Manassas
HISTORIC HEART. MODERN BEAT.

City of Manassas
BIKE SHARE REPORT

March 2019

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Executive Summary

The City of Manassas has been approached by a bike share system operator about the possibility of bringing service to the City in early 2018 prompting the City to seek more information about bike share and its potential benefits. The intent of this report is to explain bike share—and assess existing and future conditions so that the City of Manassas can make an informed decision whether to move forward with a bike share system in the City.

Bike share systems are designed to provide a cost-effective, environmentally-friendly and convenient travel option for many short trips and for a short period of time. Bike share systems are typically structured to operate like automated bike rental for short periods (typically 30 minutes or less) and either returned to any station in the system or informally parked at the final destination.

The three primary technology types for bike share programs are 1) dock-based equipment, 2) dockless smart-bike equipment and 3) lock-to smart-bike equipment. All three types of bike share equipment locking technology described above have strengths and weaknesses. These system technologies represent a fleet of shared bikes for use by members (hourly, daily, monthly or annually) within a designated service area of a city or region.

The City of Manassas has some of the characteristics traditionally thought to support bike share, including: an amenable policy environment, with support for bicycling and implementation of new facilities and programs; a walkable downtown comprised of shops, galleries, restaurants, cafés and bars; a population that includes many people who are outdoor enthusiasts; a relatively flat topography; a developing shared-use path and on-street bikeway network; a bus network gaps that could potentially be filled with bike share; high numbers of visitors and tourists; and relatively comfortable weather allows for a system to operate much of the year.

There are also several challenges to implementing bike share in Manassas. Many of these can be overcome by a logical strategy. Lack of a comprehensive on-street bicycle and shared-use path network can be mitigated by ensuring continued funding recommendations included in the Transportation Master Plan. Ease of automobile access and parking can be mitigated by ongoing redevelopment policies and public outreach to encourage transit, biking and walking trips among commuters and residents. Bike share can be leveraged to better connect workers who travel by car from their homes to transit trunk lines that connect to regional employment centers.

Some challenges Manassas faces in establishing bike share are more difficult to mitigate such as separation of land-uses in some parts of the city, low barriers to personal bicycle ownership and use, and low barriers to automobile ownership and use. The fact that driving is such a convenient mode of transportation for many residents in Manassas tends to work against the viability of a bike share system. However, it is notable that bike share has not only launched but is functioning quite well in other auto-oriented cities in including, Charlotte, Atlanta, Greenville and Norfolk. Several Virginia jurisdictions are also actively planning or have already launched bike share programs.

Bike share, especially dockless, mobility continues to rapidly evolve with mergers and even more vehicle types with rapidly changing usage trends, company mergers and amenity fleets.

In Virginia, operation of low speed mobility devices is governed under State Code § 46.2-904. The following rules related to bike share include:

- **Sidewalk use:** Current state law allows bicycles and electric bicycles to be ridden on sidewalks but prohibits such riding by electric scooters.
- **Trails**: Electric assist bikes are allowed on trails in Virginia.
- **Helmets:** There is no current enabling legislation to require helmets for electric scooters. The enabling legislation for helmets only applies to riders of bicycles and electric bicycles who are 14 years of age or younger

To proactively prepare for a bike and/or scooter share, the City of Manassas should consider two main elements:

ELEMENT 1: Improve Bicycle Infrastructure and Network. Like other transportation modes, bike share works best with supportive infrastructure and programs. Thinking ahead to policies, plans and project delivery will help avoid missed opportunities. With Complete Streets, communities are redesigning streets to support multiple modes, including walk, bike, transit and automobiles. Planning for bike share requires consideration of competing uses of streets, sidewalks, curbs and station areas as well as funding and financing strategies.

ELEMENT 2: Develop Pilot Framework. Like any innovation, new mobility comes with the potential for both benefits and challenges. Manassas and its surrounding jurisdictions need not reinvent new processes for developing a bike share system. The pilot framework for Manassas should represent a context-sensitive approach to meet the needs of City residents, employees, businesses, and visitors. To achieve a balanced and reliable shared mobility option, there are critical steps to ensuring a successful program that effectively scales and integrates into the overall mobility system.

The City of Manassas is in the process of producing its first Transportation Master Plan, which will include recommendations for improvements to the overall transportation network and specifically the bicycle network. Given the fast-moving pace of change in the personal shared mobility arena, the lack of an imminent need to negotiate with a bike share vendor and the anticipated adoption of the Transportation Master Plan, **it is recommended that the City does not move forward with a bike share program *at this time.***

As the bicycle network is being designed and built, the City should undertake a thoughtful process to make Manassas welcoming to bike share companies while protecting the safety of users, residents and visitors:

- Develop a regulatory framework for bike share services
- Set shared mobility performance standards
- Conduct outreach for partnerships
- Consider project expenses and revenues

1. Introduction

The City of Manassas has been approached by a bike share system operator about the possibility of bringing service to the City in early 2018 prompting the City to seek more information about bike share and its potential benefits. The intent of this report is to explain bike share—and assess existing and future conditions so that the City of Manassas can make an informed decision whether to move forward with a bike share system in the City.

2. What is Bike Share?

A bike share system consists of a fleet of user-friendly and durable bikes either docked at stations or parked informally by users at their ultimate destination in the case of a dockless bike share system.

Bike share systems are designed to provide a cost-effective, environmentally-friendly and convenient travel option for many short trips and for a short period of time. Bike share systems are typically structured to operate like automated bike rental for short periods (typically 30 minutes or less) and either returned to any station in the system or informally parked at the final destination. Most systems employ a pricing schedule that encourages short, frequent trips and discourages bikes being in use for long periods of time. Some systems provide for unlimited, short trips for casual (24 hour) users or annual/monthly members—so-called buffet style of pricing—while others charge for each trip or each hour of use—so-called a la carte pricing. For either pricing model, the focus is getting to nearby destinations quickly and conveniently. Public bike share is not intended to compete with bike rental companies, which are intended for those interested in using a bicycle continuously for longer periods of time.

Bike share has become a travel choice in large, mid-size and even many smaller (<100,000 population) cities across the United States. In 2017, 45 of the 50 most populous U.S. cities had a working bike share system, a 900% increase from 2010, when only five of these cities had bike share systems.

Evolution of Bike Share Technology

Bike share is not a 21st century concept and has been around for decades. Most of the first-generation systems were volunteer-led and informally organized in a handful of cities, such as Amsterdam. Netherlands and Portland, Oregon in the 1970s, 80s and 90s. These programs experienced low to moderate success because of theft, vandalism, inefficient technology and insufficient operational oversight. However, in the past ten years, innovations in technology have increased user accountability and given rise to a new generation of technology-driven bike share programs. Advancements in credit card transaction capabilities, WiFi and RFID (radio-frequency identification) chips have allowed operators to introduce accountability and reduce theft and vandalism.

