14 garage spaces that will be required by the recommendations in this report will cost approximately $3.5 million[27]. New bus stops, signage, lighting and amenities will be needed at all new stops and at many stops where ridership is expected to increase. Additionally, dedicated bus facilities are recommended for Sunset Hills Rd between Old Reston Avenue and Wiehle Avenue and for the proposed Soapstone Connector.

Overall, a very significant increase in the amount of service provided is recommended for 2030 to serve the new Metrorail stations. Service and costs are expected to almost triple in magnitude as frequencies are improved, service span is lengthened and the number of riders more than doubles. After the initial implementation of these recommendations, ridership and operations should be monitored closely so that changes can be made where necessary. The transit improvements recommended in this report, when coupled with the vehicular and pedestrian recommendations made in other reports will provide a full understanding of the improvements necessary to allow residents, employees and visitors will be able to easily access Reston.

[27] In 2007 dollars.

5. Integrated Priorities

All of the actions recommended are necessary in order to provide the best access possible to the Wiehle Avenue and Reston Parkway Metrorail stations for all residents, employees and visitors. The previous three chapters have presented recommended improvements, actions and policies for each of the four modes: vehicles, pedestrians, bicyclists and transit. The recommended system (shown in Figure 5-1) is based on the modal hierarchy developed with the RMAG, members of the public and Fairfax County staff:

1. Pedestrians
2. Bicyclists
3. Transit
4. Vehicles

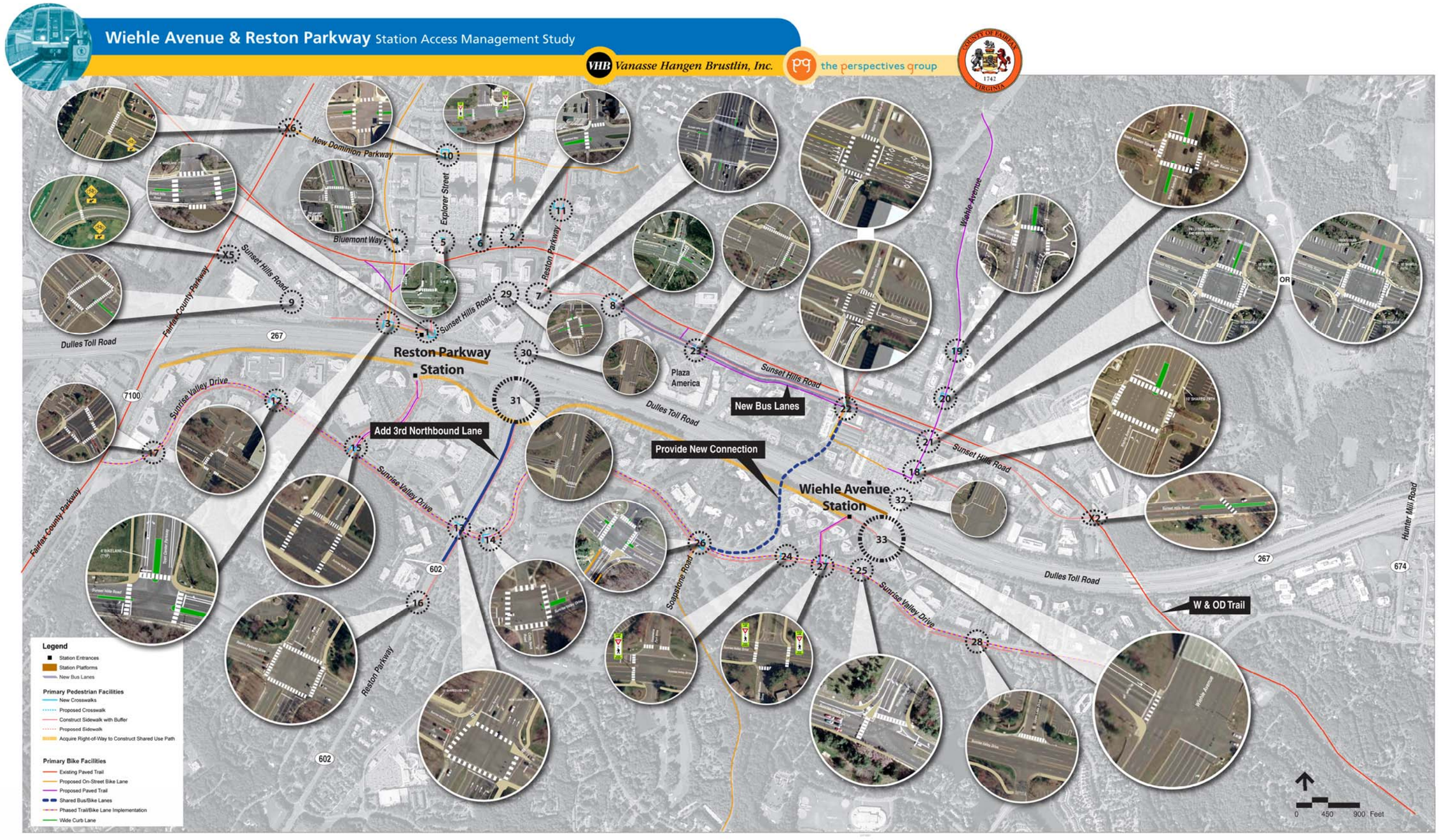
This hierarchy was used to inform which actions should be recommended and included in this report; however it was not used to develop a prioritized multi-modal program of projects. It does not make sense to construct all of the pedestrian improvements before any of the roadway projects. For establishing priorities for the recommended program, a different set of criteria was used including time, funding, resources and operational requirements of the two Metrorail stations.

This chapter details the estimated cost of the recommended access program including the recommended projects from each of the modes. The projects are then prioritized based on the timeline of the rail project. Where appropriate, adjacent projects have been grouped together so that all projects in a corridor or at an intersection might be constructed simultaneously. Three groups have been established:

1. Those projects that are necessary for the opening of the Wiehle Avenue station;
2. Those projects that are necessary for the opening of the Reston Parkway station; and
3. Projects that should be completed whenever the opportunity is presented but that are not absolutely essential for access into either of the stations.

Finally, some funding opportunities and sources are discussed for Fairfax County to use as a starting point towards implementing the recommended program of projects.

Figure 5-1: Recommended Station Access Management Actions



A. Cost

The cost for each of the recommended actions has been detailed in Chapter 2 through Chapter 4. The majority of the costs will be capital costs which include facility construction and the purchase of new equipment. All of the roadway, pedestrian and bicyclist projects are included in this category, along with the necessary contingencies for right-of-way acquisition, utility work and other unforeseen conditions. Some of the transit costs, including the new garage space and new vehicles can be included in this category as well. Transit operating costs must be paid on an annual basis. Table 5-1 shows the total capital and operating costs for the specific projects that have been recommended in this report. Other general recommendations such as Travel Demand Management strategies, improved bus amenities and generalized streetscape improvements in the station area have not been included in these estimates and will add additional projects to the program.

Table 5-1: Total Cost of Recommended Programs

Capital Costs			
	Roadways		$69,817,500
	Pedestrian/Bicyclist		
		Intersections	$5,383,800
		Paths & Bike Lanes	$22,029,500
	Transit		
		Vehicles	$4,400,000
		Facilities	$3,500,000
	TOTAL		$105,130,800
Operating Costs			
	Feeder Bus System	$15,248,575	annually

* All costs in 2007 dollars

In total, over $105 million worth of projects have been recommended in this study. Of the capital costs, the majority (over 66%) is allocated to roadway improvement projects including spot improvements, new signals, internal roadway connectors and the over $42 million for the Soapstone connector across the DIAAH. Another $22 million (approximately 21%) is allocated for the construction of sidewalks, shared use trails and bike lanes. The only annual operating cost specifically included in this study is the operations of the feeder bus system, at an annual cost of over $15.2 million. However, there may be some costs associated with the maintenance and operations of the other projects that have not been included.

B. Prioritization

Implementation of the many projects recommended in this report will be a long process; it is likely to take multiple years to complete all of the recommended projects. A timeline for implementation has been developed based on the timeline of the rail project; some projects are necessary for the opening of the Wiehle Avenue station while others are only necessary for the opening of the Reston Parkway station. The remaining projects are not strictly necessary at the time of station opening, but are still recommended as long term projects whenever implementation becomes feasible. Three priority groups have been developed based on these criteria. Additionally, projects were grouped based on proximity for ease of construction. For example, if bike lanes are recommended for a certain corridor, then the

intersection actions recommended for that corridor should be implemented at the same time. Each of the three priority groups is described below including cost estimates for each group.

a. Wiehle Avenue Station Projects

The first group of projects includes all projects that are necessary for providing access to the Wiehle Avenue station and should be completed before the opening of the station. Table 5-2 and Figure 5-2 show the 34 projects that should be completed by the start of Phase I Metrorail service. These projects account for a total cost of $58 million, more than 60% of the total capital costs for the recommended program. The major project in this group is the construction of the Soapstone Connector with its bike lanes, bus lanes and sidewalks (at a cost of over $42 million). The first segment of the trail paralleling the DIAAH should be constructed, including the portion from Reston Parkway to Wiehle Avenue.

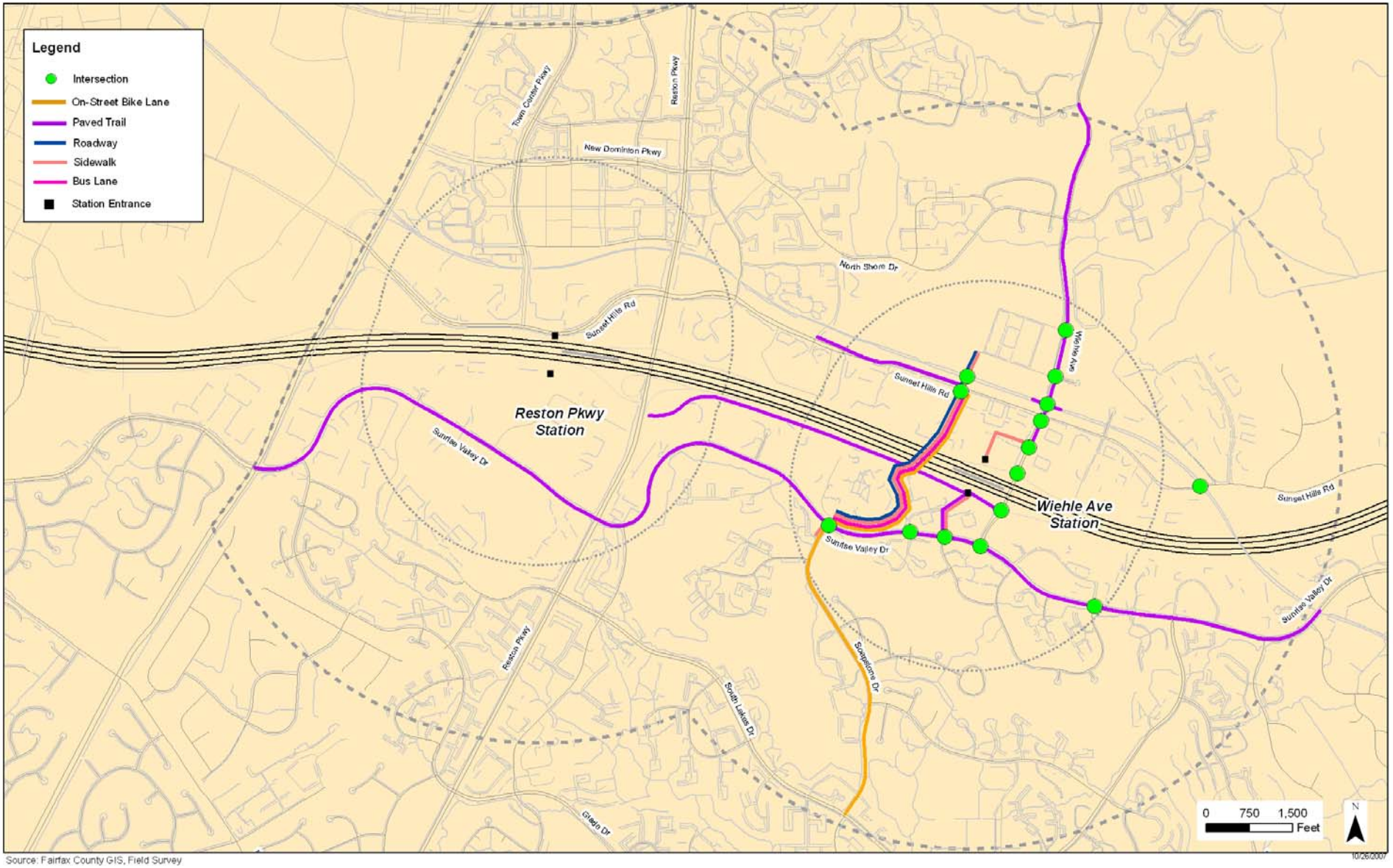
Table 5-2: Wiehle Avenue Station Projects

	Location	Actions	Comments
B	Sunset Hills Rd & Isaac Newton Sq W	New left turn lane for westbound left turning movement at Sunset Hills Rd & Isaac Newton Sq. This would replace the shared left-through lane by providing a dedicated turn lane.	
C	Wiehle Ave & Station Entrance	Add a second left turn lane for northbound traffic at Wiehle Ave & Metro Access (between Sunset Hills Rd & DIAAH) and provide a second inbound lane.	
D	Wiehle Ave & Eastbound Dulles Toll Rd ramps	Add an additional left turn lane on the eastbound DIAAH ramp at Wiehle Ave	
E	Wiehle Ave & Sunset Hills Rd	Improve the existing right turn lane on eastbound Sunset Hills Rd at Wiehle Ave	
F	Wiehle Ave & Sunrise Valley Dr	Improve the existing right turn lane for westbound Sunrise Valley Dr at Wiehle Ave	
I	Soapstone Rd	Provide a new connection over the DIAAH between Soapstone Rd and Isaac Newton Sq W, to connect the major east-west roadways: Sunset Hills Rd & Sunrise Valley Dr.	
K	Isaac Newton Sq W	Expanded section to include sidewalks, streets	
I18	Wiehle Ave & Station Entrance	North: Extend median to include pedestrian refuge; South: Extend median as much as possible, wide curb lanes to accommodate bikes; All approaches: Upgrade curb-ramps, pedestrian countdown signals, high visibility crosswalk;	To be completed with project #C
I19	Wiehle Ave & Isaac Newton Sq N	South: Potential infill of striped lane area; East: Upgrade curb ramps, high visibility crosswalk; North: Channelize right turns, median pedestrian refuge, high visibility crosswalk, pedestrian warning signs, pedestrian knockdown signs; West: High visibility crosswalk, upgrade curb ramp	To be completed with project #B7
I20	Wiehle Ave & Isaac Newton Sq S	South: pedestrian median refuge; All approaches: upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals	To be completed with project #B7 or N
I21	Wiehle Ave & Sunset Hills Rd	North: Decrease right turn radius; extend median to include pedestrian refuge; East: Raised median; South: Decrease right turn radius; West: Channelize right turns, decrease right turn radius; All Approaches: Upgraded curb ramps, re-align crosswalks, high visibility crosswalks, pedestrian countdown signals	To be completed with project #E
I22	Sunset Hills Rd & Isaac Newton Sq W	East: Upgrade curb ramps, decrease right turn radius; North: Decrease right turn radius, upgrade/construct curb ramps; West: Construct curb ramps; South: Construct/upgrade curb ramps; All Approaches: High visibility crosswalks, pedestrian countdown signals	To be completed with project #B
I24	Sunrise Valley Dr & Commerce Park Dr	North: upgraded curb ramps, high visibility cross walk; West: upgrade curb ramps, high visibility crosswalk, pedestrian warning and knockdown signs, pedestrian median refuge;	To be completed with project #S8
I25	Sunrise Valley Dr & Wiehle Ave	East: Channelize right turns; North: Re-align right turn channelization; North & West: upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals	To be completed with project #F

	Location	Actions	Comments
I26	Sunrise Valley Dr & Soapstone Rd	East: Extend median to include pedestrian refuge; West: Extend median to include pedestrian refuge; South: Construct curb ramps, decrease right turn radius; North: Median pedestrian refuge; All Approaches: High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps	To be completed with project #I
I27	Sunrise Valley Dr & Great Meadow Dr	East: High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; West: High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; South: High visibility crosswalk; All Approaches: update curb ramps	To be completed with projects #B10 & S15
I28	Sunrise Valley Dr & Upper Lake Dr	North: crosswalk, upgrade curb ramps	To be completed with project #S8
I32	Wiehle Ave & Westbound Dulles Toll Rd ramps	West: High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps	
I33	Wiehle Ave & Eastbound Dulles Toll Rd ramps	West: Decrease right turn radius, high visibility crosswalk, upgrade curb ramps, pedestrian countdown signal	To be completed with project #D
X1	Wiehle Ave & W&OD Trail	Stage 1: Yield lines, yield signage, potential user-activated flasher, improved median refuge; Stage 2: Grade-separated crossing (See B14)	To be completed ASAP and before project #B14
X2	Sunset Hills Rd @ W&OD Trail	Raised 10-foot median refuge, upgraded curb ramps	
X4	Isaac Newton Sq W @ W&OD Trail	High visibility crosswalk, warning signage	To be completed with project #K
S7	S side of DIAAH from Reston Pkwy to Wiehle Ave	Shared use path	
S8	N side of Sunrise Valley Dr	Widen existing sidewalk to 10-foot shared use path	
S11	E side of Isaac Newton Sq W from Station Entrance to Isaac Newton Sq S	Construct sidewalk	To be completed with project #K
S12	W side of Soapstone Rd from Sunrise Valley Dr to Hunter's Green Ct	Construct sidewalk	To be completed with project #B17
S15	Southern Wiehle Ave station entrance to Sunrise Valley Dr	Construct sidewalk	To be completed with project #B10
B7	E side of Wiehle Ave from Station Entrance to Fairway Dr	Construct bike trail	
B10	From southern Wiehle Ave station entrance to Sunrise Valley Dr	Construct bike path	To be completed with project #S15
B11	Private roadway opposite Isaac Newton Sq W into the station entrance	Construct shared bus/bike lanes	
B12	Proposed Soapstone connector	Construct shared bus/bike lanes	To be completed with project #I
B14	W&OD Trail over Wiehle Ave	Grade separation	
B15	South side of Sunset Hills Rd from Plaza America to Isaac Newton Sq W	Widen existing sidewalk to 10-foot shared use path	
B17	Soapstone Rd from Sunrise Valley Dr to South Lakes Dr	Construct bike lanes	To be completed with project #I
	Reston	Change Transit routes	
	Reston	Bus Stop Improvements	

In addition to the construction projects shown in Figure 5-2, transit service must be transitioned to the service proposed in this study in coordination with the start of Metrorail service. This will cost over $15 million in annual operating costs from that point onwards. In association with the change in transit service, additional bus stops may need to be constructed throughout the Reston community. Bus stop improvements, which have not been detailed specifically in this study, should take place as close as possible to the start of the new service. Many of the sidewalk connections, amenities and landing pads can be added at the same time as other pedestrian and roadway projects in close proximity.

