



Reston Bike Share Feasibility Study Fairfax County

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1 INTRODUCTION 3

2 WHAT IS BIKE SHARING? 5

2.1 DEVELOPMENT OF BIKE SHARE TECHNOLOGY 5

2.2 SYSTEM ELEMENTS 6

2.3 LOCAL BIKE SHARE SYSTEM 8

2.4 FUNDING AND PRICING OF BIKE SHARE SYSTEMS 9

3 BIKE SHARING IN RESTON 10

3.1 BACKGROUND AND TRANSPORTATION NETWORK 10

3.2 VISION AND GOALS FOR RESTON BIKE SHARE SYSTEM 10

4 RESTON IN REVIEW 12

4.1 RESTON’S TRAILS, PATHS AND ROADWAYS 12

4.2 MAPS AND WAYFINDING 14

4.3 LOCAL BICYCLING CULTURE 14

4.4 PLAN AND POLICY REVIEW 16

4.5 EMPLOYMENT 17

4.6 POPULATION AND DEMOGRAPHICS 19

4.7 RESTON CONNECTIONS TO TRANSIT NETWORK 20

4.8 PUBLIC AND STAKEHOLDER INPUT 21

5 RESTON PROGRAM DEFINITION 24

5.1 SERVICE AREA 24

5.2 POTENTIAL MARKET SEGMENTS 26

5.2.1 *Potential Users and Trip Types in Reston* 27

5.2.2 *Connecting Transit Nodes and Major Employers* 27

5.3 PROGRAM REFINEMENT AND POTENTIAL SITES 28

5.4 EQUITY ANALYSIS 29

5.5 STATION DENSITY 34

5.5.1 *Minimum System Size* 34

5.5.2 *Proposed Station Plan* 35

6 USER DEMAND AND FINANCIAL ASSESSMENT 39

6.1 SYSTEM COSTS 39

6.1.1 *Cost Reduction* 40

6.2 FUNDING 41

6.2.1 *Federal Funding Sources* 42

6.2.2 *State Funding Sources* 45

6.2.3 *Private Foundations* 45

6.2.4 *Local Public Funding and Contributions* 45

6.2.5 *Private and Corporate Sponsorships* 46

6.2.6 *Station Purchase* 47

6.2.7 *User-Generated Revenue* 48

6.2.8 *Funding Community Membership Subsidies* 51

6.3 RESTON FINANCIAL ASSESSMENT 51

6.3.1 *Forecast Validation* 53

7 RESTON DESIGN AND LAYOUT 55

7.1 STATION PLACEMENT..... 55

7.2 SYSTEM OPERATIONS AND LOGISTICS..... 57

8 SUMMARY AND CONCLUSIONS..... 62

8.1 LOCATING BIKE SHARING IN RESTON 62

8.2 PROPOSED SYSTEM AND OPERATION 62

8.3 REGIONAL OPERATION WITH CAPITAL BIKESHARE 63

8.4 LOCAL STAKEHOLDERS AND PROPERTY OWNERS..... 63

8.5 FUNDING STRATEGY..... 64

8.6 TIMELINE AND NEXT STEPS 64

8.7 SUMMARY OF OPPORTUNITIES AND CHALLENGES 65

8.7.1 *Opportunities* 65

8.7.2 *Challenges* 66

8.8 CONCLUSION 67

APPENDICES..... 68

APPENDIX A: PUBLIC MEETING ARTICLE 69

APPENDIX B: STAKEHOLDER INTERVIEWS 72

APPENDIX C: HEAT MAP INPUTS 78

APPENDIX D: STATION OPPORTUNITIES AND CONSTRAINTS ANALYSIS..... 81

APPENDIX F: FEDERAL BICYCLE AND PEDESTRIAN FUNDING OPPORTUNITIES..... 88

APPENDIX G: TYPICAL STATION DETAILS 94

List of Figures

Figure 2-1: Elements of a Fourth Generation Bike Share System	7
Figure 5-1: Composite Suitability Analysis for Reston.....	25
Figure 5-2: Composite Equity Map for Reston.....	33
Figure 5-3: Preliminary Station Plan.....	36
Figure 5-4: Bike Share Phase II Service Areas	38
Figure C-1: Composite Demand Analysis Inputs	79
Figure C-2: Composite Equity Analysis Inputs.....	80

List of Tables

Table 2-1: Milestones in Bike Sharing Technology Features	6
Table 3-1: Reston Bike Share Vision, Goals, and Objectives	11
Table 4-1: 2010 Demographic Profile Data for Reston and U.S.	19
Table 4-2: 2008-2012 Demographic Profile Data for Reston and U.S.	19
Table 4-3: Reston Public Open House Questions and Comments.....	22
Table 5-1: Reston Heat Map Inputs	24
Table 5-2: Trip Characteristics of Sample Bike Share Systems.....	26
Table 5-3: Reston Population Data	28
Table 5-4: Reston Employment Data	28
Table 5-5: System size in bike share communities that are a similar sized to Reston.....	29
Table 6-1: Cost Estimate for Proposed Reston Bike Share System.....	39
Table 6-2: Bike Share Systems Capital Funding.....	41
Table 6-3: Reston Employers	48
Table 6-4: Current Capital Bikeshare Access Fees.....	49
Table 6-5: Current Capital Bikeshare Usage Fees	49
Table 6-6: Capital Bikeshare Corporate Memberships.....	50
Table 6-7: Capital Bikeshare Corporate Memberships (Sept. 2010-May 2014).....	51
Table 6-8: 13-Station System: Five Year Usage, Revenue and Cost Forecast	52
Table 6-9: Trip Comparisons for First Year of Operation	53
Table 6-10: Member Comparison for First Year of Operation.....	54
Table 7-1: Reston System Operational Elements.....	57

Executive Summary

Fairfax County is exploring the feasibility of installing a bike share system in Reston and whether such a system could complement the expanding local multi-modal transportation network. The County was awarded technical assistance through the Transportation/Land-Use Connections Program, funded by the Transportation Planning Board of the Metropolitan Washington Council of Governments (MWWCOG) to conduct this feasibility study.

Reston was conceived and founded as a master planned community in 1964. The neighborhoods and destinations of Reston are connected by a trail and transit network that make this one of the most livable and bikeable areas in Fairfax County. The imminent opening of the new Silver Line Metro and the recently upgraded bus service is transforming Reston's transportation network. Plans are already proceeding for further transit expansion and land redevelopment. Through these changes, Reston is to accommodate an increasingly diverse population, a multi-modal transit system, and a range of travel choices and trip combinations beyond private automobile trips.

A bike share system consists of a network of bikes placed at stations situated at key locations around a geographic area. It is a relatively low cost and readily implementable extension to a region's public transportation offerings that increases the reach and flexibility of the transit network. Bike sharing provides a cost-effective option for trips that are relatively far to walk, but not lengthy enough to justify waiting for transit or making by private vehicle or taxi. Bike sharing is generally affordable and a practical option for a large range of users. Systems can be structured to encourage shorter, spontaneous trips through relatively low membership and usage fees. Over 300 cities worldwide have invested in bike sharing with the first large-scale U.S. bike share system launched in the Washington, D.C. region in 2010 and systems launched subsequently in cities all around the United States.

The vision for implementing an initial bike share system in Reston includes:

- *Active Mobility:* Offering residents, workers, and visitors an active travel option for local short trips within the heart of Reston.
- *Transportation:* Adding options for first- and last-mile multi-modal trips and improving the links between the transit network and key local destinations.
- *Livability:* Assisting in making Reston an attractive, vibrant, progressive, and environmentally-friendly community with right-sized travel options and trip choices.
- *Health & Safety:* Providing a safe, active, and healthy travel choice for central Reston trips for residents, workers, and visitors.
- *Finances & Funding:* Creating a financially viable system which includes financial participation from local interests and non-county governmental and private sources.

Reston bike share is envisioned as an extension of the existing Capital Bikeshare system. This type of system includes a network of stations, a fleet of bicycles, and teams to operate and maintain the equipment. Reston stations would be separated from the rest of the current bike share network by approximately 15 miles. Eventually, the bike system could cover the greater Washington, D.C. region with bike sharing, extending into out-lying areas by including transit connections.

A preliminary station plan was prepared that recommends thirteen initial locations where bike share stations could be sited to create a local system. These locations were determined based on the results of an analysis of population and ridership data, from stakeholder input, and considering land use and key activity centers. A Phase II concept was prepared that envisioned a future expansion of the program by extending the system along adjacent transportation and community corridors towards Lake Anne and South Lakes Village Centers. The expansion would be tied to successful operation, further promotion and additional users coming on-line. When the second Metrorail station opens in Reston, the bike share system could also be extended as part of that transportation network change.

An important element in ensuring the local success of bike share is identifying the necessary funding for installation, launch, and operation. Unlike other transportation modes, most North American systems use a combination of public and private funding to cover bike share capital and operating costs. The range of funding sources that have been employed include federal or state grants, local public funding, private or corporate sponsorship with additional support from user-generated revenues. Initial capital and launch costs to deploy the 13-station initial system in Reston are estimated at \$820,500 in year one. User-generated revenues are estimated at \$156,000, compared to annual operating costs of \$400,000. The revenue forecast projects that approximately \$2.1 million in funding will be needed to fund capital, launch, and operating costs for a 13-station system over five years.

Reston has many characteristics and opportunities that are supportive of bike sharing including the short trip between the Wiehle-Reston East Metrorail station and key destinations, the proximity of the W&OD trail, the established bicycling trail network, the moderately high population density combined with good mix of uses, the established bicycling culture, the high number of large employers and development projects that are projected to include a large amount of employment and in some cases high density residential development, the supportive local political and agency environment and the integration with Capital Bikeshare. There are also challenges for bike share in Reston that could impact usage levels and revenues from a proposed system. Some of the challenges identified in the study include lack of densities and connected high-quality bicycling infrastructure in the predominantly residential areas beyond the immediate Wiehle Station area, distance from system to lower-income neighborhoods and village centers, private property station locations requiring agreements between the system operator and the private entity, need for bicycling wayfinding and signposting, trail operational issues and the need to identify funding sources.

The feasibility study suggests that a bike share system is possible for Reston and, if carefully planned and managed, can enhance the mobility needs of those living, working and visiting the area. This opportunity is enhanced by the opening of the new rail line in the near future. There are however challenges also which may need to be addressed or considered in any final planning or decision making or future expansions of the system. Identifying funding sources for both capital and on-going operations is a critical issue in moving forward with the system. However, there may be opportunities within the commercial and employment sectors of Reston for contributing to the system costs. With its established trail network and bicycling culture as well as supportive political, agency and community environment, Reston appears to provide an overall supportive situation. Launching a bike-share program in Reston would be an excellent way to add first- and last-mile trips to the transformed local transportation network.

1 Introduction

While originally developed in a suburban pattern, Fairfax County is currently undergoing urban redevelopment in several key geographic areas including Tysons, Merrifield, and Reston. The County's transportation network is also changing, most notably with the addition this year of the Silver Line, a 23-mile extension of the regional Metrorail system.

Reston is an internationally-known planned community founded in 1964 and located in the northwestern region of Fairfax County, close to Dulles International Airport. With a population of 60,000, Reston's neighborhoods and activity centers are connected by an existing transit and trail network that make this one of the most livable areas in Fairfax County. The Silver Line is opening in summer of 2014, with the Wiehle-Reston East Metrorail Station acting as the terminus of the line in the first phase. With the Metrorail opening and recent upgrades to the local bus service, the Reston transportation network is poised for transformation. Changes will continue in Reston with the planned redevelopments and second phase of Metrorail. Bike sharing could add a critical element of flexibility to travel for Reston residents, commuters, and visitors as well as adding previously unavailable multi-modal travel options to the wider region.

As part of the maturation of the suburban network, Fairfax County has been investing in bicycling as a local transportation option. Examples of recent and ongoing countywide projects that facilitate bicycling include:

- Fairfax County Bicycle Master Plan (currently being finalized)
- Fairfax County Bicycle Map (3rd edition)
- First enclosed, secure bicycle parking facility at Metrorail (Wiehle-Reston East Station)
- Fairfax County Guidelines for Bicycle Parking (draft)
- Ongoing installation of on-road and off-road bicycling improvements throughout the County
- Preparation of New Urban Design Street Standards (in conjunction with the Virginia Department of Transportation)

Against this background of transformation and continued investment in bicycling, the County is now exploring whether a Reston bike share system could introduce this mode to new users and further complement the expanding multi-modal transportation network. This study examines adding a bike share system to the transportation options for County residents, specifically looking at the feasibility of an initial system in the rapidly transforming community of Reston. Fairfax County Department of Transportation was awarded technical assistance through the Transportation/Land-Use Connections (TLC) Program, funded by the National Capital Region Transportation Planning Board (TPB) of the Metropolitan Washington Council of Governments (MWCOG) to examine the feasibility of bike sharing for the community of Reston.

Integration of travel modes with local transit systems is critical to a thriving transportation system; thus, the study will cover specifics of how bike share could be co-located with the transit network while providing a cost-effective option for first and last mile trips in the following sections:

- What is Bike Sharing?
- Reston System Visions and Goals
- Reston in Review

- Reston Program Definition
- User Demand and Financial Assessment
- Reston Design and Layout
- Summary and Conclusions
- Appendices



The Wiehle-Reston East Metrorail station, opening in 2014, will transform the Reston transportation network

2 What is Bike Sharing?

Bike sharing provides a cost-effective and elegant mobility service option for trips that are relatively far to walk, but not lengthy enough to justify waiting for transit or else too costly to make by taxi or private vehicle. A bike share system consists of a network of bikes placed at stations situated at key locations around a geographic area. It is a relatively low cost and readily implementable extension to a region's public transportation offerings that increases the reach and flexibility of the transit network.

Bike sharing is generally affordable for a large range of users. Systems can be structured to encourage shorter, spontaneous trips through relatively low membership and usage fees. Over 300 cities worldwide have invested in bike sharing with the first large-scale U.S. bike share system launched in the Washington, D.C. region in 2010 and systems launched subsequently in New York City, Boston, Chicago, Boulder, Denver, and Minneapolis with more being added.

2.1 Development of Bike Share Technology

The international community has experimented with bike share programs for nearly 40 years, as there has long been an interest in a convenient form of local travel that involves shared bicycles. Until recently, these programs experienced low to moderate success because of theft and vandalism. In the last five years, innovations in technology to increase user accountability have given rise to a new generation of technology-driven bike share programs that have allowed successful implementation of large-scale systems.

First-generation bike share programs began in the 1960's and included a fleet of free-to-use bicycles with a distinguishing feature (e.g., painted white) distributed around a community. Theft and poor organization were the key reasons for many failures of such first-generation programs.

To add a level of accountability, second-generation systems introduced a locking mechanism and required a check-out deposit payable at pick-up and returned at drop-off. An example of this system type is the Copenhagen Bycyklen, founded in 1995, which required a coin deposit to release the bicycle for use. However, the low deposit was not enough to significantly reduce bicycle theft.

The primary issue with first and second generation bike sharing was a lack of sufficient accountability, resulting in the development of third-generation bike share systems, which are characterized by credit card transactions and radio-frequency identification (RFID) chips. These crucial technology upgrades allow user identification and a security deposit. These system types have stations that are typically hardwired into the existing infrastructure. Examples of third-generation systems currently in operation include Barclay's Cycle Hire in London and Vélib in Paris.

Fourth-generation systems are characterized by their modular equipment design that does not require excavation or hardwiring because of the use of solar power and wireless communication. Stations can be readily moved, relocated, expanded, or reduced to meet demand. In the U.S., Denver, Minneapolis, Miami Beach, Boston, and the local system, Capital Bikeshare, utilize fourth-generation technology. Next generation technologies are currently being developed including station-less bike share (where bicycles are unlocked through mobile device applications), electric-assist bikes, and integrated shared mobility including transit, car-share and bicycles. The system being considered for Reston in this feasibility study is a fourth-generation design and operation.

Table 2-1: Milestones in Bike Sharing Technology Features

Generation System	Time Period	Technology Advancement	System Feature
1st Generation	1960's	Distinguishing appearance for bikes (i.e., certain paint color)	Subject to theft and poor organization
2nd Generation	1990's	Locking mechanism and check-out deposit	Minimal deposit not enough to significantly reduce theft
3rd Generation	2005 onwards	Credit card transactions and radio-frequency identification chips	User identification and a security deposit to ensure accountability against theft and vandalism
4th Generation	2008 onwards	Solar power and wireless communication	Modular systems that do not require excavation as part of station installation
Next generations	Current	Stationless bike share (unlocked via mobile devices), electric-assist bikes, integrated shared mobility	Not yet in wide-scale operation

2.2 System Elements

The type of fourth-generation bike share system being considered for Reston includes a network of stations, a fleet of bicycles, as well as a software back-end and maintenance/redistribution teams to operate the system as described in Figure 2-1.

Figure 2-1: Elements of a Fourth Generation Bike Share System

A network of stations spread across a broad area to provide convenient access to bikes. Each station includes a terminal where transactions are made and docking points where the bicycles are secured when not in use. Recent technologies have introduced modular station platforms that can be relocated, expanded, and have solar power and wireless communications.



A fleet of bicycles - specially designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.



Maintenance: staff and programs to rebalance bikes amongst the stations and maintain the system infrastructure.



A software back-end that keeps track of transactions and ridership information and can be linked to real-time website and mobile device applications and user profiles that report the number of trips, distance traveled, calories burned, etc.

Bike share systems generally employ upright step-through bicycles, suiting a broader range of users and encouraging slower-paced riding. Bicycles may have gears and are usually fitted with built-in safety features such as pedal-powered lights, thick tires, a bell, and reflectors. Generally, upright bicycles are appropriate for intended use of the system on existing roadways, bike lanes, and the developed trail system.

2.3 Local Bike Share System

In 2008, Washington, D.C. launched Smart Bike, the first commercial bike-sharing program in a major U.S. city. The network never expanded beyond its initial pilot program due in part to the expense and difficulty of installing new hardwired stations. However, the seed had been planted locally and soon afterwards Smart Bike was replaced by a much larger next-generation system. Capital Bikeshare (CaBi) launched in the fall of 2010 and proved successful with membership and ridership rates exceeding expectations.

CaBi currently serves the following jurisdictions: the District of Columbia, Arlington County, the City of Alexandria, and Montgomery County. It is owned and operated under a written joint understanding between the jurisdictions. The CaBi contract includes a MWCOG Rider Clause that allows all MWCOG jurisdictions to independently procure services of the selected vendor through the existing contract. The proposed Reston system would operate as part of the CaBi system and understanding and would be the first expansion of that network to Fairfax County. The City of Alexandria and Montgomery implemented extensions of CaBi in 2012 and 2013, respectively. The Alexandria system has 8 stations and 70 bikes, while the Montgomery system has 49 stations and 400 bikes.

Although each jurisdiction purchases a specific number of bicycles with their stations, bicycles circulate freely throughout the system and in the warehouse and are not dedicated to one jurisdictional location. To ensure that CaBi is operated with uniform service standard and characteristics throughout the system, the contract stipulates a set of Key Service Standards for the system:

- Between April and November, at least 90% of bicycles must be available to the public.
- In the winter months, at least 80% of bicycles must be available to the public.
- Bicycles must have an inspection and tune-up at a minimum of every 30 days.
- Between 6am and midnight, no station may be empty or full for longer than 3 hours.

For the purposes of this study Fairfax County has focused on developing the Reston system as an extension of CaBi. As a result, the analysis is based on using 4th generation system technologies.



Capital Bikeshare bicycles built-in safety features include front and rear flashing LED lights, tire reflectors, adjustable seat height, step-thru frame for lower center of gravity, and plastic casing around cables to prevent tampering

2.4 Funding and Pricing of Bike Share Systems

Most North American bike share systems use a combination of public and private funding to cover the capital and operating costs of the system. Funding sources include federal or state grants, local public funding, private or corporate sponsorship, and user-generated revenues. Such tasks as marketing may be funded and/or coordinated through established public agency departments as part of their financial contribution to the system.

Similar to car sharing, bicycle sharing describes a membership-based system where bicycles are checked out from a network of automated stations, biked to the station nearest the destination, and left safely locked for someone else to use. Bike share pricing differs from traditional bicycle rental as there is generally a range of fee-based membership options from a daily pass through an annual membership. Members may take unlimited short trips (typically 30 minutes) while longer trips incur charges for each additional half-hour on an escalating scale. This pricing structure is designed to encourage short trips and to keep bikes in circulation. In addition, there is generally a significant replacement fee that is incurred if a bike is not returned within 24 hours.

3 Bike Sharing in Reston

3.1 Background and Transportation Network

Reston was conceived and founded as a master planned community in 1964. The neighborhoods and commercial destinations of Reston are connected by a trail and transit network that make this one of the most livable and bikeable areas in Fairfax County. The imminent opening of the new Metrorail line and the recently upgraded bus service is transforming Reston's transportation network. Plans are already proceeding for further transit expansion and land redevelopment which will lead to additional network evolution and maturation. Through these changes, Reston is to accommodate an increasingly diverse population, a multi-modal transit system, and a range of travel choices and trip combinations beyond private automobile trips.

3.2 Vision and Goals for Reston Bike Share System

With the launch of Capital Bikeshare in the fall of 2010, and the subsequent interest in the system, the idea of bike share has been discussed widely in the region. From the earliest conversations, Reston had been identified by many as a suitable candidate to consider for an extension of the CaBi system into Fairfax. The vision for implementing an initial bike share system in Reston includes:

- *Active Mobility:* Offering residents, workers, and visitors an active travel option for local short trips within the heart of Reston.
- *Transportation:* Adding options for first- and last-mile multi-modal trips and improving the links between the transit network and key local destinations.
- *Livability:* Assisting in making Reston an attractive, vibrant, progressive, and environmentally-friendly community with right-sized travel options and trip choices.
- *Health & Safety:* Providing a safe, active, and healthy travel choice for central Reston trips for residents, workers, and visitors.
- *Finances & Funding:* Creating a financially viable system which includes financial participation from local interests and non-county governmental and private sources.

Table 3-1 expands on the vision to discuss objectives of these goals for the Reston community and Fairfax County.

Table 3-1: Reston Bike Share Vision, Goals, and Objectives

Vision	Goals & Objectives
Active Mobility	<p>Offer personal mobility options for more access to central Reston destinations:</p> <ul style="list-style-type: none"> • Increase education and encouragement of bicycling for transportation. • Serve a wide range of bicycling abilities and types of users. • Serve a range of different trip types over the course of the day and week. • Improve access to system for minority and low-income users to allow improved access to transit and jobs. • Support future expansion beyond the dense core of Reston.
Transportation	<p>Develop transportation option linking transit and central Reston destinations:</p> <ul style="list-style-type: none"> • Connect the existing bicycle, trail, and transit networks. • Integrate system with transit access (Metrorail and buses). • Expand the reach of the transit network (first-/ last-mile trips). • Increase modal shift from driving to bicycling/transit. • Reduce need to bring personal vehicle to Reston. • Provide local travel option without need to move already parked vehicle.
Livability	<p>Add to Reston’s livability and competitiveness:</p> <ul style="list-style-type: none"> • Create an environment that attracts professional workers and residents. • Serve as a catalyst for infrastructure and operational improvements that better accommodate active transportation. • Create an environment that attracts investment, new jobs and visitors. • Assist in being an environmental friendly place to live, work, and play. • Become a model system for bike share elsewhere in Fairfax County.
Health & Safety	<p>Create an active travel option that promotes safety and health:</p> <ul style="list-style-type: none"> • Improve public health through active transportation. • Divert a greater share of local trips to bicycling from personal vehicles. • Serve as a catalyst for additional safety improvements to the streets and trail network, including intersection crossings. • Provide a tool for new local health encouragement programs. • Be an educational tool for safe and healthy bike riding and behaviors. • Promote safe riding behavior among bike share users.
Finances & Funding	<p>Create a financially viable system:</p> <ul style="list-style-type: none"> • Utilize a wide range of public funding sources: federal, state, and local. • Attract private sector investment to meet financial goals for upfront capital and system operations. • Make available and attract station and system sponsorship options. • Become a financially-sustainable system that can cover a significant percent of operating costs. • Develop performance goals for on-going operation. • Plan for funding future system growth and phased expansion.

4 Reston in Review

Reston is located less than ten miles from Tysons and the Capital Beltway to the east, and five miles from Dulles Airport to the west. The Dulles Toll Road splits Reston along a west-to-east axis, while several heavily-trafficked roads run north-south: Fairfax County Parkway on the western side, Reston Parkway through the center of town, Wiehle Avenue through the northeastern residential section, and Hunter Mill Road on the eastern border.