The three primary technology types for bike share programs are 1) dock-based equipment, 2) dockless smart-bike equipment and 3) lock-to smart-bike equipment. Many dock-based bike share systems are modular, consisting of docking plates and kiosks that use solar power and wireless communication; this approach allows for bike share stations to be moved, relocated, expanded, or reduced to meet demand. Smart-bike dockless

bike share systems allow the shared bicycles to be locked anywhere within a designated service area. Dockless bikes with lock-to technology are locked to another object, not just to themselves.

In all cases, these system technologies represent a fleet of shared bikes for use by members (hourly, daily, monthly or annually) within a designated service area of a city or region. Depending on levels of use, bicycles must be redistributed (a.k.a. rebalanced) from one station or part of the city to another to ensure that bikes are available in areas where members would typically look for them. All systems require a software back-end that keeps track of ridership information and can be linked in real time to a website or mobile device application. The back-end also tracks the number of trips, the distance travelled and where the bicycle was both accessed and parked. The differences among the three types of technologies are described below.

Dock-based Equipment

Dock-based bike share systems have existed In North America since 2007. Beginning in Montreal, dock-based programs have been launched in nearly all of the 20 largest cities in U.S. and Canada, with most in place prior to 2015. Because the equipment is quite expensive—roughly $50,000 for a 10-bike, 20-dock station—most cities received federal transportation grants and/or large corporate sponsorship deals to cover the high capital and operations costs. Docking points use strong magnets to secure the bicycles, powered by a solar panel typically affixed to the transaction kiosk. The kiosk provides the opportunity for casual users to purchase a short-term membership on demand, using a credit card. Bicycles within a dock-based system may only be secured properly at the station, so density and high visibility of stations is critical to success of the system. Stations that are spread too thinly in a given city or region and/or are not in high-visibility locations next to key destinations have sometimes suffered from low ridership.

Figure 1.Dock-based bike share system in Madison, WI

Dockless Smart-Bike Equipment

Dockless smart-bike equipment provides a greater sense of flexibility, as it allows the user to retrieve or park the bicycle anywhere within the designated service area. Dockless bikes are locked using a rear wheel lock, which is enabled or disabled with a smart phone app. Because the technology is part of the bike design itself, centrally-located stations are not required for the system to function. As such, the costs are far lower than dock-based systems and they offer a level of flexibility that some cities find very attractive. Many dockless bike share companies are supported financially by Chinese

Figure 2. Dockless smart bikes in Durham, NC

and Silicon-Valley based venture capital firms and have offered their systems at very little or no cost to the respective cities (though City staff time to assist with launch and oversight is necessary). Because of the low cost of the equipment and the fact that they can be parked anywhere, the dockless systems have suffered with far higher rates of vandalism and theft relative to the dock-based which are nearly impossible to remove from a station.

Lock-to Smart-Bike Equipment

Lock-to smart-bike equipment also provides a high level of flexibility, as users are typically allowed to retrieve or park the bicycle anywhere within the designated service area. Unlike the dockless bikes, they do not feature built-in wheel locks and must be locked to a fixed object using a U lock or heavy cable attached to the bike. These smart-bikes are also called a hybrid between the two options described above because the need to lock-to a fixed object provides the opportunity to easily create a group of branded bike racks and designated them as a station (see photo at right). The physical presence of the bike share station provides high level of visibility for the bike share program, allows users to easily locate a pod of bicycles, and offers predictability for where bicycles can be found at a given moment. Because of these advantages, operators of the lock-to equipment encourage users to return the bike share bikes to designated stations (sometimes called hubs) through economic incentives. Typically, an additional fee of $1-$2 is charged for locking the bike outside of the hub, if it is within the broadly-defined bike share service area. Although the hybrid systems feature stations, the equipment is far less expensive then dock-based because a pricey transaction kiosk is not required at all stations and the on-bike locking technology is far less expensive than the high-tech docking points required at the dock-based stations.

Figure 3. Lock-to smart bikes at station in Orlando, FL

Electric-assist Bike Share Equipment

In the past three or four years, electric-assist bike (e-bike) share equipment has become more accessible. Companies that provide dock-based, dockless and lock-to hybrid systems all have e-assist models that can be integrated into a current or future bike share program. All models require the rider to pedal the bicycle to get an assist from the electric motor. Though commercially available for private bicycles, no bike share models offer a throttle-based e-bike. The handful of systems that employ e-bike share currently cap the top speed at 15 mph at which time the regulator cuts off any additional power. Because the e-bikes are powered by


Figure 4. Electric-assist bike share system in Birmingham, AL

a battery, they must be recharged on a regular basis which creates a significant challenge for operators who must either swap the batteries or dock the bikes into a recharging station. Some systems offer credits for individual users who dock them into the recharging stations. The benefits of an e-bike share system (either partial or full) include the increased distance riders can cover and an enhanced ability to ride up and over hills.

Evaluation of Technology Options

All three types of bike share equipment locking technology described above have strengths and weaknesses. To help determine which type of system (or perhaps systems) is most appropriate for the City of Manassas' needs, it is helpful to consider key issues for each option.

Table 1. Comparison of Bike Share Equipment Locking Technology

Criterion	Dock-based Equipment	Dockless Smart-Bike Equipment	Lock-to Smart-Bike Equipment
Bicycle/Station Durability	40+ pound bike with proprietary components and internal cables to reduce vandalism; puncture proof tires.	Dockless bikes are described as "off the shelf" and tend to be of lower quality; frequent replacement is necessary.	40+ pound bike with proprietary components and internal cables to reduce vandalism; puncture proof tires.
Ease of Use	Requires a key fob or swipe card for member access; casual users require interaction with transaction kiosk or a smart phone app to get a day pass.	Short-term or long-term members access a bike using a QR code from their smart phones; some systems offer opportunities to get an unlocking code at participating businesses using cash.	Members use RFID card or punch-in access code onto bike-mounted interface; casual users require interaction with transaction kiosk or a smart phone app to get a day pass.
Level of Visibility within the Given Context	Highly visible stations, whether on-street or sidewalk; transaction kiosk and map panel add to the presence of the station.	Other than the busiest destinations, visibility is minimal since bikes are typically parked alone or in small groups, sometimes off the beaten path.	Highly visible stations, whether on-street or sidewalk (though less prominent typically than the dock-based system stations).
Brandability of Equipment	Branding space on rear fender, front basket and the kiosks that are required at every station.	While branding space is available, because most dockless systems are at no cost to the city, they are typically without any branded logos.	Branding space on rear fender, front basket and kiosks (though many stations may forego kiosk).