Figure 5-2: Wiehle Avenue Station Projects



b. Reston Parkway Station Projects

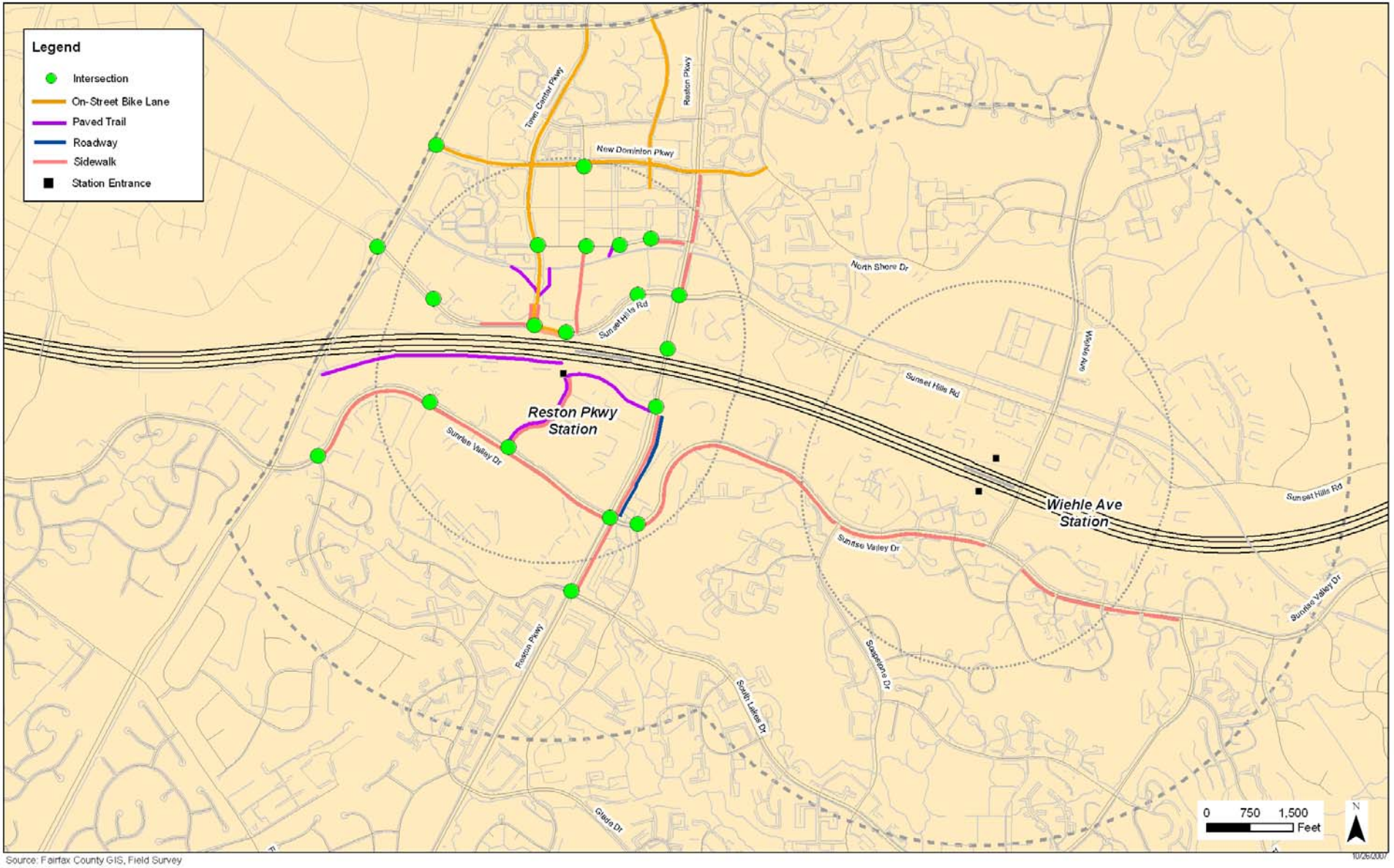
The second group of projects includes all actions that are necessary for access to the Reston Parkway station. Table 5-3 and Figure 5-3 show the 39 projects that should be complete by the start of Phase II Metrorail service to the Reston Parkway station, which is currently planned to begin several years after the Wiehle Avenue station. These projects account for a cost of almost $14 million or approximately 14% of the total recommended program cost. The major projects include intersection actions throughout the study area; the addition of a through lane on Reston Parkway; bike lanes in Reston Town Center; the completion of the DIAAH trail to Fairfax County Parkway; and sidewalks and trail connections near the stations.

Table 5-3: Reston Parkway Station Projects

	Location	Actions	Comments
A	Sunset Hills Rd & Station Entrance	New signal and turn lanes on Sunset Hills Rd for access into the proposed Reston Parkway Metrorail station	
G	Reston Parkway	Add northbound though lane on Reston Parkway at Sunrise Valley Dr, continuing the lane to the ramp for eastbound DIAAH	To be completed with project #S10
H	Reston Pkwy & Sunrise Valley Dr	Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Dr	
I1	Sunset Hills @ Station Entrance	East: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; West: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; South: High visibility crosswalk, pedestrian countdown signal, curb ramps	To be completed with project #A
I2	Bluemont Way & Discovery St @ Pedestrian Bridge	West: High visibility crosswalk, pedestrian countdown signal, raised median refuge island; North: High visibility crosswalk, construct curb ramp (east)	To be completed with project #S4
I3	Sunset Hills & Town Center Pkwy	All Approaches: High visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, construct curb ramps	To be completed with projects #B1 & B2
I4	Town Center Pkwy & Bluemont Way	North: Extend median to include pedestrian refuge; South:, extend median to include pedestrian refuge, decrease right turn radius; All Approaches: Upgrade curb ramps, high visibility crosswalk, re-align crosswalk	To be completed with project #B1
I5	Explorer St & Bluemont Way	North: High visibility crosswalk & upgraded curb ramps	To be completed with project #S16
I6	Library St & Bluemont Way	North: Upgraded curb ramps; East: Median pedestrian refuge, pedestrian warning and knockdown signs; West: Median pedestrian refuge, pedestrian warning and knockdown signs; All Approaches: High visibility crosswalk;	
I7	Reston Pkwy & Sunset Hills Rd	East: Realign right turn channelization; South: Realign right turn channelization, extend median to include pedestrian refuge; West: Realign right turn channelization, extend median to include pedestrian refuge; All Approaches: High visibility crosswalk, pedestrian countdown signal, decrease right turn radius, upgrade curb ramps	
I9	Sunset Hills @ Target Driveway	All approaches: High visibility crosswalks, countdown signals, upgraded curb ramps; East: Extend medians to include pedestrian refuge, re-align crosswalk	To be completed with project # S1
I10	Explorer St & New Dominion Pkwy	All approaches: High visibility crosswalks, upgraded curb ramps, decrease curb radii, potential signal with pedestrian phase; East: Extend median island to include pedestrian refuge; West: Pedestrian median refuge;	To be completed with project #B3
I12	Sunrise Valley Dr & Mercator Dr	North: High visibility crosswalk, upgrade curb-ramps, pedestrian countdown signal; West: High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge, upgrade/construct curb ramps, decrease right turn curb radius; South: High visibility crosswalk, construct curb-ramps, pedestrian median refuge, pedestrian countdown signal;	To be completed with projects #S9 & B5
I13	Sunrise Valley & Reston Pkwy	North: Channelized right turns; West: Re-align crosswalk; South: Re-align crosswalk; East: Re-align crosswalk, channelize right turns, decrease right turn radius; All Approaches: high visibility crosswalks, pedestrian countdown signals, upgrade curb-ramps	To be completed with projects #G & H
I14	Sunrise Valley & Colts Neck	West: Re-align stop bar, upgrade curb ramps; North: Upgrade 1 curb ramp; East: Extend median to include pedestrian refuge; All approaches: pedestrian countdown signals, high visibility crosswalks	To be completed with projects #S9 & B5

	Location	Actions	Comments
I15	Sunrise Valley & Edmund Halley Dr	North: Upgrade curb ramps; East: construct/upgrade curb ramps; West: construct/upgrade curb ramps; All Approaches: High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge	To be completed with projects #S6 & B6
I16	Reston Pkwy & South Lakes	All Approaches: Upgrade curb-ramps, high visibility crosswalks, pedestrian countdown signals	To be completed with project #S10
I17	Sunrise Valley & Glade Dr	East: Pedestrian median refuge, upgrade/ construct curb ramps; South: Re-align crosswalk, construct/upgrade curb ramps; West: Re-align crosswalk, pedestrian median refuge, upgrade curb ramps; North: Reduce right turn radius/ remove acceleration lane, upgrade curb ramps; All approaches: High visibility crosswalk, pedestrian countdown signal	To be completed with projects #S9 & B5
I29	Sunset Hills Rd & Discovery Sq/Northrup Grumman E Entrance	East: Median pedestrian refuge; West: Median pedestrian refuge; All Approaches: High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps	
I30	Reston Pkwy & Westbound Dulles Toll Rd ramps	North: Realign pedestrian refuge island, decrease right turn radius; West: Realign crosswalks, high visibility crosswalks, pedestrian countdown signal, upgrade curb ramps;	
I31	Reston Pkwy & Eastbound Dulles Toll Rd ramps	West: High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps, warning signage at unsignalized crossing, decrease right turn radius; South: Pedestrian median refuges, high visibility crosswalk, pedestrian countdown signal, construct curb ramps, stop bar for eastbound on ramp;	To completed with projects #G & S10
X5	Sunset Hills Rd @ Fairfax County Pkwy Trail	East: Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage, redesign ramp, warning flashers with automatic detection	To be completed with projects #S9 & B5
X6	New Dominion Pkwy @ Fairfax County Pkwy Trail	East: Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage	To be completed with project #B3
S1	Along N side of Sunset Hills Rd from the Station Entrance to Target	Construct sidewalk	
S2	E side of Reston Pkwy from Sunset Hills Rd to New Dominion Pkwy	Complete sidewalk	
S4	S side of Bluemont Way from Reston Pkwy to Discovery St	Construct sidewalk	
S5	Town Center Pkwy from W&OD Trail to Sunset Hills Rd	Complete sidewalk	To be completed with projects #B1, B2 & B9
S6	Edmund Halley Dr from the Station entrance to Sunrise Valley Dr	Construct sidewalk	
S7	S side of DIAAH from Fairfax County Pkwy to Reston Pkwy	Construct shared use path	
S9	S side of Sunrise Valley Dr from Fairfax County Pkwy to W&OD Trail	Construct sidewalk	
S10	E side of Reston Pkwy from DIAAH ramps to South Lakes Dr	Construct sidewalk	To be completed with project #G
S16	Through "Gateway Property" for direct connection from Sunset Hills Rd to Bluemont Way	Dedicated multi-use path	Possibly to be completed with project #B13
B1	Town Center Pkwy from Sunset Hills Rd to Baron Cameron Ave	Bike lanes	To be completed with project #B2
B2	Sunset Hills Rd from Town Center Pkwy to Station Entrance	Bike lanes	To be completed with project #b1
B3	New Dominion Pkwy from Fairfax County Pkwy to North Shore Dr	Bike lanes	
B4	Fountain Dr from Freedom Dr to Baron Cameron Ave	Bike lanes	
B6	Edmund Halley Dr from Sunrise Valley Dr to Station Entrance	Bike path	To be completed with project #S6
B9	Town Center Pkwy & W&OD Trail	Pave and formalize existing at-grade access ramp to W&OD Trail on E side of Town Center Pkwy; construct a connection on the W side of Town Center Pkwy	To be completed with projects #B1 & B2
B13	From W&OD trail to Bluemont Way at the Reston Town Center Transit Station	Bike connection	Possibly to be completed with project #S16

Figure 5-3: Reston Parkway Station Projects



c. Other Recommended Projects

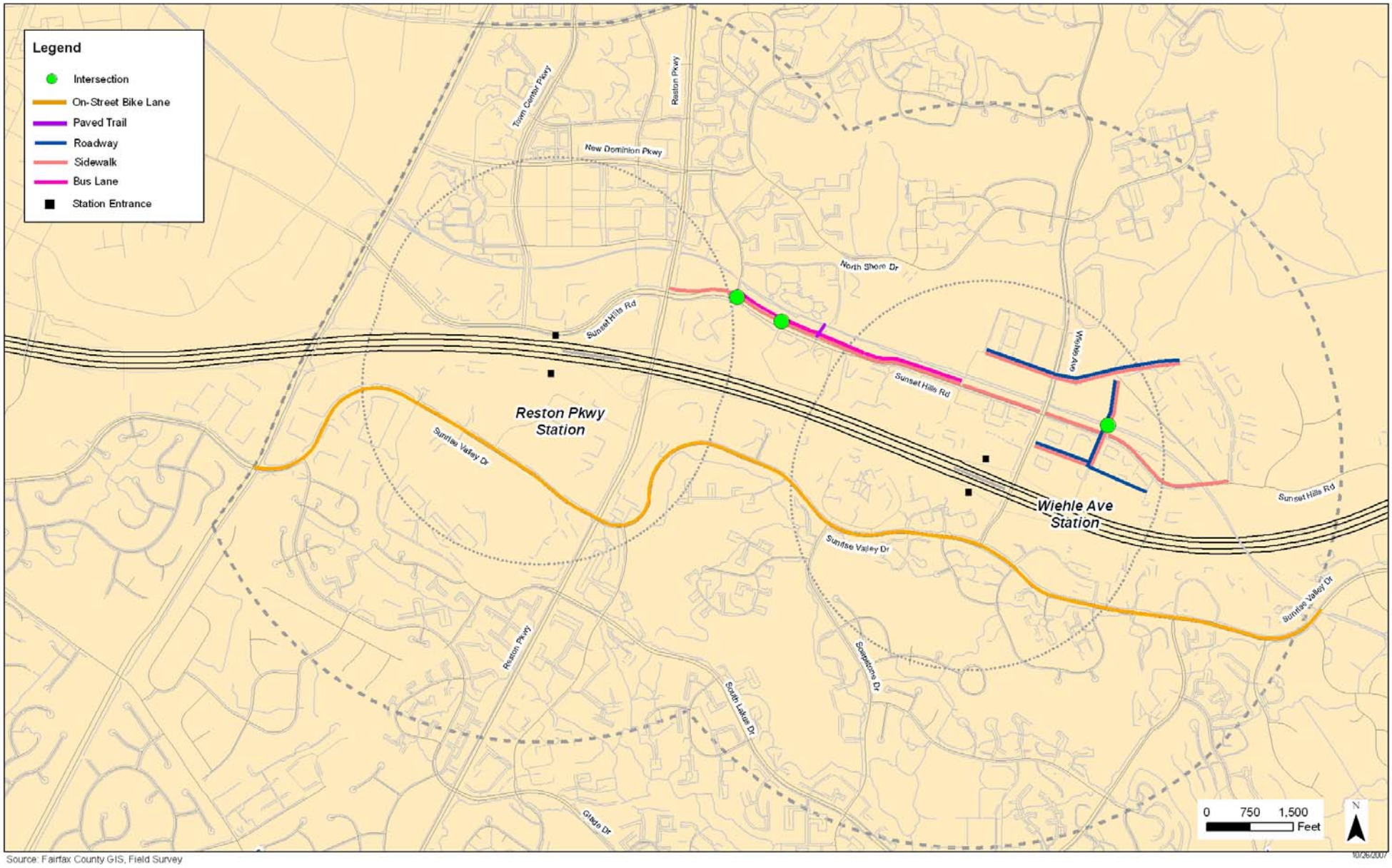
The remaining twelve projects shown in Table 5-4 and Figure 5-4 are not required for access to either station but are recommended to improve overall accessibility in the station areas. These projects account for over $24 million of the total recommended projects and include many large-scale projects that may require right-of-way acquisition or other major investments. Each project in this group should be completed as soon as an opportunity becomes available, whether before or after the opening of either Metrorail station. The major projects in this group are the dedicated bus lanes on Sunset Hills Rd (costing an estimated $8.1 million) and the construction or expansion of several internal streets including Michael Faraday Court, Isaac Newton Square S and Roger Bacon Dr.

