

HOWARD COUNTY BIKE SHARE FEASIBILITY STUDY

December 2014



Columbia
Association



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TRANSPORTATION
PLANNING



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EXECUTIVE SUMMARY

Bike share is a mobility option that allows users to access a fleet of public bicycles throughout a community. Bike share systems have successfully been implemented in communities throughout the United States during the past six years. In the Baltimore Washington region, Capital Bikeshare (launched in 2010) was one of the first and continues to be one of the most successful systems in the United States. While there has been increasing interest in expanding bike share into suburban areas, to date there have been very few systems implemented in lower-density areas such as Howard County. This study was undertaken to assess the feasibility of a bike share system in Howard County, which has unique characteristics and challenges as a suburban area.

COMPARABLE BIKE SHARE SYSTEMS

Four existing U.S. bike share programs were selected based on their demographic, economic and geographic similarities to Howard County as well as the bike share system's operational and ownership model. The selected programs included:

- **Capital Bikeshare – Montgomery County** (Washington, DC Area)
- **Bay Area Bike Share - South Bay Satellites** (San Francisco Bay Area)
- **Greenville B-cycle** (Greenville, SC)
- **Spartanburg B-cycle** (Spartanburg, SC)

Characteristics from these programs were used to compare to and evaluate existing conditions in Howard County.

EXISTING CONDITIONS

The study undertook an analysis of existing conditions in Howard County, including geographic and road conditions, demographics, transportation mode share, bicycle infrastructure and tourism.

The findings of the existing conditions analysis showed that there are several aspects of Howard County which make it conducive to a potential bike share system. These include (1) a climate to support year-round cycling; (2) residential density in certain areas comparable to peer jurisdictions that have implemented bike share; (3) large employment centers; (3) a strong network of bicycle pathways around the County; (4) high income demographic that could be early adopters; (5) a low-income demographic that could benefit from a system; and

(6) significant tourism. However, there are also challenges which include (1) an auto-oriented culture; (2) streets with high traffic volumes and speeds, which create uncomfortable bicycling conditions; (3) low use of public transit; (4) older age demographic; and (5) few areas where employment and residential density overlap.

PUBLIC ENGAGEMENT

As part of the study, the consultant team, Howard County and Columbia Association (CA) reached out to various representatives and stakeholders within the community, as well as the general public, to help determine the overall feasibility of implementing a bike share program in the County. The public engagement process encouraged input utilizing various media to shape the direction of the project and answer many questions about local sentiment towards implementation of a bike share program.

Feedback received during the public engagement process was mixed, identifying many of the same opportunities and challenges described in the Existing Conditions section of the study.

DEMAND ANALYSIS

A bike share demand analysis was performed using publicly available data. A heat mapping analysis assigned points to various factors to identify areas with the highest potential demand for bike share ridership in the County. Points were assigned to different geographic areas based on the concentration of people, jobs, attractions, available infrastructure, and other factors. The final heat map for Howard County is shown on the figure below and shows that the areas of the County with the highest potential for bike share use include:

- Town Center and Downtown Columbia
- Howard County Hospital and Howard County Community College campus
- Village of Oakland Mills
- Village of Owen Brown
- Village of Wilde Lake
- Historic Ellicott City
- North Laurel/Savage