Criterion	Dock-based Equipment	Dockless Smart-Bike Equipment	Lock-to Smart-Bike Equipment
Site Planning and installation issues	Heavy steel plates require small crane and flatbed truck for installation of station docks; permits needed for the station to occupy the ROW.	Permits typically are needed for general use of the ROW, not to occupy a particular area within the street or sidewalk.	Standard or branded bike racks are typically mounted to small plate so no crane or large delivery truck required; permits needed for the station to occupy the ROW.
Sustainability: solar power, local/domestic production, WiFi	All vendor options use solar power and are WiFi enabled; some products are manufactured in U.S. and Canada.	All vendor options use solar power and are WiFi enabled; limited production in U.S. and Canada (more typically in China).	All vendor options use solar power and are WiFi enabled; limited production in U.S. and Canada (more typically in China).
Track Record of Existing Systems	Nearly all large and many mid-size cities use dock-based equipment with generally high levels of success and popularity.	Dockless has existed in U.S. cities (primarily mid-size and small) for only a year or less, so success has been hard to gauge at this point.	Deployed in many mid-size and small (<100,000) cities and generally well received.
Equipment Costs	Typical station with 8-10 bikes: $45,000 to $55,000 (owned by city or non-profit group).	Systems are typically owned by the equipment/operations vendor and provided to the cities at no costs (other than staff time); some revenue available to cities, depending on permit fees.	Typical station with 8-10 bikes: $20,000 to $25,000, less if no kiosk used (owned by city or non-profit group).
Operational Cost	Typical fees are in the $2,000-$2,500 per bike range, annually paid for by sponsorship, user fees and occasional city/state grants.	Operations come at no cost to the city; operators are supported by venture capital funding and user fees; in some areas maintenance and customer service has suffered.	Typical fees are in the $2,000-$2,500 per bike range, annually paid for by sponsorship, user fees and occasional city/state grants.

Criterion	Dock-based Equipment	Dockless Smart-Bike Equipment	Lock-to Smart-Bike Equipment
Pros of System	Highly visible stations include opportunities for advertising/branding. Docking stations easily adapted into E-bike recharging stations.	Highly flexible as they can parked anywhere within the service area, minimizing walking and time. No land leasing or purchase needed for bike stations. Labor to continually move bikes from station to station is greatly minimized.	High level of flexibility, as users may generally retrieve or park anywhere within the designated service area. Provides opportunity to create a group of highly visible branded bike racks that can serve as designated stations for far less than the cost of docking stations. Offers predictability for where bicycles can be found at a given moment. Can offer incentives for parking bikes at designated stations, or additional charges for parking bikes outside of the designated stations.
Cons of System	Docking station equipment is expensive, often requiring federal grants or corporate sponsorships for capital and operational costs. Finding a bike at transit hubs or a vacant docking slot in popular retail/restaurant areas can be difficult at peak times. Distribution of bicycles across docking stations may become unbalanced, creating the need for labor to redistribute bikes.	Losses due to theft and equipment failure will be higher with a lighter-duty dockless fleet. Bikes may be improperly parked, potentially blocking pedestrian traffic on sidewalks and streets.	Depending on the City's regulatory framework, lock-to bikes may be secured to public bike racks, retired parking meters, or street signs, which could conceivably create a bike parking shortage in some higher-traffic areas at peak times.

3. Benefits of Bike Share

Bike share has been transformative for many cities in North America. This section provides a summary of some of the financial, health, transportation and safety benefits that can result from a successful bike share system.

Health Benefits

The health benefits of bicycling are well recognized and include the potential to reduce obesity levels, heart disease and other sedentary lifestyle diseases. The recommended amount of physical activity for adults is 150 minutes per week or 20-30 minutes of moderate physical activity each day. **Because average bike share trips are just over one mile at relatively slow speeds, the typical 20-minute trip can help people get this needed physical activity as part of their daily commute or travel pattern.**

In addition to personal health, several health care providers have recognized the benefits of bike share and have committed resources to deploy and operate systems. Health care providers such as Seattle Children's Hospital, Kaiser Permanente, Allegheny Health Network, Blue Cross Blue Shield and Humana have provided sponsorship or other financial support for bike share systems. Some example systems that have received health care company sponsorship include the Blue Bike system in Boston, Nice Ride Minneapolis and Charlotte B-Cycle. Blue Cross Blue Shield of Illinois recently became the Chicago Divvy system's largest corporate sponsor, providing $12.5 million over a five-year period. Carolina's Healthcare System (now Atrium) also provided sponsorship for Charlotte's B-Cycle system.

Transportation/Mobility Benefits

Bike share provides additional transportation options for short urban trips for residents and visitors. Bike share fills an existing gap between trips too far to walk, but perhaps not long enough to justify driving and parking, waiting for a bus or the cost of taking a taxi, Uber or Lyft.

Bike share can also:

- **Reduce reliance on private automobiles.** Initial experience in North American cities has shown that between 5%-25% of bike share trips replace a motor vehicle trip.
- **Extend the reach of transit** by providing a first and last-mile transportation solution, providing service to under-served areas or areas that do not justify the cost of other transit options.
- **Encourage more bicycling.** According to a 2013 study from the Mineta Transportation Institute, over 70% of surveyed users in Minneapolis, Toronto, Montreal and Washington, DC stated that they bicycle more since subscribing to bike share.
- **Reduce barriers to cycling.** Bike share makes bicycling convenient - there is no need to own or store a personal bicycle or worry about locking your bike and having it stolen. In 2013, 40% of Capital Bike share survey respondents in the Washington, DC metro area reported that they would not have otherwise made the trip in the past month, and almost 10% reduced their driving miles by using bike share.

Economic Benefits

Bike share is a relatively inexpensive and quick-to-implement urban transportation option compared to other transportation modes. The relative cost of launching a bike share system is several orders of magnitude less than investments in highway infrastructure and public transit. For the capital cost of a bike share system—ranging from virtually nothing to perhaps up to $2 million—the financial and economic development benefits in Manassas could include:

- **Infilling the city's transit system/Last mile connectivity.** When sited adjacent to key bus stops, bike share helps to fill in the gaps between transit lines and a rider's home or place of employment. Within many of the U.S.'s most prominent bike share systems are numerous multi-modal hubs that contain bike share stations at subway stops, light rail stations, and bus stops.
- **Enhancing Manassas's image as a bike-friendly city.** Bike share systems can become an attraction for residents, employees, visitors and businesses. They can also generate positive local and regional media exposure related to bicycling that would otherwise be difficult or costly to generate.
- **Businesses can benefit from improved access to their stores.** Customers and employees can use bike share as an inexpensive transportation option for commuting or running errands. A 2014 Capital Bike share (Washington, DC) user survey found that 67% of all induced trips (i.e. a trip otherwise not made without bike share as an option) were made by people more likely to patronize businesses proximate to bike share stations.
- **Bike share stations can provide space for brand development for local businesses.** Depending on the technology and operating model for a system, space on the bike and the stations could be available for sponsorship.
- **Reduced transportation costs for household budgets.** Like public transit, bike share can help some households reduce their number of short vehicle trips or eliminate the need for a vehicle or an extra vehicle altogether.

Bicycling and, in particular, bike share is an affordable form of transportation relative to other options. The cost of using a bike share bike for a year can be as low as the annual membership fee, which is typically between $80 and $100 per year, compared to $6,000 for annual ownership and operation of a personal vehicle, or up to $750 annually to ride OmniLink services.

Safety

To date, bike share systems have an exemplary safety record. In North American systems, few serious injuries and only three fatalities (Montreal, Chicago and New York City) have been reported out of nearly 100 million trips taken. In Washington, DC, a total of 14 crashes were reported in the first year of operation, of which only one was serious in nature. Approximately one million trips were made during this same period for an injury crash rate of 0.83 injuries per million miles (the average trip length was approximately 1.2 miles per trip), which is lower than the injury rate of 7.3 injuries per million miles ridden for private bicycling in Washington, DC. Also, in its inaugural year, Citi Bike in New York City had over 12 million trips without fatality and less than 80 crashes that required trips to the hospital.