Table 5-4: Other Recommended Projects

	Location	Actions	Comments
J	Sunset Hills Rd	Bus lanes from Wiehle Ave to Old Reston Ave	
L	Wiehle Ave Station Entrance	Expand roadway east of Wiehle Ave opposite the station entrance	To be completed along with redevelopment if possible
M	Michael Faraday Ct	Extend and expand from new Roger Bacon to new roadway south of Sunset Hills	To be completed along with redevelopment if possible
N	Roger Bacon/Isaac Newton Sq S	Extensions from Isaac Newton Sq W to World Wildlife - improve INSS and Roger Bacon	To be completed along with redevelopment if possible
I8	Sunset Hills & Old Reston Ave	North: High visibility crosswalk, pedestrian countdown signal, upgrade/construct curb ramps; South: Pedestrian countdown signal, upgraded curb ramps, high visibility crosswalk; East: Re-align high visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, upgrade/construct curb ramps	To be completed with project #J
I23	Sunset Hills Rd & Plaza America	East: Re-align crosswalk, high visibility crosswalk, pedestrian countdown signal, extend median to include pedestrian refuge; North: High visibility crosswalk, pedestrian countdown signal; All Approaches: upgraded curb ramps;	To be completed with project #J
X3	Michael Faraday Ct @ W&OD Trail	High visibility crosswalk, upgrade curb ramps, warning signage	To be completed with project #M or sooner
S3	N side of Sunset Hills from Reston Pkwy to Business Center Dr	Construct sidewalk	To be completed with project #I
S13	Isaac Newton Sq S	Construct sidewalk	To be completed with project #N
S14	New roadway extension of Roger Bacon Dr	Construct sidewalk	To be completed with project #N
B5	Sunrise Valley Dr from W&OD Trail to Fairfax County Pkwy	Bike lanes	
B16	W&OD Trail near Plaza America	Formalize existing goat trail connection to W&OD trail near Plaza America with a paved asphalt trail	

The construction of the internal street grid is likely to require major redevelopment in the area surrounding the Wiehle Ave station, which may occur before or after the start of Metrorail service. Whenever redevelopment begins, these projects should be pursued. The sidewalk and bus lanes along Sunset Hills Rd will require right of way acquisition and significant construction to the roadway. This process will take several years to complete and should be started as soon as possible. Construction on all of the projects in this area can begin once engineering and design hurdles have been cleared and funding has been ascertained.

Figure 5-4: Other Recommended Projects



C. Funding

Funding for these projects will come from a myriad of different sources based on the type of action including:

- Rail project funds
- Proffers and redevelopment
- Local and County sources
- State Programs
- Federal programs

a. Local Sources

Fairfax County will be responsible for funding the majority of the projects in the recommended station access program. However, where general funds and transportation funds are not sufficient to cover the full cost of the program (estimated at over $105 million) other local funding sources are available to be combined with federal and state funds.

One of the major sources of funding for the recommended roadway projects will be the rail project itself, which is required to implement certain projects in the area to help mitigate the effects of the construction of the rail line. The projects included in the Record of Decision as mitigation efforts include the roadway projects A- H. These projects accounted for a total of almost $7 million of the total cost of the recommended access management program.

Redevelopment will offer another major opportunity to implement some of the recommendations in this report, especially sidewalks, trails and street expansions through private property. The Metrorail stations are likely to create interest in redevelopment as increased densities near the stations become possible and profitable. As this redevelopment of occurs Fairfax County will have the opportunity to ensure that many of the recommended projects are implemented as part of the development projects. Proffers from developers can include roadway expansions and improvements, construction of sidewalks and trails or other projects that would improve accessibility in the station areas. The County can also use the development process to ensure that new developments match the environment around the stations that is envisioned by the community with all necessary pedestrian, bicycle and transit amenities.

Tax Increment Financing (TIF) is a tool which has been used for redevelopment and community improvement projects that uses future gains in taxes to finance current public projects such as roads, schools, or hazardous waste cleanup. The project increases the value of surrounding real estate and spurs new investment, creating more taxable property. The increased tax revenues, or tax increment, are used to finance debt issued to pay for the project. This type of program could be implemented in the Reston community to provide funds for some of the recommended transportation improvements.

b. State Programs

The Commonwealth of Virginia operates some programs that could provide additional sources of funding for projects that are recommended in this report. Access Programs provide funding for access roads to qualifying economic development sites, airports, and public recreational or historic areas. Access may require the construction of a new roadway, improvement of an existing roadway, or both. Funding is available through VDOT's Industrial, Airport, and Rail Access Fund which currently receives a

$5.5 million annual allocation. Access roads and bikeways to recreational and historic areas are provided through VDOT's Recreational Access Fund which receives $1.5 million annual allocation.

The Revenue Sharing Program provides additional funding for use by a county, city, or town to construct, maintain, or improve the highway systems within such county, city, or town, with limitations on the amount of state funds authorized per locality. Locality funds are matched with state funds for qualifying projects. Annual allocation of funds for this program is designated by the Commonwealth Transportation Board.

Capital and operating funds distributed from programs managed by the Department of Rail and Public Transportation will be available to support a portion of the recommended transit program.

c. Federal Programs

The Congestion Mitigation and Air Quality Program CMAQ program provides a flexible funding source to State and local governments for transportation projects and to help meet the requirements of the Clean Air Act. The Federal government provides over $8.6 billion in CMAQ funds to State DOTs, MPOs, and transit agencies to invest in projects that reduce transportation-related criteria air pollutants. CMAQ funds require a state or local match of 20% State and/or local match and 80% Federal funds. Projects that increase transit ridership, such as improved access to Metrorail stations are eligible for this program.

The Transportation Enhancement Activities Program (TEA) provides innovative opportunities for local communities to enhance and contribute to the transportation system. Federal share is 80%, with a 20% State and/or local match. Activities that provide facilities for pedestrians are eligible for TEA funding, which account for over $27 million of the program cost.

The Surface Transportation Program (STP) provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and public bus terminals and facilities. A total of $32.5 billion in STP funds is authorized through 2009 with funds being distributed among the States based on lane-miles of Federal-aid highways, total vehicle-miles traveled on those Federal-aid highways, and contributions to the Highway Account of the Highway Trust Fund.

Appendices

Appendix A: Estimated Roadway Action Costs

The following table illustrates the estimated costs, in 2007 dollars, for constructing the recommended roadway actions described in Chapter 2. The costs shown include right-of-way, engineering and other contingencies, but the actual costs may vary depending on the site restraints at each location.

	Project	Estimated Cost
A	New signal and turn lanes on Sunset Hills Rd for access into the proposed Reston Parkway Metrorail station	$1,001,200
B	New left turn lane for westbound left turning movement at Sunset Hills Rd & Isaac Newton Sq. This would replace the shared left-through lane by providing a dedicated turn lane.	$500,600
C	Add a second left turn lane for northbound traffic at Wiehle Ave & Metro Access (between Sunset Hills Rd & DIAAH) and provide a second inbound lane.	$500,600
D	Add an additional left turn lane on the eastbound DIAAH ramp at Wiehle Ave	$500,600
E	Improve the existing right turn lane on eastbound Sunset Hills Rd at Wiehle Ave	$500,600
F	Improve the existing right turn lane for westbound Sunrise Valley Dr at Wiehle Ave	$41,791,500
G	Add northbound though lane on Reston Parkway at Sunrise Valley Dr, continuing the lane to the ramp for eastbound DIAAH	$1,927,100
H	Improve the right turn lane for southbound Reston Parkway at Sunrise Valley Dr	$1,251,400
I	Provide a new connection over the DIAAH between Soapstone Rd and Isaac Newton Sq W, to connect the major east-west roadways: Sunset Hills Rd & Sunrise Valley Dr.	$1,659,100
J	Provide bus lanes on Sunset Hills Rd from Wiehle Ave to Old Reston Ave	$500,600
K	Isaac Newton Square West from Isaac Newton Square South to the station as an extension of the proposed Soapstone Connector.	$8,146,600
L	The Station Entrance (already planned for improvements as part of station construction) should be extended across Wiehle Avenue to the Private Driveway as far east as Samuel Morse Dr.	$3,816,700
M	Michael Faraday Court extension from the new roadway described in (L) north to the extended Roger Bacon Dr described in (N)	$3,291,100
N	Extension/improvements to Isaac Newton Square South from Isaac Newton Square West to Wildlife Center Drive.	$4,429,800
	TOTAL	**$69,817,500**

Appendix B: Recommended Intersection Actions

The table and images below include all of the recommended actions at the 33 intersections and 6 trail crossings that were studied in detail in this report.

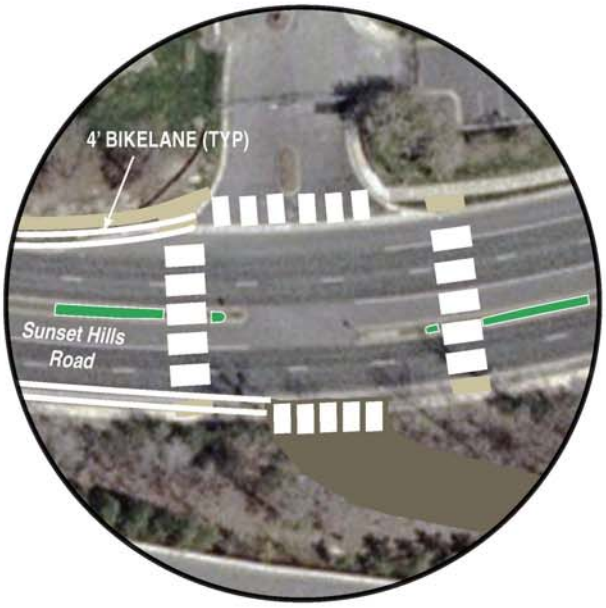
No	Location	Recommendations
1	Sunset Hills @ Station Entrance	**East**: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; **West**: High visibility crosswalk, pedestrian countdown signal, curb ramps, median refuge island; **South:** High visibility crosswalk, pedestrian countdown signal, curb ramps
I2	Bluemont Way & Discovery St @ Pedestrian Bridge	**West**: High visibility crosswalk, pedestrian countdown signal, raised median refuge island; **North:** High visibility crosswalk, construct curb ramp (east)
I3	Sunset Hills & Town Center Pkwy	**All Approaches:** High visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, construct curb ramps
I4	Town Center Pkwy & Bluemont Way	**North:** Extend median to include pedestrian refuge; **South:**, extend median to include pedestrian refuge, decrease right turn radius; **All Approaches:** Upgrade curb ramps, high visibility crosswalk, re-align crosswalk
I5	Explorer St & Bluemont Way	**North**: High visibility crosswalk & upgraded curb ramps
I6	Library St & Bluemont Way	**North:** Upgraded curb ramps; **East:** Median pedestrian refuge, pedestrian warning and knockdown signs; **West:** Median pedestrian refuge, pedestrian warning and knockdown signs; **All Approaches:** High visibility crosswalk;
I7	Reston Pkwy & Sunset Hills Rd	**East:** Realign right turn channelization; **South:** Realign right turn channelization, extend median to include pedestrian refuge; **West:** Realign right turn channelization, extend median to include pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, decrease right turn radius, upgrade curb ramps
I8	Sunset Hills & Old Reston Ave	**North:** High visibility crosswalk, pedestrian countdown signal, upgrade/construct curb ramps; **South**: Pedestrian countdown signal, upgraded curb ramps, high visibility crosswalk; **East:** Re-align high visibility crosswalk, extend median to include pedestrian refuge, pedestrian countdown signal, upgrade/construct curb ramps
I9	Sunset Hills @ Target Driveway	**All approaches**: High visibility crosswalks, countdown signals, upgraded curb ramps; **East**: Extend medians to include pedestrian refuge, re-align crosswalk
I10	Explorer St & New Dominion Pkwy	**All approaches**: High visibility crosswalks, upgraded curb ramps, decrease curb radii, potential signal with pedestrian phase; **East**: Extend median island to include pedestrian refuge; **West:** Pedestrian median refuge;
I11	Reston Pkwy & Market St	**South:** High visibility crosswalk, pedestrian countdown signal, curb ramps, pedestrian median refuge; **West**: pedestrian countdown signal, high visibility crosswalk, curb ramps; **East:** pedestrian countdown signal, high visibility crosswalk, upgrade curb ramps; ****Intersection currently under construction to implement improvements****
I12	Sunrise Valley Dr & Mercator Dr	**North:** High visibility crosswalk, upgrade curb-ramps, pedestrian countdown signal; **West:** High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge, upgrade/construct curb ramps, decrease right turn curb radius; **South:** High visibility crosswalk, construct curb-ramps, pedestrian median refuge, pedestrian countdown signal;
I13	Sunrise Valley & Reston Pkwy	**North:** Channelized right turns; **West:** Re-align crosswalk; **South:** Re-align crosswalk; **East:** Re-align crosswalk, channelize right turns, decrease right turn radius; **All Approaches:** high visibility crosswalks, pedestrian countdown signals, upgrade curb-ramps
I14	Sunrise Valley & Colts Neck	**West: R**e-align stop bar, upgrade curb ramps; **North:** Upgrade 1 curb ramp; **East:** Extend median to include pedestrian refuge; **All approaches:** pedestrian countdown signals, high visibility crosswalks
I15	Sunrise Valley & Edmund Halley Dr	**North:** Upgrade curb ramps; **East:** construct/upgrade curb ramps; **West:** construct/upgrade curb ramps; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, pedestrian median refuge