Reston is a 17 square mile census-designated place in Fairfax County. The community also includes Reston Regional Library, Reston Hospital Center, and The Embry Rucker Community Shelter. The Reston police sub-station is also the location for a regional County government center serving the northern part of Fairfax and the office headquarters of the locally elected supervisor of the Hunter Mill District within the Fairfax County Board of Supervisors. Some services similar to those typically provided by government are looked after by the nonprofit Reston Association, which is supported by a per-household fee for all residential properties. Higher density development such as commercial and high-rise residential is mostly located in the Reston Town Center District, administered by the Reston Town Center District Association (RTCA). The Reston Urban Core Association (RUCA) is a sub-association of RTCA that is responsible for the maintenance of streets and parks in the main urban area of Reston Town Center. The Virginia Department of Transportation (VDOT) owns, operates, and maintains most of the public streets in Reston.

4.1 Reston's Trails, Paths and Roadways

As a planned suburban community, Reston developed 55 miles of paved and natural surface trails (with 95 bridges and 26 underpasses for bicyclists and pedestrians) connecting neighborhoods, recreation areas, shopping centers and transit. Seventy seven percent of the trails are at least 8 feet wide and all are on Reston Association (RA) property or an RA easement. All trails are multi-use so users include pedestrians, joggers, wheelchairs and pathway maintenance vehicles. No motor vehicles are allowed on the trail system except maintenance vehicles and motorized wheelchairs.

The RA is responsible for trail maintenance with paved routes repaved on a scheduled and recurring basis. The trails are regularly cleared of debris and snow and bushes are trimmed or otherwise cleared to ensure safe and accessible bike routes. Reston trails are mostly unlit although they are open 24 hours per day, year round. Inherent in Reston's planned background, bridges and underpasses are designed into the network, limiting the need to have to cross public roads or negotiate intersections with vehicles. The Reston trails network connects to the local roadway system in numerous locations making it easy to combine travel between the networks by bicycle.

The historic W&OD Trail runs through the heart of Reston. Local bicyclists can travel west to more rural locations and east to Washington, D.C. via the 45 mile long rail-trail. The Northern Virginia Regional Park Authority (NVRPA) owns, operates and maintains the W&OD. The W&OD is a key trail element of the most comfortable bike route connecting Wiehle Station to the Reston Town Center district area. The W&OD's level grade makes it especially popular with a broad range of bicyclists. Much of the trail has been recently repaved making for an improved riding surface. Snow clearing on the W&OD is generally limited to removing from curb ramps and at key crossings. The W&OD trail

intersects the local roadway system and the Reston trail system in many locations making it easy to combine travel between the networks.



The underpass allows bicyclists to avoid crossing Reston Parkway at grade when travelling between Reston Town Center and the Wiehle Station via the W&OD trail

Most of the neighborhood and arterial roads in Reston are owned, operated and maintained by VDOT. Fairfax County and VDOT work together on all intersection and road improvements for these roads as well as the addition of bike lanes, shared use lanes or shared lane markings, and all appropriate signing and pavement markings. Outside of the neighborhoods, most of the arterial roads are typical of those described in the draft Fairfax County Bicycle Master Plan which “may or may not be bicycle friendly depending on traffic volumes, right-of-way width, depending on the era in which the roadway was initially built, and the nature of the more recent upgrades”.¹ There are barriers to bicycle travel including gaps in the sidewalks, wide intersections and the Dulles Toll Road. Reston’s arterials are typically multi-lane with parallel sidewalks or sidepaths² on one or both sides. Sidewalk and parallel path widths range from 4-6 feet in width, too narrow for sharing bike and pedestrian travel especially as the adjacent buffers from high-speed traffic are limited also. Bike travel may be two-way on these facilities due to the large block lengths and wide intersection crossings that may also cause out-of-the-way travel. Routine maintenance of the sidewalk facilities is limited so many are in poor condition with broken surfaces. Generally, there is no routine snow removal from sidewalks or along arterials.

As part of recent repaving and restriping of Lawyers Road and Soapstone Road, new bike lanes were installed on both of these roads. However, there are no on-road bike lanes or other on-road facilities in the central Reston area. The local roadway system intersects with the Reston trail system and the W&OD in many locations making it easy for bicyclists riding on-road or on adjacent paths to combine travel and routes with the other Reston bike travel networks.

¹ Fairfax County Bicycle Master plan (Draft March 2014)

² A shared-use path located immediately adjacent and parallel to a roadway.

4.2 Maps and Wayfinding

Several detailed maps are available for Reston with high-quality and up-to-date information about local trails and bicycling facilities including:

- The Fairfax County Bicycle Map (third edition, 2012). This map is widely available in paper form at such locations as bike shops, the Reston library, and other public offices throughout Reston. In addition, the Bike Fairfax Interactive webmap is available as an app and online at <http://www.fairfaxcounty.gov/fcdot/bike/bikemap/>
- The Reston Association Map (updated and reissued in 2012) is available for \$2 at the Reston Association headquarters and on-line on their website.
- There are paper and on-line maps available for local trail loops through Reston Association.

The Reston trail network employs a trail marking wayfinding system created by the RA Pedestrian and Bicycling Advisory Committee (PBAC). The signage system does not extend outside of the trail network.



Beyond the W&OD trail, there are few signs to indicate its presence or how to get there.

4.3 Local Bicycling Culture

Many in Reston are active and engaged in bicycling, both as a means of getting around and recreating or as a policy and design topic. The Reston Pedestrian and Bicycling Advisory Committee advise the Reston Association Board of Directors on bicycling issues as they relate to infrastructure improvements, accessibility, and promoting the benefits. In 2013, Reston was named a bronze-level Bicycle Friendly Community by the League of American Bicyclists. This is a national-level honor recognizing progress in

providing facilities and programs for bicyclists. This reflects in part, the many bicycle-related programs and events currently take place in Reston including:

- Youth cycling and bicycle safety through Safe Routes to School (SRTS) programs, education programs, mini grants, Bike to School Days, and youth rides and races.
- The Reston Bike to Work Day pit stop, one of the most well attended pit stops in the region. In 2014, the Reston pit stop relocated to the Wiehle Station plaza.
- The Reston Bicycle Club organizes rides several times per week and hosts the annual Reston Bicycle Club Century with over 1,000 cyclists participating.
- The Bike Lane bike shop hosts weekly rides, including Saturday morning women's rides, Thursday evening mountain bike rides with the Mid-Atlantic Off Road Enthusiasts (MORE), and junior rides.
- Other annual events including the Reston Triathlon, Reston Town Center Grand Prix Kids' Race, Paul's Ride for Life, Reston Youth Triathlon, Reston Kids Triathlon, and Sprint Triathlon.

In addition, there are end-of-trip facilities for biking in Reston including:

- Bicycle parking available at businesses, schools, parks, swimming pools, and other destinations
- Bicycle lockers currently available to rent at several transit locations
- With the opening of the new rail station, the new County secure bike parking facility to provide capacity for over 200 bicycles.

The Reston Pedestrian and Bicycling Advisory Committee recently issued an update of the *Reston on Foot and Bicycle* report which covers a wide range of local bicycling issues and recommended improvements.

4.4 Plan and Policy Review

FCDOT is in the process of finalizing the Fairfax County Bicycle Master Plan. The Plan is currently out for public review and the plan is scheduled to be presented to the Planning Commission and Board of Supervisors in late 2014. The purpose of the Plan is to provide policies, programs, and physical facility recommendations that can serve as a guide for bicycling in Fairfax County. The Plan includes a detailed discussion of the recommended Bikeway Network, and a set of policy, programmatic and implementation recommendations. The Bikeway Network provides the long-term vision for a connected network of bikeways and will guide the selection of bicycle facilities as a part of ongoing and future road improvement projects and private developments.

As part of the Plan, Fairfax County has set aggressive targets for implementation of facility improvements and overall performance recommendations including:

- As part of every resurfacing project, VDOT and Fairfax County should refer to Bikeway Network Plan for potential upgrades to bicycling conditions
- Identifying stand-alone shoulder repaving projects
- Consideration of speed reductions to allow use of Shared lane markings in some locations.

The Bicycle Master Plan's recommendations and investment in bicycling infrastructure, policies, programs and coordination as recommended in the Bicycle Master Plan can also assist in making Reston more bikeable and can help Reston residents, workers and visitors achieve the many benefits of bicycling.

In terms of rules and regulations related to bicycling, the Virginia Code states:

- Bicycles ridden between sunset and sunrise must have at least one white headlamp visible for at least 500 feet.
- Bicycles must have a red reflector mounted on the rear visible for at least 600 feet.
- On roads with a posted speed of 35 mph or higher, bicycles must be equipped with at least one red taillight visible for at least 500 feet. Taillights may be steady or flashing, are allowed under all conditions and may be attached to either the cycle or rider.

More detailed information regarding laws for bicycling, rights and duties, and riding/safety tips is available on the VDOT's bicycle site: www.vdot.virginia.gov/programs/bk-laws.asp.

In addition, Fairfax County has the following helmet wearing requirements for younger riders:

- Any person under the age of fifteen years of age shall wear a protective helmet that meets the standards promulgated by the American National Standards Institute or the Snell Memorial Foundation while riding or being carried on a bicycle on any highway, sidewalk, or public bicycle path.

W&OD Trail extended opening hours are currently 5 am to 9 pm. Before 2013, the trail was considered off limits after sunset. The following NVRPA rules apply to those bicycling on the trail after sunset during extended hours:

- Riders are required to wear reflective clothing that can be easily seen from the front and rear.
- Bicycles must be equipped with at least one white headlight light that is visible in clear weather from a distance of at least 500 feet to the front and a red reflector visible from 600 feet to the rear.

- Bicycles must be equipped with a taillight visible from a distance of at least 500 feet. This taillight may be affixed to the bicycle or rider and may be steady or blinking.

In addition, NVRPA notes that exceptional care should be taken when crossing highways including obeying all laws and posted signage. Trail users are also required to follow all existing rules and regulations governing the use the trail. NVRPA has posted nearly a dozen signs along route to help make bicyclists aware of the rules governing bicycling during extended hours after sunset.

Any of the proposed stations located within VDOT right-of-way will require a VDOT Land Use permit. These permits deal with maintenance of traffic and related issues during the station installation. There is a \$119 permit fee and the VDOT review takes approximately a month. Arlington County has several stations located within VDOT right-of-way and report that they have readily secured permits for these sites.

As long as the stations are placed within public property, no licensing for the stations is required. Any stations located on private property will require a license agreement between the system operator and the private entity. Additionally, these sites may require a Proffer Condition Amendment (PCA)³ to allow location of the bike share station on the sites. If the County moves forward with bike share, staff will need to determine if PCAs will be required. If sponsorships are used for the system, posting of sponsor information on the stations may trigger the county's sign ordinance leading to additional permits and review as well as PCA review.

4.5 Employment

Reston is a significant employment base and is home to national corporate bases, large, commercial centers and governmental agencies. Commercial development and employment is primarily clustered along three main arteries: Reston Parkway, Sunrise Valley Drive, and Sunset Hills Road. Reston is home to four hotels, about 466,000 square feet of industrial/flex space, and 1.7 million square feet of retail development, much of which is focused around the Reston Town Center. Reston is the second largest office market in Fairfax County with almost 20 million square feet of space. Office buildings range from condominiums to the high-rise structures around the Reston Town Center. Other Reston business parks include Campus Commons, Commerce Executive Park, Isaac Newton Square, Lake Fairfax Business Center, and Parkridge. Office space in Reston is primarily located along two roads running east-to-west on either side of the Dulles Toll Road: Sunrise Valley Drive to the south and Sunset Hills Road to the north.

In terms to accessing their work, twelve percent of Reston citizens use a method other than a car to commute to work, five percent work from home, and two percent take the bus.

³ PROFFERED CONDITION AMENDMENT (PCA): Application to change a set of conditions accepted by the Board of Supervisors at the time of zoning. A PCA application is subject to public hearing by the Planning Commission and the Board of Supervisors



Bicyclists at Reston Town Center, a popular employment and entertainment destination

4.6 Population and Demographics

With a population of approximately 58,000 people, Reston is smaller than most North American communities with bike share systems; however, it would not be the first to be part of a region with bike share. Reston's population was 58,404 at the 2010 Census growing from 56,407 at the 2000 census. Tables 4-1 and 4-2 present demographic data for Reston, Virginia in comparison to the U.S. as a whole.

Table 4-1: 2010 Demographic Profile Data for Reston and U.S.

Characteristic	Reston	U.S.
Median Age	38.2 years	37.2 years
Percent Non-White	29.9%	27.6%
Percent Hispanic or Latino	12.8%	16.3%
Percent Family households	58%	66.4%
Percent owner-occupied housing units	65.2%	65.1%

Source: 2010 Demographic Profile Data, U.S. Census Bureau, 2010 Census

Table 4-2: 2008-2012 Demographic Profile Data for Reston and U.S.

Characteristic	Reston	U.S.
Percent bachelor's degree or higher	65.5%	28.5%
Percent unemployed	6.1%	9.3%
Median Household income	\$105,775	\$53,046
Mean travel time to work	30 min	25 min
Percent travelling to work by transit	7.4%	5.0%
Percent travelling to work by bicycle	0.5%	0.6%

Source: 2008-2012 American Community Survey 5-year estimates, U.S. Census Bureau

4.7 Reston Connections to Transit Network

When the Metrorail system is extended to Dulles Airport along the right-of-way in the middle of the Dulles Toll Road, two Silver Line stations will be located in Reston. The first, Wiehle-Reston East Station, is close by the Wiehle Avenue/Dulles Toll Road interchange (phase one) and the second will be located at the Reston Parkway/Dulles Toll Road interchange (phase two), Reston Town Center station. A third station (Herndon to the west) will straddle the Herndon/Reston border at the existing Herndon Monroe transit hub.

Currently, Fairfax County operates several commuter express buses from free park-and-ride lots in Reston to the West Falls Church Metrorail station. The Reston Internal Bus System (RIBS) operates five routes that circulate within the Reston community, using Reston Town Center as a transfer point. RIBS is operated by the Fairfax Connector bus service and has the same fare system. In addition, Metrobus service is available to Dulles Airport from the Herndon Monroe Park and Ride (which is located in Reston), and it is also possible to take routes to the West Falls Church station, which then connects with Ronald Reagan Washington National Airport. Every Fairfax Connector bus that serves Reston is equipped with front-mounted two- or three-bicycle racks.



RIBS, Fairfax Connector and Metrobus serve the Reston area

LINK is a transit service website providing comprehensive transportation alternatives and bus schedule information and strategies to help make travel choices for Reston. It is funded by the Reston Town Center Association.

Reston bike share would be an extension of the existing Capital Bikeshare system and would act as an extension of the existing Reston transit system. Reston bike share stations would be separated from the rest of the current network by approximately 15 miles. Eventually, the bike system could cover the greater Washington, D.C. region with bike sharing, extending into out-lying areas by including transit connections to smaller service areas in dense, bike-friendly development nodes.

4.8 Public and Stakeholder Input

Two public open houses and an invited stakeholder workshop were held as part of this study. In addition, a number of local stakeholders representing a diverse range of interests were interviewed directly for input to the project.

Fairfax County Department of Transportation hosted a public open house on January 29th at Lake Anne Elementary School in Reston. The project team presented about bike sharing, solicited station suggestions on maps, and gathered ideas. The public was invited to give input to understand their interests and concerns and to encourage information sharing about the proposed bike share system. The open house also included information about how the system could work and how to decide the best locations to add new stations. In addition, it considered user and community issues and how to include underserved neighborhoods.

The open house began with a presentation about the project by Fairfax County Bicycle Coordinator, Charlie Strunk, followed by presentations by the project team about bike sharing and the feasibility analysis for Reston. After a question and answer period and discussion, further input was solicited at round tables and at poster boards with team members addressing public questions one-on-one. The public provided suggestions on locating bike share stations and what areas and services the bike share could serve locally. Additional displays presented on-line trip visualizations and Streetfilms videos about bike sharing and the CaBi system.

A second open house was held on June 25th, 2014 to present the results and recommendations of the feasibility study to the public.



The public gave input on the bike share project at the January open house event

Table 4-3 summarizes the questions and comments that were addressed during the first public open house. See Appendix A for media report about the evening.

Table 4-3: Reston Public Open House Questions and Comments

Topic	Summary of Questions and Comments from Open House Attendees
Property Owners	<ul style="list-style-type: none"> • Have you spoken to developers/property owners? • The developer of Lake Anne, Dave Peter, is interested
Users & Use	<ul style="list-style-type: none"> • Do you anticipate the desired uses to be different for suburban to urban uses • Do other areas have different use? • Is there a minimum age to sign up? • Can you rent helmets? • How is signing a waiver handled? • Will educational programs and route information be provided? • Reston has lots of hills: have you looked around at constraints when there are only three gears? • Low income users: good possible sites include Lake Anne and Southgate • Need for different types of marketing to differ users: residents, tourists • Ride to Silver Line for commute to work • Farmer market trips • Ride to/from village centers and Reston Town Center • Ride to/from Wiehle Station • Ride to/from Plaza America • Neighborhood is not dense enough for a station so would have to walk to pick up a bike: probably easier to use my own bike
System Design	<ul style="list-style-type: none"> • Do other areas have different bikes? • How is Rockville doing? • How do you handle/transfer bikes that travel to other jurisdictions? • How do you take into account where stations are to be installed?
Funding	<ul style="list-style-type: none"> • How does it affect funding or system if someone rides a bike from Reston to DC? • How conceptually are you going to make it work as a County system when the existing system is mostly for tourists?

The team conducted a half-day Reston Bike Share Stakeholders Workshop on December 18th, 2013 at the Hunter Mill District Government Center Office with key stakeholders to understand their interests and concerns and to encourage information sharing, champion building, and collaboration. The team worked with Fairfax County staff to identify representatives from Reston Association, Reston Town Center Association, Reston Pedestrian and Bicycling Committee, business interests, community organizations, local non-profits, and others.

The workshop began with an opening address by Fairfax County Supervisor Catherine Hudgins and was followed with bike share presentations by Charlie Strunk of Fairfax County DOT, Fionnuala Quinn and Charlie Denney of Alta Planning + Design, and Chris Eatough of BikeArlington. Following the presentation, a discussion session was held with the assembled stakeholders provided input, making suggestions and asking questions using the following topics:

1. What are the goals for bike share in Reston?
2. Identify key Reston destinations and types of trips
3. What are the opportunities and challenges for Reston bike share?

In addition, phone and one-on-one interviews were conducted with key local stakeholders. See Appendix B for details of the stakeholder interviews.

5 Reston Program Definition

Analyzing demographic information can help predict information about a potential Reston bike share system, including where and how users might travel. This section discusses the analysis of local demographic information to consider the extent, size, and phasing of a potential local system and define such system parameters as station spacing, the number of bikes per station, and the number of docks. It also identifies typical station placements and identifies considerations for expanding the system in the future.

5.1 Service Area

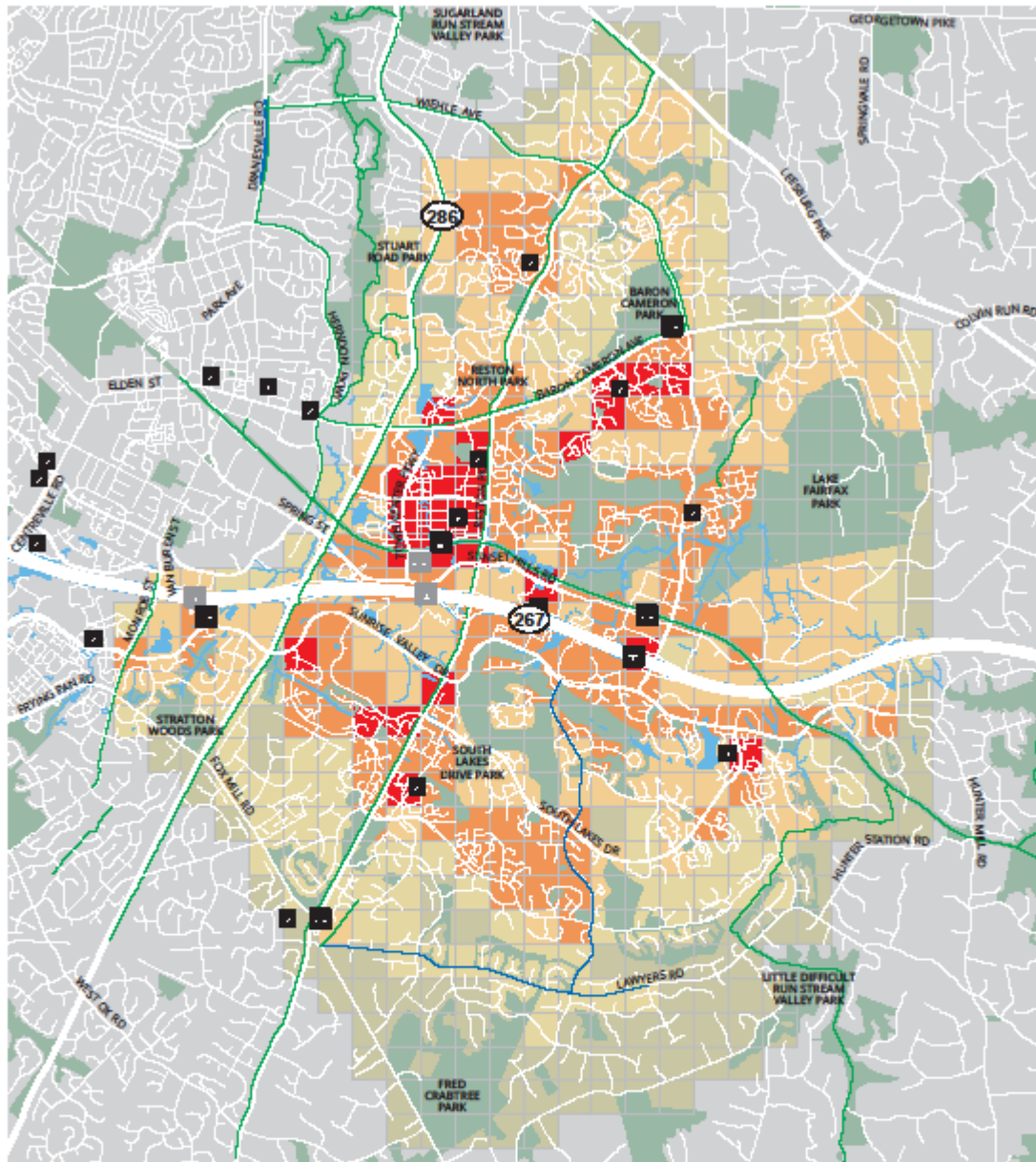
Areas with high potential demand for bike share were identified through a heat mapping exercise that allocate “points” to where people live, work, shop, play, and take transit. The factors used in this analysis are identified in Table 5-1 below.

Table 5-1: Reston Heat Map Inputs

Category		Base Score
Where People Live	Total Population	1 – 5
Where People Work	Total Employment	1 – 5
	Total Retail Jobs	1 – 5
Where People Play and Other Destinations	Retail / Commercial Parcels / Mixed Use Areas	1 – 5
	Total Arts, Entertainment and Recreation Jobs	1 – 5
Where People Access Transit	Fairfax Connector/RIBS Bus Stops	1 – 5
	Wiehle-Reston East Station	1 – 5
	Transit Oriented Development	5

The heat map shown in Figure 5-1 is a composite map based on the factors identified in Table 5-1. See Appendix C for heat maps input factors. Highest demand potential in Reston is indicated in the vicinity of the Reston Town Center District and the Wiehle Station-Sunset Hills Drive corridor. South of this corridor, bike share potential is limited by lower residential and commercial densities. Bike share potential is also limited north of Sunset Hills Drive, as this area predominantly comprises residential housing, lacking density and mix of uses that would generate frequent bike share trips. Wiehle Station and Reston Town Center have characteristics supportive of bike share trip destination and are also close to other key destinations. These areas were identified through a combination of heat mapping analysis of potential trip origins and destinations (i.e., transit stops, employment, commercial areas, and higher density residential) as well as through stakeholder interviews and consultation with agency staff.

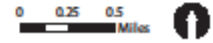
Figure 5-1: Composite Suitability Analysis for Reston



Estimated Composite Demand

- Demand**
- Higher
 - Medium-High
 - Medium-Low
 - Lower

- Legend**
- Park and Ride
 - Park and Ride (Closing with opening of Silver Line)
 - Silver Line Stn. (Under Constr)
 - Silver Line Stn. (Future)
 - Reston Transit Center
 - Shopping Center
 - Off-Road Bikeway
 - On-Road Bikeway
 - Park



Data obtained from Fairfax County and the U.S. Census Bureau. Map updated June, 2014.