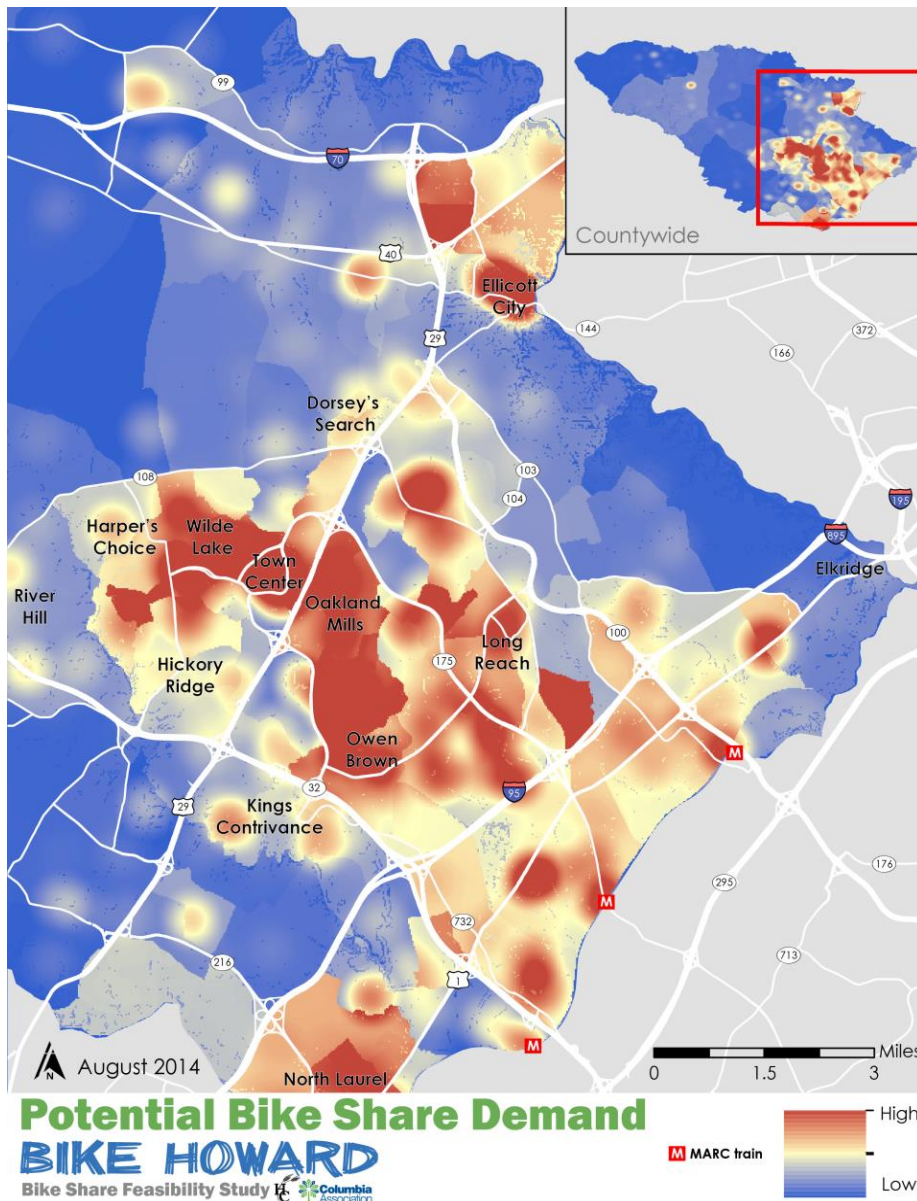
During the development of the project, the County and CA developed the following goals for a potential bike share program:

1. To improve access to transit systems and expand transportation options for County residents
2. To increase the convenience and visibility of bicycle use for short distance trips so cycling can more readily become a popular daily transportation mode
3. To enhance public health by reducing air pollution and promoting active lifestyles
4. To enhance the quality of life for Howard County residents by supporting bicycling as a fun and convenient transportation mode

In consideration of geographic, population, employment, existing bicycling infrastructure, local plans and ordinances, as well as public feedback, the overall analysis of feasibility is that a recreation- and health-oriented bike share system (supporting Goals #3 and #4) is currently FEASIBLE. To this end, a recreational- and health-oriented bike share system can be implemented Howard County in the near-term. Reasons why a recreational- and health-oriented system in Howard County can be successful are:

- There is a moderately interconnected network of trails and pathways throughout the most populated areas of the County which are mostly used for recreational purposes. A bike share program may benefit from these comfortable bicycle facilities while it may be able to increase use of these facilities.
- While the trail system does not currently have a strong wayfinding system, it is already being improved. A bike share system would further enhance visibility and overall awareness of cycling in Howard County.
- There are a significant number of annual visitors in some parts of the County including Downtown Columbia (including Merriweather Post Pavilion), Ellicott City, and a good number of lakes and parks within Howard County. These visitors would be likely to use a bike share system to enhance their experience of Howard County.