No	Location	Recommendations
I16	Reston Pkwy & South Lakes	**All Approaches:** Upgrade curb-ramps, high visibility crosswalks, pedestrian countdown signals
I17	Sunrise Valley & Glade Dr	**East:** Pedestrian median refuge, upgrade/ construct curb ramps; **South:** Re-align crosswalk, construct/upgrade curb ramps; **West:** Re-align crosswalk, pedestrian median refuge, upgrade curb ramps; **North:** Reduce right turn radius/ remove acceleration lane, upgrade curb ramps; **All approaches:** High visibility crosswalk, pedestrian countdown signal
I18	Wiehle Ave & Station Entrance	**North:** Extend median to include pedestrian refuge; **South:** Extend median as much as possible, wide curb lanes to accommodate bikes; **All approaches:** Upgrade curb-ramps, pedestrian countdown signals, high visibility crosswalk;
I19	Wiehle Ave & Isaac Newton Sq N	**South:** Potential infill of striped lane area; **East:** Upgrade curb ramps, high visibility crosswalk; **North:** Channelize right turns, median pedestrian refuge, high visibility crosswalk, pedestrian warning signs, pedestrian knockdown signs; **West:** High visibility crosswalk, upgrade curb ramp
I20	Wiehle Ave & Isaac Newton Sq S	**South:** pedestrian median refuge; **All approaches:** upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals
I21	Wiehle Ave & Sunset Hills Rd	**North:** Decrease right turn radius; extend median to include pedestrian refuge; **East:** Raised median; **South:** Decrease right turn radius; **West:** Channelize right turns, decrease right turn radius; **All Approaches:** Upgraded curb ramps, re-align crosswalks, high visibility crosswalks, pedestrian countdown signals
I22	Sunset Hills Rd & Isaac Newton Sq W	**East:** Upgrade curb ramps, decrease right turn radius; **North:** Decrease right turn radius, upgrade/construct curb ramps; **West:** Construct curb ramps; **South:** Construct/upgrade curb ramps; **All Approaches:** High visibility crosswalks, pedestrian countdown signals
I23	Sunset Hills Rd & Plaza America	**East:** Re-align crosswalk, high visibility crosswalk, pedestrian countdown signal, extend median to include pedestrian refuge; **North:** High visibility crosswalk, pedestrian countdown signal; **All Approaches:** upgraded curb ramps;
I24	Sunrise Valley Dr & Commerce Park Dr	**North:** upgraded curb ramps, high visibility cross walk; **West:** upgrade curb ramps, high visibility crosswalk, pedestrian warning and knockdown signs, pedestrian median refuge;
I25	Sunrise Valley Dr & Wiehle Ave	**East:** Channelize right turns; **North:** Re-align right turn channelization; **North & West:** upgrade curb ramps, high visibility crosswalks, pedestrian countdown signals
I26	Sunrise Valley Dr & Soapstone Rd	**East:** Extend median to include pedestrian refuge; **West:** Extend median to include pedestrian refuge; **South:** Construct curb ramps, decrease right turn radius; **North:** Median pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps
I27	Sunrise Valley Dr & Great Meadow Dr	**East:** High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; **West:** High visibility crosswalk, median pedestrian refuge, pedestrian warning and knockdown signs, flashing beacons; **South:** High visibility crosswalk; **All Approaches:** update curb ramps
I28	Sunrise Valley Dr & Upper Lake Dr	**North:** crosswalk, upgrade curb ramps
I29	Sunset Hills Rd & Discovery Sq/Northrup Grumman E Entrance	**East:** Median pedestrian refuge; **West:** Median pedestrian refuge; **All Approaches:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps
I30	Reston Pkwy & Westbound Dulles Toll Rd ramps	**North:** Realign pedestrian refuge island, decrease right turn radius; **West:** Realign crosswalks, high visibility crosswalks, pedestrian countdown signal, upgrade curb ramps;
I31	Reston Pkwy & Eastbound Dulles Toll Rd ramps	**West:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps, warning signage at unsignalized crossing, decrease right turn radius; **South:** Pedestrian median refuges, high visibility crosswalk, pedestrian countdown signal, construct curb ramps, stop bar for eastbound on ramp;
I32	Wiehle Ave & Westbound Dulles Toll Rd ramps	**West:** High visibility crosswalk, pedestrian countdown signal, upgrade curb ramps
I33	Wiehle Ave & Eastbound Dulles Toll Rd ramps	**West:** Decrease right turn radius, high visibility crosswalk, upgrade curb ramps, pedestrian countdown signal

No	Location	Recommendations
X1	Wiehle Ave & W&OD Trail	**Stage1:** Yield lines, yield signage, potential user-activated flasher, improved median refuge; **Stage 2:** Grade-separated crossing (see B14)
X2	Sunset Hills Rd @ W&OD Trail	Raised 10-foot median refuge, upgraded curb ramps
X3	Michael Faraday Ct @ W&OD Trail	High visibility crosswalk, upgrade curb ramps, warning signage
X4	Isaac Newton Sq W @ W&OD Trail	High visibility crosswalk, warning signage
X5	Sunset Hills Rd @ Fairfax County Pkwy Trail	**East:** Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage, redesign ramp, warning flashers with automatic detection
X6	New Dominion Pkwy @ Fairfax County Pkwy Trail	**East:** Widen waiting area, widen curb ramps, pedestrian countdown signal, improved crosswalk, warning signage

Intersection Improvements

Intersection 1
Sunset Hills Road & Reston Parkway Station Entrance



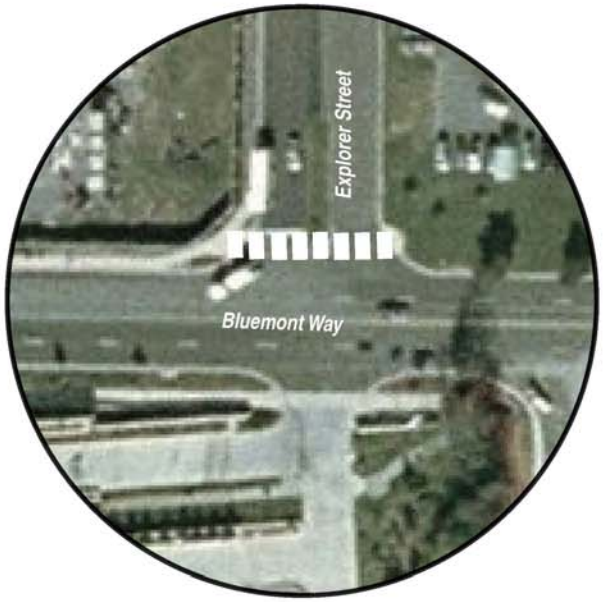
Intersection 2
Bluemont Way & Discovery Street/Pedestrian Bridge

Intersection 3
Sunset Hills Road & Town Center Parkway

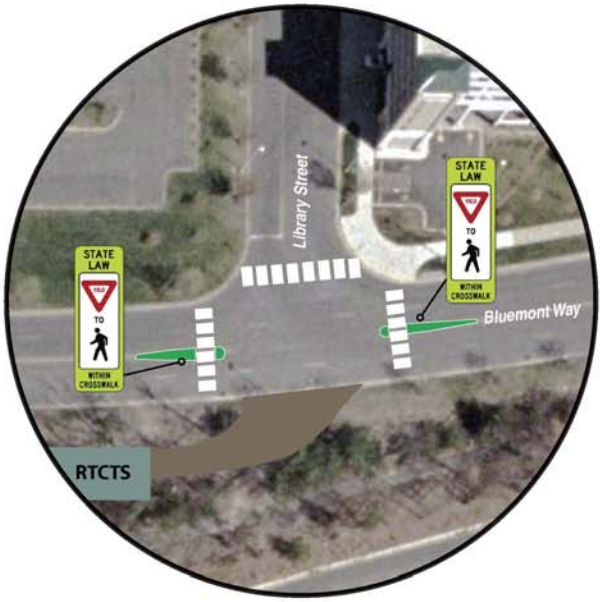
Intersection 4
Bluemont Way & Town Center Parkway

Intersection Improvements

Intersection 5
Bluemont Way & Explorer Street



Intersection 6
Bluemont Way & Library Street

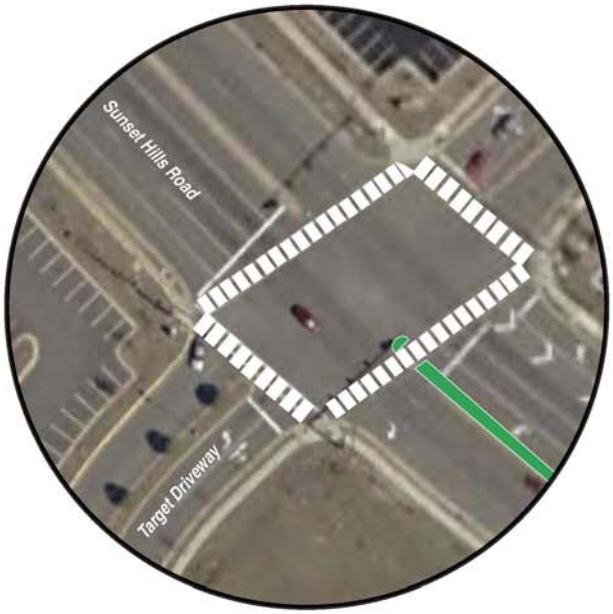


Intersection 7
Sunset Hills Road & Reston Parkway

Intersection 8
Sunset Hills Road & Old Reston Avenue

Intersection Improvements

Intersection 9
Sunset Hills Road & Target Driveway



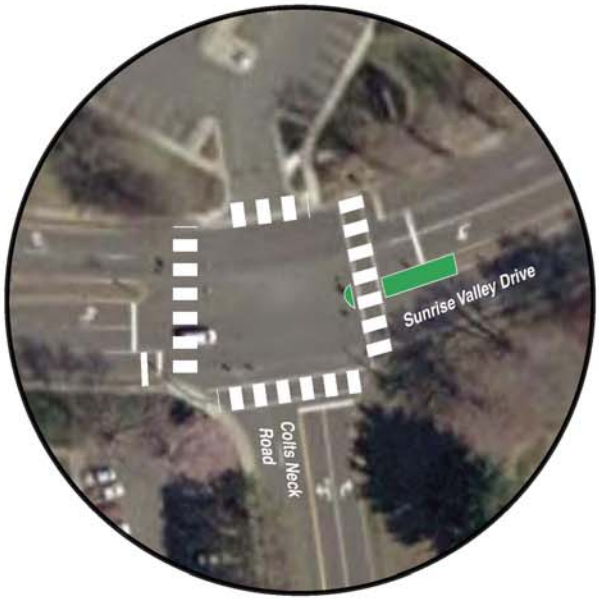
Intersection 10
Explorer Street & New Dominion Parkway

Intersection 12
Sunrise Valley Drive & Mercator Drive

Intersection 13
Sunrise Valley Drive & Reston Parkway

Intersection Improvements

Intersection 14
Sunrise Valley Drive & Colts Neck Road



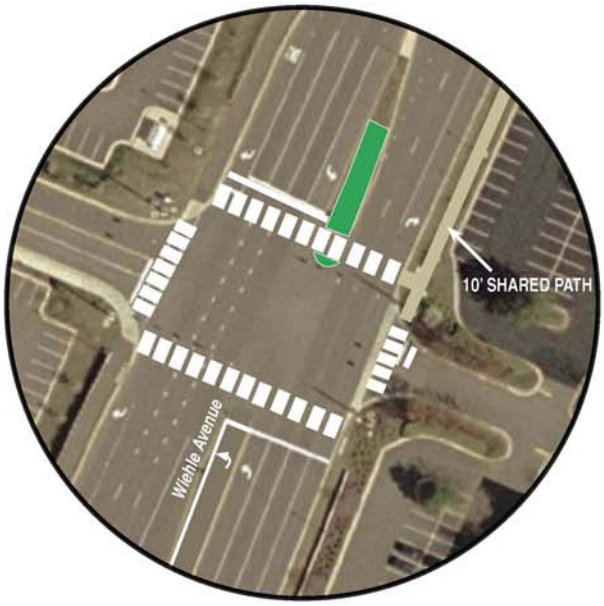
Intersection 15
Sunrise Valley Drive & Edmund Halley Drive

Intersection 16
Reston Parkway Drive & South Lakes Drive

Intersection 17
Sunrise Valley Drive & Glade Drive

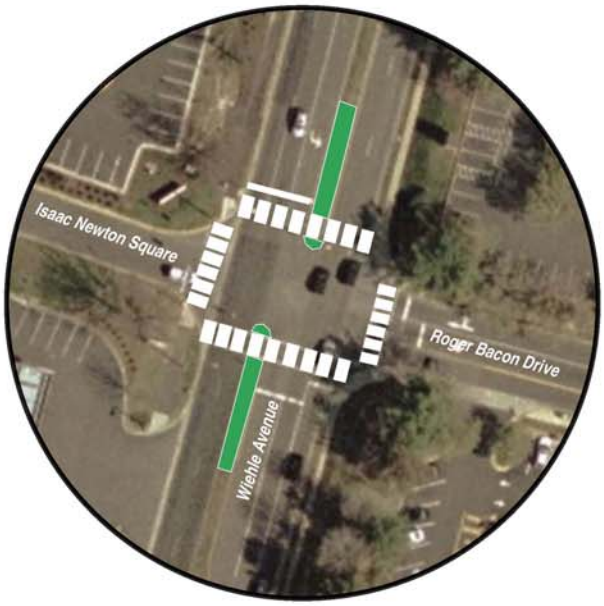
Intersection Improvements

Intersection 18
Wiehle Avenue & Station Entrance



Intersection 19
Wiehle Avenue & Isaac Newton Square North

Intersection 20
Wiehle Avenue & Isaac Newton Square South



Intersection 21 & Trail Crossing 1 (Option 1)
Wiehle Avenue & Sunset Hills Road

Wiehle Avenue & Reston Parkway Station Access Management Study

Vanasse Hangen Brustlin, Inc. | the perspectives group

Intersection Improvements

Intersection 21 & Trail Crossing 1 (Option 2)
Wiehle Avenue & Sunset Hills Road

Intersection 22 (Option 1)
Sunset Hills Road & Isaac Newton Square West

Intersection 22 (Option 2)
Sunset Hills Road & Isaac Newton Square West

Intersection 23
Sunset Hills Road & Plaza America

Intersection Improvements

Intersection 24
Sunrise Valley Drive & Commerce Park Drive

Intersection 25
Sunrise Valley Drive & Wiehle Avenue

Intersection 26
Sunrise Valley Drive & Soapstone Road

Intersection 27
Sunrise Valley Drive & Great Meadow Drive

Intersection Improvements

Intersection 28
Sunrise Valley Drive & Upper Lake Drive

Intersection 29
Sunset Hills Road & Discovery Square/Northrup Grumman East Entrance

Intersection 30
Reston Parkway & Westbound Dulles Toll Road Ramps

Intersection 31
Reston Parkway & Eastbound Dulles Toll Road Ramps

Intersection Improvements

Intersection 32
Wiehle Avenue & Westbound Dulles Toll Road Ramps

Intersection 33
Wiehle Avenue & Eastbound Dulles Toll Road Ramps

Trail Crossing 2
Sunset Hill Road

Intersection Improvements

Intersection X5
Fairfax County Parkway & Sunset Hills Road

Intersection X6
Fairfax County Parkway & New Dominion Parkway

Appendix C: Potential Pedestrian Volumes

The maximum number of potential pedestrians estimated to use each crosswalk was estimated based on origin-destination data developed as part of the FEIS process. Because it is impossible to know which crosswalks a pedestrian will used when multiple routes of the same length are possible, the values in this table represent the maximum potential number of pedestrians who could use each crosswalk. The total number of actual pedestrians will be significantly less than this potential maximum.

Intersection	North Approach	East Approach	South Approach	West Approach
1	305	925	337	305
2	54	--	--	408
3	153	287	--	153
4	105	239	105	105
5	42	--	--	--
6	42	--	--	42
7	122	122	198	126
8	60	60	98	22
9	14	46	46	14
10	182	182	182	195
11	--	48	46	36
12	72	--	44	44
13	82	75	75	75
14	37	30	30	30
15	66	66	--	66
16	56	56	56	56
17	46	28	28	28
18	297	297	418	394
19	31	31	30	31
20	79	79	96	82
21	193	193	216	214
22	46	262	169	46
23	41	60	60	22
24	102	--	42	42
25	397	--	--	80
26	66	70	66	66
27	69	68	42	46
28	102	--	61	--
29	530	530	606	562
30	--	--	--	32
31	--	--	58	36
32	--	--	--	34
33	--	--	--	34