Some of the factors contributing to this safety record could include:

- The **safety in numbers** effect and increased driver awareness due to increased media; increased number of cyclists on the street; and because more drivers use the bike share system or own a bicycle.
- Nearly all bike share **bicycles are designed for the rigors of constant use in an urban environment**. As such, they are far heavier than most bicycles and are relatively slow to ride. The typical 3-speed hubs are geared low; thus, most riders travel at speeds of roughly 10 mph. These slower speeds improve the safety record for bike share.
- The **safe design of the upright-position bicycle** fitted with internal safety features such as wide, puncture-proof tires, drum brakes, generator-powered lights and a bell. The bikes are also regularly inspected to ensure that all safety features are in proper working order.

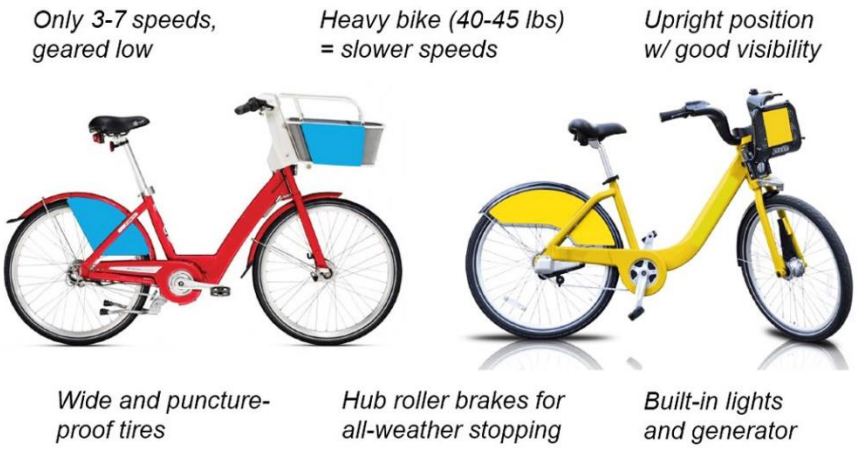

Figure 5. Smart Bike Features

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4. Local Context Analysis

Assessing the opportunities and challenges of implementing a potential bike share system in Manassas requires consideration of the city's demographics, the built environment, and the types of destinations that typically propagate bike share use. The City of Manassas has some of the characteristics traditionally thought to support bike share, including:

- Pending implementation of the 2019 Transportation Master Plan, an amenable policy environment, with support for bicycling and implementation of new facilities and programs.
- A walkable downtown comprised of shops, galleries, restaurants, cafés and bars (high demand for bike share exists in areas with many places to eat and drink).
- A population that includes many people who are outdoor enthusiasts (who frequently supporting bicycling programs, including bike share).
- A relatively flat topography, allowing for a user-friendly experience for a larger number of users.
- A developing shared-use path and on-street bikeway network.
- A bus network that works well for a city of Manassas' size but leaves gaps that could potentially be filled with bike share.
- High numbers of visitors and tourists to Manassas National Battlefield, Historic Downtown Manassas, and other arts and historic attractions that may be interested in using bike share to explore parts of the city.
- Relatively comfortable weather that provides opportunities for a system to operate much of the year.

User Profiles

Bike share systems are most successful where there is a mix of land uses, medium or high density of homes and jobs, and where trip-making occurs throughout the day and night as well as on weekends. In Manassas, the profile of a potential user of the bike share program would include:

- **Residents who live, work and recreate in the bike share service area** seeking another mobility options to get to work or go out to a restaurant; while car ownership in Manassas is higher than the national average, this can be especially critical for those who don't have access to a personal automobile or live near a bus line.
- **Transit commuters** traveling to or from OmniRide, MetroDirect, VRE or elsewhere. In this way the system can:
    - Offer a first or last mile option between home and transit or between the bus stop and school, work, or other similar destinations.
    - Extend the reach of transit into areas that are currently underserved by transit.
- **Residents, employees or visitors** looking to go for a relatively-short recreational or destination ride around the City.

The people who use and benefit from bike share systems are constantly changing. Initially, bike share programs in the U.S. were considered limited to only large cities with a high population and employment density and large mass transit systems. As more success has been realized, larger cities are expanding bike share into lower density and lower income areas, and mid-size and smaller cities have launched successful bike share systems.

Shared-use mobility is lowering barriers to low speed travel via bikes and scooters. This is likely to increase the benefits of active travel including lower car use and increased activity (for health and economic benefits). Likewise, other cities have seen in increase in women and underserved communities with access to scooters.

Challenges and Mitigation Strategies

While there are many factors that exist in Manassas that are favorable to bike share, there are also several challenges. Many of these can be overcome by a logical strategy to mitigate the challenges through policy changes, future bike share planning efforts and additional investments in bicycle programs and projects.

Table 2. Challenges to Implementing Bike Share and Mitigation Strategies

Challenges	Mitigation Strategies
Lack of a comprehensive on-street bicycle and shared-use path network. The City's bicycle network is growing but is not yet a comprehensive network. Many busy streets make bicycling a challenge for novice bicyclists and other potential bike share users	Ensure continued funding and implementation of the Bicycle System Plan recommendations included in the forthcoming Transportation Master Plan
Ease of automobile access and parking can be an incentive for many to drive rather than seek alternative modes	Use ongoing redevelopment policies and public outreach to encourage transit, biking and walking trips among commuters and residents; work with employers and developers to provide viable transportation alternatives, including bike share
As a regional employment destination, **Manassas attracts hundreds of workers each weekday who arrive by private car**.	Bike share—especially dockless—can be leveraged to better connect people from their homes to transit trunk lines that connect to regional employment centers

There are also entrenched and endemic challenges to establishing bike share that are far more difficult to mitigate in the near term. These include:

- A land use pattern that historically has resulted in a separation of land-uses in some parts of the city. Bike share works well in dense, mixed-use areas which create multiple origins and destinations, creating higher demand for spontaneous trips.
- Low barriers to personal bicycle ownership and use. Most people live in detached homes or townhouse complexes where there is ample storage space for a bicycle and the fear that one's

bicycle will be stolen when locked is relatively low. That reduces the pool of people looking for a way to get around Manassas who might not otherwise use their own bicycle.

- Low barriers to automobile ownership and use. Automobile travel is the dominant form of transportation in Manassas and parking is generally available and frequently free or inexpensive.

The last point is expressed in the relative ease of auto travel and parking throughout the region. Most successful bike share systems include large portions of their service area in districts and neighborhoods where travel by car or transit can be slow, parking is difficult and expensive, and/or residents are already accustomed to taking some of their trips by non-auto modes of transportation. The fact that driving is such a convenient mode of transportation for many residents in Manassas tends to work against the viability of a bike share system. However, it is notable that bike share has not only launched but is functioning quite well in other auto-oriented cities in including, Charlotte, Atlanta, Greenville and Norfolk. This shows the resilience of bike share in many contexts.