The most suitable areas for bike sharing stations are in the vicinity of Wiehle Station and the Reston Town Center District and including:

- The eastern corridor (Wiehle-Reston East Metrorail Station and bus transit areas).
- The central corridor (Plaza America commercial and employment area).
- The north-western corridor (Reston Town Center District, Reston Hospital and medical office campus, Reston Library and North Government Center, the Spectrum commercial shopping areas).

Although potential demand is also shown around the Lake Anne Village Center, there is limited potential demand indicated in the geographic areas linking Lake Anne to the other higher demand areas.

5.2 Potential market segments

Communities interested in bike share systems now have the opportunity to learn from a number of established North American programs. Table 5-2 below identifies trip characteristics from several existing bike share systems and is summarized below:

- **Bike share trips tend to be relatively short in distance but vary based on location.** The average trip length on CaBi bikes is just over a mile. Boston Hubway trips are averaging similar distances while Denver B-cycle trips are longer at approximately two miles.
- **Annual members are less likely to exceed the free ride period casual users.** CaBi has a price structure designed to encourage short trips and includes a free ride period of 30 minutes. Tourists and other casual users who purchase day-memberships tend to be more willing to exceed the free ride period and pay associated overage fees. Annual members tend to keep their trips within the free ride period and do not end up paying many fees.
- **Usage on a per bike basis varies.** The number of trips per bike is indicative of overall system use and also impacts revenue. The larger and more densely populated urban areas experience more usage on a per bike basis. Usage tends to increase as the system matures and more people have the opportunity to try bike sharing.

Table 5-2: Trip Characteristics of Sample Bike Share Systems

System	Average Trip Distance	Average Trip Duration	Trips/Bike/Day	Most Popular Station
Capital Bikeshare	1.33 miles	44 minutes (casual user)/20 minutes (annual member)	2.67	Dupont Circle
Hubway	1.13 miles	70 minutes (casual user)/17 minutes (annual member)	1.95	Boston Public Library
Boulder B-cycle	2.8 miles	<30 minutes	0.62	15th & Pearl Street (Downtown parking garage)
Denver B-cycle	2.05 miles	<30 minutes	1.44	16th & Market Street

5.2.1 Potential Users and Trip Types in Reston

Expected users of the system and the geographic spread of local attractions suggest the following potential trip types:

- Short distance trips to and from transit stops, particularly from Wiehle Station to nearby large employers during the morning and evening commute times.
- Short distance trips to and from residential areas particularly from the Reston Town Center District to and from transit stops during the morning and evening commute times.
- Daytime trips to Wiehle Station to reach meetings elsewhere in the region and in downtown DC.
- Mid-day trips from employment to commercial areas (e.g., to Reston town Center for lunch or errands) or meetings.
- Short distance trips to commercial areas or downtown.
- Recreational rides, including along the W&OD to the towns of Herndon or Vienna.
- Integration with CaBi trips at the other end of commuter trips in Arlington or Washington DC. For example, Arlington residents taking CaBi trips to Ballston or Clarendon Metrorail stations for the morning reverse commute to Reston and then using CaBi again at the Reston end of trip to access employer.
- Residents of Reston traveling via transit to other CaBi communities for business, leisure or other purposes both during the week and weekend.
- Residents of Reston traveling via transit to other CaBi communities in the evening or at weekends for events and having the option not to take their personal vehicle to Arlington or downtown DC destinations.

5.2.2 Connecting Transit Nodes and Major Employers

An important opportunity exists for bike share to serve as a ‘last mile’ connection between transit nodes and major employers in Reston. As well as the existing employment sites along Sunrise Valley Drive and in the Reston Town Center District, there are also a new employment sites expected to be developed in the coming years. There are additional opportunities for bike share trips originating from employers even for those who have driven to their place of work: where local workers may be unwilling to avail of the myriad of local restaurants and stores, because of the risk of losing their workplace parking spot or because of traffic congestion, now they will have the option of a more-direct active lunch-time trip by bike. Similarly, they may find that it is more pleasant to conduct local business such as attend a meeting in downtown DC by combining bikes with the extensive trail network and the new rail system without the worry of the local road congestion issues.

Bike share can help employers achieve Transportation Demand Management (TDM) goals around promoting alternatives to driving and active transportation. Many employers in Reston already see value in supporting alternate modes of transportation for their employees through transportation demand management programs such as offering free or subsidized transit passes. Policies are already in place that will encourage developers and tenants of new developments to support alternate modes of travel for their tenants, customers and employees. Employers can be partners in implementing or growing a bike share network through the purchase of a station at their site and/or by purchasing or subsidizing bike share memberships for their employees. Given the proximity of employers to other destinations such as Reston

Town Center, the Reston Library/North Government Center, the Spectrum centers, employer support of bike share can help increase the accessibility of bike sharing to the general public. Large employers may have an interest in becoming an overall program sponsor.

5.3 Program Refinement and Potential Sites

This section identifies key considerations in system planning for bike share, which include:

- Providing stations at an appropriate spacing so users can easily access a bike
- Ensuring that the system is not too small to be effective
- Identifying an appropriate dock-to-bike ratio to balance capital and rebalancing costs.

Reston is smaller in size and less dense than some of the more prominent urban locations with bike share. However, there have been an increasing number of smaller communities investing in bike share and Reston bike share would be a part of an established system that is already operating successfully. There are increasing numbers of examples of communities becoming part of regional bike share systems, including Alexandria and Rockville joining the CaBi system and Brookline, Cambridge, and Somerville joining the Hubway system.

The Land Use and Demographics analysis considers residential and employment densities, demographics, activity and employment centers, and land use mix. Reston is defined by the census-designated place boundary. Table 5-3 summarizes the population and population density for both Reston and the proposed Bike Share Service Area.

Table 5-3: Reston Population Data

	Reston	Bike Share Service Area
Population	58,404 people	4,903 people
Population Density	3,712 people per square mile	5,760 people per square mile

Source: U.S. Census Bureau, 2010 Census

Table 5-4 summarizes the employment and employment density for both Reston and the proposed Bike Share Service Area. Note that the Reston employment population is greater than the Reston resident population.

Table 5-4: Reston Employment Data

	Reston	Bike Share Service Area
Employment	64,538 employees	25,614 employees
Employment Density	6.4 employees per acre 9,856 employees per sq. mile	47 employees per acre 30,080 employees per sq. mile

Source: 2010 Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES)

The face of bike share is constantly changing. Many U.S. transportation officials were skeptical that bike sharing would be able to replicate the success of its European counterparts, and initially, bike share systems in the U.S. were considered limited to only large cities with high population and employment density and large mass transit systems. As more success is realized, larger cities are expanding bike sharing into lower density and lower income areas and new, smaller communities (such as Boulder, Charlotte, Spartanburg, Nashville, and Chattanooga) have entered the bike share market. These systems have been the real test of bike sharing in smaller markets, and in many cases, it is too early to fully measure their success.

Table 5-5 below presents population, population density, and system size information for communities of similar size to Reston operating bike share systems, including communities that have been incorporated into expanded regional bike share programs. Reston has similar overall population and population density to several of these communities. As indicated in this table, many community systems of this size have been associated with a regional expansion of a large system rather than a stand-alone system

Table 5-5: System size in bike share communities that are a similar sized to Reston

City	Population	Population Density (Persons/Sq. Mi.)	Stations	Bikes	Commenced Operation
Alexandria, VA (expansion of CaBi)	139,966	3,697	8	70	2012
Chattanooga, TN	167,674	1,242	27	270	2012
Cambridge, MA (part of Hubway)	105,162	16,422	22	220	2012
Boulder, CO	97,385	3,884	15	110	2011
Somerville, MA (part of Hubway – Boston area)	75,754	18,147	8	73	2012
Brookline, MA (part of Hubway)	58,732	8,637	3	27	2012
Greenville, SC	61,674	2,148	6	28	2013

5.4 Equity Analysis

Bike share systems are gaining increased attention as a potential tool to address transportation equity issues that exist in communities. Bicycling has long been regarded as a method to address transportation access issues due to the low cost in comparison with car ownership (and even transit fares). Because many low-income neighborhoods also face health issues, active transportation modes like bike share can assist communities in addressing issues on multiple fronts.

Some of the challenges of providing bike sharing to lower income and traditionally under-served communities include barriers associated with encouraging bicycling in general such as a lack of access to bike facilities, funding programs dedicated to bicycling projects in these areas; as well as barriers to bike

sharing such as typically lower densities with destinations tending to be more spread out, lower visitor activity (a critical driver of user revenues), and the need for a credit card to access the system.

Programs to address equity and increase access to the system can occur at the planning stage and through programs implemented during launch and operations. Examples of programs already underway around the U.S are summarized in Table 5-6 and it is recommended that these programs be explored further for implementation in Reston.

Table 5-6: Programs to Address Equity Access to Bike Share

Barrier	Program
Planning	
System Planning and Expansion	<ul style="list-style-type: none"> • Hubway: have provided 3 – 4 stations in low-income neighborhoods, even though demand and revenue projections did not support these locations. • Nice Ride: has encouraged expansion into “neighborhoods with historic issues of poverty and a high incidence of heart disease, diabetes, high blood pressure and obesity”. Specific funding is often available for this purpose such as the federal Job Access Reverse Commute program (now part of the Enhanced Mobility of Seniors and Individuals with Disabilities Program). • Denver B-Cycle: used local funding from the Denver Housing Authority to provide several stations in low income neighborhoods.
Public Outreach	<ul style="list-style-type: none"> • Community input is an important part of system planning. Online maps are becoming common for many new and expanding bike share systems. • Ensure that non-electronic media are also available and placed in locations more accessible to under-served and non-English speaking communities. • Partnerships with social service organizations can help to spread the word and encourage participation in the process.
Launch and Operations	
Need a computer to register	<ul style="list-style-type: none"> • Hubway: members can be signed up over the phone; membership drives through community partners and at local events.

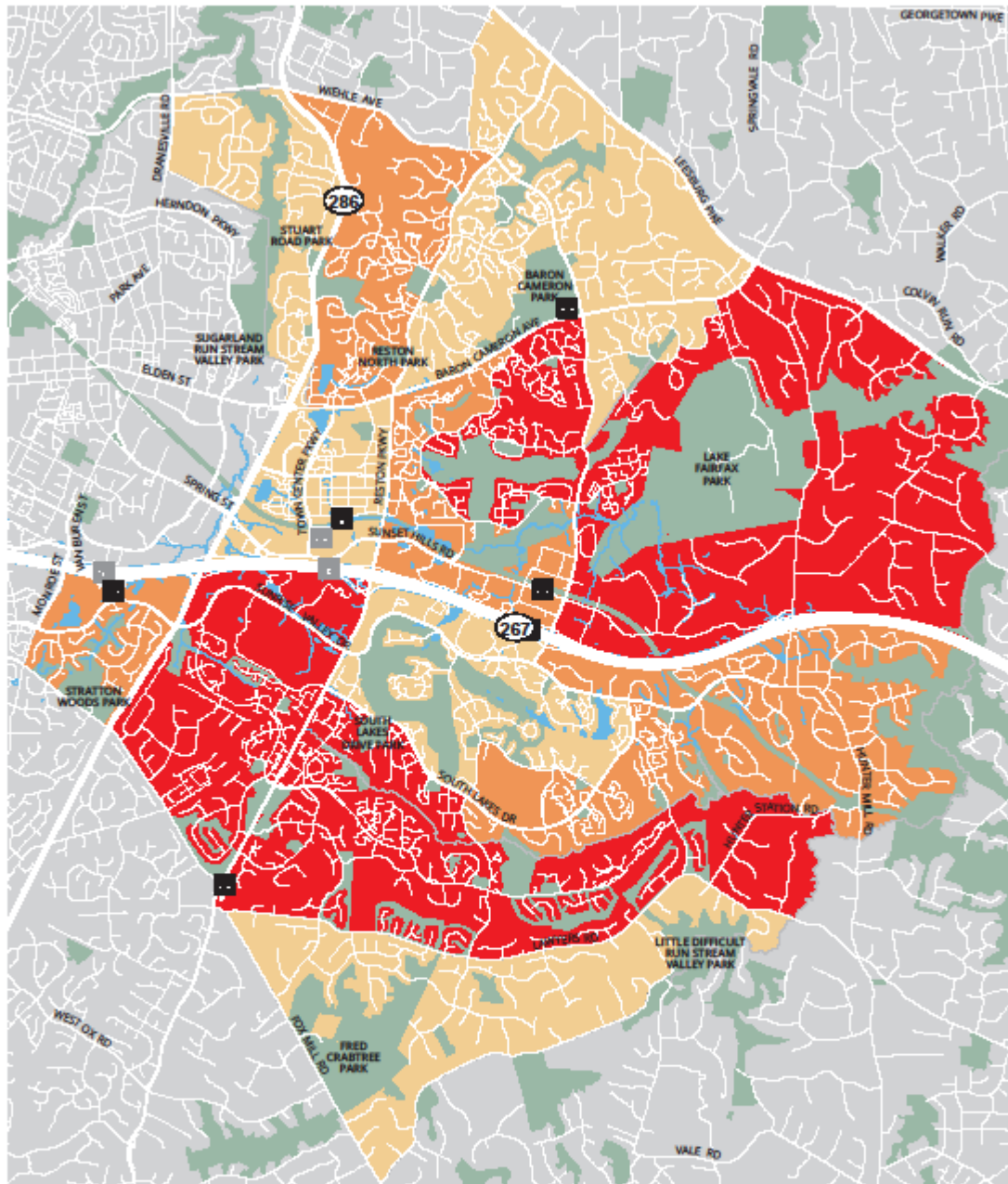
Barrier	Program
Need a credit card to access the system	<ul style="list-style-type: none"> • Capital Bikeshare: partners with local community financial institutions and Bank on DC to enable new bike share users to establish a checking account and obtain a debit card. Bank On DC is an organization that seeks to provide financial education and services to unbanked families and individuals. Reduced price memberships are provided to Bank On DC account holders. • Hubway: accepts debit cards as well. • New York City: partnering with community organizations to provide a guarantor program that shifts responsibilities for the hire of the bike from the individual to the guarantor organization.
Language barrier	<ul style="list-style-type: none"> • Capital Bikeshare: provides materials in Spanish that are mailed to local residents when a bike share station is opened in a new neighborhood. • Hubway (and other systems): Technology displays information available in multiple languages, flyers developed in multiple languages, partner support.
A deposit is required for the bikes	<ul style="list-style-type: none"> • Hubway: has removed deposit requirements for annual and subsidized memberships.
Price	<ul style="list-style-type: none"> • Hubway: provided 600 subsidized \$5 annual memberships in 2012 funded by a grant from the Communities Putting Prevention to Work (CPPW) program. • Nice Ride Minnesota: Target Corporation sponsors Nice Ride’s low-income outreach program and subsidized 600 free annual subscription coupons distributed to low income residents in 2012. • Capital Bikeshare, Hubway, and Madison B-Cycle: provided discounted membership offers through Groupon, Living Social, or other discount providers. • Denver B-Cycle: has partnerships with employers of low-income individuals (such as Goodwill) to encourage participation through corporate membership. • Most systems: offer an introductory rate (e.g., \$60 for annual Hubway membership rather than \$85).
Lack of riding skills or discomfort in riding	<ul style="list-style-type: none"> • Hubway: helmet giveaways (funded by a federal grant); learn-to-ride classes; safety training courses.
Lack of familiarity with the system	<ul style="list-style-type: none"> • Hubway: membership drives, increase education, attendance at local events and festivals, demonstration videos.

Barrier	Program
Biking not popular amongst all groups	Hubway: neighborhood promotions (e.g., guided bike rides, messages from local personalities, etc.); education programs.
Employment opportunities	Chicago: DBE requirements for site planning and launch. Toronto: job-training program where bicycles are maintained by the Learning Enrichment Foundation, which hires local youth and trains them in bicycle repair as part of its mission.

Given the need to be financially self-sufficient, bike share systems have typically launched in high demand areas such as urban downtowns, which tend to have higher densities and a mixture of land uses and potential trips. However, more recently, some cities including Minneapolis and Washington D.C. have started to expand into lower demand areas, with a particular emphasis on making the system available to all users and to provide an additional, low-cost transportation option to under-served communities. Increasingly, geographic and social equity have become important considerations for new and existing bike share systems.

A spatial analysis of three variables associated with traditionally underserved populations was conducted as part of this study. The analysis considered: the percentage of population living in poverty, the percentage of non-white population, and the percentage of non-English speaking population with the highest occurrences of these populations shown in Figure 5-2 as a 'composite equity map' that combines the percentage scores in each criteria by census tract. Reston has a high proportion of traditionally underserved populations living in neighborhoods throughout the area. Bike share can provide a low-cost travel option for these populations and a number of strategies described in Table 5-6 can be employed to engage these populations and reduce access barriers to the system.

Figure 5-2: Composite Equity Map for Reston



Composite Equity Analysis

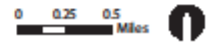
The Composite Social Equity Tiers reflect the average of four social groups with higher concentrations of:

- 1) Families living below or near the poverty line
- 2) Households with nonwhite racial/ethnic
- 3) Households with a non-Hispanic English speaking ability
- 4) Populations below age of 15 or above age 65

A higher tier represents a higher relative concentration of these groups.

Equity Tier
High
Medium
Low

Legend
■ Park and Ride
□ Park and Ride (Closing with opening of Silver Line)
■ Silver Line Stn. (Under Con. #2)
■ Silver Line Stn. (Future)
■ Reston Transit Center
■ Park



Data obtained from Fairfax County and the U.S. Census Bureau. Map updated June, 2014.



5.5 Station density

The size of the system is a function of the coverage area and the desired spacing/density of stations. State of-the-practice from bike share systems in larger North American cities suggests that stations be spaced on average approximately 1,000 feet to 1,300 feet apart in the highest demand areas. However, Reston does not have the density of residential, commercial and visitor destinations to make such spacing necessary or financially viable. Instead it is recommended to focus on locating stations that target key destinations such as transit stations, employment sites, and commercial areas.

A key factor that will influence use of a given station is the number of stations located within a relatively short 10-15 minute ride along a route that is comfortable for biking. Additionally, each station would ideally be located relatively close by to at least one other station to provide a nearby alternative to return a bike if the destination station is full. While bike share in Reston is likely to be implemented incrementally as funding allows, the overall station plan could target a density of stations to maximize the number of stations that are proximate to a variety of other bike share trip destinations.

5.5.1 Minimum System Size

Similar to the discussion above, a system that is too small limits its effectiveness. Bike share systems typically aim to provide a mix of trip origins and destinations to generate enough activity to justify the cost of operations. The following system layout planning considerations are recommended:

- The coverage area at which bicycling becomes a more attractive option than walking. The median walking trip is approximately five minutes, in which time a person can walk approximately 1/4 of a mile, but can cycle approximately 3/4 of a mile.
- The system must provide a variety of trip origins and destinations.
- Reasonable station density so users can easily access a station. If stations are too far apart, users will consider they have to walk too far to access a bike and will not make the trip or will take a different mode.
- The system needs to be a reasonable size to justify the cost to operate the system. There are some economies of scale in terms of operating the system.
- A system of 10 stations is considered the minimum to provide an effective mix of trip origins and destinations and to justify the cost of operations.

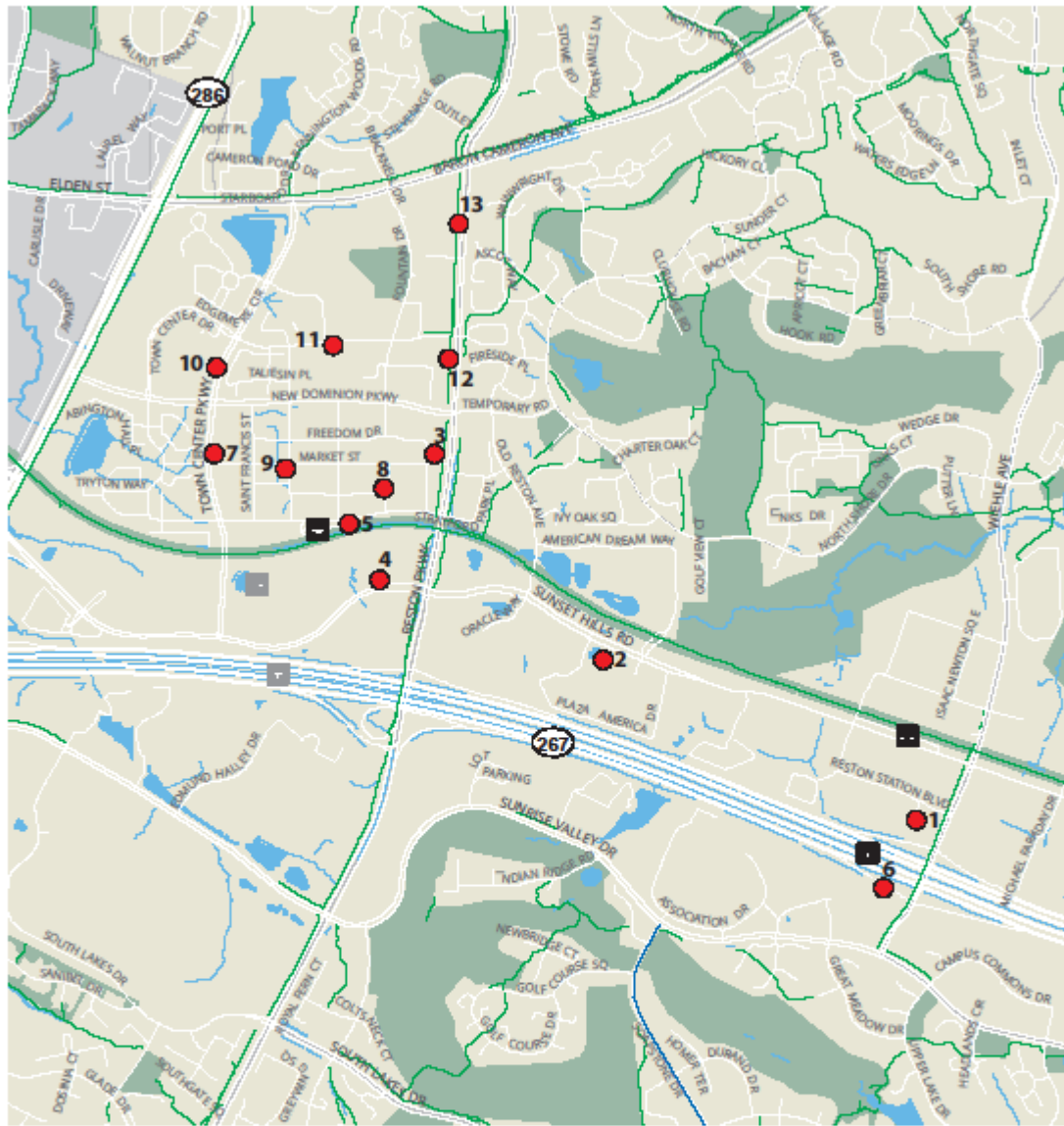
An element of the interest around bike share in Reston is the existence of several large employers and development projects that are encouraging bicycle use as an alternate and healthy form of transportation. While each of these entities could develop their own bike sharing or lending program, the opportunity exists for these efforts to come together to create a bike sharing program that is greater than the sum of its parts. Bike share could start on a small scale in Reston and grow over time as funding allows.

5.5.2 Proposed Station Plan

A preliminary station map is shown in Figure 5-3. Refer to Appendix D for the opportunities and constraints analysis matrix for these station locations. Specific station locations, e.g., the specific intersection corner or block face will need to be determined as part of the implementation phase. Preliminary recommendations for bike share station locations were determined based on the results of the heat map, from stakeholder input, and considering land use and activity centers such as: key transit stops, higher density housing and employment centers, permitted future major development projects, neighborhood and commercial centers, visitor attractions, landmarks, civic facilities; and college and hospital campuses. However, siting stations while meeting station densities and ridership rates in areas identified as high need in the Equity Analysis proved difficult. Due to the financial and ridership implications to the system operation, bike share stations cannot be located far from the central Reston area into the surrounding neighborhoods in the first phase.

Additional station locations were analyzed and may be added to later phases of the system. The cost and ridership analysis looked at extending the initial system to the South Lakes Village Center including additional stations on the south side of the Wiehle Station. While this extension of the system would facilitate access to the Metrorail system for the South Lakes area residential community, it was found that based on the characteristics around each station (including population density, employment density, transit access, and proximity to other stations) these stations scored the lowest and would expect lower ridership. The additional stations are relatively isolated from the rest of the system, so there are fewer other stations within a short ride. In addition, there are gaps and surface issues in the existing trail network which would need to be addressed to allow better access to these stations. It was not recommended to include these stations in the first phase of the project due to the cost of purchasing and operating these stations balanced against the expected lower ridership.