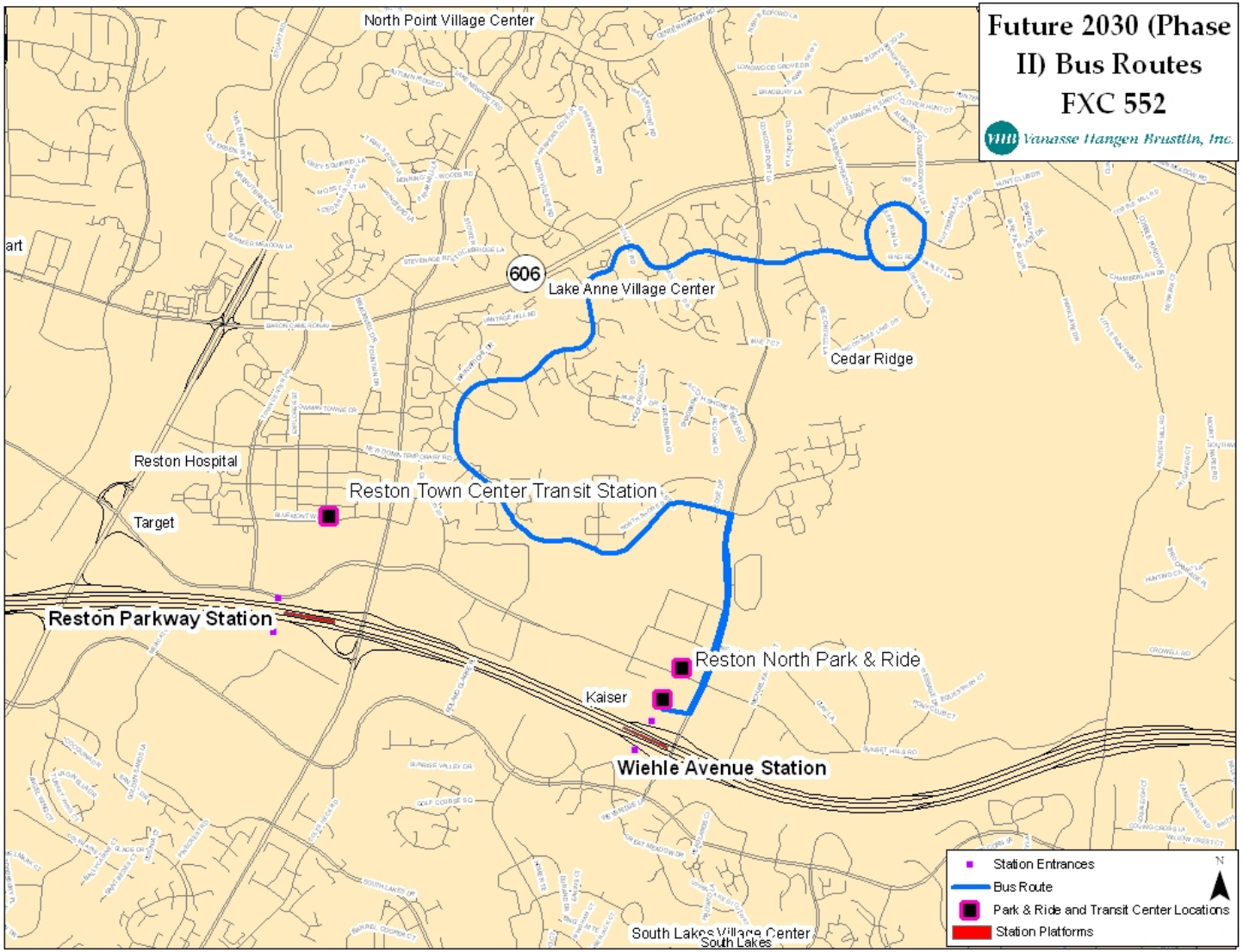
Appendix D: Intersection Action Costs

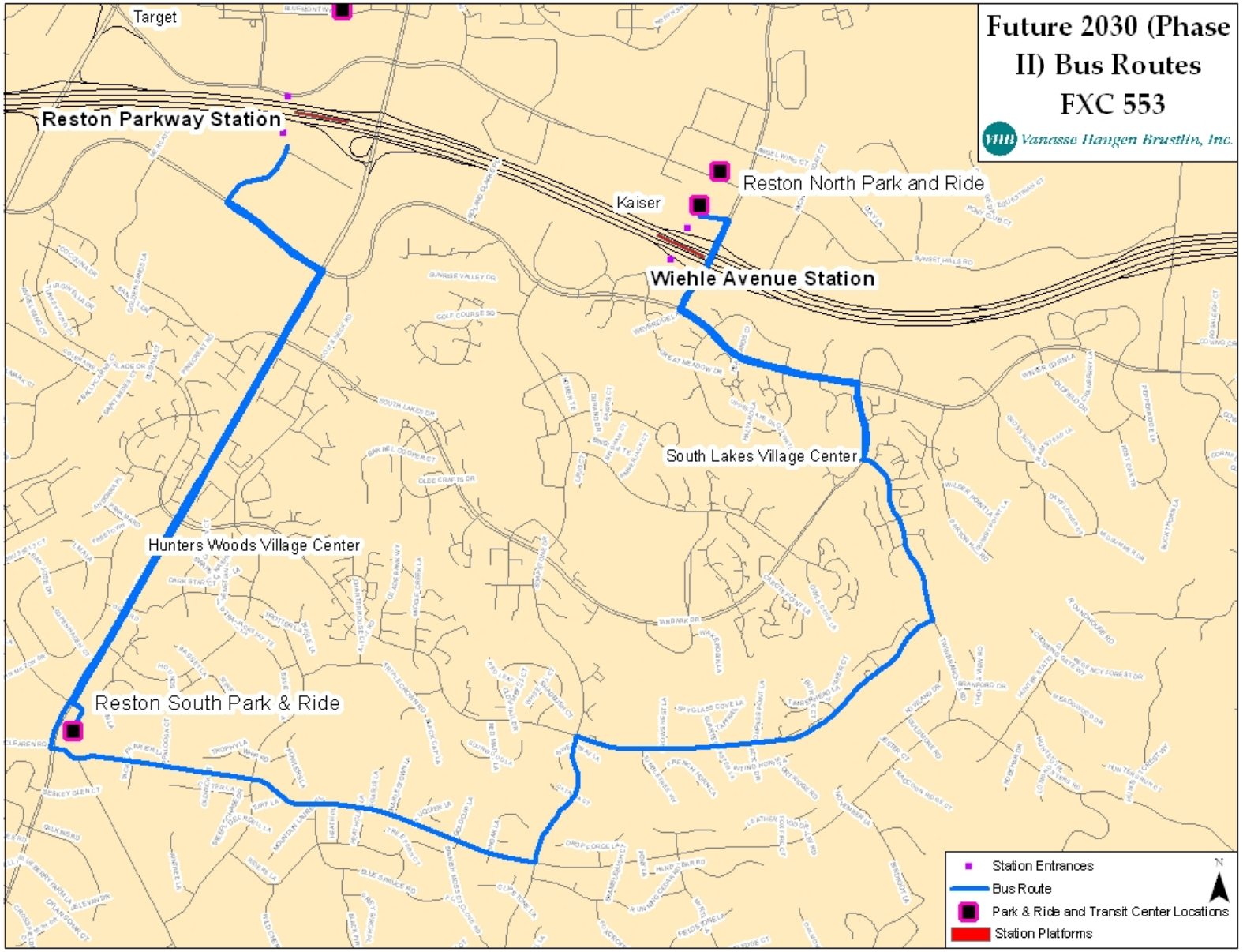
This table illustrates the estimated costs, in 2007 dollars, for constructing the recommended actions for each intersection including a 50% contingency for right-of-way acquisition, and other costs.

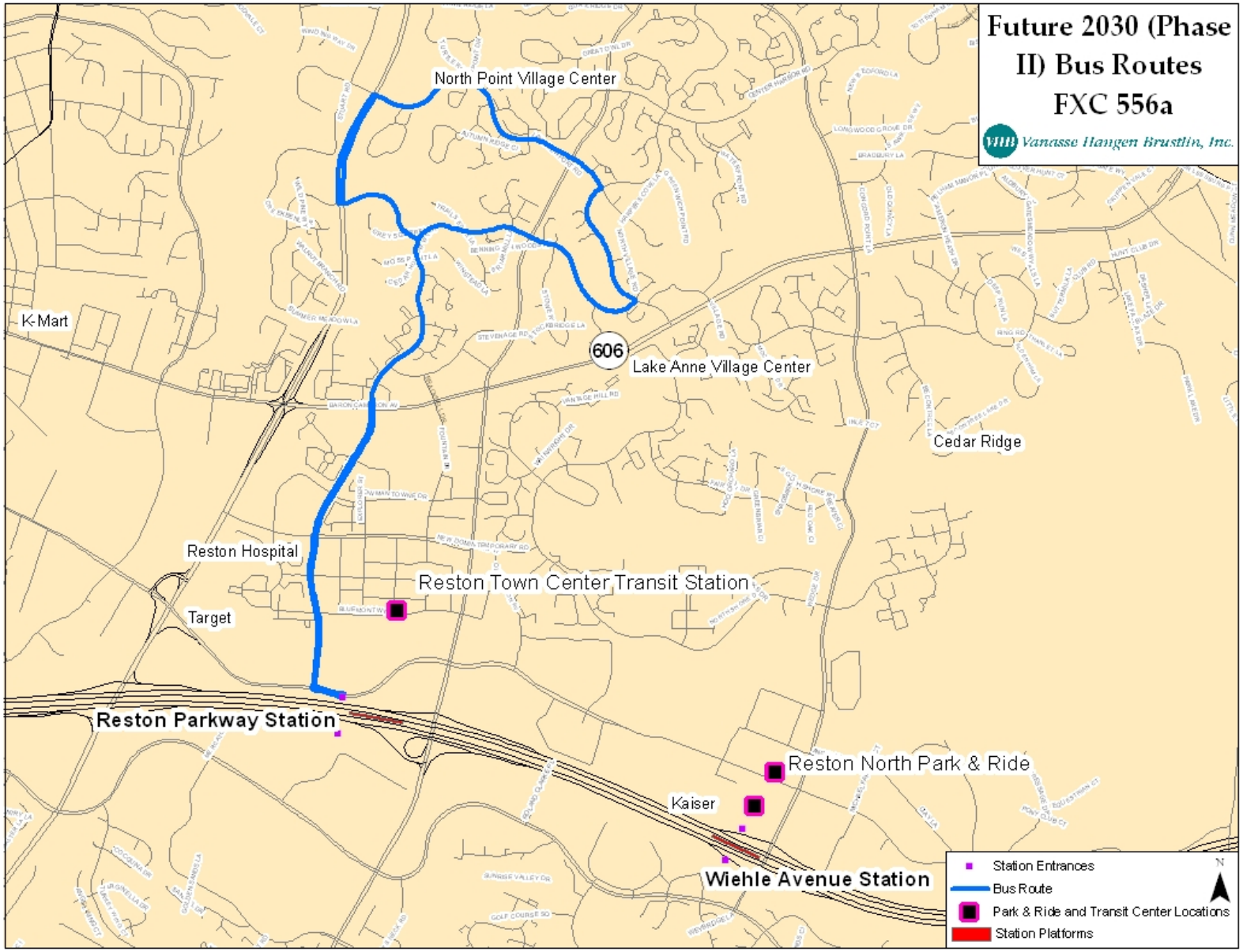
Intersection	Construction Cost	ROW Cost	Total Cost
1	$97,800	$48,900	$146,700
2	$336,800	$168,400	$505,200
3	$127,800	$63,900	$191,700
4	$88,200	$44,100	$132,300
5	$2,600	$1,300	$3,900
6	$54,400	$27,200	$81,600
7	$153,800	$76,900	$230,700
8	$74,000	$37,000	$111,000
9	$65,800	$32,900	$98,700
10	$102,400	$51,200	$153,600
11	$113,800	$56,900	$170,700
12	$270,200	$135,100	$405,300
13	$81,600	$40,800	$122,400
14	$121,800	$60,900	$182,700
15	$40,800	$20,400	$61,200
16	$123,200	$61,600	$184,800
17	$80,200	$40,100	$120,300
18	$145,100	$72,550	$217,650
19	$79,600	$39,800	$119,400
20	$210,800	$105,400	$316,200
21	$88,000	$44,000	$132,000
22	$61,800	$30,900	$92,700
23	$31,100	$15,550	$46,650
24	$152,400	$76,200	$228,600
25	$135,000	$67,500	$202,500
26	$55,800	$27,900	$83,700
27	$2,600	$1,300	$3,900
28	$105,200	$52,600	$157,800
29	$29,400	$14,700	$44,100
30	$213,100	$106,550	$319,650
31	$11,200	$5,600	$16,800
32	$26,200	$13,100	$39,300
33	$26,500	$13,250	$39,750
X1	$28,200	$14,100	$42,300
X2	$3,500	$1,750	$5,250
X3	$1,500	$750	$2,250
X4	$233,500	$116,750	$350,250
X5	$13,500	$6,750	$20,250
X6	$97,800	$48,900	$146,700
Total	$3,863,100	$1,931,550	$5,794,650

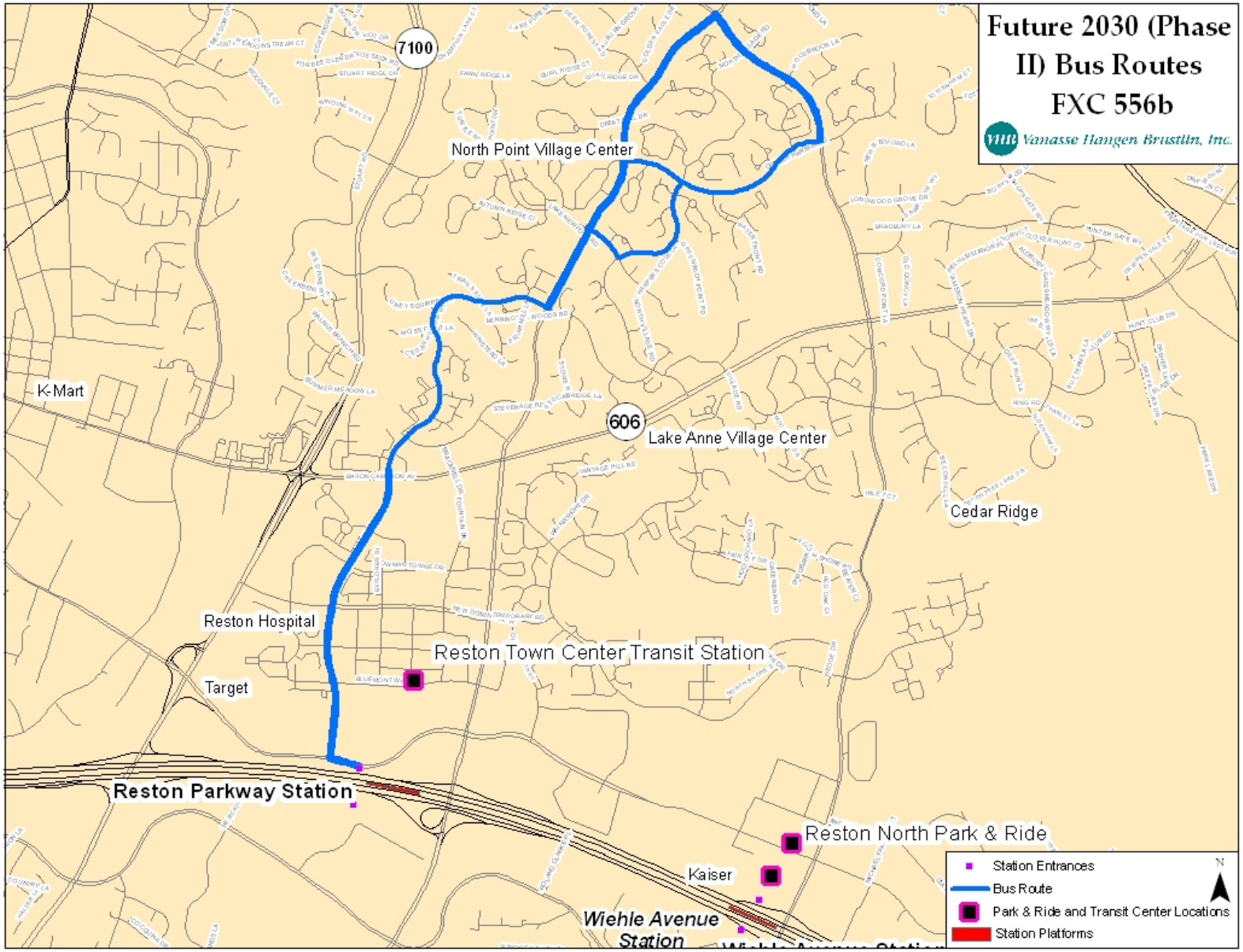
Appendix E: Route Maps

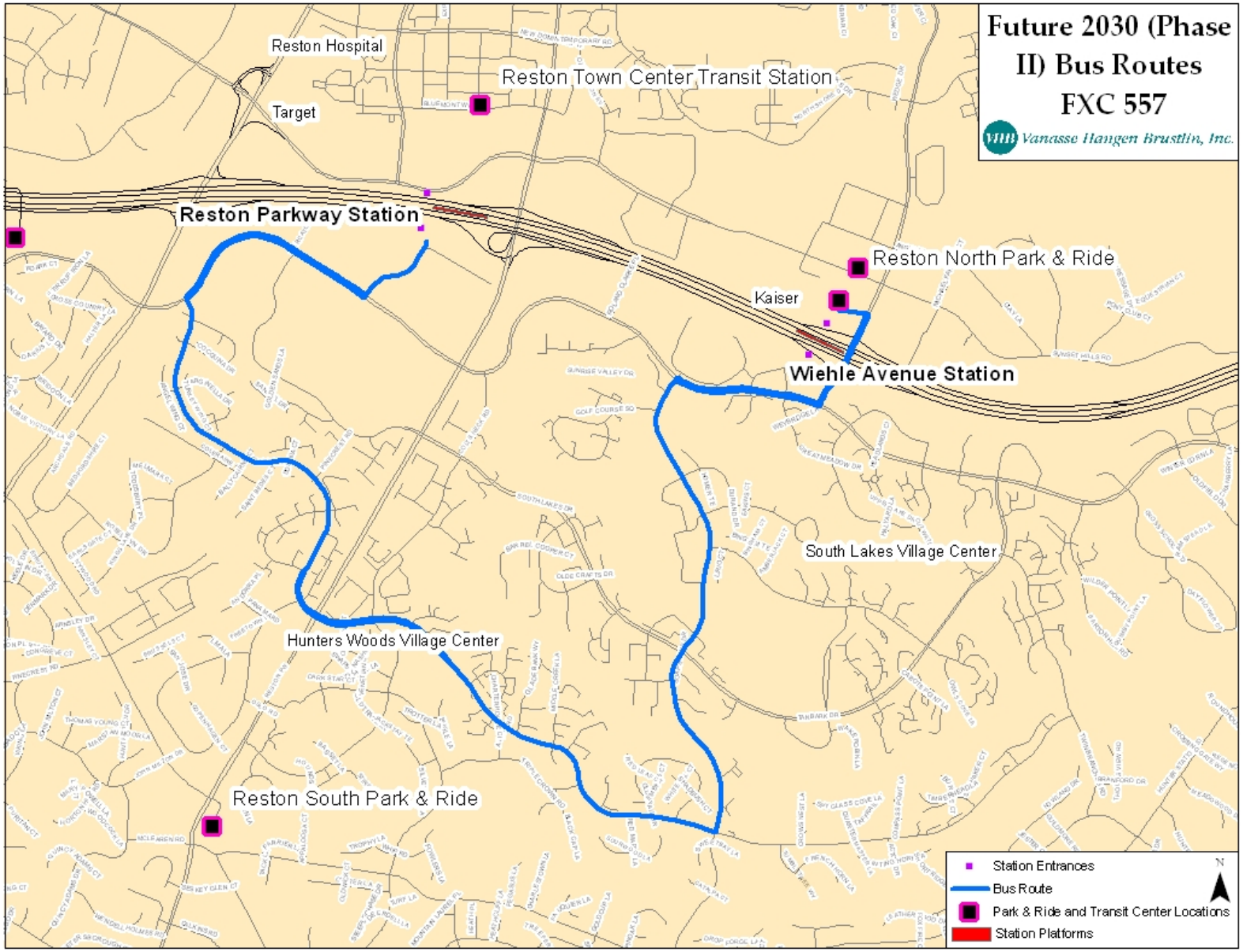
Maps of each proposed bus route are shown below as they will operate in 2030, after Phase II of the rail project is operational.