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5. Peer City Review

While there is a lot of information and stories about bike share programs in larger cities and communities, it is important to try and understand the experience with bike share in smaller communities similar to Manassas. Five bike share systems in smaller communities with similarities to Manassas were selected for review. College Park, MD, Norfolk, VA, Arlington, MA, Greenville, SC and Fort Collins, CO. Details of each system will be provided, including type of system, number of bikes, funding, and lessons learned.

College Park, MD

This system was selected as it is another suburb of Washington, DC and the City chose to operate its own system separate from Capital Bikeshare. The mBike system is a joint project of the City of College Park and the University of Maryland. The City and University originally pursued joining the Capital Bikeshare system but were concerned that would be too costly. The City and University secured a grant from the Maryland Department of Transportation for the initial purchase of system equipment and selected Pace to install and operate the system. This is a lock-to system with 14 hubs/stations and 120 bikes located in the City. The system opened in May of 2016. Ongoing maintenance and operation of the system is covered by member and user fees and funding from both the City and the University.

Both the City and University view the program as being successful. While the use level of the bikes, 1-2 trips per bike per day, is not as high as it is for Capital Bikeshare, 4-5 trips per day per bike, the system does show that a separate system can operate and be successful in a market dominated by a bigger system.

Norfolk, VA

As another independent City in Virginia, the Norfolk system is a good example for Manassas. The system launched in April of 2018 with 150 bikes using a lock-to technology. The system is operated by Zagster, the same company as the College Park System. The City worked directly with Pace to start the system and provided some funding to assist with the launch. The City's goal is for ongoing operation and maintenance of the system to be covered by user fees and memberships and sponsorship from local businesses and organizations.

Since the initial launch, 100 bikes have been added to the system for a total of 250 bikes at present. The City is pleased with the system and is seeing use rates of close to 1.5 trips per bike per day. The efforts to obtain sponsorships have not been as successful as the City had hoped, but with a strong eight months of performance to cite, they are hoping businesses will be more open in the coming year. Norfolk serves as a good example for Manassas regarding how to invite and permit a dockless bike share system in a Virginia City.

Arlington, MA

Arlington, MA is included as a peer city because it is a suburban jurisdiction outside a large city, Boston, which has an established bike share system for the Boston and adjacent jurisdictions. The system was launched in the spring of 2018 under an agreement between 15-member jurisdictions of the Metropolitan Area Planning Council (MAPC). The program, operated by Lime, included 2000 bikes for all 15 jurisdictions, with 150 targeted for Arlington. An additional 150 bikes were added to Arlington in Fall 2018. The system allows bikes to travel within and between the partnering jurisdictions and has been with mixed results, as are many dockless bike share systems. While use data is still pending, anecdotal evidence shows reasonable levels of use. Issues with

parked bikes blocking sidewalks and building entries and some vandalism have been reported. These issues have been common in most dockless systems that have started. Overall, the participating jurisdictions are pleased with the initial start of the system and there are plans to add additional bikes in the spring of 2019. The multi-jurisdictional structure of this system could be a model that Manassas could look to, given the City's location in Prince William County and proximity to Manassas Park.

Greenville, SC

The Greenville system is an established, dock-based program that launched in April 2013 with seven stations and 35 bikes. The system has expanded to now have 10 stations and 50 bikes, and its B-Cycle system is operated by a local non-profit. The City is pleased with the system and usage rates for the bikes have been around 2 trips per day per bike. The system launch was funded with local money and with some equipment donated by B-Cycle. Ongoing operation of the system is funded with memberships and user fees and sponsorship with numerous community businesses and organizations. Greenville shows that bike share can work in a small southern city and is a good example of how sponsorships can help fund a bike share system. The bikeway network in Greenville is more established and connected than the network in Manassas and this contributes to the success of the program.

Fort Collins, CO

Fort Collins is an example of how to start small and then grow a program to meet the needs of their community. In 2008 Fort Collins started a bike library program, manned by volunteers, where people could check out used bikes on both a long-term or short-term basis. As this bike library program became more successful and more flexible options for bike share equipment became available the City pursued a true bike share system. A pilot program with 100 lock-to dockless bikes and 20 hubs was launched in 2016. The system is also operated by Zagster. The pilot was deemed to be successful and was expanded to 250 bikes 23 hubs and made permanent in 2018. Fort Collins is a college town, which is a factor in the success of the program, that is not present in Manassas. But the example of starting small, conducting a pilot program and then establishing a permanent operation could be a good example for Manassas.

Table 3 presents a summary of each peer city and pricing and payment options for each system.

Table 3. Summary of Peer City Bike Share Programs and Payment Plans

City	Vendor	Type of Bike Share System	Current Number of Bikes	Launch Date	Pricing
College Park, MD	Zagster	Lock-to	120	May 2016	**Hourly:** $3/hour up to $24/ride **Monthly Membership:** $25 includes free rides under 1 hour/3 hours weekends, then hourly rates **Annual Membership:** $65 includes free rides under 1 hour/3 hours weekends, then hourly rates **Student Annual Membership:** $35 includes free rides under 1 hour/3 hours weekends, then hourly rates **Payments Accepted:** Credit or Debit Card
Norfolk, VA	Zagster	Lock-to	250	April 2018	**Monthly Membership:** $4.99/month (1st 3 months), then $19.99/month for unlimited 60-minute rides **Student, Senior & Military Discounts:** $4.99/month (1st 3 months), then $9.99/month for unlimited 60-minute rides **Payments Accepted:** Credit or Debit Card, PayPal Cash, PayNearMe
Arlington, MA	Lime	Dockless	300 (2,000 total distributed among 15 regional jurisdictions)	June 2018	**Manual LimeBikes:** $1 per 30 minutes **Lime-E Electric Bikes:** $1 to unlock plus $0.15/minute **Payments Accepted:** Credit or Debit Card, PayNearMe
Greenville, SC	Upstate Forever/ Greenville Health System	Docked	50	April 2013	**24 Hour Membership:** $5 for unlimited 60-minute rides, $4 each additional 30 minutes, $75 daily max **Weekly Membership:** $15 for unlimited 60-minute rides, $4 each additional 30 minutes, $75 daily max **Annual Membership:** $60 for unlimited 60 minute rides, $4 each additional 30 minutes, $75 daily max **Payments Accepted:** Credit card only

City	Vendor	Type of Bike Share System	Current Number of Bikes	Launch Date	Pricing
Fort Collins, CO	Zagster	Lock-to	250	2016 (pilot), April 2018 (launch)	**Hourly:** $1 per 30 minutes **Monthly Membership:** $4.99/month (1st 3 months), then $19.99/month for unlimited 60-minute rides **Student, Senior & Military Discounts:** $4.99/month (1st 3 months), then $9.99/month for unlimited 60-minute rides **Payments Accepted:** Credit or Debit Card, PayPal Cash, PayNearMe

6. Recent Trends

Shared mobility continues to rapidly evolve with mergers and even more vehicle types.