Figure 5-3: Preliminary Station Plan



Proposed Station Plan

Draft, June 2014

Stations

- 1. Wiehle Station/Plaza
- 2. Sunset Hills/Plaza America
- 3. Reston Town Center/Freedom
- 4. Sunset Hills/Fountain
- 5. Bluemont/Transit Center
- 6. Wiehle Station/Southside
- 7. Town Center Parkway/Market
- 8. Reston Town Center/Fountain
- 9. Market Street/Explorer
- 10. Town Center Parkway/Reston Hospital
- 11. Bowman Towne Drive/Library
- 12. Reston Parkway/Spectrum (South)
- 13. Reston Parkway/Spectrum (North)

Legend

- Proposed Bike Share Station
- Off-Road Bikeway
- On-Road Bikeway
- Park and Ride
- Park and Ride (Closing with opening of Silver Line)
- Silver Line Stn. (Under Con str.)
- Silver Line Stn. (Future)
- Reston Transit Center
- Park
- Reston (Census)
- Designated Boundary

0 750 1,500 Feet

Data obtained from Fairfax County Map updated June, 2014.

A Phase II concept was prepared and envisioned an expansion of the program by extending the system along adjacent transportation and community corridors. The expansion would be tied to successful

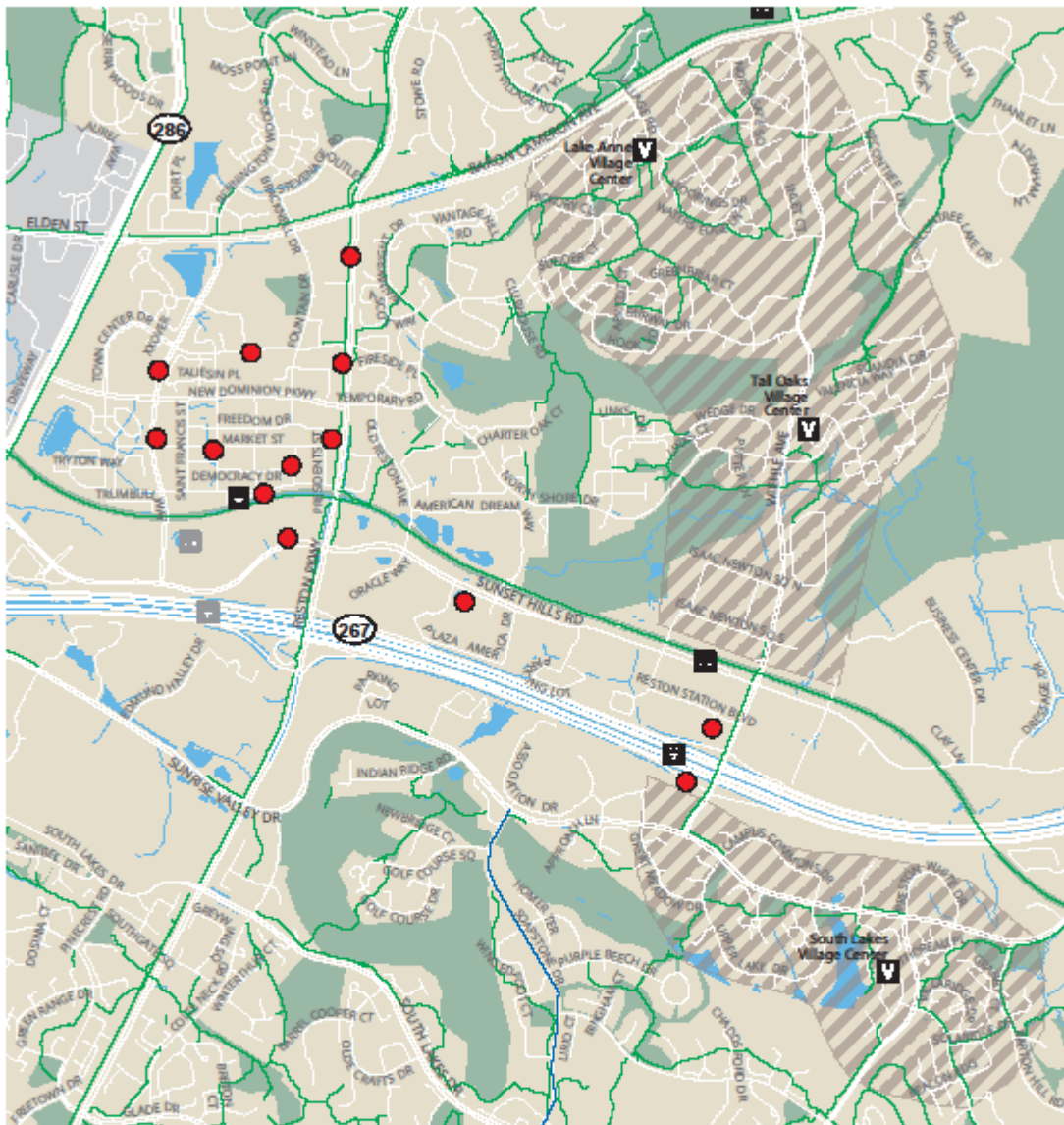
operation, further promotion and additional users coming on-line. Refer to Figure 5-4 for the proposed Phase II service areas:

- Northwards to encompass the Lake Anne Village Center area (and incorporating the Tall Oaks Village Center)
- Southeast to encompass the South Lakes Village Center area
- Additional stations could be added where there is potential for an employer or development project to support a station, including through direct purchase

The mix of commercial, employment, and residential uses along these corridors increases the likelihood of adequate demand although the lower densities in between may depress demand at some stations. However, these corridors may potentially serve an increased range of lower-income Reston communities.

With the opening of the second phase of the Silver Line, the additional area westward along the Dulles Toll Road corridor could also be considered as part of Phase II. When the second Metrorail station opens in Reston, the bike share system could also be extended as part of that transportation network change.

Figure 5-4: Bike Share Phase II Service Areas



Proposed Station Phasing Plan

Draft, June 2014

0 750 1,500 Feet

Data obtained from Fairfax County
Map updated June, 2014.



Station Phasing

- Phase 1 Proposed Bike Share Station
- Phase 2 Service Area

Legend

- Off-Road Bikeway
- On-Road Bikeway
- Village Center
- Reston Transit Center
- Park and Ride
- Park and Ride (Closing with opening of Silver Line)
- Silver Line Stn. (Under Constr.)
- Silver Line Stn. (Future)
- Park
- Reston (Census Designated Boundary)

6 User Demand and Financial Assessment

This section compares expected system costs to forecasted user demand and revenues to determine any additional funding requirements. Suggested funding and potential funding strategies are also explored in detail.

6.1 System Costs

The major costs associated with a bike share system are start-up costs, broken into capital and launch costs, and operating costs are presented in Table 6-1 for the 13 station/130 bike system scenario.

Table 6-1: Cost Estimate for Proposed Reston Bike Share System

Costs	13- station/130 bike system	
	\$	Notes
Launch	\$54,500	<ul style="list-style-type: none"> • Cost per station 15-27 docks@\$3,000, 35 docks@\$3,500 • \$15,000 cost to purchase spare parts, train new staff, etc.
Capital	\$766,000	<ul style="list-style-type: none"> • Cost per Station, 15 dock - \$49,000, 19 dock - \$58,000, 23 dock - \$64,000, 27 dock- \$73,000 and 35 dock - \$89,000
Operating	\$397, 824	<ul style="list-style-type: none"> • 259 Docks at \$128 per dock per month
Total	\$1,218,324	

Launch costs are the start-up costs associated with establishing a bike share system. These are mostly one-time expenses associated with hiring employees, procuring a storage warehouse, purchasing bike and station assembly tools, website development, communications and IT set-up, and pre-launch marketing. These one-time costs would be significantly less for a Reston system as most of these elements needed for launch are already in place. Each additional system phase has a start-up cost also. These include site planning and permitting, bike and station assembly, station installation, etc.

Capital costs are the costs associated with purchase of equipment including stations, kiosks, bikes, and docks. Equipment costs can vary depending on system parameters, such as the number of bikes per station or the number of docks per bike. The bikes themselves are only a small portion of the capital costs for the system.

Operating costs include those required to operate and maintain the system. This includes staff and equipment related to:

- **Station maintenance:** including troubleshooting any technology problems with the kiosk or docking points, cleaning and clearing the station, snow removal, removing litter and graffiti, etc.
- **Bike maintenance:** including regular inspection and servicing of bikes as well as maintaining equipment inventory, etc.
- **Rebalancing:** typically the highest operating cost for the system is the staff time and equipment associated with moving bikes from full to empty stations.
- **Customer service:** providing a responsive customer interface for enquiries and complaints as well as performing marketing and outreach to new and existing customers.
- **Direct expenses:** such as maintaining an operations facility, purchasing tools and spare parts, upkeep of software, communications, IT, and general administrative costs such as insurance.

Operational costs will depend on numerous factors but are most influenced by the Service Level Agreement, which sets out the operating terms that must be met (e.g., how long a station can remain empty, how often bikes are inspected, snow removal policy, etc.). The agreed upon service levels will need to balance operating costs with the impact on customer service from any operating cost cuts. There are also economies of scale, with a number of fixed costs associated with operating the system that do not scale with the number of stations or bikes. Relatively smaller systems cost more to operate (per station or per bike) than larger systems. Experience so far suggests that economies of scale do not materialize until a system reaches 10 stations or more.

6.1.1 Cost Reduction

City agencies and other organizations can play a key role in minimizing costs by providing station right-of-way and a streamlined permitting process. There may be other in-kind contributions to reduce budget line items such as providing free or low-cost warehouse space, utilizing staff assistance with marketing and promotion, etc.

There is also the potential for private developments to contribute to bike share through a condition to fund all or a portion of a bike share station as part of a trip mitigation or travel demand strategy. Possible mechanisms include the codification of bike share stations as a method to achieve vehicle or bicycle parking modifications or trip reduction credits.

6.2 Funding

An important element in ensuring the local success of bike share is identifying the necessary funding for installation, launch, and operation. Unlike other transportation modes, most North American systems use a combination of public and private funding to cover bike share capital and operating costs. The range of funding sources that have been employed include federal or state grants, local public funding, private or corporate sponsorship with additional support from user-generated revenues. See Table 6-2 for examples of the mix of funding sources used in various North American bike share systems.

Table 6-2: Bike Share Systems Capital Funding

Bike Share System	System Description	Public Capital Funding	Private Capital Funding
Hubway, Boston, MA	<ul style="list-style-type: none"> Publicly owned/Private operated 61 stations 	\$3 million - 75% (CDC Communities Putting Prevention to Work, CMAQ, FTA Bus Facilities Livability Initiative Program, state grants)	\$1 million - 25% (Multiple local sponsors and a naming sponsor)
Capital Bikeshare - Washington DC (Phase 1)	<ul style="list-style-type: none"> Publicly owned/Private operated 	\$5 million - 100% (83% CMAQ, 17% District funding)	\$0
Capital Bikeshare - Arlington (Phase 1)	<ul style="list-style-type: none"> Publicly owned/Private operated 	\$200,000 - 40% (State grants)	\$300,000 - 60% (Local BID sponsorship)
Denver Bike Sharing	<ul style="list-style-type: none"> Non-profit/non-profit 	\$210,000 - 16% (ARRA Federal Energy Efficiency and Conservation Block Grant program)	\$1.3 million - 84% (Kaiser Permanente as "presenting sponsor", Denver 2008 DNC Host Committee, several foundations, multiple station sponsors)
Nice Ride Minnesota (Phase 1)	<ul style="list-style-type: none"> Non-profit/non-profit 	\$1.75 million - 58% (Bike Walk Twin Cities/FHWA) + \$250,000 - 8% (City Convention Center Fund)	\$1 million - 33% (Blue Cross Blue Shield tobacco settlement funds)

6.2.1 Federal Funding Sources

Federal grants have been the largest source of capital funding for most bike share programs established so far in the United States, including the bike share systems in Washington, D.C., Boston, and Minneapolis. The current federal transportation funding program, Moving Ahead for Progress in the Twenty-First Century (MAP-21), will be in effect through September 30, 2014. Work is currently underway on the next transportation bill, the GROW AMERICA Act, but it is too early to know how bike share funding will be addressed.

Federal transportation funding is typically directed through state agencies to local governments either in the form of grants or direct appropriations, independent from state budgets. While the programs that have funded bike share are federal, they are often managed at the state or regional level. In Virginia, federal monies are administered through the Virginia Department of Transportation (VDOT) and metropolitan planning organizations (MPOs), such as the Metropolitan Washington Council of Governments (MWCOCG). Most, but not all, of these programs are oriented toward transportation, with an emphasis on reducing auto trips and providing intermodal connections.

The majority of the funding for the capital costs, implementation, and expansion of Capital Bikeshare in Arlington and Alexandria has been federal funds that are administered by the VDOT. The funds require that the locality pay a 20% match to the federal funds. Additionally, for the initial startup in Arlington, the Crystal City Business Improvement District provided a contribution of \$200,000. Monthly operation and maintenance costs are paid by each jurisdiction. In Arlington and Alexandria, membership and user fees help to offset these costs but do not cover the entire expense. Both jurisdictions use a combination of local and federal funds to fund the system.

The following is a list of possible federal funding sources that can be used to support bicycle share. Most of these are competitive and involve documentation of the project need, costs, and benefits. Bicycle share can compete for money intended for bicycle transportation, general transportation funds, and also select pools of transit funding.

Moving Ahead for Progress in the Twenty-First Century (MAP-21)

The largest source of federal funding for bicycle and pedestrian projects is the US DOT's Federal-Aid Highway Program, which Congress has reauthorized roughly every six years since the passage of the Federal-Aid Road Act of 1916. The current legislation, MAP-21 was enacted in July 2012, and authorizes funding for federal surface transportation programs including highways and transit until September 2014. The reauthorization of MAP-21 is currently in process so Fairfax County will need to keep track of potential funding as the legislation is developed. There are a number of programs identified within MAP-21 that are applicable to bicycle and pedestrian projects. MAP-21 programs that are eligible to fund bike share include:

- Federal Transit Administration Capital Funds (FTA)
- Associated Transit Improvement (ATI)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- National Highway Performance Program (National Highway System) (NHPP/NHS)
- Surface Transportation Program (STP)
- Transportation Alternatives Program/Transportation Enhancement Activities (TAP/TE)

- Federal Lands Highway Program (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program) (FLH)
- Transportation, Community, and System Preservation Program (TCSP) – until funds expended

See Appendix F for a more complete list of federal bicycle and pedestrian funding opportunities and whether or not bike share systems are eligible. Most of these programs are competitive, and involve documentation of the project need, costs, and benefits.

Transportation Alternatives (TAP)

Transportation Alternatives (TAP) is a funding source under MAP-21 that may be used for a variety of pedestrian, bicycle, and streetscape projects including sidewalks, bikeways, multi-use paths, school safety, and rail-trails. Bike share applications for TAP funding would be competing against other bicycle projects in the state or region.

Eligible projects for TAP funding include Transportation Alternatives as defined by Section 1103 (a)(29). This category includes the construction, planning, and design of a range of bicycle and pedestrian infrastructure including “on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation, including sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with Disabilities Act of 1990.” Infrastructure projects and systems that provide “Safe Routes for Non-Drivers” is a new eligible activity. For the complete list of eligible activities, visit:

http://www.fhwa.dot.gov/environment/transportation_enhancements/legislation/map21.cfm

Average annual funds available through TAP over the life of MAP-21 equal \$814 million nationally, which is based on a 2% set-aside of total MAP-21 authorizations. TAP funds for the Washington, D.C. Region are administered through the Transportation Planning Board of the MWCOG. Fairfax County received a \$400,000 allocation of these funds to implement this TLC study during the most recent funding cycle.

Interim guidance released by the Federal Highway Administration clarifies that the Transportation Alternatives Program does not establish specific standards or procedures for the competitive grant process, but indicates that the USDOT plans to develop best practices for consideration: “DOT will publish a model Request for Proposal or Notice of Funds Available that States and MPOs may use at their discretion.” For more information, see: <http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm>.

Congestion Mitigation/Air Quality Program (CMAQ)

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter, which reduces transportation related emissions. States with no nonattainment areas may use their CMAQ funds for any CMAQ or STP eligible project. These federal dollars can be used to build bicycle facilities that reduce travel by automobile, and have been used to fund the initial capital expenses of many US bike share systems. However, while CMAQ has been used to fund the capital expense of bike share system expansions to new service areas, it has not been proven as a source of funds for ongoing costs like program operations and maintenance.

MAP-21 has allocated a notable increase in total CMAQ funding, to an average of \$2.2 billion per year in 2013 and 2014. Because bike share has a history of successfully competing for CMAQ grants, this larger

funding pool is positive for bike share funding. Fairfax County continues to be an air quality non-attainment area qualifying for these funds. CMAQ funds provided key funding of the DC phase of the initial Capital Bikeshare system and also funded subsequent expansions for both DC and Arlington. However, while CMAQ has been used to successfully fund the capital expense of bike share system expansions to new service areas, it has not been a source of funds for ongoing costs like program operations and maintenance. CMAG funding for Northern Virginia jurisdictions, including Fairfax County, is managed through the Northern Virginia Transportation Authority. Both the City of Alexandria and Arlington County have used these funds for capital expenses associated with Capital Bikeshare.

Pilot Transit-Oriented Development Planning

MAP-21 established a new pilot program to promote planning for Transit-Oriented Development also administered by the FTA. The bill text states that the Secretary of Transportation may make grants available for the planning of projects that seek to “*facilitate multimodal connectivity and accessibility*” and “*increase access to transit hubs for pedestrian and bicycle traffic*”. This program is purposed to support comprehensive planning, so this will not be a source for capital funding.

Research, Development, Demonstration and Deployment Projects

MAP-21 established a pool of transit funds for innovative, low or zero emission transit vehicles and infrastructure, administered by the Federal Transit Administration (FTA). The purpose of the program is to:

To support research activities that improve the safety, reliability, efficiency, and sustainability of public transportation by investing in the development, testing, and deployment of innovative technologies, materials, and processes; carry out related endeavors; and to support the demonstration and deployment of low-emission and no-emission vehicles to promote clean energy and improve air quality.

Bike share programs appear to qualify for funding. The program has been allocated \$70 million per year in 2014. As part of any award, a 20% local match is required along with an evaluation report on the project's effectiveness within two years of the funding date. For additional information on the program visit:

http://www.fta.dot.gov/documents/MAP-21_Fact_Sheet_Research_Development_Demonstration_and_Deployment_Projects.pdf

Job Access Reverse Commute Program (eliminated), now part of Enhanced Mobility of Seniors and Individuals with Disabilities Program

The recent expansion of Capital Bikeshare to Rockville, Maryland, was funded in part by Job Access and Reverse Commute (JARC) program funds from the Federal Transit Agency. Under MAP-21, the JARC program was eliminated, and job access and reverse commute activities were made eligible expenses under the Section 5307 (Urbanized Area Formula) grants, which go to transit agencies in urbanized areas. MAP-21 combines the New Freedom program with the Section 5310 (Elderly & Disabled) program to create a new Section 5310 "Enhanced Mobility" program. MWCOG is the Designated Recipient for the Washington DC-VA-MD Urbanized Area funds under MAP-21. The first solicitation under MAP-21's Enhanced Mobility of Seniors and Individuals with Disabilities Program is anticipated to occur in the summer of 2014.

Non-Transportation Federal Funding Sources

Partnership for Sustainable Communities

Founded in 2009, the Partnership for Sustainable Communities is a joint project of the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (USDOT). The partnership aims to “improve access to affordable housing, more transportation options, and lower transportation costs while protecting the environment in communities nationwide.” The Partnership is based on five Livability Principles, one of which explicitly addresses the need for bicycle and pedestrian infrastructure:

Provide more transportation choices: Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.

While the Partnership is not a formal agency with a regular annual grant program, it is an important effort that has already led to some new funding opportunities. It is recommended to track the Partnership announcements and be prepared to respond proactively to grant announcements on www.grants.gov. Initiatives that speak to multiple livability goals (such as partnerships with transit providers) are more likely to score well than initiatives that are narrowly limited in scope to bicycle efforts. In addition, each of the partnership agencies maintains websites to track their own grant announcements. The grants announced on these sites will also be announced on www.grants.gov.

6.2.2 State Funding Sources

Arlington County received a grant from the Department of Rail and Public Transit to fund a portion of the initial Capital Bikeshare system in the County. No other State level funds have been used to study, plan, or implement bike share programs in Virginia.

6.2.3 Private Foundations

Private foundations are becoming an increasingly important source of funds for bicycle transportation projects, and grants in support of bike share systems are part of this trend. Many corporations or wealthy business families have related foundations that support social causes and the health and environmental benefits of bicycle share are attracting public attention. In Minneapolis, Nice Ride Minnesota received funding from the Central Corridor Funders Collaborative (<http://www.funderscollaborative.org/>), a coalition of local and national private foundations interested in supporting activities synergistic with the local light rail line.

6.2.4 Local Public Funding and Contributions

Some jurisdictions have used local public funding for the initial deployment of bike sharing, e.g., providing “match” amounts as a show of support or to encourage the private sector in a public/private business model. These funds are most likely to be directed towards capital costs or a specific annual amount for operations. Agencies are less likely to want the responsibility (and uncertainty) of funding annual operating costs.

Ongoing public funding could potentially come from local “steady stream” sources such as Commercial and Industrial (C&I) tax revenues, parking revenues, bus bike rack advertising, special taxes, distribution of license plate fees, etc. Under state law, Northern Virginia jurisdictions may use

commercial real estate taxes as a way to raise money for transportation projects and improvements. Station purchase could also form part of a developer’s travel demand management strategy and proffer contributions. Bike share could potentially follow the example of recent streetcar systems in the US, which have often used federal funding for initial capital expenses, and then used local funding for operations with expenses shared by multiple governments and transit agencies.

6.2.5 Private and Corporate Sponsorships

Many North American bike share systems rely on some portion of private funding. This can be in the form of donations (such as in Denver and Boulder), sponsorship (such as in Minneapolis), and/or advertising (such as in Boston and Montreal).

There is a subtle difference between advertising and sponsorship. Advertising includes a contract with a company to provide a regularly changing graphic display and message, which could be independent of the bike share station on other street furniture. The advertiser and/or message may not be associated with bike sharing or bicycling in general. Revenue could be generated by selling advertisement space on Fairfax Connector bus shelters and benches and on Capital Bikeshare information panels. Sponsorship typically involves a longer-term relationship between the sponsor and the vendor, where stickers are put on the infrastructure (bikes, stations, and/or website) with a logo and/or statement that “Company X supports Capital Bikeshare”.

Sponsorship models vary significantly between jurisdictions and the level of branding. For example, New York City obtained a five-year system-wide sponsorship from Citibank for \$41 million (or an average of nearly \$14,000 per station per year for 600 stations) that includes the Citibank branding on all bikes, kiosks, and media. Sponsorship packages are offered in Denver for \$20,000 to \$30,000 per year and include logo placement on the station kiosk, logo placement on 10 bikes, and links on the website. In 2011, Denver Bike Sharing obtained over \$600,000 in sponsorship revenue. In 2103, Seattle Children’s Hospital announced a \$500,000 grant to Puget Sound Bike Share to provide for two stations on the hospital campus as well as providing adult helmets at future bike-share stations in the Seattle area. Locally, the Arlington County sponsorship packages offer station sponsorship or Adopt-a-Station options with a range of levels for each: <http://www.bikearlington.com/tasks/sites/bike/assets/File/CB-Sponsorship.pdf>

There are generally two approaches to sponsorship:

- System-wide sponsorship: this can be a single sponsor that pays for full branding of system infrastructure, e.g., London or New York, or multiple sponsors that split the cost in exchange for proportional branding, e.g., Montreal or Toronto:
 - Advantages: one-time sale of sponsorship, known timeline and full “occupancy”, consistent and recognizable branding.
 - Disadvantages: often difficult to secure sponsor given the large initial investment, less opportunity for smaller businesses to get involved, competing brands can conflict certain tenants or nearby businesses, which could be an issue in Reston if many stations are placed on the private property of employers or other businesses.
- Multiple sponsors: this model ranges from a single large sponsor paying for branding of a portion of the infrastructure but still allowing smaller station sponsors, such as in Minneapolis, to the

model of selling many smaller sponsorships, such as in Miami and Denver. Capital Bikeshare has also leveraged smaller station-level sponsorships to incrementally expand its system.