Under current conditions, a transportation focused bike share system (supporting Goals #1 and #2) is found to be NOT FEASIBLE. However, it



FEASIBILITY RECOMMENDATION

is anticipated that a more transportation-oriented system can be implemented in the future. It is important to note that a proposed initial system designed with recreation and health in mind will still provide some components of transportation and mobility to residents. Based on examples from around the U.S. especially those in less dense jurisdictions, residents tend to find creative ways to utilize a bike share system serving a utilitarian transportation function, such as workday lunch trips. As discussed earlier, conditions are quickly changing in Howard County and may lead to the transformation of a bike share system from a recreational system to a transportation-oriented system. Should the County consider expanding its focus to serving as a transportation-oriented bike share program, it is recommended that the following issues be addressed:

- Increase connectivity between destinations and to- and from-public transit. With the completion of the Downtown Columbia Trail Project (currently under construction), increased connectivity between major activity centers will support bike share ridership for transportation.
- Further develop an interconnected network of on- and off-street bicycle friendly facilities. Ongoing development of on- and off-street safe bicycle infrastructure is strongly recommended, even after implementation. This will allow users to more comfortably ride between existing destinations.
- Increased mixed-use development, as well as the reconfiguration of neighborhoods in Downtown Columbia will continue. The current development plans of 5,500 new residential units, 4.3 million square feet of commercial office space, 1.25 million square feet of retail space and 640 hotel rooms supports the fact that people use bike share for different reasons: where they live, work, play and transit. Although this development need not be 100% completed to support a bike share system, it should at least be partially implemented prior to installation of a transportation-oriented bike share system.

CHARACTERISTICS OF A HEALTH- AND RECREATION-ORIENTED BIKE SHARE SYSTEM

As described above, this report has found that a recreational- and health-oriented bike share system can be implemented Howard County in the near-term. Following are some considerations as to how

such a system may vary from a “standard” dense, urban transportation-oriented system:

- Station locations should be placed near trails
- Highly visible signage and strong wayfinding should be implemented
- Standard “free” riding time should be expanded
- Helmet distribution should be a priority
- The system should have a simple pricing structure
- Alternative bicycle specifications to accommodate topography and longer rides should be considered
- Increased visitor outreach should be a priority
- Increased online presence promoting trails should be a priority

EVOLVING TO A TRANSPORTATION-ORIENTED SYSTEM

Based on current bicycle infrastructure and mixed use development plans in Howard County, as discussed above, it is anticipated that a more transportation-oriented system can be implemented in the future. This system will build from the strong culture and visibility created by the recreational system, but will add the following characteristics:

- Higher station density to encourage point-to-point short trips
- Additional pricing options for regular commuters
- Access program for low-income riders
- Online presence promoting commuting
- Potential regional integration with other systems (Baltimore and/or Washington DC)
- Business outreach for corporate memberships
- Transportation partnerships with the transit agencies and car- and ride-share companies

BUSINESS PLAN

Following the results of the Demand Analysis, the development of a Business Plan was undertaken to understand the logistics and costs of how a bike share program could be implemented. Few bike share systems to date have been implemented in lower-density suburban settings, and Howard County represents new territory for bike share in the United States. The second phase of the study explored what such a system would look like on the ground, from the business plan and phasing, to costs and program impacts.