Usage Trends: From the FHWA's February 2018 study on multi-modal transportation planning:[1]

- While conventional (non-electric) bike share services have predominantly been used by men by a factor of 2x to 3x, this new study suggests that electric scooters may enjoy more support and adoption by women.
- Dockless electric scooters may also enjoy higher adoption rates by lower-income groups.
- In Washington, DC, dockless systems have not affected use of the popular dock-based system; in September 2018, Capital Bikeshare, launched a pilot program to add pedal assisted bikes to docked fleets.
- **Implications:** Dockless bikes and scooters have the potential to increase ridership (number and types of riders) based on early pilots.

Company Mergers: Companies are assembling and integrating several modes into one app.

- Ford bought the scooter company Spin.
- Uber acquired JUMP and, as of December 2018, is reportedly considering acquisition of Lime & Bird scooters.
- Lyft acquired Motivate and now provides transit information, so travelers can compare options by price and time.
- All: Most companies are scaling back non-motorized dockless bike fleets in favor of electric models; this is in part because of the popularity of motorized scooters.
- **Implications:** As companies add more modes within one app, the travelling public will be more aware of trip (and trip-chaining) options. The ease of trip planning could increase demand for these additional modes and supporting infrastructure.

Amenity Fleets: Companies are providing and managing fleets for campuses and individual buildings.

- Bird Platform will be offering fleets of Bird scooters to individuals who will manage their own scooter fleets
- Gotcha Technologies provides shuttle services, Bike share and scooters mainly to college campuses and have a presence in Virginia.
- ReachNow and Envoy offer shared electric cars, mopeds and e-bikes to individual residential buildings, though signal expansion to commercial buildings and mixed-use developments. While

[1] Federal Highway Administration, Integrating Shared Mobility into Multimodal Transportation Planning: Improving Regional Performance to Meet Public Goals, February 2018

confined to large cities, this model would work well in suburban developments to serve as an alternative to a second car.

- **Implications:** Scooters and bikes will be included in packages beyond today's companies, including those managed by real estate managers and even transit agencies. These applications have even more potential for suburban areas since most companies rely on urban density.

7. Summary of Virginia and Local Regulations

How are shared mobility vehicles regulated in Virginia?

Virginia is a "Dillon Rule" state, not a "Home Rule" state, meaning local governments are limited to the powers expressly granted to them by their state. In Virginia, operation of low speed mobility devices is governed under State Code § 46.2-904. Use of roller skates and skateboards on sidewalks and shared-use paths; operation of bicycles and certain motorized and electric items and devices on sidewalks, crosswalks, and shared-use paths; local ordinances. Under State Code § 10.1-204. Statewide system of trails, wheelchairs and other power-driven mobility vehicles are addressed, however only in the context of use by disabled travelers.

The following rules related to shared mobility include:

- **Sidewalk use:** Current state law allows bicycles and electric bicycles to be ridden on sidewalks but prohibits such riding by electric scooters.
- **Trails**: Electric assist bikes are allowed on trails in Virginia.
- **Helmets:** There is no current enabling legislation to require helmets for electric scooters. The enabling legislation for helmets only applies to riders of bicycles and electric bicycles who are 14 years of age or younger

Local examples: The table below presents the status of scooter/bike programs in various Virginia jurisdictions as of December 2018. Arlington and Alexandria have the most recent programs.

Table 4. Status of Bike Share Programs in Virginia

Jurisdiction	Bike/Scooter Share System	Status
Arlington	Lime dockless e-scooters, Bird dockless e-scooters, Capital Bikeshare dock-based bikes	Pilot started, e-scooters may not be ridden on the sidewalk, e-scooters and e-bikes may not be ridden on trails.
Alexandria	N/A	City currently seeking community input to gauge interest in mobility pilot program. Dockless mobility devices are not currently permitted to be left on public property in Alexandria, City Council has not yet determined whether to change how devices are regulated on a pilot basis or beyond.
Blacksburg & Christiansburg	ROAM dock-based bikes	E-bikes to be added to the fleet. Standard road rules apply.
Harrisonburg	Bird dockless e-scooters	Staff currently drafting regulations.

Jurisdiction	Bike/Scooter Share System	Status
Norfolk	Pace lock-to bikes	Pilot project underway; bikes can be locked to Pace racks and public bike racks.
Richmond	Bird dockless e-scooters (Pending)	Bird e-scooters dropped off in the city were impounded pending draft legislation for the operation and use of motorized dockless scooters and bikes in the city.
Virginia Beach	Bird dockless e-scooters	After Bird e-scooters dropped off in the city, October 4th regulations passed banning them on the Boardwalk, adjacent bike path, sidewalk, and other locations. Unattended scooters left in these areas or in a way that interferes with pedestrian or vehicular traffic are impounded.
City of Fairfax & Vienna	N/A	Feasibility study underway with funding from Fairfax County & George Mason University.

8. Preparing for Bike Share

The following sections present items to consider in proactively preparing for a bike share/shared mobility program that facilitates the convenient provision of bicycles/scooters where people want them while maintaining orderly and accessible public space. Bike share should provide a reliable mobility option within and between major activity centers and support access to and from the regional transit network.

ELEMENT 1: Improve Bicycle Infrastructure and Network

Like other transportation modes, bike share works best with supportive infrastructure and programs. Thinking ahead to policies, plans and project delivery will help avoid missed opportunities.

With Complete Streets, communities are redesigning streets to support multiple modes, including walk, bike, transit and automobiles. Transportation technology is putting pressure on the allocation of space for each mode. Planning for bike share requires consideration of competing uses of streets, sidewalks, curbs and station areas as well as funding and financing strategies.

Streets. Complete Street design can slow traffic, enhance safety and incorporate a variety of bikeway designs including signed marked roads, bike lanes, shared use paths and trails. Many improvements start with tactical designs as temporary tests and to solicit public input. This is important since road diets and protected bike lanes can be a source of controversy in communities, especially as they may modify parking availability, travel lanes, and aesthetics.

Complete Streets considerations for the bicycle network should include:

- How network improvements could incorporate bike share or scooters to connect campuses, residential areas and other destinations highlighted in the Transportation Master Plan recommendations
- Data & analysis to review and set infrastructure and network connection priorities
- Performance metrics
- Whether off-street trails would accommodate e-bikes or scooters

Sidewalks. Urban sidewalks are seeing more competition for use. In addition to traditional uses – pedestrians, street trees, parking meters, emergency response – demands for dining, landscaping, signage and entertainment are on the rise. New mobility is also applying pressure: passengers waiting for ride hail and microtransit trips, parking and passageways for ride share vehicles. Ground drones are currently operating in pilot cities and will also eventually compete for downtown sidewalk space.

Sidewalk considerations for bike share implementation include:

- Developing goals and objectives to prioritize sidewalk uses
- Rules on bike share travel and parking on sidewalks
- Updated right of way usage permits for bike share systems

- Alignment with green infrastructure and landscaping design for stormwater and urban heat island abatement
- Smart City Technology integration as applicable

Curbs. In the last decade, ride hailing and e-commerce deliveries have drastically increased and may cause congestion at curbsides in downtown locations. As biking and bike share grow, so will demand for biking infrastructure. Several cities with bike share have installed bike share stations, bike racks or bike corrals in curbside parking spaces. To balance other curb side uses with bike share, cities could also use technology to apply small usage fees for pick up and drop off such as pricing for incentives to gather at designated locations and disincentives for blocking through traffic.