Participants have been businesses like hotels that can leverage an adjacent bicycle share station as a selling point for customers.

- Advantages: fewer competing interest concerns, opportunities for businesses of all sizes to be involved, opportunity to value sponsorship by demand;
- Disadvantages: income relies on “uptake” of a certain amount of sponsorship each year, significant effort in securing numerous sponsors, less consistent branding.

Several large businesses in Reston could be interested in sponsoring a local bike share system. Experience in other communities has shown that companies are generally interested in sponsorship for its positive media and “good corporate citizen” benefits as much as for the amount of advertising exposure it provides. In interviews related to this project, several of the business stakeholders indicated a potential willingness to sponsor the purchase and installation of a station at their property or contribute towards the naming of an adjacent station.

A regional corporate sponsorship of the entire system would assist in generating revenues by providing placement of a corporate sponsor’s logo on the bicycle, docks or map panels, as well as website, and social media sites. Placement locations on the bicycle include both sides of the skirt guard, basket panel, website, and social media sites. Completing the regional Request for Proposal (RFP) with all the local member jurisdictions’ input and selecting a winning bidder could take 6 - 12 months.

Any system sponsorship needs to be in accordance with the Capital Bikeshare written joint understanding between the jurisdictions.

6.2.6 Station Purchase

Large employers or developers may also consider directly purchasing a station for their development. There are a number of factors to consider in establishing direct-purchase agreements including the level of sponsorship to be included, the cost of access for their employees (if any), and the cost to purchase the station. It is important to remember that bike share includes both capital and operating costs. Thus, if a local employer were to purchase a station at their location, the additional station and bikes would add to the cost of operating the bike share program and these costs would need to be accounted for and either included as part of the agreement or paid for out of other funds supporting operations for the entire system.

Table 6-3: Reston Employers

Reston: Largest Employers (Above 200 employees)		
Accenture	Lafarge	Simplexity
American College of Radiology	Learning Tree International	SLM Corp. (Sallie Mae)
American Society of Civil Engineers	Lightsquared	SoftwareAG
BAE Systems	Lockheed Martin	Sprint
Capital One Bank	Maximus	STG
College Entrance Exam Board	Microsoft Corp.	TEKSystems
comScore	NCI Information Systems	Triple Canopy
Ericsson	Northrop Grumman	Truland Systems Corp.
Fairfax County	NVR	Unisys
Freddie Mac	Oracle	U.S. Department of the Interior – U.S. Geological Survey
Gate Gourmet	Quadrant	Value Options
GCI	QinetiQ North America	Verizon
Hydrogeologic	Pragmatics	Versign
Insperty	Reston Hospital Center	VM Ware
ITT Exelis	Scitor	Whitney, Bradley & Brown
L-3 Communications	Serco North America	
	Siemens	

6.2.7 User-Generated Revenue

Most North American cities rely on a combination of user revenues, public funding, and private funding. There are some systems that have sufficient demand such that user revenues entirely or almost entirely cover the cost to operate the system. While rates may vary between jurisdictions within the CaBi system, user-generated revenues will provide the Reston bike share with some level of income. User revenues consist of access fees paid up-front to register for the system and usage fees are charged to the user based on how long they use the system.

Table 6-4: Current Capital Bikeshare Access Fees

Membership	Charge	Notes
24-hour	\$7	<ul style="list-style-type: none"> Casual user Credit card, new passcode each use
3-day	\$15	<ul style="list-style-type: none"> Casual user Credit card, new pass code for each use
Daily key	\$10 + \$7/day	<ul style="list-style-type: none"> Key Credit card on file
Monthly	\$25	<ul style="list-style-type: none"> Key Credit card on file
Annual	\$75	<ul style="list-style-type: none"> Key Credit card on file
Annual with Monthly Installments	\$84 (12 monthly payments of \$7)	<ul style="list-style-type: none"> Key Credit card on file

Usage fees are charged to the user based on how long they use the system. Most systems offer a “free ride” period, typically between 30 and 60 minutes where the user pays no additional costs if the bike is returned within that time period: the CaBi “free ride” period is 30-minutes with fees charged to users on a graduated scale once that period is exceeded. The free ride period and the graduated rate scale differ for annual members (typically residents) and casual users (typically visitors) as described in Table 6-5.

Table 6-5: Current Capital Bikeshare Usage Fees

Ride Time	Total Hourly Fee	
	24-hour and 3-day members	Monthly, Annual, Annual Installment Members
00:00-29:59 min	Free	Free
30:00-59:50 min	\$2	\$1.50
60:00-89:59 min	\$6	\$4.50
90:00-119:59 min	\$14	\$10.50
+ Each half hour	+\$8/half-hour	+\$6/half-hour

The fare rate system is intended to keep annual membership attractive to the resident population, encourage use to the extent it does not compete with local bike rental vendors, provide reasonable and comparable prices to other public transportation modes, and encourage short local trips.

Although system-wide ridership per station is increasing, Arlington’s most recent expansion occurred predominately in lower demand areas; thus, the cost recovery ratio (user revenues as a percentage of overall operating costs) has remained roughly similar between fiscal years. Arlington covers the difference entirely by commissions on the sale of transit fare media generated by Arlington County Commuter Services (ACCS). However, Arlington County is in the process of identifying new revenue sources to support the operations and capital replacement costs.

Corporate Sponsorship Options

Corporate discount programs are one option for increasing membership in a bike share program. Memberships can be offered at a discount rate to employees with employers paying some portion of the membership. See Table 6-6 for CaBi corporate membership offers.

Table 6-6: Capital Bikeshare Corporate Memberships

Corporate Membership Option	Platinum (100% plus)	Gold (100%)	Silver (50%)	Bronze (25%)
Organization Contribution to Membership	\$50	\$50	\$25	\$12.50
Employee Contribution to Membership	\$0	\$0	\$25	\$37.50
Organization Responsibility for Usage Fees	All	None	None	None
Employee Responsibility for Usage Fees	None	All	All	All

Table 6-7 provides a summary of local corporate sponsorships for the CaBi system.

Table 6-7: Capital Bikeshare Corporate Memberships (Sept. 2010-May 2014)

Corporate Membership Option	Number of Corporate Partners	Number of Memberships Sold ⁴
Platinum	6	67
Gold	71	2513
Silver	20	1166
Bronze	6	186
Portal (2014 YTD sales only)	16	1750

Based on information supplied by goDCgo, 6/5/14

6.2.8 Funding Community Membership Subsidies

While bike share is affordable for many, for some in the community it still may be a challenge due to cost or the need to have a credit card with ability to maintenance a certain balance level. In recognition of these issues, communities have created programs to allow wider access to membership. The introduction of bike sharing to Rockville, Maryland was funded in part by a JARC grant, so the system was specifically intended to extend commuting options to lower income workers commuting to work, education, or job training. Under the JARC grant, Rockville provides free bike share memberships for those who meet income eligibility requirements. As well as membership, qualified individuals receive free bike safety training, a free helmet, and route planning. Lower income community members qualify if one end of a trip to work or job training is in the Rockville area.

6.3 Reston Financial Assessment

Table 6-8 applies the current Capital Bikeshare rate structure to five-year estimates of membership and demand for the deployment of a 13-station/130 bike system in Reston. The deployment would occur in a single system wide rollout beginning in year one. The resulting user-generated revenue estimates are compared to capital, launch, and annual operating costs to determine the amount of additional funding that will be required over the initial five year operation period.

As shown in Table 6-8, at system maturity for the 13 station system scenario, user-generated revenues are estimated at \$156,000, compared to annual operating costs of \$400,000. Initial capital and launch costs amount to \$820,500 in year one.

The revenue forecast projects that approximately \$2.1 million in funding will be needed to fund capital, launch, and operating costs for a 13-station system over five years. If this funding gap were to be filled through sponsorship, this represents approximately \$33,000 per station per year (13 stations and 5 years).

⁴ Includes renewing memberships for existing members as well as membership for brand-new members

Table 6-8: 13-Station System: Five Year Usage, Revenue and Cost Forecast⁵

	Year 1	Year 2	Year 3	Year 4	Year 5
Demand					
Bikes	130	130	130	130	130
Trips	34,000	45,000	49,000	51,000	51,000
Trips / Bike / Day	0.72	0.95	1.03	1.07	1.07
Member Trips	24,000	32,000	35,000	36,000	36,000
Casual Trips	10,000	13,000	14,000	15,000	15,000
Membership					
Annual	400	500	500	600	600
Casual Subscribers	4,100	5,300	5,800	6,200	6,200
Cost					
Capital	\$765,000				
Launch	\$55,000				
Operating (annual)	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000
Total	\$1,220,000	\$400,000	\$400,000	\$400,000	\$400,000
Funding					
Annual Memberships	\$34,000	\$43,000	\$43,000	\$51,000	\$51,000
Casual Subscriptions	\$42,000	\$56,000	\$59,000	\$63,000	\$63,000
Annual Member Trip Fees	\$3,000	\$3,000	\$4,000	\$4,000	\$4,000
Casual Subscriber Trip Fees	\$32,000	\$42,000	\$46,000	\$48,000	\$48,000
Refunds	\$(10,000)	\$(13,000)	\$(12,000)	\$(11,000)	\$(10,000)
Total Revenue	\$101,000	\$131,000	\$140,000	\$155,000	\$156,000
User Revenue / Bike	\$777	\$1,008	\$1,008	\$1,192	\$1,200
User Revenue / Trip	\$2.97	\$2.91	\$2.86	\$3.04	\$3.06
Funding Required	\$1,119,000	\$269,000	\$260,000	\$245,000	\$244,000
Five-Year Total Funding	\$2,137,000 (-\$33,000 per station per year)				

⁵ With additional funding (e.g., title sponsor, station sponsors, or contributions from institutional, private, or individual donors) additional bikes or station expansions could be readily added to system during this five-year timeframe resulting in a more robust system potentially serving a broader area of Reston

6.3.1 Forecast Validation

Forecasts for Reston were compared to first year usage and membership statistics for existing systems in Alexandria (CaBi), Somerville (Hubway), Brookline (Hubway), and Boulder for the following metrics:

- Trips / bike / day: the Year 1 forecast for Reston of 0.72 trips/bike/day is within the range of other systems. It is similar to first year statistics for Boulder (0.7 trips/bike/ day) and Alexandria (0.90 trips/bike/day). The systems in Somerville and Brookline experienced higher rates, likely due to their greater population densities.
- Members-per-bike ratio: Reston is expected to have a members-per-bike ratio of 3.1:1, which is lower than the ratio in many cities, likely due to the lower population base in Reston (see Table 6-9).
- Trips per member ratio: bike share in Reston system is expected to operate at approximately 60 trips per member, which is higher than first year performance of other systems, but lower than the average number of trips per member in the entire Capital Bikeshare system (-90 trips/member/year) (see Table 6-10).

Table 6-9: Trip Comparisons for First Year of Operation

	Operating Days	Trips	Bikes	Stations	Trips/Bike/Day
Reston, VA – 13 – Station System	365	34,000	130	13	0.72
Alexandria (CaBi)	365		70	8	0.90
Somerville, MA	242	35,642	108	12	1.36
Brookline, MA	242	17,019	36	4	1.95
Boulder, CO	240	18,500	110	15	0.70

Notes: Operating days are based on the first year of operation for all systems

Table 6-10: Member Comparison for First Year of Operation

	Years (Season)	Bikes	Annual Membership	Members /Bike	Total Annual Member Trips	Trips per Member
Reston, VA – 13 – Station System	1 st Year	130	400	3.1	24,000	60.0
Alexandria, VA	2012/2013 (1 st)	70	429	6.1	15,815	36.8
Somerville, MA	2012/2013 (1 st)	108	508	4.7	12,107	23.8
Brookline, MA	2012/2013 (1 st)	36	365	10.1	8,638	23.7
Boulder, CO	2011 (1 st)	110	1,170	10.6	n/a	n/a

Notes: Operating days are based on the first year of operation for all systems

7 Reston Design and Layout

Typical bike share system considerations for a system such as Reston include the following:

- **Ensuring that the system is not so small as to provide ineffective service:** The system needs to be of a reasonable size to justify the cost for an operator to service the system and cover the costs for the necessary elements. A minimum of 10 stations could justify the cost of operations as part of the existing CaBi system.
- **Providing a variety of origins and destinations:** Users would have a broad range of possible trips that can serve a wide range of types of users over the entire course of the day and week. A 10-station system provides a mix of trip origins and destinations, especially when transit hubs are included.
- **Providing stations at an appropriate spacing so users can easily access a bike:** This is the coverage area at which bicycling becomes a more attractive option than walking. The median walking trip is approximately 5 minutes, in which time a person can walk approximately 0.25 miles, but can cycle approximately 0.8 miles. A five-minute bike trip represents approximately a 2-square mile catchment area. As station spacing increases, at some point users will consider they have to walk too far to access a bike and may no longer be inclined to make the trip or will likely select a different mode.
- **Number of bikes and docks:** It is important that there be sufficient empty docks for riders to return bikes. Operators across North America have utilized dock to bike ratios ranging from 1.5 docks per bike to 2.0 docks per bike in service and in the system. Higher ratios require more up front capital cost, but reduce operating cost as there is reduced need to create space for bike return. A ratio of 2 docks per bike exists for CaBi as a whole and would be a required ratio should Reston join the greater system.
- **Station dimensions:** The dimensions of a typical 20-position (i.e., 19 docks plus the terminal/kiosk) CaBi station are 40 feet by 6 feet with bikes parked. Station width is approximately 3 feet without bikes and four-dock station module units are 10-feet in length. The total length of a 20-position station is equivalent to about two vehicle parking spaces. Examples of typical layout details for a range of station sizes and configurations are included in Appendix G.

7.1 Station Placement

Capital Bikeshare stations are modular, rely on solar power and wireless communications, and do not require excavation or hardwiring. As such, stations can be moved, relocated, or expanded to meet demand. Stations locations need to be visible and accessible and located considering the needs of other travel modes (e.g., pedestrian circulation, bus zones, building entrances). Stations require vertical clearance for installation and solar access and, while there may be occasions when stations are placed under existing cover, this is not usual as it also creates station placement equipment access issues.

The basic site requirements are a hard surface, asphalt or concrete, with at least four hours of daily solar exposure and convenient access for rebalancing and maintenance activities. There needs to be an area within site of the station where a Sprinter van can park to load and unload bikes. Adequate space for pedestrians usually needs to be maintained adjacent to the station. The area also needs to be clear of

overhead wires, signs, and other possible obstructions that could interfere with the operation of the crane that is used for installation of the stations.

Considerations for station placements include:

- **Sidewalks:** Many of the public sidewalks in Reston are relatively narrow at 4'-5' in width. Bike share stations are approximately 6 feet deep with bikes parked. VDOT should be closely involved to determine what width of sidewalk is considered appropriate to maintain sufficient pedestrian circulation. This may vary depending on the volume of pedestrians.
- **On-street:** It may be possible to use on-street locations in place of low-use on-street parking in Reston. In places where an on-street station location is desirable, it will be necessary to discuss parking removal with VDOT as well as the installation of bollards or flexposts to protect users. Parking is at a premium in Reston. In places where an on-street location is desirable, it will be necessary to discuss parking removal with Public Works, Planning, and stakeholders. Some agreement may be required to offset lost revenue to the city, though the donation of parking spaces by the city can be viewed as in-kind support of the bike share program.
- **Off-street sites:** Station locations in publicly-owned plazas, public spaces, at transit stations or in parks would require consultation with the relevant agency or department. Agreements would need to be negotiated between the owner/operator and the individual landowner for stations placed on private lands.
- **Powering stations:** The solar system in use in the CaBi system has proven effective. System operators remotely monitor station power levels and replace batteries when needed. CaBi has never had a station go out-of-service or operation due to lack of power. Bike share stations using solar panels tend to be more cost-effective over time as AC-powered stations require additional infrastructure and time for deployment, and cannot easily be moved to other locations. Solar-powered stations are easier to relocate in response to market needs but are not as easy to locate due to their need for a daily dose of direct sunlight in order to maintain power.

To date all of the stations in the Capital Bikeshare system are located on public property or within easements that allow public uses. The Hubway system in Boston has a dozen stations located on private property. A licensing agreement is in place for these locations in Boston, and if any such locations were considered for Reston, that agreement could be used as a model.

7.2 System Operations and Logistics

Specific elements of a potential operation in Reston are summarized in Table 7-1 with information about the preferred set up and minimum requirements to be met for a local operation.

Table 7-1: Reston System Operational Elements

Element	Service & Application	Preferred Location or Set-up	Notes
Hardware			
Bicycle	<ul style="list-style-type: none"> A fleet of specially designed bikes Same as CaBi model (color, style, system name, logos) 	<ul style="list-style-type: none"> Refer to Reston Preliminary Station Plan for service area Trips likely centered around central Reston destinations 	<ul style="list-style-type: none"> Specific bikes are not individually owned by each jurisdiction as bikes circulate throughout the system Next closest CaBi station 15 miles away so few bikes will likely leave the Reston area Minor modifications are being made to the CaBi bike design over time
Modular Bike Share Station	<ul style="list-style-type: none"> Allows bike docking and rental transactions Solar-powered stations Modular to allow for easy installation and varied configurations 	<ul style="list-style-type: none"> Refer to Reston Preliminary Station Plan for initial phase station placement Minimum 10-stations recommended for local system Minimum 15-dock station size recommended Ratio 1 bike per 2 docks (per other operations nation-wide) Three-hour full or empty station standard Stations located in dense core Preferred density 1,000-1,400 ft apart Specific station installations must meet requirements for sunlight, space and clearance, grade, and operational access 	<ul style="list-style-type: none"> Reston stations approximately 15 miles west of closest existing CaBi stations Station style, appearance, and design would remain same as CaBi system Station density will likely be below preferred levels Additional sponsorship on stations possible Modular and various configurations possible Includes one kiosk per station Kiosk map + one side of kiosk available for advertisement Bike-to-dock ratio standard in Alta Bicycle Share operated systems While three-hour full or empty standard is used by all CaBi jurisdictions, timing could be varied for outlying Reston stations Minor modifications are being made to station design over time

Element	Service & Application	Preferred Location or Set-up	Notes
Rebalancing van	<ul style="list-style-type: none"> • Van accommodating 20-25 bikes • Van tracked by dispatcher 	<ul style="list-style-type: none"> • One rebalancing van would be added to the existing van fleet, primarily to serve Reston • For efficiency purposes, Reston-assigned van would likely perform additional rebalancing duties in Arlington en route • Park van overnight at existing secure South West Washington DC operations center 	<ul style="list-style-type: none"> • In later phase and with larger system, Reston or close-by location could be considered for van overnight • Staff could possibly access van via rail line • Possible traffic and congestion issues travelling to and from SW DC • Concerns about having a secure place to leave van at a remote location • Future possibility of creating secure over-night area at Reston transit stations or North Government Center
Bike Checking Equipment	<ul style="list-style-type: none"> • Bike, trailer, tools, supplies 	<ul style="list-style-type: none"> • Park overnight at secure SW DC operations center 	<ul style="list-style-type: none"> • Possible to use bike share for riding between stations to perform service • Concerns about having a secure place for equipment and supplies at a remote location • Future possibility of creating secure storage area at Reston transit stations or North Government Center
System Staff			
Manager	<ul style="list-style-type: none"> • Overseeing and management • Responsible for all aspects of daily operation 	<ul style="list-style-type: none"> • Reston system would be managed by the CaBi system manager and senior staff 	<ul style="list-style-type: none"> • Duties include supervising station and bike building and deployment, station and bike repair and maintenance, and bicycle redistribution as well as associated staff and equipment
Rebalancing staff technician	<ul style="list-style-type: none"> • Drive van that can fit 20 to 25 bikes • Load and unload bikes into stations per rebalancing needs 	<ul style="list-style-type: none"> • Continue with current practice of single staff member performing rebalancing tasks • Rebalancing, bike delivery/pick-up for service/repairs) would be run from the existing operations center in SW DC • Once a station is full/empty, the 	<ul style="list-style-type: none"> • Consider modifying contractual empty/full time requirements for outlying low-use stations • Rebalancing truck may sometimes include trailer or additional loader on board (approx. 5% of trips) • Average rebalancer can move 70-80 bikes per day

Element	Service & Application	Preferred Location or Set-up	Notes
	<ul style="list-style-type: none"> • Bike delivery/pick-up for repairs • Attend to battery replacements as needed 	<ul style="list-style-type: none"> • rebalancer has 3 hours to remove/add bikes • Battery recharging performed at SW DC operations center 	
Bike mechanic	<ul style="list-style-type: none"> • Perform routine service and major repairs 	<ul style="list-style-type: none"> • Bikes would be serviced and repaired at the SW DC operations center • Share existing space, equipment, supplies with existing mechanic team 	<ul style="list-style-type: none"> • Working space required as well as other staff amenities • No advantage to setting up a secondary location when rebalancing truck is travelling to and from SW base
Bike Checking Staff	<ul style="list-style-type: none"> • Inspect, repair and maintain fleet in field • Travel by bike between stations 	<ul style="list-style-type: none"> • Usually two staff per team • Bike checkers could possibly be hired locally • Consider teaming with local non-profit or bike store • Bike checkers could travel with rebalancing van to and from the SE operations center 	<ul style="list-style-type: none"> • Single person crew has been employed in Rockville on occasion; consider for Reston • Perform simple repairs • Decide when bikes at station are to be sent to mechanics for more comprehensive repairs • Bike checkers could use rail line for access • Consider hiring/training program through local non-profits • Possible teaming with local bike shop for service
Van dispatcher and station monitoring	<ul style="list-style-type: none"> • Monitor bicycle demand data • Assign and direct bike redistribution • Monitor station functionality; direct technicians 	<ul style="list-style-type: none"> • Van dispatch and station bike monitoring would be performed centrally from the current location as part of the overall regional operation 	<ul style="list-style-type: none"> • Continue to manage centrally even with any future phase or expansion

Element	Service & Application	Preferred Location or Set-up	Notes
Software, Information & Communication			
IT system and payment mechanism	<ul style="list-style-type: none"> Connects individual users, stations and control center Use key fob (members) or credit card (casual users) to check bikes in and out 	<ul style="list-style-type: none"> Wireless communications Software covers registration, payments, subscriptions, station monitoring, outages, notification about out-of-service bikes, billing and customer data Same control center, software and system reporting as CaBi Station and bike information would be real-time Bikes to include RFID tracking system which allows tracking of removal and return 	<ul style="list-style-type: none"> Software is licensed for use with system System is designed as 'open source' Put local programs in place to allow the unbanked to access the system No on-board GPS system planned for bikes (similar to rest of CaBi system)
Dispatch Communications	<ul style="list-style-type: none"> Vehicle dispatch system and staff conversations Wireless communications 	<ul style="list-style-type: none"> Continue with current central system at SW DC operations center as Reston is within range for quality and communications coverage Vehicles: Nextrak (GPS-based) vehicle dispatch system Staff conversation: Use cell phone with 2-day direct connect (functions like a walkie talkie) 	<ul style="list-style-type: none"> Control center is a critical system element Use regular cell phones as back-up to both systems
Customer service	<ul style="list-style-type: none"> Public means of reaching technical assistance for bike-related or payment issues 	<ul style="list-style-type: none"> Use current contracted service: 1-877-430-2453 24 hours per day / 7 days per week English, Spanish and French Email: customerservice@capitalbikeshare.com 	<ul style="list-style-type: none"> Fully-staffed customer service is important system element Round-the-clock aspect provides higher level of service which reduces overall problems and improves customer perceptions

Element	Service & Application	Preferred Location or Set-up	Notes
Smartphone Apps	<ul style="list-style-type: none"> • Use to locate bike stations, display bike and bike dock availability • Free download 	<ul style="list-style-type: none"> • Use existing third-party apps, e.g., Spotcycle 	<ul style="list-style-type: none"> • Other apps also available • Evolving area • Can be used to create and share personalized bike routes • Improves customer experience
Information sharing	<ul style="list-style-type: none"> • Share information from system 	<ul style="list-style-type: none"> • Information is made publicly available on the Capital Bikeshare Dashboard • CaBi performs regular member surveys to learn how they use the program • Data visualization is also made publically available by non-CaBi analysts (third-party) 	<ul style="list-style-type: none"> • Social media additional important element • Sharing information increase transparency, accountability and communications with members and the general public • CaBi Trip Visualizer: http://mvjantzen.com/tools/visualizer/?system=cabi • Capital Bikeshare Tracker: http://www.cabitrapper.com/
Marketing	<ul style="list-style-type: none"> • Inform public about system and how it works • Inform about benefits to individuals and community 	<ul style="list-style-type: none"> • Fairfax County will need to develop a marketing plan and strategy • Employ print media, the internet and other means • Local promotions and fun activities to engage community positively • Include business community 	<ul style="list-style-type: none"> • Considerable brand recognition and system understanding already in region • Positive local media • Plan for internal marketing as well as external marketing (internal departments and county agencies) • Launch marketing required

8 Summary and Conclusions

The purpose of this study is to assess the potential for a bike share system in Reston, identify a suitable bike share service area and size, and make recommendations based on projected costs and user revenues. The study also looks at the preparedness of the community to host bike sharing, considers the operational details of extending the Capital Bikeshare system, outlines a potential program for Reston, and explores potential funding options. These items are summarized below.