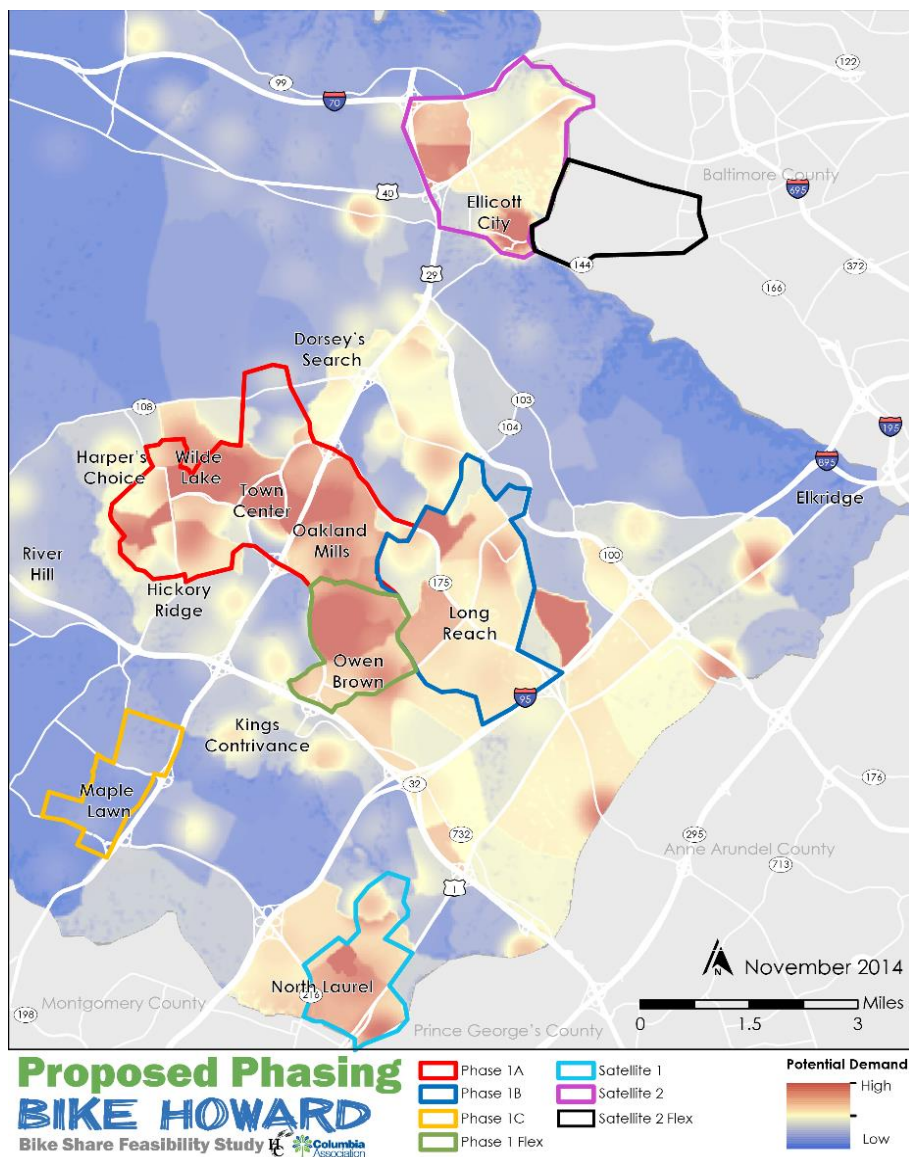


Figure 2 - Proposed Phasing

The final recommendations contained in this Plan are based on a review of available data, existing conditions and proposed goals, objectives and measurable outcomes. This review finds that the County

has the potential to support a system of 36 stations and 360 bicycles broken into seven phasing areas.

Table 1 - Proposed Phasing

	Area (Sq. mi.)	Stations	Stations (Sq. mi.)	Bicycles	Docks	Year
Phase 1A	6.9	14	2.0	140	238	Year 1 (Fall)
Phase 1B	5.1	7	1.4	70	119	Year 2 (Fall)
Phase 1C	1.6	3	1.9	30	51	Year 2 (Spring)
Phase 1 Flex	2.0	2	1.0	20	34	Year 3 (Fall)
Satellite 1 - Laurel	2.1	4	1.9	40	68	Year 4 (Fall)
Satellite 2 - Ellicott City	4.3	4	0.9	40	68	Year 4 (Fall)
Satellite 2 Flex (Catonsville)	2.3	2	0.8	20	34	Year 4 (Spring)
TOTAL	24.4	36	1.4	360	612	

The proposed bike share system would begin implementation in the core of the County around Downtown Columbia and the villages of Harpers Choice, Wilde Lake, and Oakland Mills. Subsequent phases of the proposed program would extend service to Ellicott City, and North Laurel. Other areas of the County served by the proposed bike share system include the villages Hickory Ridge, Owen Brown, Long Reach, and Maple Lawn. These areas represent the highest potential for bike share use based on the concentration of people, jobs, attractions, available infrastructure, and other factors. These areas and proposed phasing are noted in **Figure 2** and **Table 1**.