Considerations for balancing bike share with other curbside uses include:

- Developing goals and objectives to prioritize curbside uses
- Curb mapping and use audits, including on-street parking
- Location for pilots to test use allocation, pricing, and signage

Transit Stations/Stops. Most bike share companies tout their ability to feed riders to transit. Manassas can boost its transit-orientation and attendant benefits with better links to VRE. Bike share can support first-last mile(s) to the VRE station and other commuter and transit links.

Considerations to utilize bike share to support transit use include:

- Network gap analysis to assess bike lane and sidewalk connectively and quality (included in the pending TMP)
- Space-efficient design to host a growing number of modes while facilitating transfers
- Safe, convenient parking
- Wayfinding
- Recharging for electric vehicles (cars, carshare, mopeds bicycles, scooters)
- Ultimately, one card pass for transit and bike share

ELEMENT 2: Develop Pilot Framework

Like any innovation, new mobility comes with the potential for both benefits and challenges. Manassas and its surrounding jurisdictions need not reinvent new processes for developing a bike share system. However, the City may learn from the evaluations of other cities' programs. The main lessons learned for the City's consideration in shaping a bike share pilot framework include:

- **Schedule.** Launch dates and pilot duration are important and should include considerations such as school calendars (for campuses), seasons and ability to piggyback onto other programs.
- **Equity.** Equity includes (1) a variety of payment systems, (2) multi-lingual marketing, (3) provisions for riders without access to smartphones.

- **Safety**. While many permits require that companies report incidents/crashes, one consistent theme is inconsistent reporting.

The pilot framework for Manassas should represent a context-sensitive approach to meet the needs of City residents, employees, businesses, and visitors. To achieve a balanced and reliable shared mobility option, there are critical steps to ensuring a successful program that effectively scales and integrates into the overall mobility system. A discussion of these steps follows.

Step 1. Form a workgroup to guide program development and identify local and regional partners. Developing a regulatory framework should begin with discussion among City agencies, community and advocacy groups, businesses, and potential local and regional partners and include the following steps.

- Engage City agencies responsible for planning, permitting and right of way management, parking/curbside management, traffic operations, and police and emergency services.
- The City should also seek input from bicycle advocates, community and business organizations, hospitality and tourism industry
- Reach out to potential local and regional partners including George Mason University, the National Park Service, surrounding jurisdictions including Manassas Park and Prince William County.
- Establish meeting schedules to verify top opportunities and challenges for bike share within the growing bicycle network as identified in the Transportation Master Plan. Meet regularly thereafter to evaluate data collected and determine next steps in the program.
- Research and connect with mobility companies for conversations and/or presentations to the workgroup.
- Establish a vision, articulate goals and objectives, and define measures of effectiveness for a bike share service operating in Manassas only or with local and regional partners.
- Develop agreements with local and regional partners, as applicable.

Step 2. Proactively structure the pilot program framework. An effective bike share pilot framework should include public and stakeholder outreach to determine the type of bike/scooter and equipment, the form of agreement with companies seeking to deploy bike shares or scooters (exclusive or non-exclusive franchise agreement for the use of the public right of way, standard city right of way permit, or memorandum of agreement). Steps Manassas may take in preparing the pilot framework include the following.

- Conduct online survey and public outreach presenting framework for pilot program including options for types of shared mobility devices and equipment.
- Conduct Public Hearing.
- Approve shared mobility device program and equipment.
- Develop Draft MOA/MOU and/or permit requirements.
- Develop schedule and timeframe for pilot program.

Step 3. Set up a pilot program geographic area. Working with vendor companies, the City (and partners, as applicable) can establish pilot service areas. Some cities delineate boundaries (e.g. downtown) while others

open service without boundaries. In setting up a zone, some cities are employing geofencing (communications technology that sets digital boundaries).

Geofencing can help with:

- establishing go/no go zones & alerting riders or shutting off power for vehicles taken outside service areas;
- managing where parking is prohibited or encouraged; and
- setting parking incentives and disincentives.

The pilot area will need to consider working across multiple jurisdictions, similar to Lime Bike in the Boston suburbs.

Step 4. Determine the number of vendors and vehicles. Cities have wrestled with whether to limit the number of vendors. Given the growing number of companies and complexity in pilot review, limiting vendors has appeal. In addition, limitations tend to compel companies to compete by offering a better pilot experience and amenities. On the flip side, this can limit startups and local companies.

Likewise, communities have adopted a cap of vehicles (scooters, bikes, e-bikes) per company, in response to several cities' experiences with floods of non-permitted dockless bikes. There is a challenge in balancing a manageable number of vehicles with an adequate number of vehicles to successfully test demand and utility. In advance of a pilot to determine demand, it's difficult to anticipate ridership and trip patterns.

Items for consideration include:

- limitations on the number of bikes or scooters that can be placed in the public right of way, either per vendor or on a citywide basis;
- rules for the use and placement of bikes or scooters in the public right of way, including parking, sidewalk use, maximum speed for motor-assisted vehicles, etc.;
- accessibility/equity of fare payment mechanisms; and
- caps and incentives for expanding bike share program, such as a cap increase when a vendor reaches a higher use per vehicle.

Step 5. Develop rider education and safety protocols. Outreach and education tend to fall on both companies and localities. The education and safety plan may be determined in coordination with vendors or as a requirement in a Request for Proposals.

Step 6. Determine pilot data collection plan. Data sharing by the operators is a must in assisting the City with evaluating the pilot program. GPS enabled bikes provide accurate location data to assess operator compliance with parking and rebalancing requirements. Types of data to be collected and may include the following:

- **Vehicle data.** This will define an operator's active fleet as all bicycles that are within the pilot geographic area, whether they are in use, available for rental, or temporarily disabled pending maintenance. This will allow the ability to see patterns in rebalancing needs, improper parking, duration of maintenance for each shared vehicle type.

- **Trip data.** Data on trip duration, distance and starting and ending points can help the City better understand where people ride and how best to invest in new or improved bikeways, as well as discern types of trips, first mile/last mile to transit, and identify underserved neighborhoods.
- **Payment data.** Tracking payment methods will help determine whether adequate provisions are available for riders without access to credit or debit cards or smartphones.
- **Safety data.** The time, date, and location of reported incidences will inform the need to assess areas of higher safety concerns & mitigatable factors, while data on thefts and vandalization informs the need to add security and other management measures.
- **Violations.** Tracking Complaints received, parking violations, speeding reports and other complaints will help the City detect trends and determine operator compliance with the permit as well as actions the City may take.
- **Data from other sources.** Real time trip and vehicle data may inform the City of parking demand, bike routes and sidewalk use to determine expanded infrastructure needs and inform policy. Reports from EMS and healthcare centers may help capture incidents not reported to operators

Step 7. Pilot evaluation and mobility program integration. Documentation and evaluation of data collected are critical to the pilot project as data will serve as a key indicator of success. The data and analysis will inform recommendations needed to build a foundation for expansion to a broader scale program across the city or region.