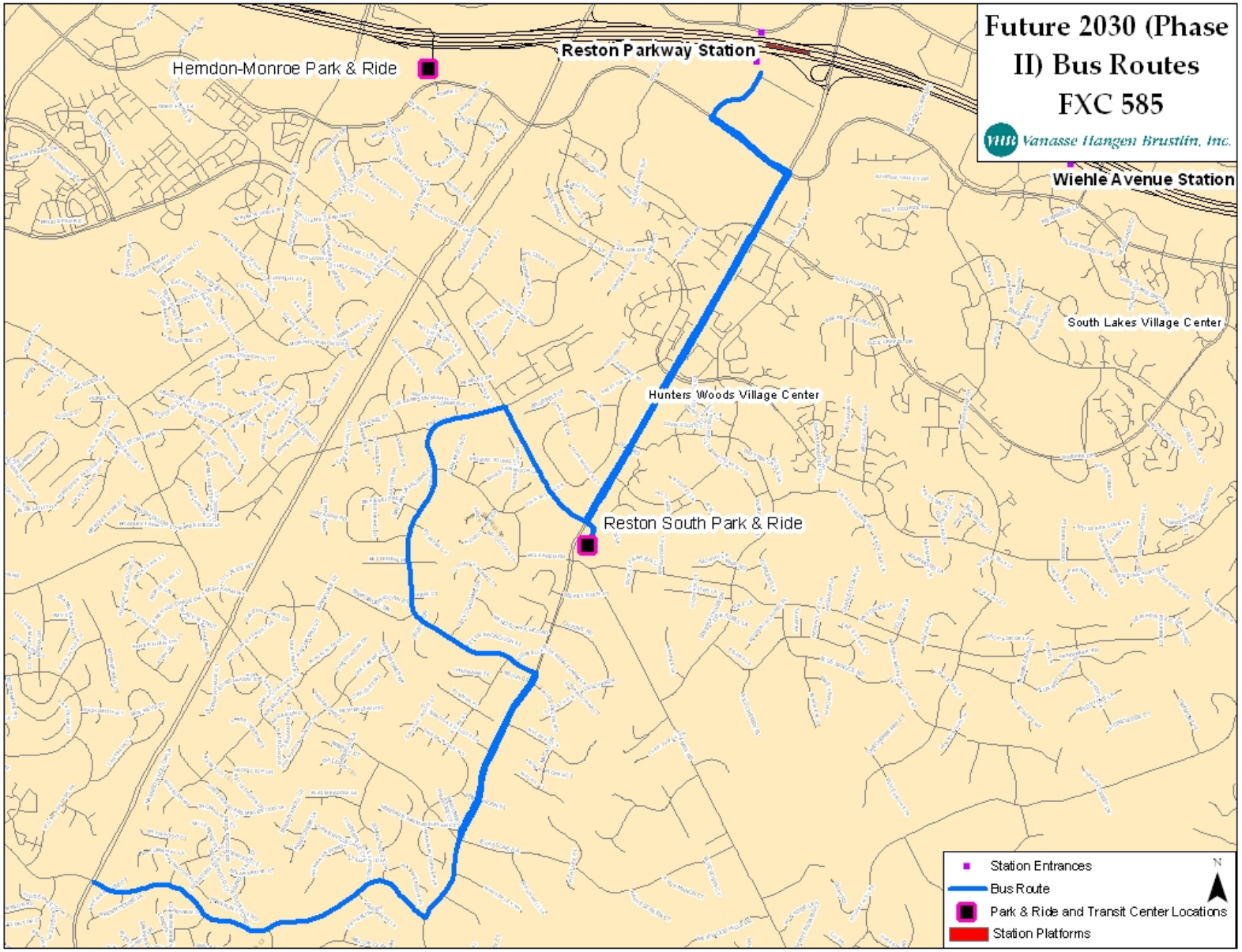


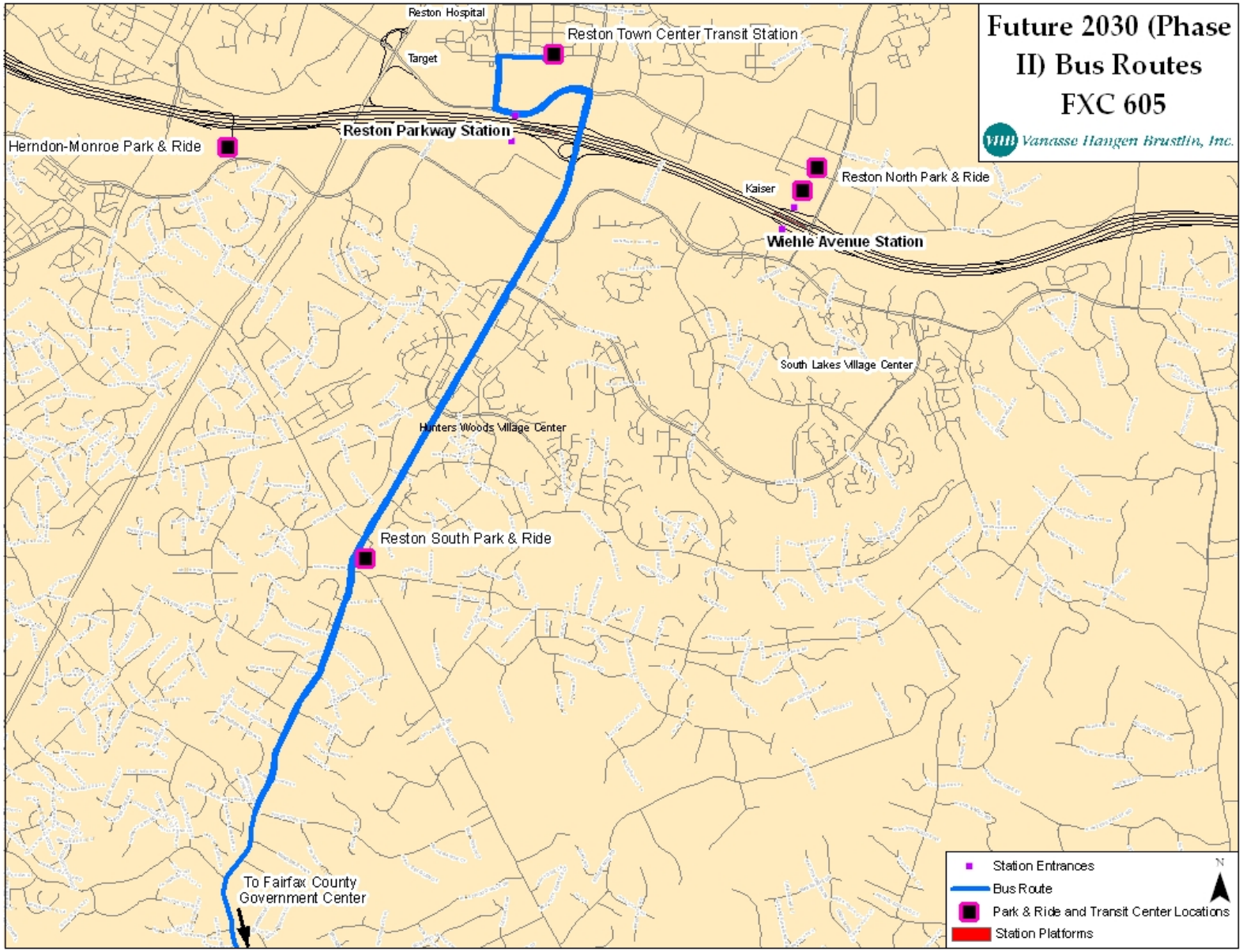

Future 2030 (Phase II) Bus Routes
FXC 553
Vanasse Hangen Brustlin, Inc.
Target
Reston Parkway Station
Reston North Park and Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

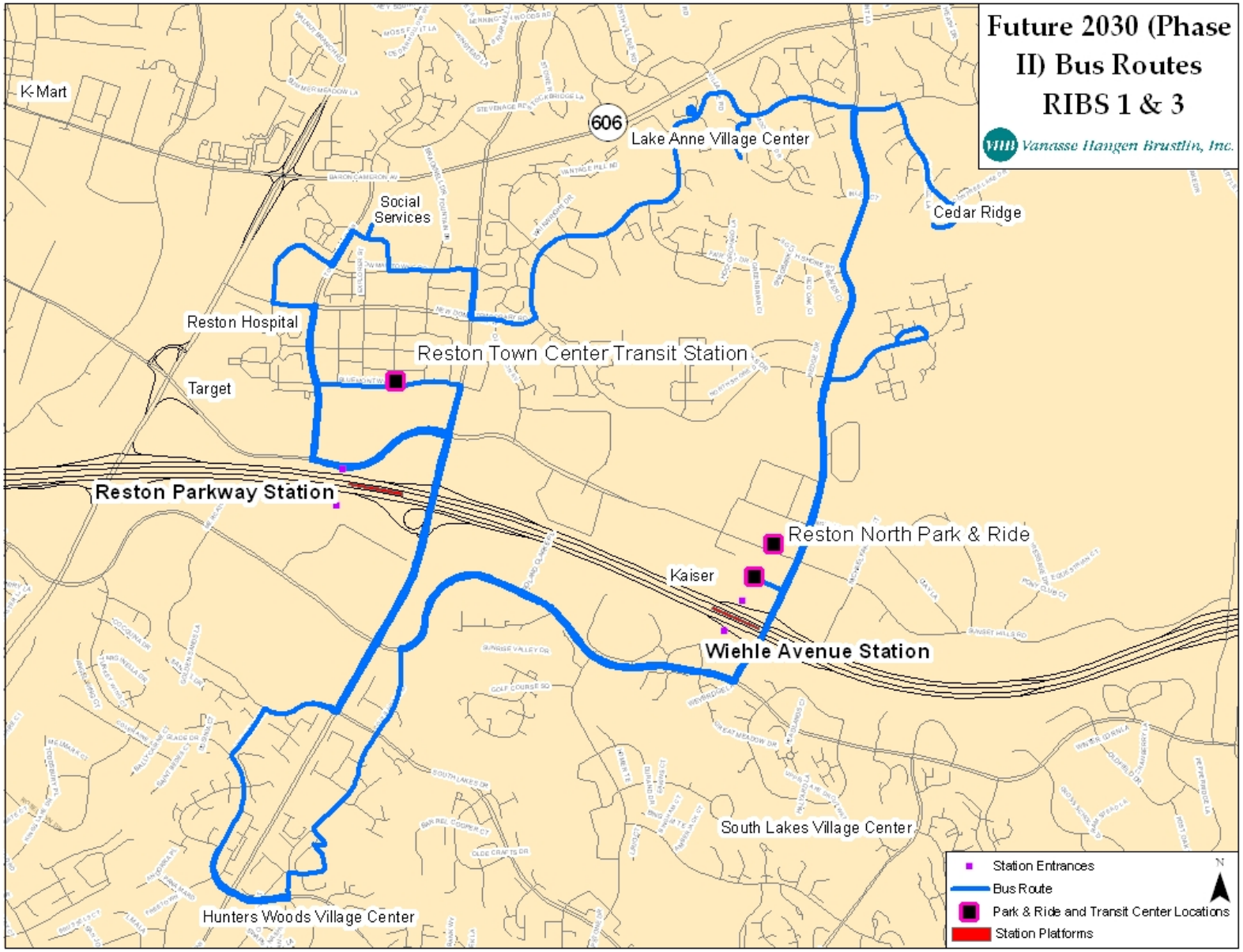

Future 2030 (Phase II) Bus Routes
FXC 556a
Vanasse Hangen Brustlin, Inc.
North Point Village Center
K-Mart
606
Lake Anne Village Center
Cedar Ridge
Reston Hospital
Reston Town Center Transit Station
Target
Reston Parkway Station
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

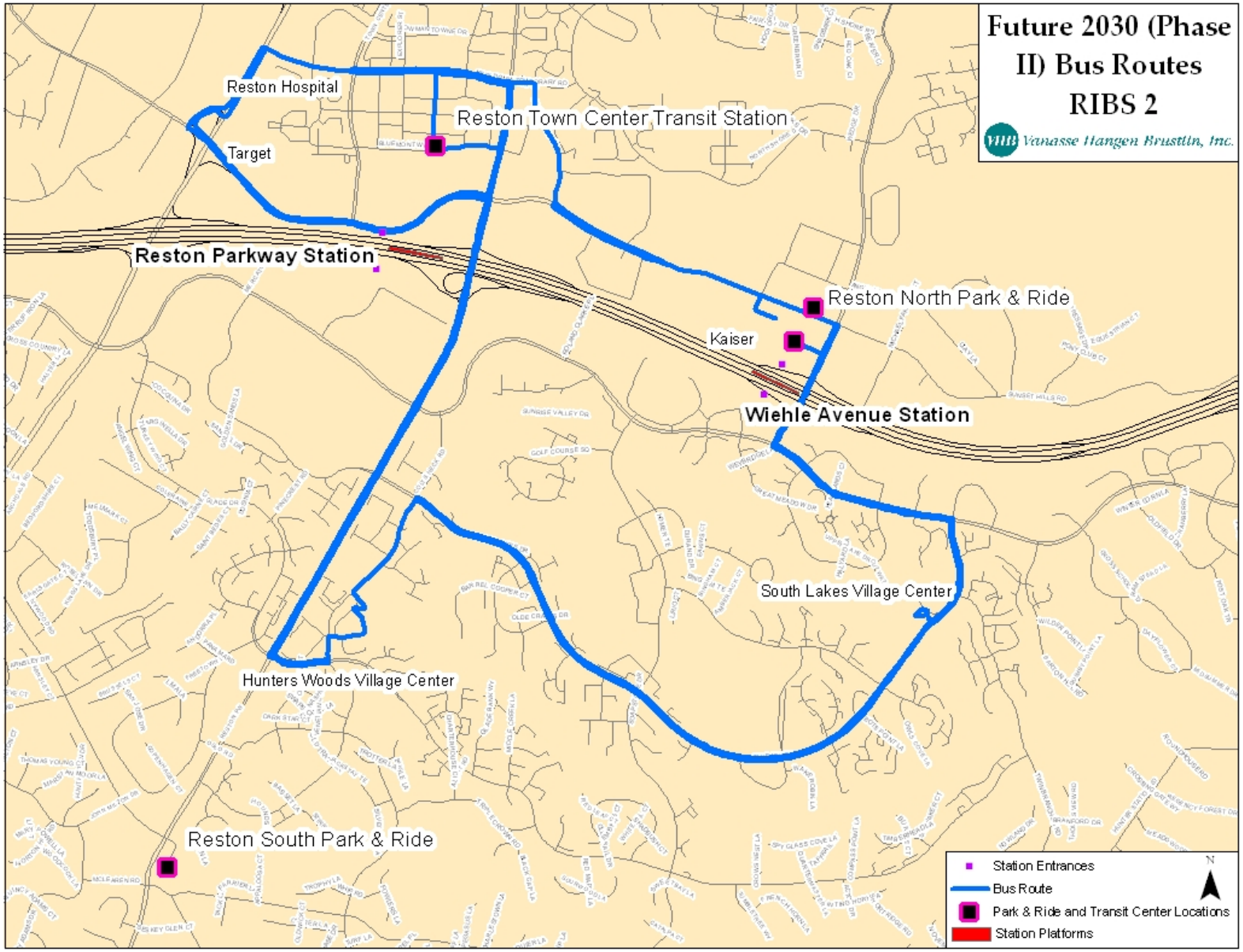

Future 2030 (Phase II) Bus Routes
FXC 556b
Vanasse Hangen Brustlin, Inc.
7100
North Point Village Center
K-Mart
606
Lake Anne Village Center
Cedar Ridge
Reston Hospital
Reston Town Center Transit Station
Target
Reston Parkway Station
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