BUSINESS PLAN

Bike share programs in the U.S. are operated and structured in various ways. Each community exploring bike share must define its own model by considering the individual program strategic goals, financial constraints, and political realities. This study guides Howard County in developing its own business plan but arriving at a final model will require wider discussions with key stakeholders. At its most basic, a business plan is composed of four basic components:

- **Ownership and Governance:** Every bike share system needs to select an “owner” who will lead the oversight of the system and legally own the equipment. The County will need to decide whether the system should be managed publically or by an outside organization (most likely a non-profit). Regardless of the final owner, the system will require a governance structure that brings together key stakeholders.
- **Operating Model:** Bike share systems in the United States are either operated directly by their owner or through a contracted vendor. There are strengths and weaknesses to both models, and the preferred operating model largely depends on the capacities of the final program owner. Howard County has extensive experience with vendor contracting, and relies on this model to operate its transit system.
- **Technology:** Bike share technology is rapidly evolving and Howard County has more choices than ever in procuring a bike share system. Regardless of what technology is selected, the County would like to procure a system that is durable, secure, easy to use, and as family-friendly as possible.
- **User Fees and Funding:** The program will depend on a diverse range of funding sources from user fees and public grants, to sponsorships and private support for the program. The County would like to explore an innovative user pricing strategy for the program based on charging riders by the minute (or other time increment), instead of requiring riders to purchase at a minimum a day pass like most other systems. The County anticipates that the private-sector will play an important role in funding the system through sponsorships.

PROGRAM COSTS

Cost and ridership projections for the program were created based on observed performance of peer systems, the proposed size and phasing of the program, and assumed user fee structure. The total capital cost of implementing the program is estimated to be \$2.26 million.

In addition to capital, the program will require ongoing operating funding. The program cost recovery is projected to grow from 23 percent in its first year to 31 percent by year 6. This cost recovery level is lower than larger bike share programs but still favorable compared to the cost recovery of local transit systems (Howard County Transit's cost

recovery is 10 percent). The challenge for the program will be to identify funds necessary to cover the ongoing operating shortfall.

Table 2 - Projected Capital Costs by Phase

Phase	New Stations and Bicycles	Installation & Site Planning	Start Up and Parts	Total
1A	\$662,000	\$59,000	\$127,000	\$848,000
1Flex	\$100,000	\$9,000	\$19,000	\$128,000
1B	\$341,000	\$30,000	\$66,000	\$437,000
1C	\$146,000	\$13,000	\$28,000	\$187,000
2-Laurel	\$207,000	\$18,000	\$40,000	\$265,000
2-Ellicott	\$207,000	\$18,000	\$40,000	\$265,000
2-Flex	\$103,000	\$9,000	\$20,000	\$132,000
Total	\$1,766,000	\$156,000	\$340,000	\$2,262,000

Table 3 - Projected Operating Cost by Year

Fiscal Year	Bikes	Ridership	Total Revenue	Total Operating Costs	Cost Recovery Ratio	Operating Shortfall
Year 1	140	13,400	\$78,000	\$337,000	23%	-\$259,000
Year 2	240	27,600	\$158,000	\$548,000	29%	-\$390,000
Year 3	260	35,000	\$214,000	\$694,000	31%	-\$480,000
Year 4	360	42,400	\$264,000	\$881,000	30%	-\$617,000
Year 5	360	48,000	\$298,000	\$981,000	30%	-\$683,000
Year 6	360	50,400	\$313,000	\$1,010,000	31%	-\$697,000

PROGRAM EQUITY

Howard County places an emphasis on developing a bike share program that serves the needs of all users. Historically bike share program riders have been disproportionately white, young, and well-educated. For the program to truly succeed in the Country, bike share needs to appeal to a more diverse range of riders, including families with children. Successfully expanding the reach of bike share will require a multi-pronged approach that includes extensive public outreach, reducing barriers to use, special pricing, and a greater emphasis on being family friendly.