Most cities launch pre-, during- and post-pilot surveys. Some vendors have also launched surveys within the vehicle screen, so a rider needs to provide information before closing out a trip. The City may develop and administer an online questionnaire after the conclusion of the primary evaluation period that is open to the public and widely publicized to obtain insight into public perception of bike share among residents, employers, and employees. The City may also undertake a community engagement process after system launch to improve access to bike share outside of activity centers by implementing additional designated parking locations and correspondingly increasing the allowed fleet size.

Step 8. Develop an estimate for the capital and operating costs associated with the system plan. Defining the costs and funding strategies by which a bike share would be implemented is essential to the success of the program. While bike share companies may tout the low or cost-free nature of agreements, cities are finding ancillary costs and should determine revenue generation versus cost recovery for services provided. In general, cities estimate the workload up front, and set vendor fees (on-time permit, per vehicle, enforcement, etc.) to match program costs.

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9. Recommendations

The range of bike share and other shared mobility options has expanded quickly over the past two years. The expansion of bike share and e-scooters has occurred with some mixed results. The City of Manassas is also in the process of producing its first City Transportation Master Plan, which will include recommendations for improvements to the overall transportation network and specifically the bicycle network. Given the fast-moving pace of change in the personal shared mobility arena, the lack of an imminent need to negotiate with a bike share vendor and the anticipated adoption of the Transportation Master Plan, **it is recommended that the City does not move forward with a bike share program *at this time.***

However, if the City does move forward with implementation of a bikeshare system pilot program, outreach to City agencies, community and business organizations, potential local and regional partners, and potential vendors will be essential to developing a pilot framework. The pilot area, bicycle fleet size, equipment type, and other considerations should also be determined in cooperation with partners and vendors.

Assuming the pilot area is the entire area within the City of Manassas limits and the mid-term bicycle network recommendations in the Transportation Master Plan are complete, the following elements may be considered in a future pilot program.

Type of Bike Share	Number of Bikes	Criteria for Dock or Rack Location
Lock-to As a preliminary consideration, the lock-to system provides the most flexibility as users may generally retrieve or park anywhere within the designated service area. The lock-to systems offer branding opportunities, a lower cost alternative to docking stations, and less infrastructure within the right of way. To offset parking in undesirable areas, the City may require bikes to be locked to the Bike Share stations or public bike racks, and offer incentives for parking at designated stations, or additional charges for parking outside of designated stations or public bike racks.	**Approximately 100 Bikes** Pedal-assist bikes would accommodate the highest number of riders, including inexperienced riders. The City may also consider a limited number of dockless e-scooters which will likely have the most utility in and around the downtown area. However, with restrictions on e-scooter use on sidewalks, additional enforcement may be needed, adding to the cost of pilots and programs.	While the City develops policies and the framework for bike sharing stations, the following may be considered: • While not all docks or rack locations can or should be directly on or adjacent to a bike lane, planners should ensure that bike share program areas are well served by a strong bike lane network. • Placing docks or rack locations stations in close, visual proximity to bus and train stops can broaden the reach of transit, solving some first/last mile problems. • Bike docks or rack locations can anchor pedestrian plazas and create new places for people to sit, mingle, and relax.

Preparatory Steps

Although it is not recommended to proceed with a bike share program *at this time*, there are several steps that should be taken by the City to prepare for the eventuality of such as system. Most important is to continue to build out the City's bicycle facilities network to accommodate bicyclists of all ages and riding abilities. If there is a common lesson among other cities with bike share systems, it is that a core network of bicycle facilities is a condition precedent to program success. As the bicycle network is being designed and built out, the City should undertake a thoughtful process to make Manassas welcoming to bike share companies while at the same time protecting the safety of users, residents and visitors.

Develop a regulatory framework for bike share services.

While providing a "social good," bike share companies are a business that is investing capital and expecting a reasonable rate of return. Having a fair, transparent, and predictable process for the deployment of a bike share system will make Manassas a more attractive business proposition than other jurisdictions where decisions are made in a reactive manner. The National Association of City Transportation Officials (NACTO) recently published Guidelines for the Regulation and Management of Shared Active Transportation[2], which can serve as a starting point for developing appropriate regulatory framework. Among the issues that should be considered by the City:

- Limitations on the number of bikes or scooters that can be placed in the public right of way (either per company on a citywide basis)
- Form of agreement with companies seeking to deploy bike shares or scooters such as an exclusive or non-exclusive franchise agreement for the use of the public right of way, standard city right of way permit, or memorandum of agreement.
- Revenue generation vs. cost recovery for services provided.
- Rules for the use and placement of bikes or scooters in the public right of way, including parking, sidewalk use, maximum speed for motor-assisted vehicles, etc.
- Accessibility/equity of fare payment mechanisms.

Developing a regulatory framework should begin with the discussion among City agencies responsible for planning, permitting and right of way management, parking/curbside management, traffic operations, and police and emergency services. The City should also seek input from bicycle advocates, community and business organizations, hospitality and tourism industry, universities and other interested parties.

Set performance standards.

Regardless of the form of agreement used to permit bikes or e-scooters, the City should use the regulatory framework to set minimum performance standards for companies providing the service. Performance standards take the place of rigid specifications and allow the vendor to deliver the program in best alignment with consumer demand and their own business model. Performance standards might relate to:

[2] https://nacto.org/2018/07/11/shared-active-transportation-guidelines/

- Minimum equipment safety specifications
- Maximum duration for removal of damaged equipment.
- Data collection and data sharing
- Equitable distribution of equipment throughout the City.
- Customer service and responsiveness

Conduct outreach for partnerships.

As there are several other bike share programs under consideration or development in the region, the City of Manassas should strongly consider joining with other jurisdictions in providing a unified bike share program. Doing so will minimize the administrative burden on the City, simplify the customer experience, and maximize the durability of a vendor to weather the ups and downs of starting a new service.

Developing bike share partnerships will also identify what type of bike share system will be most successful and where shared bicycles and other bikeshare infrastructure should be located. Currently, the City of Fairfax, George Mason University, the Town of Vienna and Fairfax County are collaborating to evaluate bringing bike share to these communities. This study[3] aims to understand how a bike share system would be used to travel throughout these communities as well as to connect to the metropolitan region. Based on the results of this study, the City of Manassas may consider a future bike share program compatible with the system selected by this collaboration. The City may also consider outreach to George Mason University and the National Park Service for bike share service to and from the University, Manassas Battlefield and points within the City limits.

Consider project financing and revenues.

Bike share programs operate at a very thin profit margin in suburban environments. The City should not pursue a bike share program with the intent to generate revenue for the city; in fact, the City should be prepared to subsidize either the start-up capital or ongoing operational cost of a bike share program to attract vendor(s) to a suburban environment.

[3] Fairfax City-Mason-Vienna Region Bikeshare Feasibility Study
https://www.fairfaxva.gov/government/public-works/transportation-division/cycling-in-the-city/bikeshare-study