8.1 Locating Bike Sharing in Reston

Reston has many of the characteristics required to make bike sharing successful:

- Comprehensive existing transit network including both rail and bus options.
- Existing bicycling network including the Reston trail system, the W&OD trail and available low-stress bicycling streets and connections.
- Established bicycling culture as demonstrated by bronze award designation from League of American Bicyclists.
- Community and business interest in bringing bike share to Reston.
- Compact developed area where most of the trip activity is focused.
- High daytime employment population travelling in and out of Reston.
- High levels of transit commuting from outlying communities.
- Supportive jurisdiction with strong commitment to the proposed system.

Despite Reston's many strengths that suggest a high-suitability for bike share, the community also has some weaknesses that may limit success of a bike share system. Potential challenges to bike share include:

- Infrastructure improvements and street crossings.
- Trail operational issues.
- Population densities and ridership rates.
- Station property ownership.
- Lower visitor levels and usage.
- Identification of capital and operations funding.

Available funding is generally the critical factor when it comes to implementation of a bike share system, and this is likely to be the case for locating bike sharing in Reston also.

8.2 Proposed System and Operation

This study proposes a 13-station system primarily located along the Wiehle-Reston East Metrorail Station to Reston Town Center District corridor. This area has the density and mix of uses that would likely generate more frequent bike share trips to support an initial system. Additional recommendations to ensure that the system and operation is a success include:

- Limiting initial system to the core Reston area with stations placed at key origins/destinations.

- Install initial system of 13 stations/130 bikes with a ratio of 2:1 docks to bikes.
- Servicing and staffing the Reston system from the existing warehouse in Washington, D.C.
- Adding one rebalancing van to the existing fleet, primarily to serve Reston.
- Assigning County staff with dedicated funding and responsibilities related to supervising, coordinating, and supporting the bike share system.
- Dedicating County staff or contractor with responsibilities for system marketing and promotion.
- Participating in the on-going regional inter-jurisdictional planning and coordination calls.

8.3 Regional Operation with Capital Bikeshare

Capital Bikeshare has been a successful addition to the transportation network in the region. Integrating into the Capital Bikeshare system offers certain benefits to both the jurisdiction and users but also has implications from a planning and inter-agency perspective. Adding Reston to the Capital Bikeshare system offers the following opportunities:

- Membership will provide new users access to the rest of the regional system.
- Existing members of the regional system benefit from having access to bike share in Reston.
- Opens up valuable regional travel options for both Reston and Northern Virginia for living and working between jurisdictions.
- Adds new travel options for reverse commuting into Reston from Arlington and Washington, D.C.
- Benefits from significant economies of scale in the launch and operation of a bike share system that is part of the existing Capital Bikeshare operation.
- Opportunity to avail of existing clause allowing all MWCOG jurisdictions to independently procure services of the selected vendor through the existing contract.
- Benefits from widespread local awareness and interest in the regional bike share program and its success to date.

Key issues to be resolved regarding extending Capital Bikeshare to Reston include:

- Negotiated contract with the operator of the system including service levels, maintenance protocols, and revenue generation.
- Although most system parameters need to be consistent between the jurisdictions, some flexibility would be possible, e.g., having separate sponsors and different funding sources.
- How system marketing and promotion will be handled locally.

8.4 Local Stakeholders and Property Owners

A key aspect of a Reston system will be engaging with the local agencies, property owners, employers, and developers as partners in support of bike share. This may involve licensing a station location or helping to bring a station to a particular location and includes consideration of the following issues:

- Establish and continue conversations regarding station siting procedures with property owners where stations are proposed for private sites.

- Once specific bike share station locations are established, Fairfax County staff from DOT and Planning and Zoning should determine how County ordinances will be applied to the stations and if any Proffer Condition Amendment (PCAs) will be required.
- Discuss opportunity for 24-hour use of the W&OD trail with NVRPA. Additional topics for discussion include trail snow removal and lighting.
- Pursue local funding possibilities and station sponsorship opportunities with employers or developers. The issue of public access could be part of discussions with potential sponsors of a station.
- Determine how bike share marketing and promotion will be handled for County.
- Include close-by property owners and developers in system marketing and promotion efforts and outreach.

8.5 Funding Strategy

Identifying funding sources for bike share in Reston is key for future success and will require a diverse funding strategy that covers the capital cost to purchase and launch the system as well as ongoing operating costs. Funding for capital and operations may be sourced as follows:

- Capital:
 - Regional, state, and federal funding.
 - Sponsorship.
 - Private sector/foundation funding.
 - Direct station purchase/support from interested land owners.
- Operations:
 - User revenue.
 - Station sponsorship.
 - Other public sources (e.g., C&I Funds).
 - Private sector/foundation funding.

As part of the potential funding strategy for Reston, the initial capital, as well as part of the first year's operating costs will require an initial investment from some other source (or combination of sources) such as use of the C&I Funds, a donation from a private foundation, or a regional, state, or federal grant. User-generated revenues and sponsorship will be required to maintain on-going operations. Potential funding strategies will need to be pursued in more detail by Fairfax County. It is also recommended to vigorously explore the availability of public funds and grants to subsidize the initial equipment purchase and launch. In addition, it appears that the local commercial and institutional market will support some private sponsorship and investments for the system.

8.6 Timeline and Next Steps

The following provides a summary of next steps to proceed with the planning and installation of a bike share system in Reston:

- Feasibility study (Completed)
- Advanced feasibility planning (6-9 months)
 - Engage private property owners.
 - Engage developers and large employers.
 - Coordinate with local agencies.
 - Identify necessary station siting agreements and permits.
 - Coordinate with regional jurisdictional partners.
- Secure funding (6-9 months, concurrent)
 - Grant applications.
 - Programming of local funds.
 - Sponsorships and advertising.
- Negotiation and Procurement (6-9 months)
 - Finalize contract, agreement, permits.
 - Confirm sponsorships.
 - Procure equipment and prepare station designs.
 - Pre-launch marketing.
- Launch system
 - Install stations and begin operations.
 - Monitor station demand and finances.
 - Assess programs for continuance, expansion.
 - Media, marketing and promotion.

8.7 Summary of Opportunities and Challenges

Reston has many characteristics that are supportive of bike sharing, but also a number of challenges that could impact usage levels and revenues from a proposed bike share system which may need to be addressed or considered in any final planning or decision making or future expansions of the system.

8.7.1 Opportunities

- The one-mile trip between the Wiehle-Reston East Metrorail station and Reston Town Center and other central Reston employment destinations.
- The W&OD trail connecting key destinations and providing a separated comfortable riding facility.
- The existing established bicycling network making a biking an attractive and comfortable option for a mid-day trip without having to give up an existing parking spot or worry about finding one at the trip destination.

- Moderately high population density combined with a good mix of uses in the vicinity of the Wiehle Station/Reston Town Center corridor that is supportive of generating short trips throughout the day and week.
- The established and supportive local bicycling culture and community including programs, BPAC and events.
- High number of large employers and development projects that are projected to include a large amount of employment and in some cases high density residential development.
- Existing up-to-date paper and on-line maps with detailed bicycling facility information.
- Large number of engaged stakeholders covering a range of commercial and community interests that support bike share and its implementation.
- Ongoing local infrastructure and crossing improvements associated with opening of Metrorail.
- Potential for partnerships with social service organizations to spread the word and encourage participation in the process
- Project timing in relation to new metro stations and local travel patterns and behaviors.
- Project timing in relation to future redevelopment allowing bike share station siting to be included in future planning.
- Progressive and supportive local political and agency environment.
- Integration with Capital Bikeshare allowing reduced launch and operating costs.
- Established bike share systems creating commuting opportunities at both ends of regional transit trips.
- Grant funding support and commercial sponsorship opportunities.

8.7.2 Challenges

- Lack of densities and connected high-quality bicycling infrastructure in the predominantly residential areas beyond the immediate Wiehle Station area.
- Distance from system to lower-income neighborhoods and village centers.
- Limited existing dedicated bicycle infrastructure along the major roadways in Reston including Sunset Hills Road, Reston Parkway, Wiehle Avenue, and Sunrise Valley Drive.
- Impacts of the design and operation of the existing street network including wide streets and intersections and high vehicle speeds and sidewalk gaps on cycling routes.
- Private property station locations requiring licensing agreements between the system operator and the private entity.
- Lack of comprehensive bicycling wayfinding and signposting for those unfamiliar with the trail alternatives and directions to key destinations.
- Trail use issues including snow clearing from key bicycling routes, W&OD trail opening hours and lighting
- Relatively low tourism which will have revenue impacts since casual users are more likely than annual members to exceed the free ride period and generate additional usage fees.

- The revenue forecast projects that approximately \$2.1 million in funding will be needed to fund capital, launch, and operating costs for a 13-station system over five years.

8.8 Conclusion

This document is intended to allow Fairfax County to move forward with consideration of implementing a bike share system. The Feasibility Study suggests that a bike share system is possible for Reston and, if carefully planned and managed, can enhance the mobility needs of those living, working and visiting the area. This opportunity is enhanced by the opening of the new rail line in the near future.

Identifying funding sources for both capital and on-going operations is a critical issue in moving forward with the system. However, there may be opportunities within the commercial and employment sectors of Reston for contributing to the system costs. With its established trail network and bicycling culture as well as supportive political, agency and community environment, Reston appears to provide an overall supportive situation for such a system. Launching a bike-share program would be an excellent way to add first- and last-mile trips to the transformed local transportation network.

APPENDICES

Appendix A: Public Meeting Article

Published: Thursday, January 30, 2014

Reston explores pilot bikeshare program *by [Kali Schumitz](#) Staff writer*

Fairfax County is evaluating whether to launch a pilot bikeshare program in Reston that would mark the first expansion of the Capital Bikeshare network into the county.

The Capital Bikeshare system, which began in Washington, D.C., and Arlington County about three years ago, now has more than 300 bikeshare stations in the District, Arlington, the City of Alexandria and Montgomery County. There have been more than 6 million trips on the system in that time.

Bike sharing systems are intended for a different use than how a bike owner might use his bike or services that rent bikes for leisure rides, said Fionnuala Quinn, an engineer with Alta Planning and Design, which is conducting a feasibility study for starting Bikeshare in Reston.

“It is quite different to owning a bicycle,” she said. “It’s an extension of the transit network.”

The goal is to help people get the last couple miles from a transit center to their destination. For example, from the Wiehle Avenue Metro Station opening later this year to Reston Town Center or Lake Anne Village Center.

Capital Bikeshare members pay \$75 per year, with monthly, three-day and daily rates also available. The first 30 minutes of any ride has no additional cost, and then the 30-minute rate increases the longer you keep the bike.

“You don’t want people using the bikes for hours at a time,” said Charlie Denney, also with Alta Planning and Design.

Reston was selected as a possible pilot location because it already has some good bike routes and sufficient density in some areas to support bikeshare, said Charlie Strunk, the county’s bicycle program coordinator.

The county also considered other urbanizing areas, like Tysons Corner and Merrifield, Strunk said.

The feasibility study is funded with a grant from the Metropolitan Washington Council of Governments. It is looking at whether Reston is ready to support bikeshare, as well as evaluating possible locations for bike stations and options for funding the system.

Capital Bikeshare is owned by the participating local governments and operated by Alta Bicycle Share, a company based in Portland, Ore., that operates bikeshare systems throughout North America.

Arlington County was expecting about two-thirds of the operating costs to be covered by user fees and sponsorships, according to its Capital Bikeshare plan, with the county covering the remaining costs. It estimated about a \$1.5 million cost to operate the

Arlington portion of the system this year.

There are also up-front capital costs for installing the stations, and ongoing capital costs for major maintenance on the system.

Strunk said that the City of Falls Church is also exploring bikeshare, which could lead to a natural westward expansion from Arlington to Falls Church to Merrifield and Tysons.

The Reston feasibility study is expected to be completed by late spring.

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Appendix B: Stakeholder Interviews

Appendix B: Reston Bike Share Stakeholder Interviews

Stakeholder Interview Contact Information and Organization	Conversation Notes
<p>Interview conducted on 2/6/14 with Bill Threlkeld, Division Director, Neighborhood Resources at Cornerstones</p>	<ul style="list-style-type: none"> • Bike share system users considerations <ul style="list-style-type: none"> ○ Don't have great expectations for a high adoption rate for use ○ Youth more likely than adults to participate in bike share ○ Uncertain if many women would use the system compared to men <ul style="list-style-type: none"> ▪ Greater mix of gender participation among the young ▪ Cornerstones could do educational & encouragement programs for women (already have many programs focused on actions for health) • Publicizing and educating public on bike share <ul style="list-style-type: none"> ○ Best forums to publicize would be community fairs/celebrations or workshop ○ Suggest individualized marketing to introduce system to local users ○ Cornerstones has flexibility with the CBI program to build in bike education/training if it seems like it would be well-received ○ System perception – residents would have to have chance to try system out and have someone explain it thoroughly • Jobs/training potential with a new bike share system • Think about tying bike share to health programs • Many constraints to using system: cultural, language, location, cost, credit cards, understanding of system <ul style="list-style-type: none"> ○ Language and reading barriers are very real for many adults (less of an issue for youth) ○ Credit card is a potential barrier – how do we overcome that; are there mechanisms possible? <ul style="list-style-type: none"> ▪ Low to moderate income individuals often use low balance credit card ▪ Many people don't have credit card as a form of personal financial management to reduce purchase temptation ▪ Southgate area and the Northside residents may have a checking account instead ○ There is a traditional handing down of culture within families and the community – some families are very strong but with the new norms of being immigrants this does not always happen – some are completely outside the culture

Stakeholder Interview Contact Information and Organization	Conversation Notes
<p>Phone Interview conducted 2/24/14 with Maggie Parker, Comstock Partners</p>	<ul style="list-style-type: none"> • Consider the system to be very important opportunity and great bike share system • Had looked into installing a local short-term fleet system • Potential problems with system <ul style="list-style-type: none"> ○ Credit card access ○ Installation of special lighting • Types of local users/trips expected: Mid-day business people, riders meeting at town center, grab a bike to get in town center, 20-somethings, weekends, grabbing a bike, and going exploring, two university settings (Marymount, Virginia Tech), • 450 apartments expected by January of 2016 – residents will be seeking to do local grocery errands • 2,300-space parking garage and public plaza serving the Wiehle Metrorail Station • 17,000 people are expected to cross the plaza daily, most traveling to or from the covered walkway connecting Reston Station to the Metrorail station located in the median of the Dulles Toll Road <ul style="list-style-type: none"> ○ Very interested in providing things for the people crossing plaza from 3:00 - 8:00pm: do they need a bike to go somewhere, on way home, coming out from Tysons or friends, pull out Arlington • Comstock would plan on playing an active role in marketing the bike share system strength <ul style="list-style-type: none"> ○ CEO has invested in marketing – public/private arrangement, county tenant, private- ○ Promote the idea of bike share as an amenity as part of the apartments, sends the green message, connectivity piece, nicely fits in with all the time, have a robust web site, strong social media, out in county, will figure into TDM, -- will be future, publicly – 40 days, for TDM – • Two station stop – transit center on 7 acres – near where bike share stored – near bus loop, one closer to Metrorail • Primary role in Reston: Reston Station, public/private arrangement • The public plaza will provide a retail link between Wiehle Station Metrorail garage and the station in the median of Dulles Toll Road • On foot, bike, bus, car (12-bus transit center, garage, close-by residents, bike station, bike share) • Comstock owns 300 more in the garage facility, and 800 in a separate-but-adjacent garage that will be used by commuters until the office building above is opened • 22-story, 450-unit luxury apartment building called the BLVD. Construction will take 22-24 months. • Planned hotel, also sitting atop the garage + 8,000-square-foot retail space, likely for a single restaurant. • Every planned building in Reston Station will include ground-floor retail.

Stakeholder Interview Contact Information and Organization	Conversation Notes
	<ul style="list-style-type: none"> • 16-story office Building One, fronting Wiehle Avenue, sits atop eight levels of underground parking. • Office Building Two will be 15 stories fronting the Toll Road, with two levels of above grade parking • Factors that are of interest and/or concern <ul style="list-style-type: none"> ○ Bike room – ideal spot for one station but not seen for lots of stations ○ Significant wayfinding, not extend off the site – not adverse to being involved in project to extend it beyond the property • Could do a free membership to bike share for apartments • When Metrorail begins operation: 12,000 sf retail, large civic plaza, (activating over time) 22-storey residential will deliver 2016, currently onsite 2,300 + 1,100 parking + bike room – Phase 2 – 350,000 SF – built the parking, plans are in county – may go with 12 months, • 150,000 sf – office building; Hotel – 200 room – it’s first floor is built – then there are other development opportunities; 400 apartments – Fall delivery— younger crowd in mind • Luxury high-rise – 30’s & 50’s people
<p>Phone interview conducted 2/28/14 with JBG staff: Ed Johnson, Matt Valentini, Kelley Miller</p>	<ul style="list-style-type: none"> • Project update – working on the preliminary station plan • Concerned about state transportation policy, the key to mobility for Reston heights is streets • Has bike share been a part of County – not had some – push significant bike parking • Recommend seeking broad-based build support from Greater Reston Chamber of Commerce and Reston Association • Easements <ul style="list-style-type: none"> ○ No public easements outside of right-of-way ○ Formal easement on private property bike share • Properties owned by JBG: South side of toll road includes 1831 Wiehle, south Sprint – Summit 1 & 2, Reston International Center, Sheraton Reston, Weston, Reston heights. Along Reston Parkway – Fairfax, Charter Oak (golf), Along Town Center Parkway – Reston Executive Center – Herndon Metrorail site, Reston Arboretum building (south Herndon) • Reston Heights project may be complete by late 2016 • RMAG improvements at Toll Road crossing (full movement between Toll Road & Sunrise) • Gaining support for bike share <ul style="list-style-type: none"> ○ Collective problems bring people together ○ Broad-based support is important, larger conservation ○ Support for Urban Design Standards recently developed ○ Has bike share been discussed in the light of TDM?

Stakeholder Interview Contact Information and Organization	Conversation Notes
<p>Interview conducted on 2/5/14 with Dan Iglhaut, Northern Virginia Regional Park Authority (NVRPA)</p>	<ul style="list-style-type: none"> • Lighting– Under the Reston Parkway is the only portion of the W&OD that is lit in the vicinity. Toole report developed guidelines for users and lighting the trail. NVRPA likely open to lighting sections of the trail • Rules covering night time use and reflective clothing • Extended hours – 5:00am to 9:00pm • Trail rule enforcement is generally conducted by local jurisdiction law enforcement. Trail patrol (volunteers) are organized by trail managers and report back to trail staff • The trail is owned fee simple by NVRPA and is not rail banked (like most rails-to-trails). The property was purchased from VA Power who had purchased it from the railroad company. VA power retained perpetual use and access easement over the 100-foot property width. New VA Power facilities cannot interfere with trail use of the park. NVRPA work with them not to block the trail whenever they need to do work or have access • Ownership of side access paths/connector trails are by permit from the park authority to whoever builds and maintains them – local jurisdictions do not maintain or build them • Stafford Condo Association received permit for connector trail about 15 years ago – was originally part of detour • Trail is designed to support vehicles. NVRPA encourage VA Power to use the parallel gravel trails and they cannot drive on bridges. Bridges are designed to support emergency vehicles. • Emergencies – mile markers every half miles, names at roadway crossing, stop ahead signs have street names • Wayfinding to/on/from trail is needed especially for those unfamiliar with the trail and where it is located • NVRPA don't have rules or guideline for wayfinding on trail. Review on a case-by-case basis, looking for signs for to be in appropriate distance back, not blocking sight triangle, etc. Comparable example may be the signs that Fairfax County Parks installed for the FFX CCT. In that case, they don't even have written agreement for the signs. • Permit to Arlington at Walter Reed Drive for CaBi station is probably the model. If station located on any part of trail, VA Power has to approve as well – looking at grounding and site restrictions • For most activities, NVRPA consider the application and grant a license for the activity (with terms on licenses). They generally don't have detailed rules and permitting is generally straightforward. Whatever the activity, they require the other agency/group to do all the installation and maintenance. • Fiber optic line along running side the trail • Snow & Ice removal: The cross-country skiers like to get out there on the new snow before it gets packed down. NVRPA clearing is generally limited to removing from curb ramps and limited snow removal at key crossings

Stakeholder Interview Contact Information and Organization	Conversation Notes
	<ul style="list-style-type: none"> • Bike share users are not a concern: many users are constantly interacting on the W&OD, regard these as a sub-group of the existing bike users (who they are already used to). • Trail Crossings – see study of six crossings by Toole Design for improvement recommendations, some already implemented. • Fairfax County DOT is working on realigning trail on both approaches to Wiehle Avenue as an interim safety improvement. The long-term improvement is the proposed Wiehle overpass design. The realigned trail can act as the detour trail during construction (which they always require). • NVRPA gave the Town of Herndon a license to install and maintain lights along the trail. The Toole design lighting study included guidelines and recommendations that could be employed elsewhere. Trail users need to see each other and better visibility is needed at cross walks. In the old railroad areas, reductions in ambient light. The lighting used on the Metropolitan Branch Trail is a good model.