PROGRAM IMPACTS AND CONCLUSION

The programs greatest benefit will be in expanding opportunities for recreation and physical activity. Program users are expected to burn over 2.8 million calories per year by Year 6. Bike share will allow riders to explore the County park system and increase exposure to Howard County's extensive bicycle path network.

Table 4 - Select Projected Annual Health and Environmental Indicators for Bike Share

Year	Bike Share Miles	Calories Burned	Vehicle Miles Diverted	Greenhouse Gas Reductions (LB. of CO ₂)
Year 1	20,208	767,899	4,244	2,864
Year 2	41,363	1,571,777	8,686	5,863
Year 3	52,423	1,992,083	11,009	7,431
Year 4	63,684	2,419,981	13,374	9,027
Year 5	71,959	2,734,430	15,111	10,200
Year 6	75,557	2,871,152	15,867	10,710

The bike share program is expected to have smaller impacts on congestion, and emissions than other more traditional transit options (i.e., bus or rail). Overall the environmental and congestion impacts are expected to be negligible on a county-wide level, however bike share could support improved mobility on a local level; bike share may enhance, for example, travel between the Howard Community College and Downtown Columbia. At this time, there is not enough data to quantify the program's projected impact on transit ridership.

The final feasibility of Howard County bike share will be driven by whether funding can be identified for capital and operating. Successfully developing a bike share program will require cooperation between key stakeholders in the community, including the County, non-profits, local institutions, and private businesses.

PROGRAM PILOT

If funding cannot be identified for the full implementation of the system, the County may decide to implement a smaller scale pilot. The appendix of this plan outlines the costs, revenue, and ridership expected from an 8 station pilot based around Columbia Town Center, the Community College, and General Hospital. A pilot program will have a more limited impact but provides the program an opportunity to assess strategy and build implementation capacity.