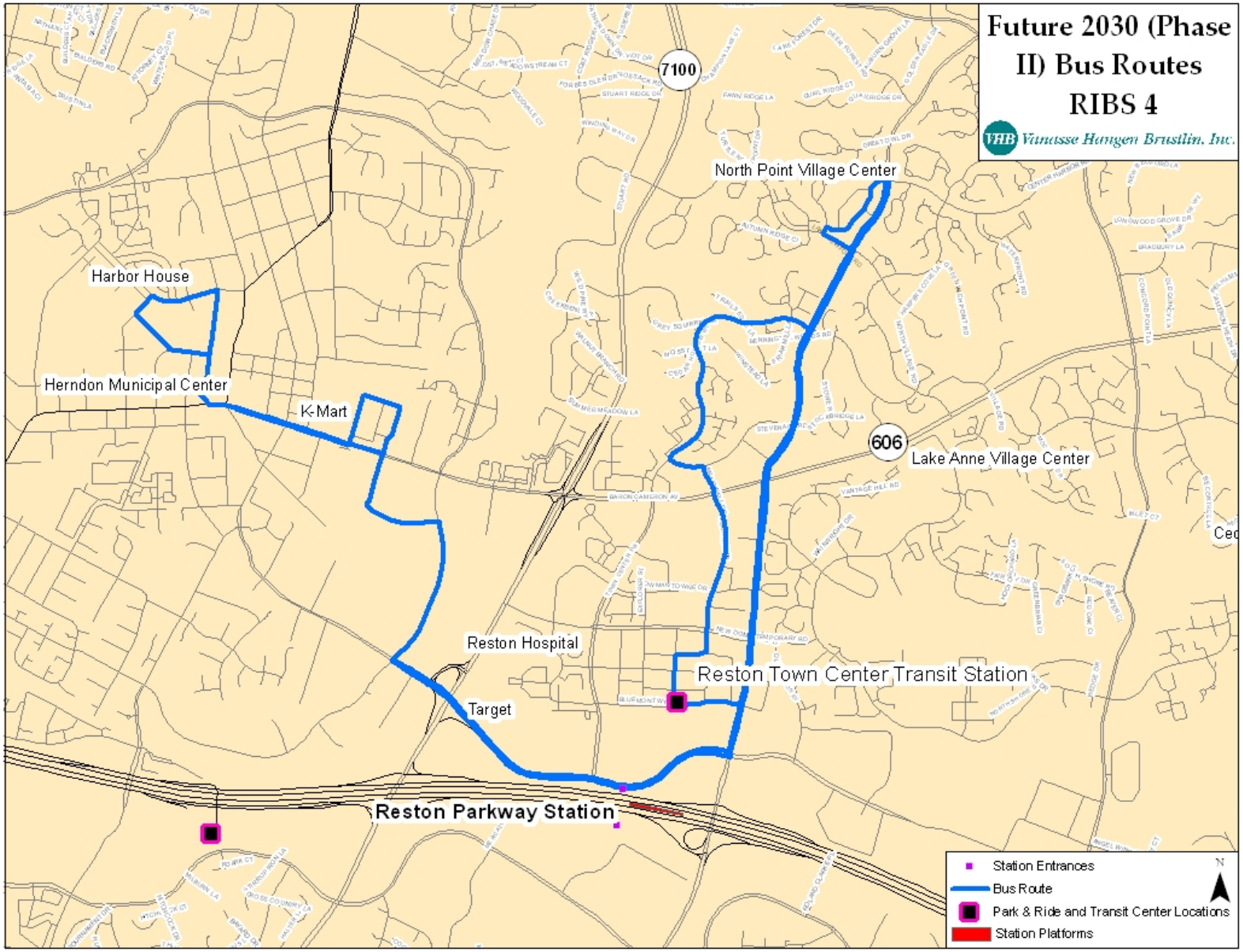

Future 2030 (Phase II) Bus Routes
FXC 557
Vanasse Hangen Brustlin, Inc.
Reston Hospital
Target
Reston Town Center Transit Station
Reston Parkway Station
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

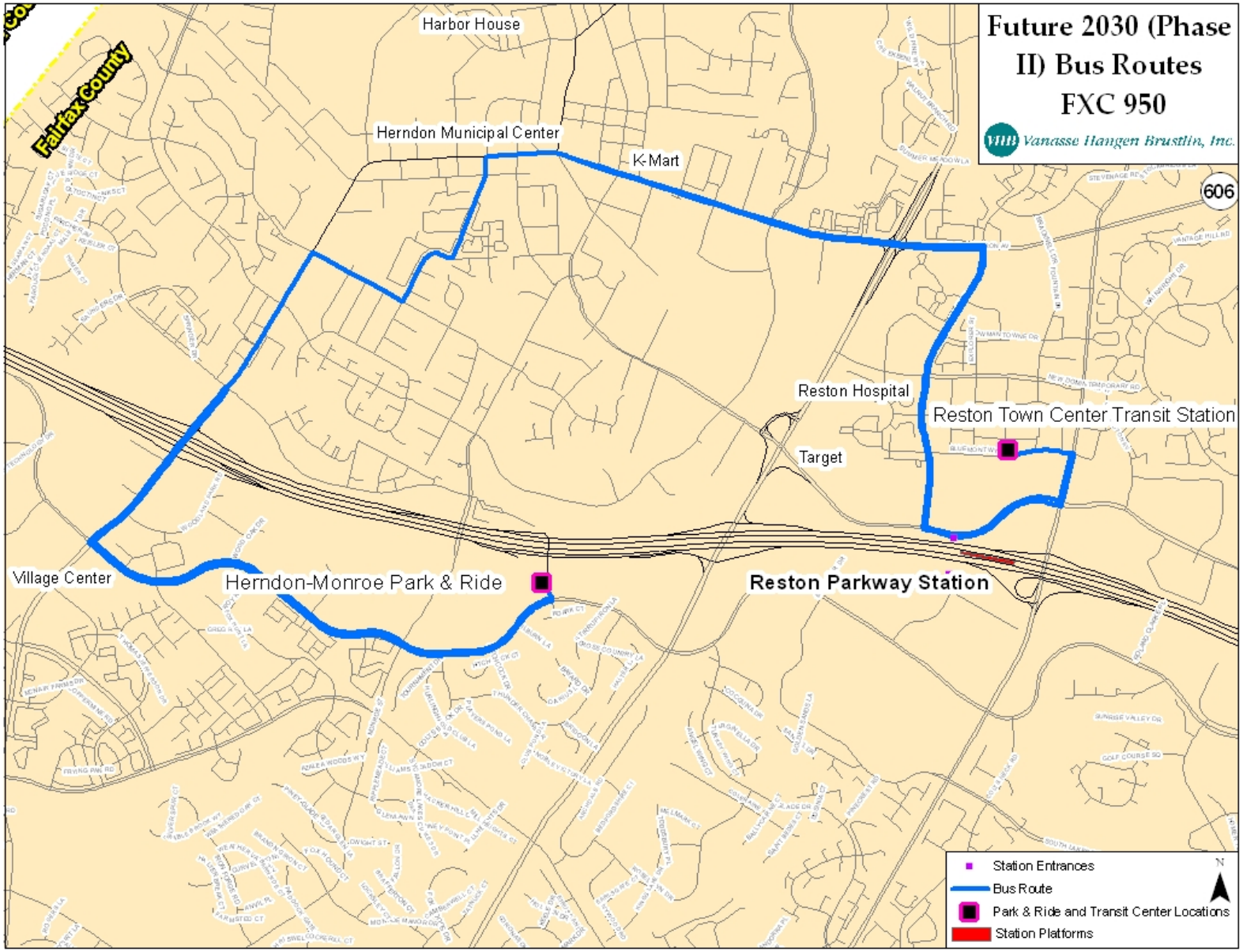

Future 2030 (Phase II) Bus Routes
FXC 585
Vanasse Hangen Brustlin, Inc.
Herndon-Monroe Park & Ride
Reston Parkway Station
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

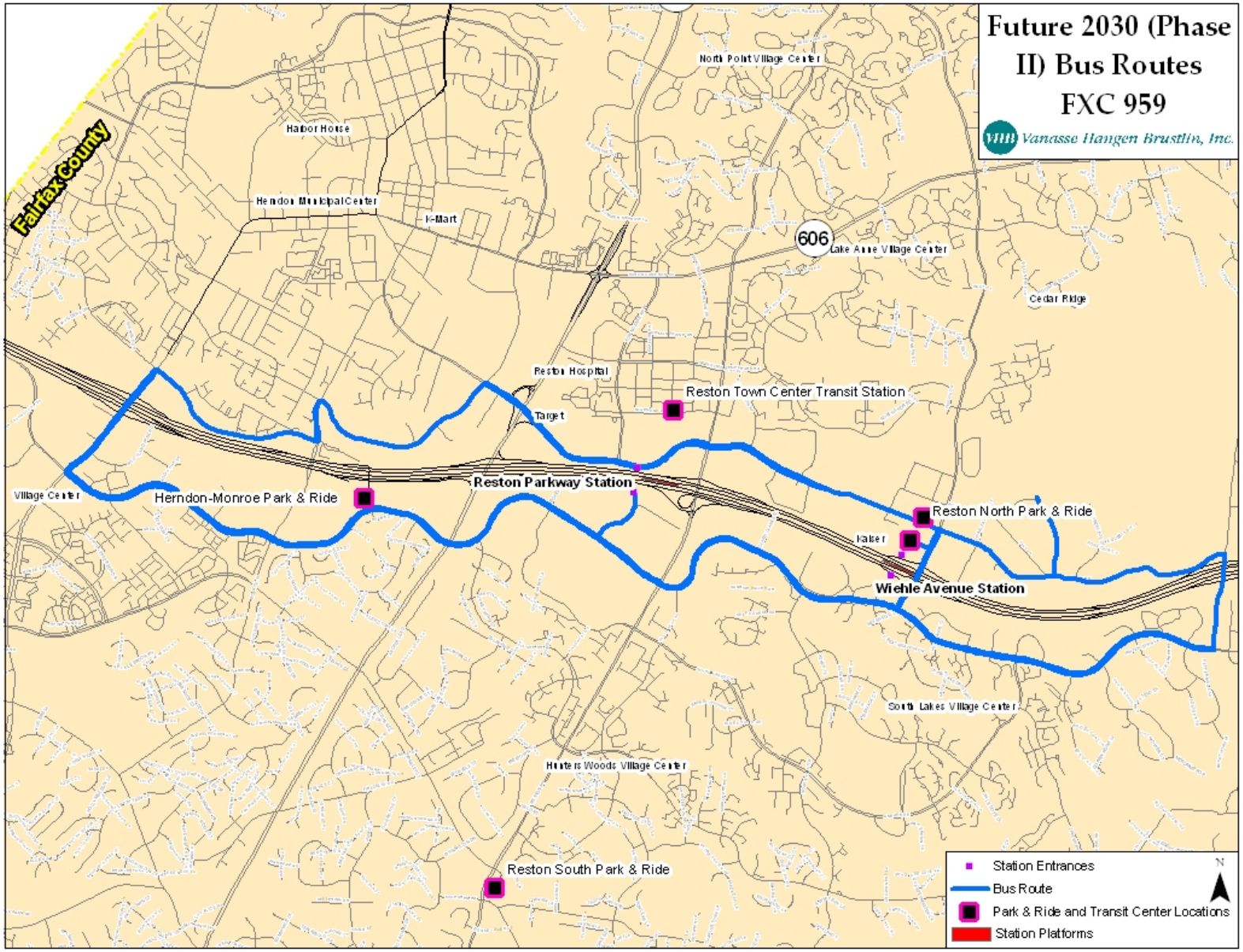

Future 2030 (Phase II) Bus Routes
FXC 605
Vanasse Hangen Brustlin, Inc.
Reston Hospital
Reston Town Center Transit Station
Target
Reston Parkway Station
Herndon-Monroe Park & Ride
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
To Fairfax County Government Center
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N


Future 2030 (Phase II) Bus Routes
RIBS 1 & 3
Vanasse Hangen Brustlin, Inc.
K-Mart
606
Lake Anne Village Center
Cedar Ridge
Social Services
Reston Hospital
Reston Town Center Transit Station
Target
Reston Parkway Station
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

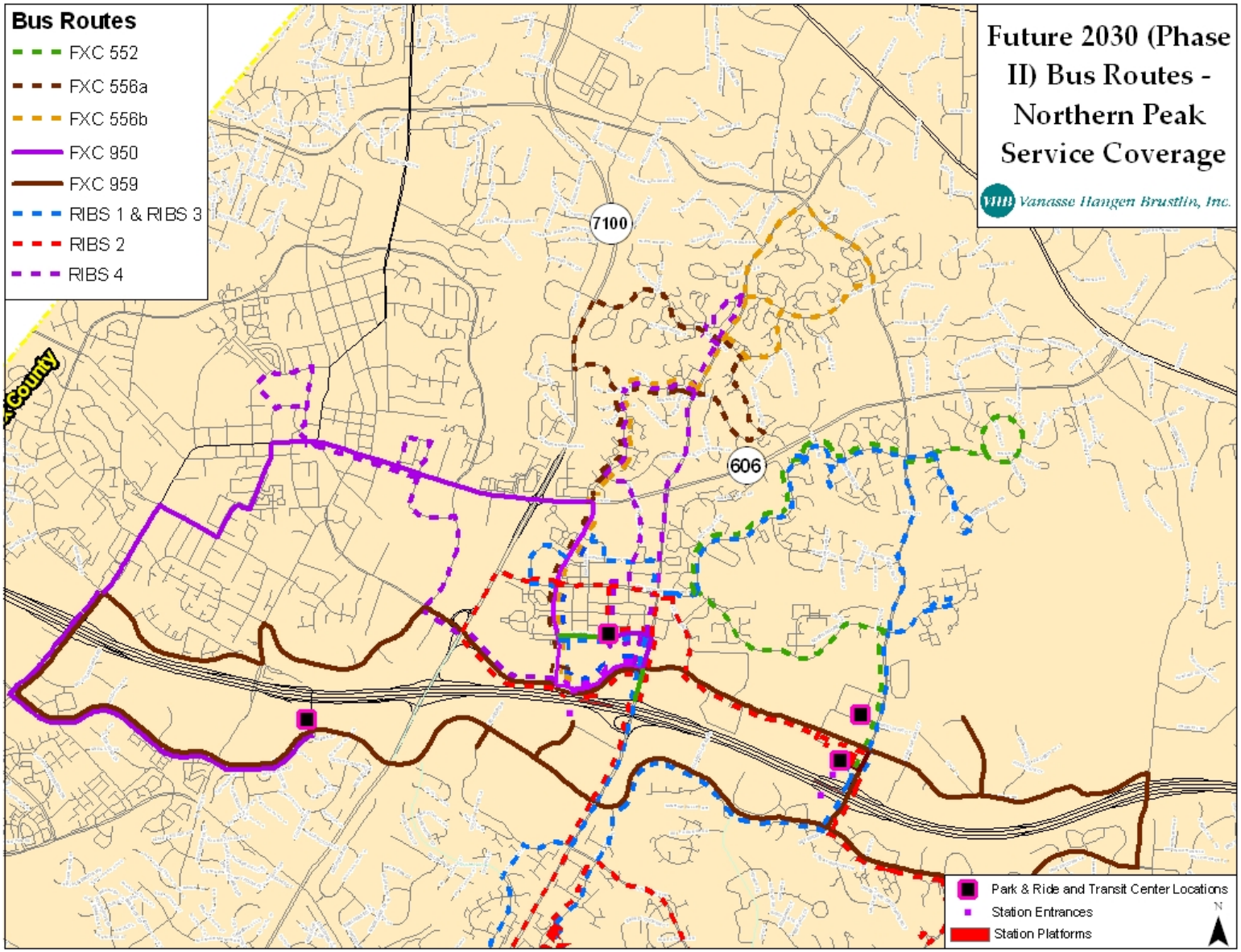

Future 2030 (Phase II) Bus Routes
RIBS 2
Vanasse Hangen Brustlin, Inc.
Reston Hospital
Target
Reston Town Center Transit Station
Reston Parkway Station
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