Appendix C: Heat Map Inputs

Figure C-1: Composite Demand Analysis Inputs

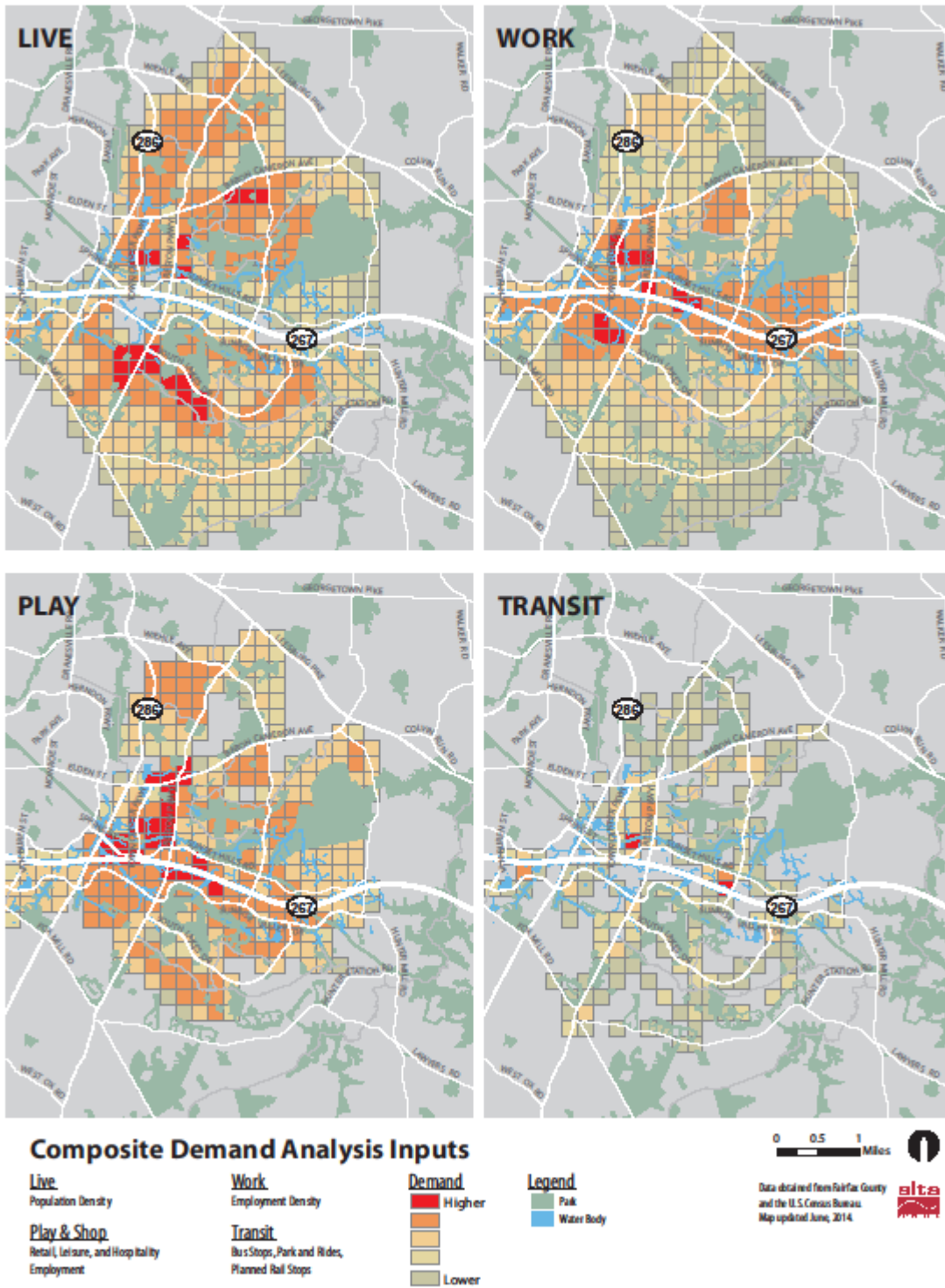
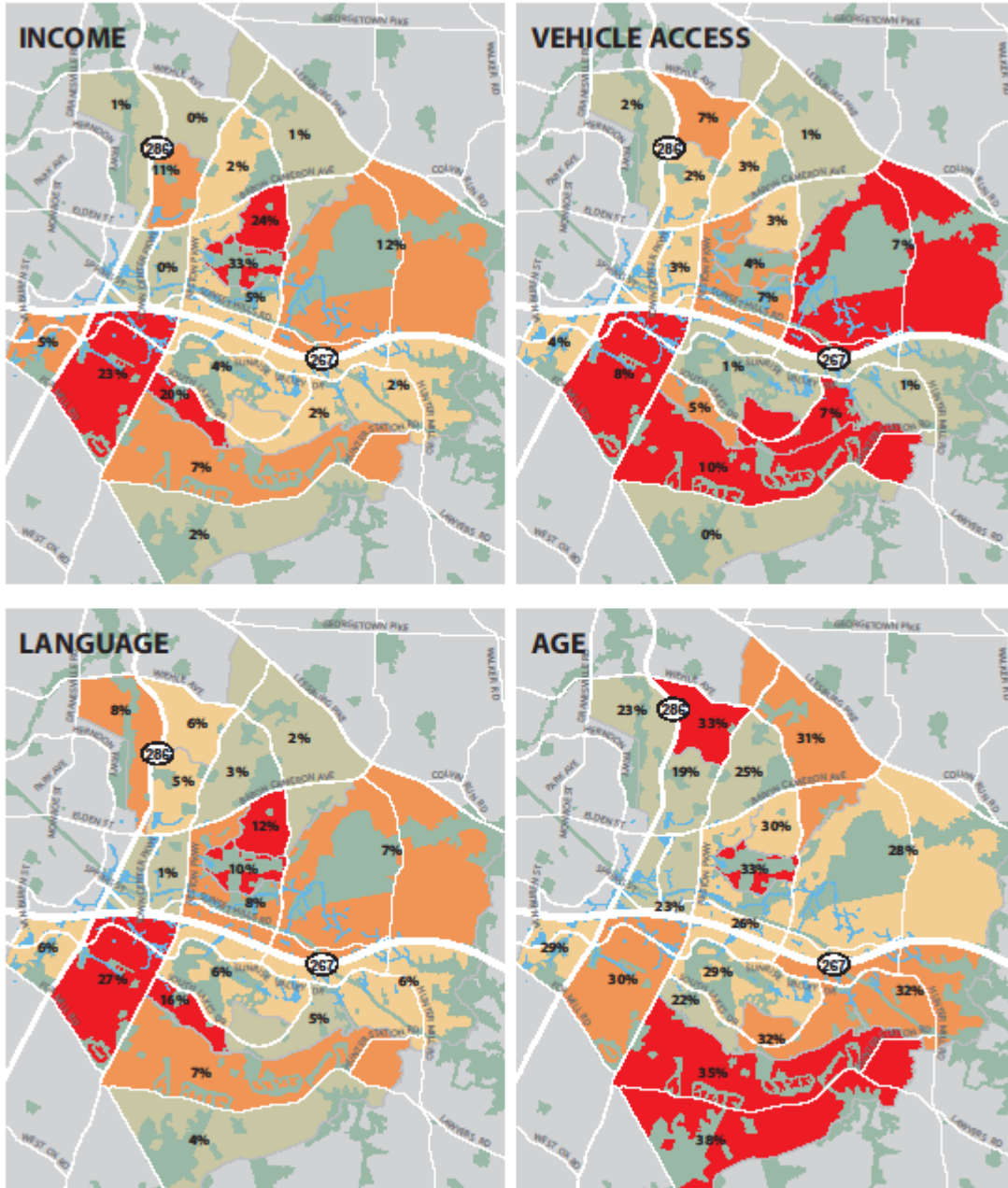


Figure C-2: Composite Equity Analysis Inputs



Composite Equity Analysis Inputs

Income

Percent of families with an income below 200% of the poverty line

Language

Percent of households with a limitation in the ability to speak english 'very well'

Vehicle Access

Percent of occupied households with no vehicle available

Age

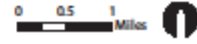
Percent of the population on below age 15 or above age 65

Equity Tier

- High
- Medium
- Low

Legend

- Risk
- Water Body



Data obtained from Fairfax County and the U.S. Census Bureau. Map updated June, 2014.



Appendix D: Station Opportunities and Constraints Analysis

The following matrix provides an evaluation of opportunities and challenges specific to the proposed Reston preliminary bike share station plan. The matrix is based on experience from similar communities as well as local information. The analysis also includes an assessment of potential impact on system success and projects trip-types associated with particular station locations.

Table D- 1: Reston Bike Share: Preliminary Station Opportunities and Constraints Matrix

Location	Opportunities	Challenges	Notes and Assumptions
l. Wiehle Station/Plaza	<ul style="list-style-type: none"> • Key Metrorail station and transit hub • Complete several network first/last-mile gaps, most notably Reston Town Center (RTC) connection • Reverse commutes from DC/Arlington • Close proximity to W&OD providing key connection • Arriving to Reston without personal occupancy vehicle (POV) • Create non-POV link to Tysons Future residential community and hotel development • Recreational/weekend day-trippers • Evening & weekend access to RTC 	<ul style="list-style-type: none"> • Bike share station located at outer edge of system • Lengthy walk to next closest bike share station • Crossing Sunset Hills Road to access W&OD • Improved wayfinding needed • Station balancing during peak commute hours • Uncomfortable biking conditions along Sunset Hills Road • Biking is not permitted on W&OD from 9:00pm-5:00am • Bicyclists riding on W&OD are required to wear reflective clothing during extended hours • The W&OD trail is unlit in the Reston area impacting safety as well as rider comfort/concerns • Limited snow and ice removal along W&OD 	<ul style="list-style-type: none"> • High levels of use associated with Metrorail travel • Marketing and promotion by adjacent developer (Comstock) • Station sponsorship by developer • Future sponsorship by hotel • Future improvements at Sunset Hills and Wiehle intersection • Future biking improvements along Sunset Hills • Future rule changes associated W&OD access and clothing • Future lighting projects along key portions of W&OD • Future enhanced snow removal along W&OD

Location	Opportunities	Challenges	Notes and Assumptions
<p>2. Sunset Hills/Plaza America</p>	<ul style="list-style-type: none"> • Close proximity to W&OD and Wiehle Station • Trips to/from RTC • Midday trips (i.e., lunch, errands, meetings) • First/last-mile Metrorail commute trips • Reverse DC/Arlington commutes • Shopping, banks, and restaurants plus major employers co-located • Closest commercial services to Wiehle Station 	<ul style="list-style-type: none"> • Uncomfortable crossing on Sunset Hills to access W&OD and network • Need wayfinding to W&OD and RTC • Uncomfortable biking conditions along Sunset Hills Road • W&OD trail is unlit in the Reston area • Limited snow and ice removal along W&OD • Biking is not permitted on W&OD from 9:00pm-5:00am • Bicyclists riding on W&OD are required to wear reflective clothing during extended hours 	<ul style="list-style-type: none"> • Busy destination during workweek • Additional attractions during evenings, weekends • Future W&OD rule, lighting and snow removal changes
<p>3. Reston Town Center/Freedom</p>	<ul style="list-style-type: none"> • Midday trips (i.e., lunch, errands, meetings) • First/last-mile Metrorail commute trips • Reverse DC/Arlington commutes • Serves evening and weekend recreational and entertainment trips • Connects RTC to Metrorail • Highly visible, high-profile station location 	<ul style="list-style-type: none"> • Need wayfinding to W&OD, Wiehle Station and other destinations • Biking is currently not permitted on RTC streets • Station balancing during peak hours • Biking is not permitted on W&OD from 9:00pm-5:00am • Bicyclists riding on W&OD are required to wear reflective clothing during extended hours • W&OD is unlit in the Reston area • Limited snow and ice removal along W&OD 	<ul style="list-style-type: none"> • Likely to be highly used bike share stations • Marketing and promotion by property manager, local developers and businesses • Busy destination during workweek, evenings and weekends • Wide range of users • Future rule change about bike riding on RTC streets

Location	Opportunities	Challenges	Notes and Assumptions
4. Sunset Hills/Fountain	<ul style="list-style-type: none"> Serves trips (mid-day and others) from other stations /employers / developments Close to other bike share stations Connection to Wiehle Station Last-mile Metrorail commute trips for employees Reverse commutes from DC/Arlington Employees lunch trips and local errands Evening & weekend access to RTC 	<ul style="list-style-type: none"> Mostly weekday trips, limited trip generation at weekends Need wayfinding to W&OD, Wiehle Station and other destinations Biking is currently not permitted on RTC streets 	<ul style="list-style-type: none"> Opportunity for commute and mid-daytrips Primarily serve employees, fewer weekend trips Marketing and promotion by property manager, local developers and businesses Easy to walk to RTC from this location
5. Bluemont/Transit Center	<ul style="list-style-type: none"> Key bus terminus location and transit hub Close proximity to W&OD Short walk to RTC Links with bus network Evening & weekend access to RTC Close to other bike share stations 	<ul style="list-style-type: none"> Bicycle access to this station is somewhat challenging for less experienced bicyclists from W&OD (grade). Improved wayfinding needed Biking is not permitted on W&OD from 9:00pm-5:00am Bicyclists riding on W&OD are required to wear reflective clothing during extended hours No W&OD trail lighting in the Reston area 	<ul style="list-style-type: none"> Fewer share of trips than metro station Promotion by Fairfax Connections and RIBS Serve those who rely on buses
6. Wiehle Station/South Side	<ul style="list-style-type: none"> Key bus terminus location and transit hub Close proximity to W&OD Link with bus network Serves in-bound commuting patterns Close to other bike share stations Provides overflow for the Wiehle Station plaza bike share station 	<ul style="list-style-type: none"> Riders will need to negotiate crossing Dulles Toll Road off ramp (5 lanes) Improved wayfinding needed to W&OD and Reston Town Center Biking is not permitted on W&OD from 9:00pm-5:00am Bicyclists riding on W&OD are required to wear reflective clothing during extended hours No W&OD trail lighting in the Reston area 	<ul style="list-style-type: none"> Fewer share of trips than Metrorail Station Promotion by Fairfax Connections Serves those who rely on buses

Location	Opportunities	Challenges	Notes and Assumptions
7. Town Center Parkway/Market	<ul style="list-style-type: none"> Proximity to higher-density residential Last-mile Metrorail trips Employees lunch trips and local errands Evening & weekend access to RTC Serves RTC, residential and commercial Serves work commutes in-bound and out-bound via Metrorail Highly visible, high-profile location Close to other bike share stations 	<ul style="list-style-type: none"> Improved wayfinding needed Biking is currently not permitted on RTC streets 	<ul style="list-style-type: none"> Opportunity for commute and mid-daytrips Serve employees, fewer weekend trips Marketing and promotion by property manager, local developers and businesses Easy to walk around RTC from this location Future rule change about bike riding on RTC streets
8. Reston Town Center/Fountain	<ul style="list-style-type: none"> Key central Reston location High visibility, high profile community gathering area and station location Proximity to higher-density residential Last-mile Metrorail commute trips Employees lunch trips and local errands Close to other bike share stations 	<ul style="list-style-type: none"> Improved wayfinding needed Biking is currently not permitted on RTC streets 	<ul style="list-style-type: none"> Opportunity for commute and mid-daytrips Serve employees, fewer weekend trips Marketing and promotion by property manager, local developers and businesses Easy to walk around RTC from this location Future rule change about bike riding on RTC streets
9. Market Street/Explorer	<ul style="list-style-type: none"> Central Reston location High visibility, high profile community gathering area and station location Close to other bike share stations Last-mile Metrorail commute trips Employees lunch trips and local errands 	<ul style="list-style-type: none"> Improved wayfinding needed Biking is currently not permitted on RTC streets 	<ul style="list-style-type: none"> Commute mid-daytrips Serve employees, fewer weekend trips Marketing and promotion by property manager, local developers and businesses Easy access to RTC from this location Future rule change about bike riding on RTC streets
10. Town Center Parkway/Reston Hospital	<ul style="list-style-type: none"> Serves hospital complex Visible station location 	<ul style="list-style-type: none"> Outer edge of system Improved wayfinding needed Suburban road design with wide 	<ul style="list-style-type: none"> Likely employer support/sponsorship of memberships Reston Hospital likely interested in

Location	Opportunities	Challenges	Notes and Assumptions
	<ul style="list-style-type: none"> • Last-mile Metrorail commute trips • Hospital campus employees lunch trips and local errands • Family visitors lunch trips 	<p>intersections</p> <ul style="list-style-type: none"> • Little bike culture among hospital staff • Employees largely commute by POV from outlying counties • Hospital staff have limited time for mid-day trips and needs are met on-site 	<p>station sponsorship/naming opportunities</p> <ul style="list-style-type: none"> • Encouragement and promotion by Reston Hospital and medical businesses • Assume employees may leave campus more during workday
<p>11. Bowman Towne Drive/Library</p>	<ul style="list-style-type: none"> • Proximity to library and government services and offices • Adjacent bus route • Last-mile Metrorail commute trips • Employees lunch trips and local errands • Local residents using government services 	<ul style="list-style-type: none"> • Improved wayfinding needed • Sufficient trips starting and ending at this location 	<ul style="list-style-type: none"> • Many local trips to library • Trips to this location weekdays and weekends • Promotion by Library and Hunter Mill District office
<p>12. Reston Parkway/Spectrum (South)</p>	<ul style="list-style-type: none"> • Shopping and restaurants • Proximity to Reston Green Trail • Can readily serve dense residential communities east of Reston Parkway • Last-mile Metrorail commute trips for close-by residents • Employees lunch trips and local errands 	<ul style="list-style-type: none"> • Improved wayfinding needed • Sufficient trips starting and ending at this location 	<ul style="list-style-type: none"> • Fewer trips due to more limited attractions/generators • Promotion by property owner and local businesses

Location	Opportunities	Challenges	Notes and Assumptions
13. Reston Parkway/Spectrum (North)	<ul style="list-style-type: none"> • Shopping, banks, and restaurants • Last-mile Metrorail commute trips • Employees lunch trips and local errands • Proximity to Reston Green Trail 	<ul style="list-style-type: none"> • Location is at outer end of system • Relatively further from other stations. • Sufficient trips starting and ending at this location • Improved wayfinding needed • Difficult existing trail connection south of Bowman Towne Drive 	<ul style="list-style-type: none"> • Fewer trips due to more limited attractions/generators • Promotion by property owner and local businesses

Appendix F: Federal Bicycle and Pedestrian Funding Opportunities

DRAFT Bicycle and Pedestrian Funding Opportunities

Federal Transit and Federal Highway Funds

This table indicates potential eligibility for pedestrian and bicycle projects under Federal Transit and Federal Highway programs. Specific program requirements must be met, and eligibility must be determined on a case-by-case basis. For example: transit funds must provide access to transit, CMAQ must benefit air quality, HSIP must benefit safety, NHPP must benefit NHS corridors, RTP must benefit trails, FLH must provide access to or within Federal lands. See more information about [Bikes and Transit](#) and [Eligibility of Pedestrian and Bicycle Improvements under Federal Transit Law](#).

This Table was revised January 28, 2014, to incorporate programs authorized under the Moving Ahead for Progress in the 21st Century Act (MAP-21). This table focuses on bicycle and pedestrian, trail, and related eligibility, not to other Federal transportation program provisions or requirements.

DRAFT Bicycle and Pedestrian Funding Opportunities / Federal Transit and Federal Highway Funds														
Activity	FTA	ATI	CMAQ	HSIP	NHPP NHS	STP	TAP TE	RTP	SRTS until expended	PLAN	402	FLH	BYW until not available	TCSP until not available
Access enhancements to public transportation	*	*	*			*	*					*		*
ADA/504 Self Evaluation / Transition Plan						*	*	*		*		*		*
Bicycle and/or pedestrian plans	*					*	*			*		*		*
Bicycle lanes on road	*	*	*	*	*	*	*		*			*	*	*
Bicycle parking	*	*	*			*	*		*			*	*	*
Bike racks on transit	*	*	*			*	*					*		*

DRAFT Bicycle and Pedestrian Funding Opportunities / Federal Transit and Federal Highway Funds

Activity	FTA	ATI	<u>CMAQ</u>	<u>HSIP</u>	<u>NHPP</u> <u>NHS</u>	<u>STP</u>	<u>TAP</u> <u>TE</u>	<u>RTP</u>	<u>SRTS</u> until expended	<u>PLAN</u>	<u>402</u>	<u>FLH</u>	<u>BYW</u> until not available	<u>TCSP</u> until not available
Bicycle share (capital and equipment; not operations)	*	*	*		*	*	*					*		*
Bicycle storage or service centers	*	*	*			*	*							*
Bridges / overcrossings	*	*	*	*	*	*	*	*	*			*	*	*
Bus shelters	*	*				*	*					*		*
Coordinator positions (State or local)			*			*	* as SRTS		*					
Crosswalks (new or retrofit)	*	*	*	*	*	*	*	*	*			*	*	*
Curb cuts and ramps	*	*	*	*	*	*	*	*	*			*	*	*
Helmet promotion						*	* as SRTS		*		*			
Historic preservation (bicycle and pedestrian and transit facilities)	*	*				*	*					*		*
Landscaping, streetscaping (bicycle and/or pedestrian route; transit access)	*	*				*	*					*		*

DRAFT Bicycle and Pedestrian Funding Opportunities / Federal Transit and Federal Highway Funds														
Activity	FTA	ATI	CMAQ	HSIP	NHPP NHS	STP	TAP TE	RTP	SRTS until expended	PLAN	402	FLH	BYW until not available	TCSP until not available
Maps (for bicyclists and/or pedestrians)	*	*	*			*	* as SRTS		*		*		*	*
Paved shoulders			*	*	*	*	*		*			*	*	*
Police patrols						* as SRTS	* as SRTS		*		*			
Recreational trails						*	*	*				*		*
Safety brochures, books						* as SRTS	* as SRTS		*		*			
Safety education positions						* as SRTS	* as SRTS		*		*			
Shared use paths / transportation trails	*	*	*	*	*	*	*	*	*			*	*	*
Sidewalks (new or retrofit)	*	*	*	*	*	*	*	*	*			*	*	*
Signs / signals / signal improvements	*	*	*	*	*	*	*		*			*		*
Signed bicycle or pedestrian routes	*	*	*		*	*	*		*			*	*	*
Spot improvement programs	*		*	*		*	*	*	*					*
Traffic calming	*			*	*	*	*		*					*

DRAFT Bicycle and Pedestrian Funding Opportunities / Federal Transit and Federal Highway Funds

Activity	FTA	ATI	<u>CMAQ</u>	<u>HSIP</u>	<u>NHPP</u> <u>NHS</u>	<u>STP</u>	<u>TAP</u> <u>TE</u>	<u>RTP</u>	<u>SRTS</u> until expended	<u>PLAN</u>	<u>402</u>	<u>FLH</u>	<u>BYW</u> until not available	<u>TCSP</u> until not available
Trail bridges			*	*	*	*	*	*	*			*	*	*
Trail/highway intersections			*	*	*	*	*	*	*			*	*	*
Training			*			*	*	*	*		*			*
Tunnels / undercrossings	*	*	*	*	*	*	*	*	*			*	*	*

KEY

- ADA/504: Americans with Disabilities Act of 1990 / Section 504 of the Rehabilitation Act of 1973
- FTA: Federal Transit Administration Capital Funds
- ATI: Associated Transit Improvement
- CMAQ: Congestion Mitigation and Air Quality Improvement Program
- HSIP: Highway Safety Improvement Program
- NHPP/NHS: National Highway Performance Program (National Highway System)
- STP: Surface Transportation Program
- TAP/TE: Transportation Alternatives Program / Transportation Enhancement Activities
- RTP: Recreational Trails Program
- SRTS: Safe Routes to School Program
- PLAN: Statewide or Metropolitan Planning
- 402: State and Community Traffic Safety Program
- FLH: Federal Lands Highway Program (Federal Lands Access Program, Federal Lands Transportation Program, Tribal Transportation Program)
- BYW: National Scenic Byways Program
- TCSP: Transportation, Community, and System Preservation Program

Appendix G: Typical Station Details

Linear 15 Dock Station (41'X6')

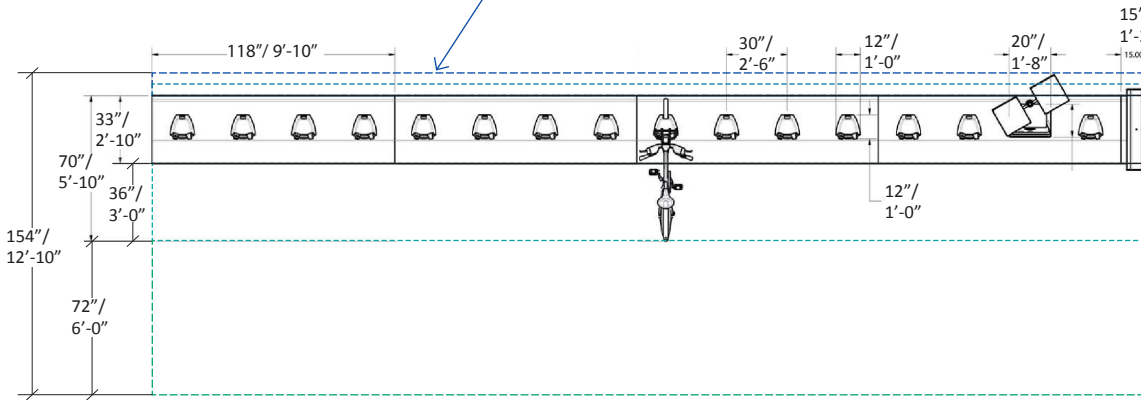
Plan View

For sidewalk stations,
 1'-0" to 2'-0" off-set from
 curb required (3'-0" min.
 if parking is allowed)

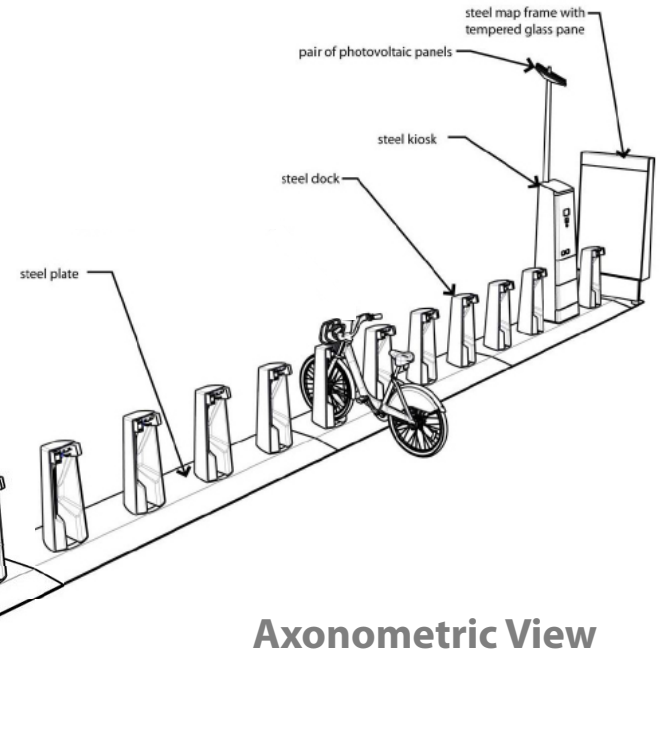
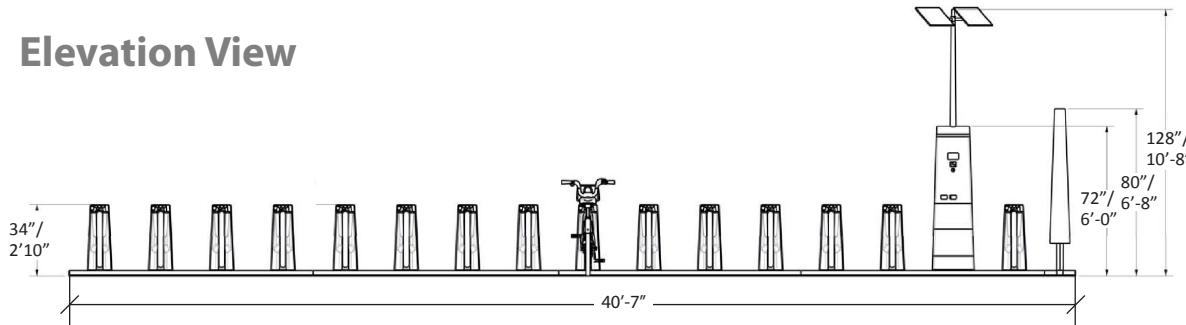
For on-street stations,
 6" off-set from curb
 required