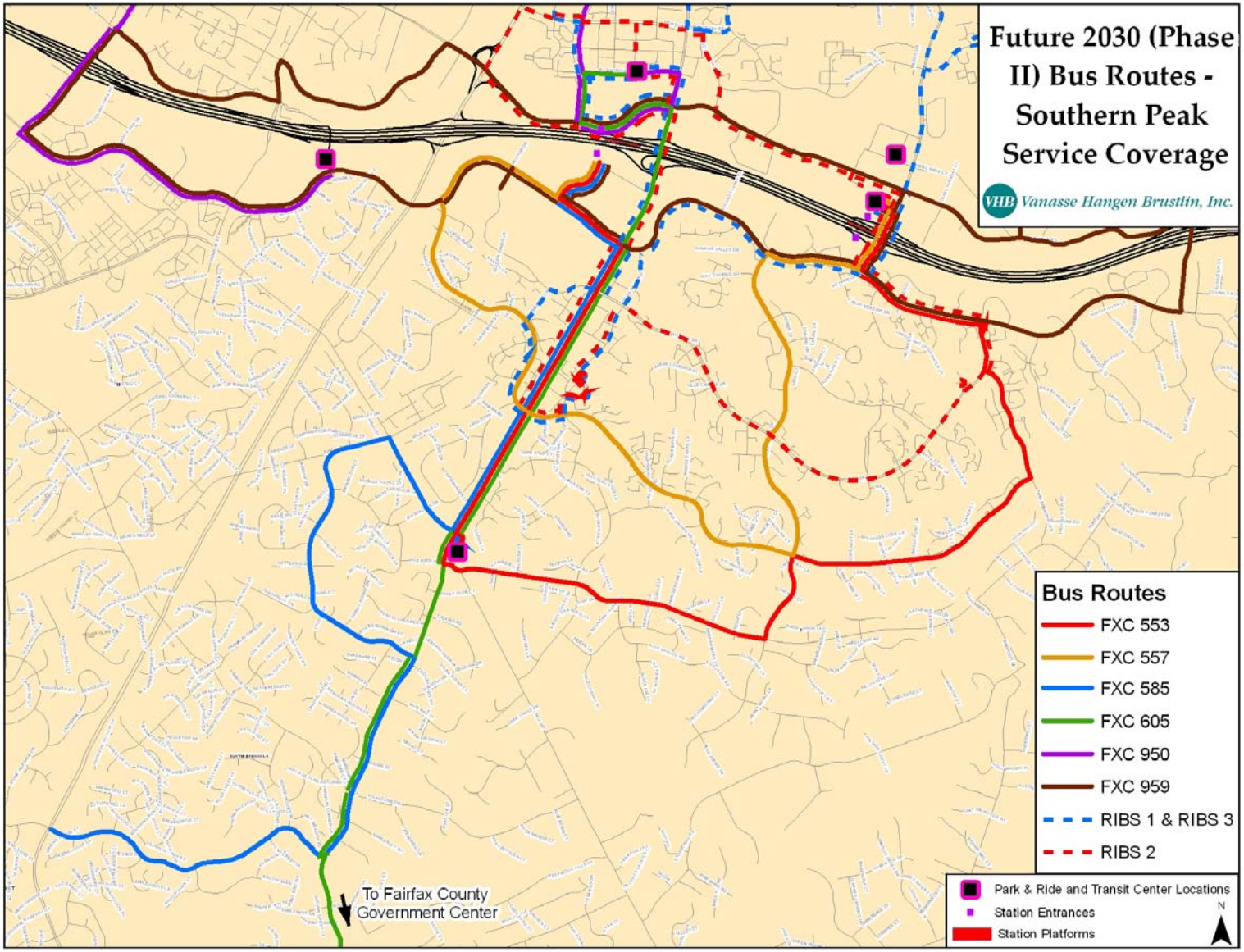

Future 2030 (Phase II) Bus Routes
RIBS 4
Vanasse Hangen Brustlin, Inc.
7100
606
North Point Village Center
Harbor House
Herndon Municipal Center
K-Mart
Lake Anne Village Center
Reston Hospital
Reston Town Center Transit Station
Target
Reston Parkway Station
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

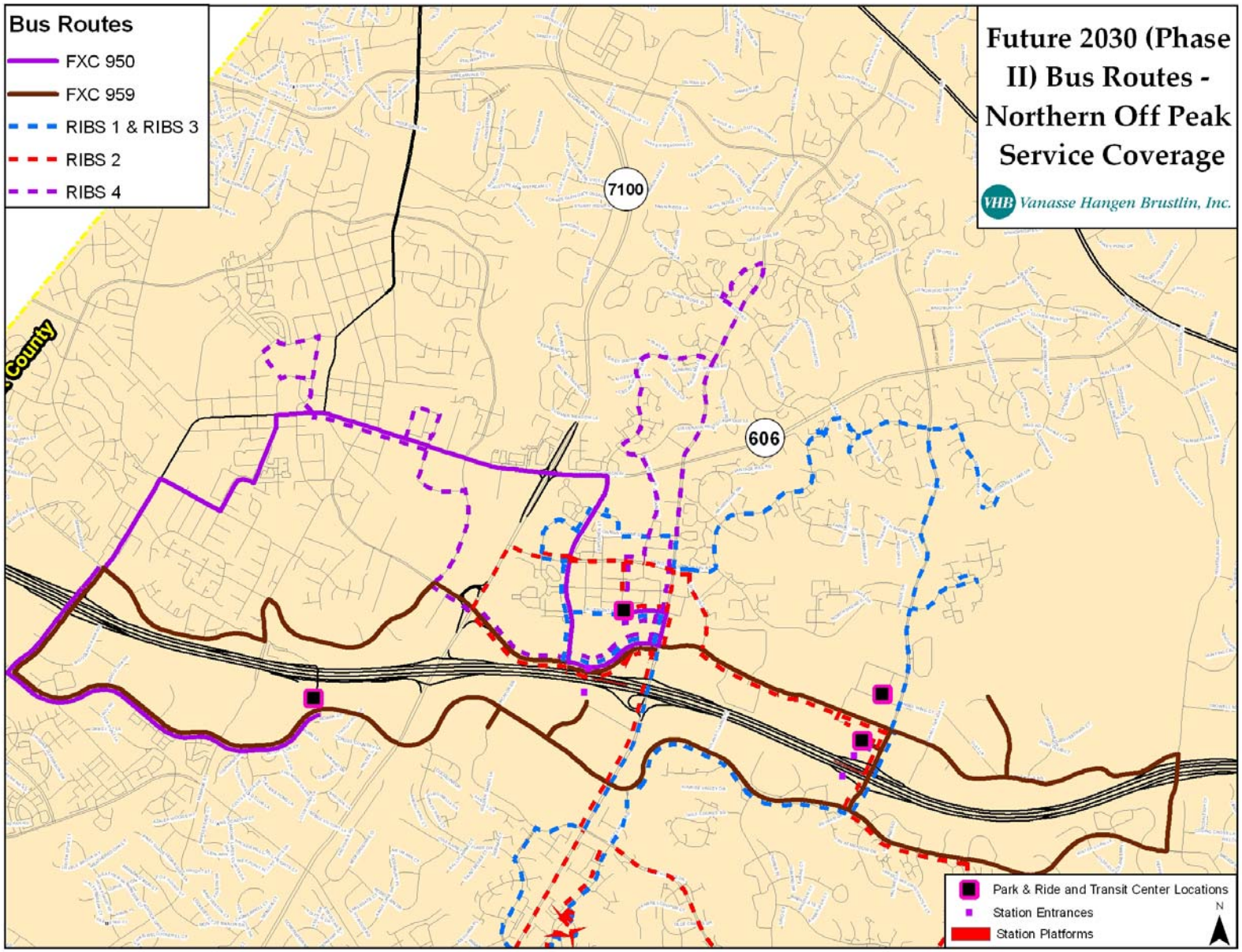

Future 2030 (Phase II) Bus Routes
FXC 950
Vanasse Hangen Brustlin, Inc.
Harbor House
Fairfax County
Herndon Municipal Center
K-Mart
606
Reston Hospital
Reston Town Center Transit Station
Target
Village Center
Herndon-Monroe Park & Ride
Reston Parkway Station
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

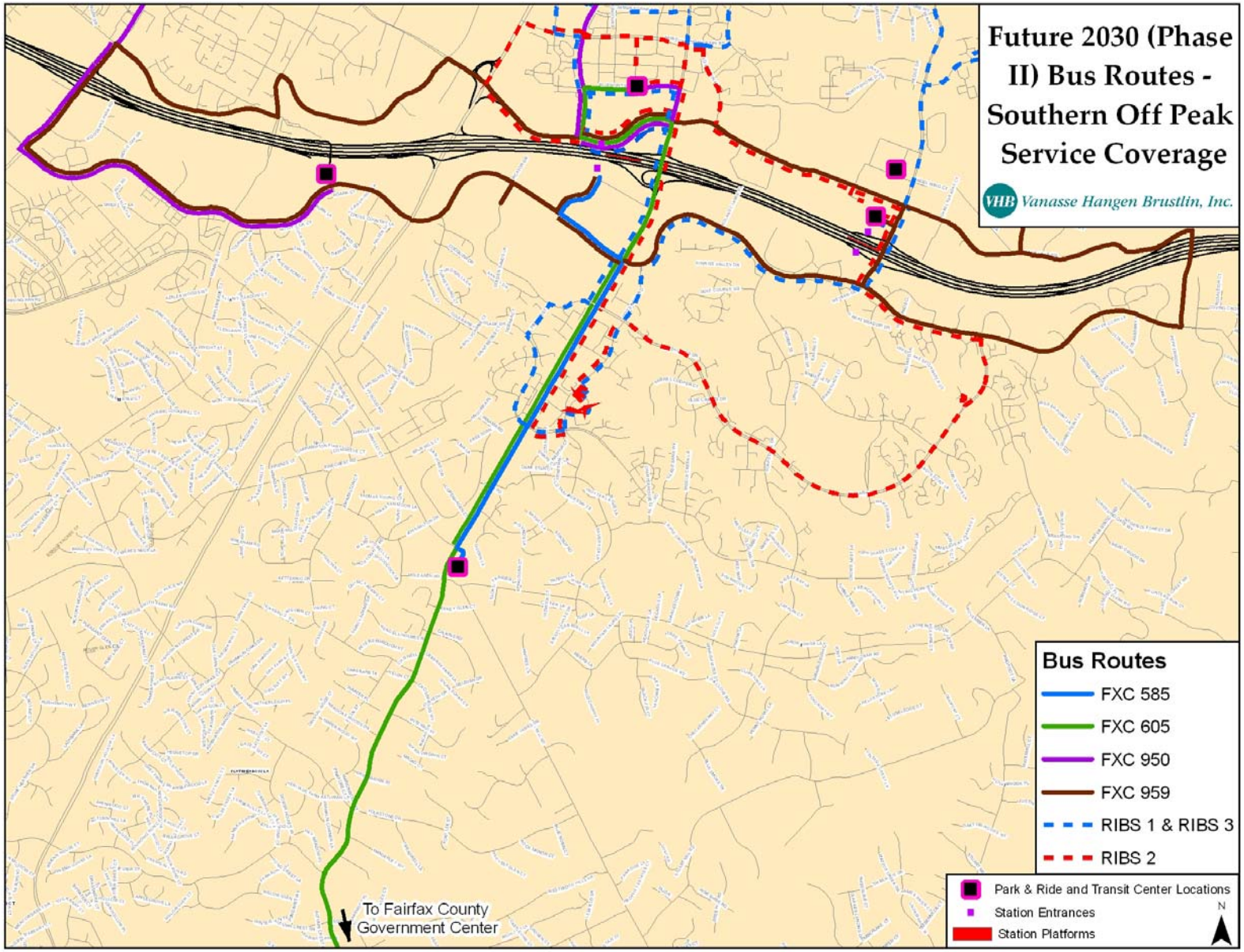

Future 2030 (Phase II) Bus Routes
FXC 959
Vanasse Hangen Brustlin, Inc.
Fairfax County
Harbor House
Herndon Municipal Center
H-Mart
North Point Village Center
606
Lake Anne Village Center
Cedar Ridge
Reston Hospital
Target
Reston Town Center Transit Station
Reston Parkway Station
Village Center
Herndon-Monroe Park & Ride
Reston North Park & Ride
Kaiser
Wiehle Avenue Station
South Lakes Village Center
Hunters Woods Village Center
Reston South Park & Ride
Station Entrances
Bus Route
Park & Ride and Transit Center Locations
Station Platforms
N

Appendix F: Service Coverage Maps




Future 2030 (Phase II) Bus Routes - Southern Peak Service Coverage
Vanasse Hangen Brustlin, Inc.
Bus Routes
FXC 553
FXC 557
FXC 585
FXC 605
FXC 950
FXC 959
RIBS 1 & RIBS 3
RIBS 2
Park & Ride and Transit Center Locations
Station Entrances
Station Platforms
N
To Fairfax County Government Center


Bus Routes
FXC 950
FXC 959
RIBS 1 & RIBS 3
RIBS 2
RIBS 4
Future 2030 (Phase II) Bus Routes - Northern Off Peak Service Coverage
Vanasse Hangen Brustlin, Inc.
7100
606
County
Park & Ride and Transit Center Locations
Station Entrances
Station Platforms
N


Future 2030 (Phase II) Bus Routes - Southern Off Peak Service Coverage
VHB Vanasse Hangen Brustlin, Inc.
Bus Routes
FXC 585
FXC 605
FXC 950
FXC 959
RIBS 1 & RIBS 3
RIBS 2
Park & Ride and Transit Center Locations
Station Entrances
Station Platforms
N
To Fairfax County Government Center

Appendix G: Other Community Projects

Several projects were recommended by community members and the RMAG that were investigated by the study team. While they were not recommended for this report, some of them may be analyzed again and constructed in the future.

Reston Parkway Grade Separated Crossing (skyway)

Interest has been expressed in a grade separated crossing of Reston Parkway at the eastbound DIAAH ramps (I31 just south of the DIAAH). The owner of the parcel directly to the east of Reston Parkway is currently planning for redevelopment and is interested in the potential of a direct, grade-separated crossing to the Reston Parkway station. Often referred to as a skyway, a pedestrian tunnel might also be possible in this area. Generally, grade separated crossings are not popular with pedestrians and bicyclists because they often require steep grade changes; they require users to go out of their way; or there may be safety concerns. All of these issues must be resolved to get pedestrians and bicyclists to use a grade separated crossing instead of an at-grade one. Additionally, if a grade-separated crossing were designed for this location there must be some type of destination located on the same level as the crossing; shopping or entertainment venues without a grade change help to encourage the use of grade separated crossings. Finally, a grade-separated crossing at this location should be accessible to all users of the proposed trail; bicyclists will be encouraged to use this trail and should not be required to dismount inside a building in order to use the crossing. Based on other similar projects completed elsewhere, a grade-separated crossing of Reston is estimated to cost approximately $2 million.

Bicycle/Pedestrian crossing of DIAAH

There is some support in the Reston community for a pedestrian and bicycle bridge across the DIAAH between Reston Parkway and Wiehle Avenue to provide additional north-south connectivity in the area. One suggested routing would connect the back side of Plaza America area with the International Center area (which is currently slated for redevelopment by JBG Properties.) While this bridge was not explicitly recommended at the current time in this report, such a connection might be valuable and possible in the future in association with major redevelopment of some of the parcels in the area. The cost of such an improvement is likely to be rather high due to its length and the need to construct it over a busy highway. As an example, the Millennium Trail pedestrian/bike bridge that crosses I-270 in Rockville was contracted for construction at $4.2 million in 2006[28]. Depending on the specific requirements of a similar bridge in Reston, the cost would be projected to be at least $6 million.

Trail to the North side of the DIAAH

This report recommends the construction of a shared-use trail paralleling the DIAAH to the south; it has not recommended a similar trail to the north of DIAAH. While the time savings provided to pedestrians and bicyclists provided by this northern path are less substantial than the southern path, the community may have additional uses for this path which is included in the most recent Fairfax County Trails Plan. Because the buildings in the area near this proposed trail are distinctly oriented towards Sunset Hills Rd, especially at Plaza America, redevelopment may be necessary before this path can be completed. The presence of secure facilities and buildings in the area may add further complications to the design of this path.

[28] "City Approves Bid for Scaled-Back Hiking Trail" The Gazette. Warren Parrish. April 12, 2006. < http://www.gazette.net/stories/041206/aspenew223733_31973.shtml>