For on-street stations, recommended
 3'-0" min. setback from traffic lane

Minimum Pedestrian Access and
 Bicycle Pull-out Zone



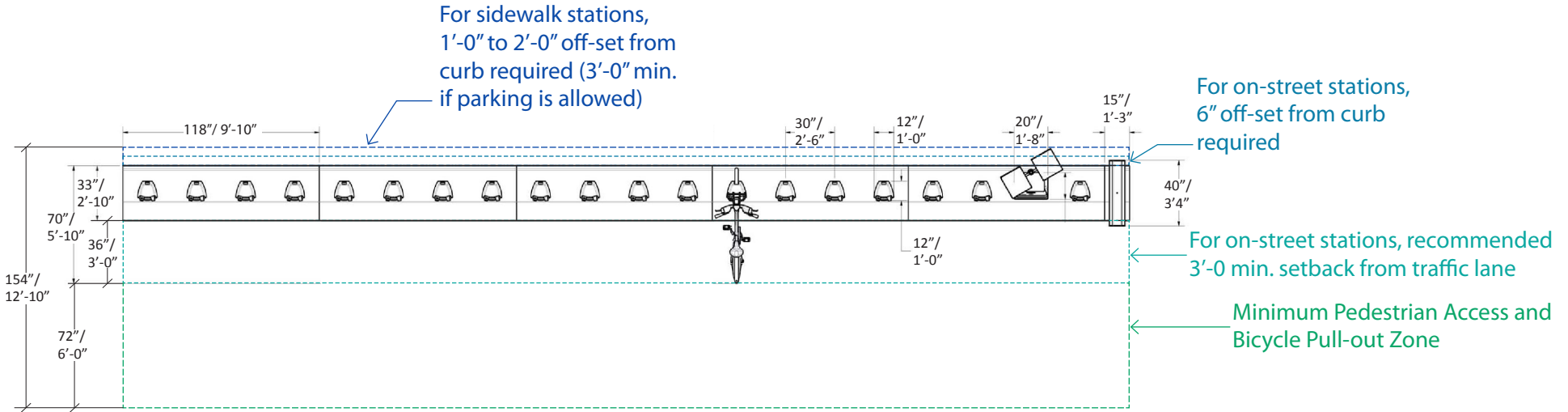
Elevation View



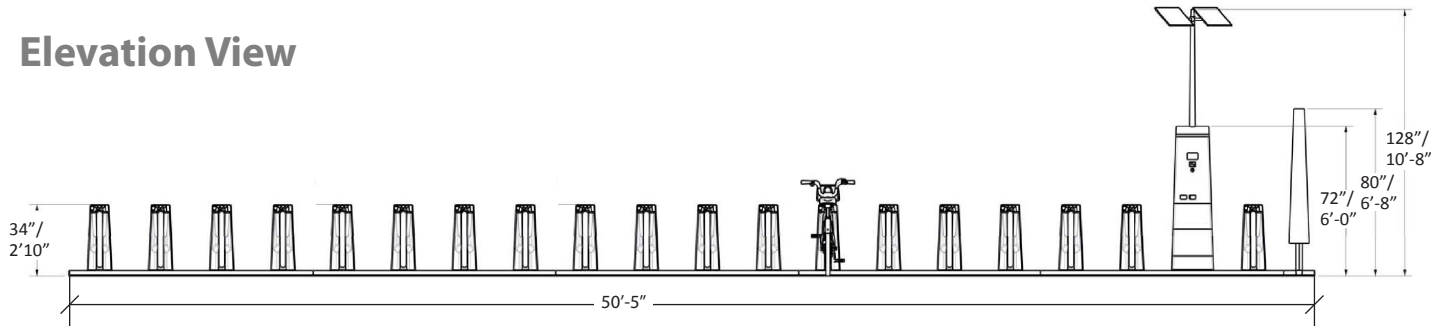
Axonometric View

Linear 19 Dock Station (51'X6')

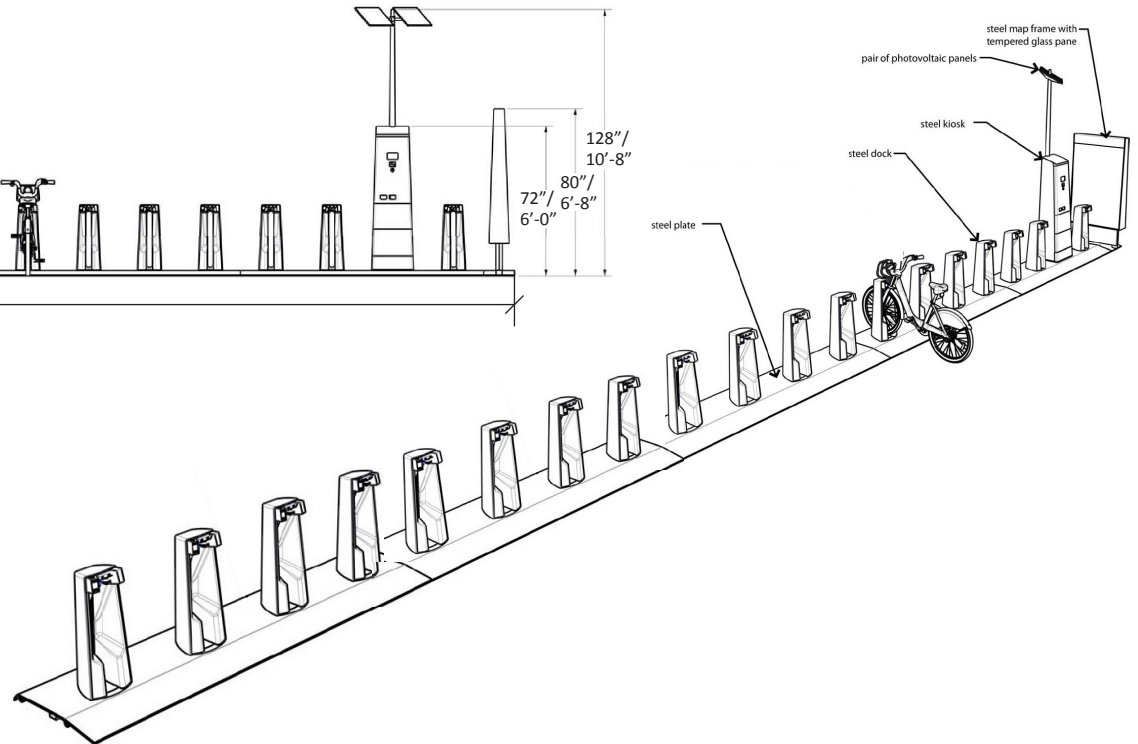
Plan View



Elevation View

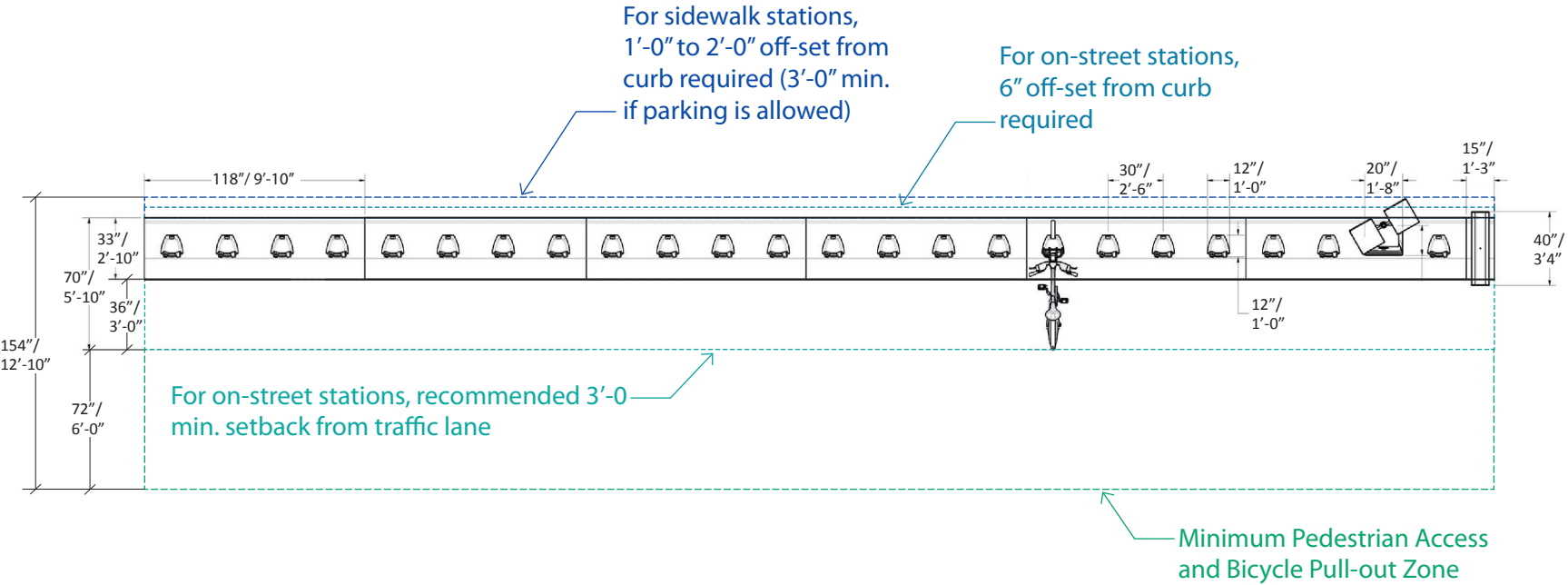


Axonometric View

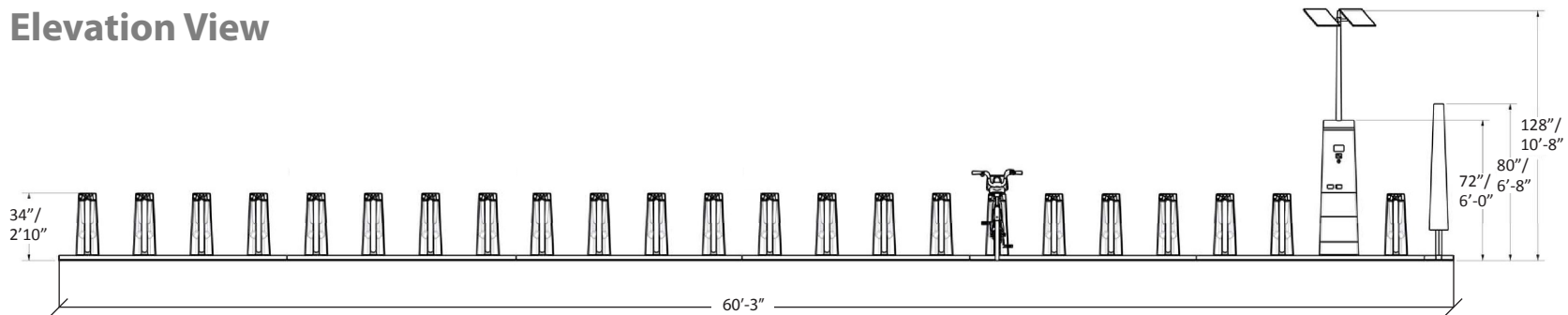


Linear 23 Dock Station (61'X6')

Plan View

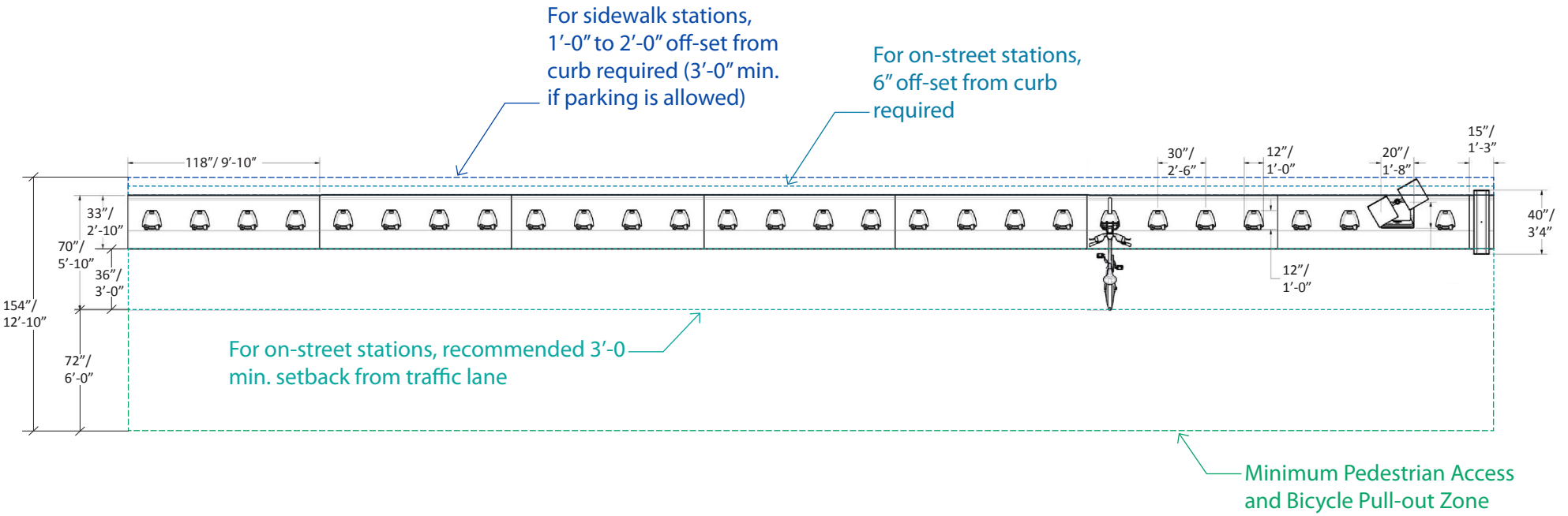


Elevation View

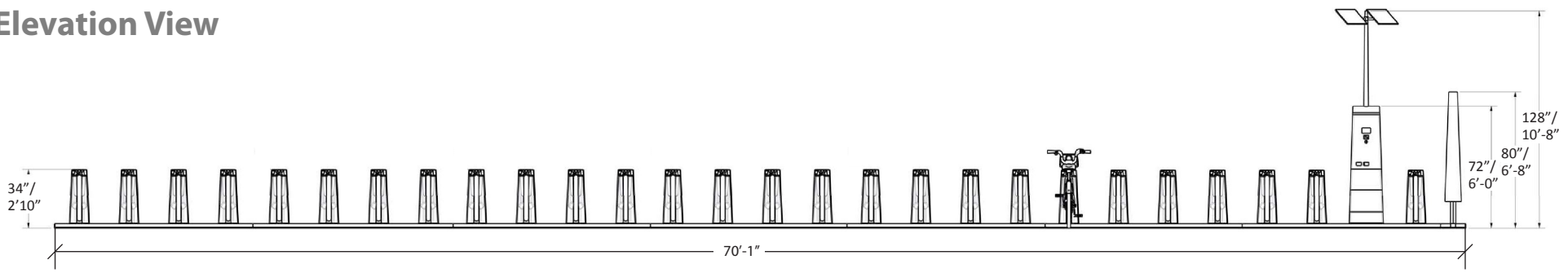


Linear 27 Dock Station (71'X6')

Plan View

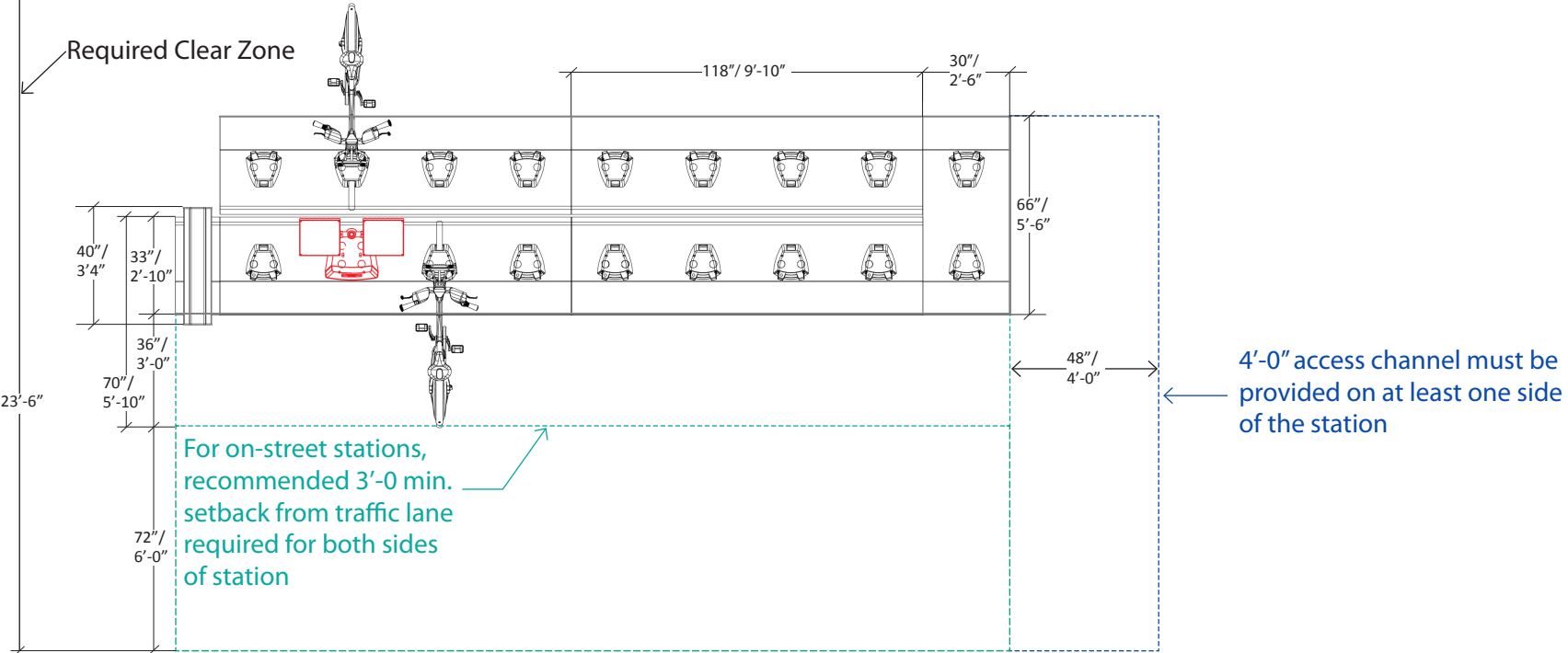


Elevation View



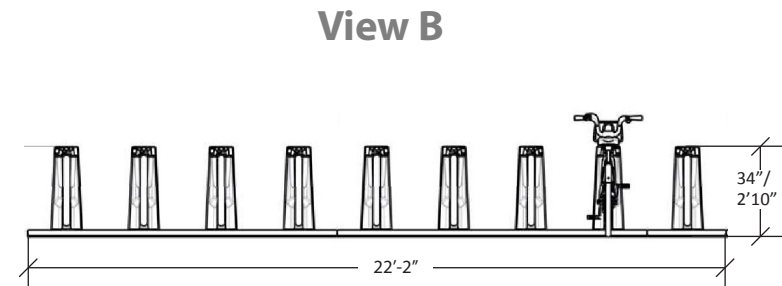
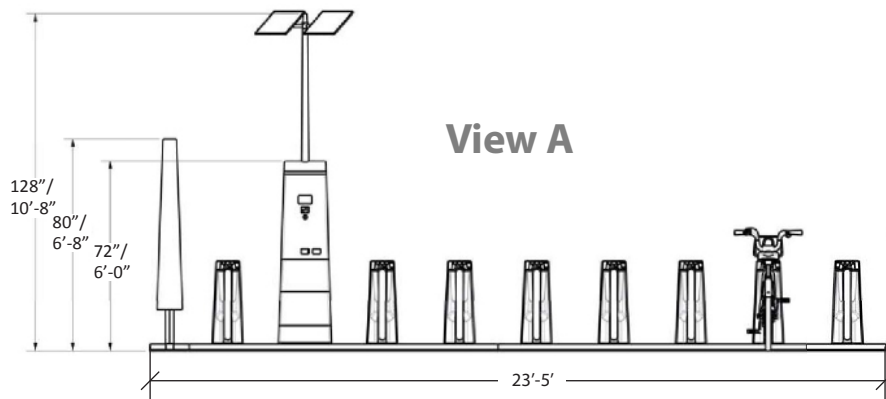
Back-to-Back 17 Dock Station (25'X12')

Plan View



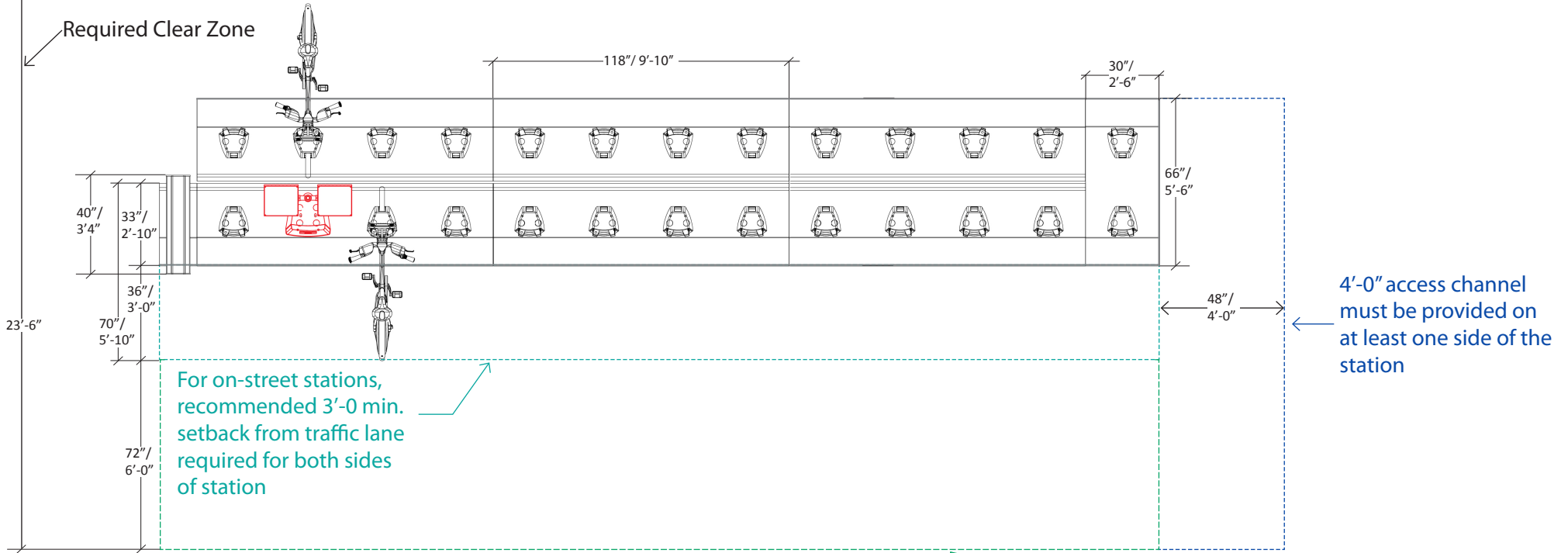
Minimum Pedestrian Access and Bicycle Pull-out Zone required for both sides of station

Elevation View



Back-to-Back 25 Dock Station (35'X12')

Plan View



Elevation View