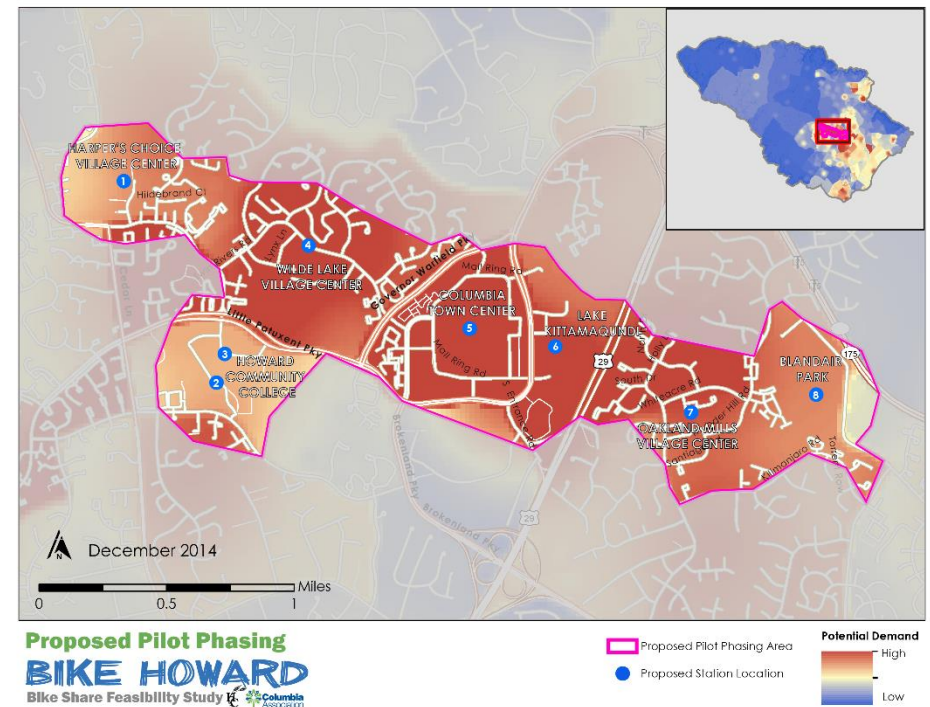


Figure 3 - Pilot Program Phasing Area

This proposed Pilot Program is expected to provide a resource for transportation and recreation travel, connecting various activity centers in the core of the County including the Villages of Harpers Choice, Oakland Mills and Wilde Lake. The project would also provide service to Howard Community College, Howard General Hospital, Downtown Columbia, Blandair Park and Lake Kittamaquundi.

Given the system's location in the core of the community, as well as the proximity of the stations to a network of over 100 miles of pathways

throughout Columbia, it is anticipated that the system will serve both transportation trips (e.g. journey to work, shopping, and social / recreational destinations) as well as purely recreational trips that don't involve a destination, but are rather for enjoyment or exercise.

The proposed pilot program is expected to include eight stations in an area of 2.1 square miles for a total station density of around 3.9 stations per square mile, double the density of stations of the overall proposed program. Based on this proposed density and phasing, the Pilot is expected to serve around eight percent of the County's total jobs and just over five percent of the County's residents based on place of residence and place of employment. The system is also expected to serve visitors who go to Downtown Columbia for its shopping, restaurants, parks, etc. Finally, the proposed pilot program has the potential to serve 30,000 students who are enrolled at Howard Community College.¹

¹ Interview with Bob Marietta of Howard County Community College, May 2014

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HOWARD COUNTY BIKE SHARE DEMAND ANALYSIS

PART 1



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CONTENTS

1. Background	2
What is Bike share?	2
Benefits of Bike Share Systems.....	4
2. Comparable Programs.....	8
Capital Bikeshare	8
Bay Area Bike Share	10
Greenville B-Cycle.....	11
Spartanburg B-Cycle	12
3. Community Analysis	15
Geography and Existing Roadway Conditions	15
Demographics	15
Transportation Mode Share	22
Bicycle Infrastructure	23
Tourism	27
Summary of Existing Conditions	29
4. Policy Review	30
Local and Regional Plans	30
Policies and County Ordinances	30
5. Public Engagement	33
Stakeholder Engagement	33
Public Input	33
Feedback Summary	34
6. Demand Analysis	38
Indicators	38
Methodology	40
7. Feasibility Recommendation.....	43

INTRODUCTION

Bike share systems have successfully been implemented in cities of all sizes throughout the United States for the past six years. In the Baltimore Washington region, Capital Bikeshare (launched in 2010) was one of the first and continues to be one of the most successful systems in the United States. However, to date there have been very few systems implemented in lower-density suburban areas such as Howard County, although there has been increasing interest in expanding bike share into suburban areas. The unique nature of such a system provides an opportunity and a challenge to this study, as there are few similar systems around the country for comparison.

This feasibility study follows on a preliminary analysis undertaken in 2012 and incorporates additional indicators that have historically been linked to increased bike share demand. The preliminary analysis indicated potential demand for a bike share program in four areas:

- Central Columbia (Howard Community College, Howard General Hospital, Downtown Columbia, Oakland Mills)
- East Columbia (Gateway and Dobbin Road Areas)
- Johns Hopkins Applied Physics Lab/Maple Lawn
- Route 1 Corridor

The document reviews and refines the analytical methods in the preliminary analysis and proposes a refined analysis of existing conditions.

During the development of the project, the County and CA developed the following goals for a potential bike share program:

1. Improve access to transit systems and expand transportation options for County residents.
2. Increase the convenience of bicycle use for short distance trips so cycling can more readily become a daily transportation mode.
3. Enhance public health by reducing air pollution and promoting active lifestyles.

4. Enhance the quality of life for Howard County residents by supporting bicycling as a fun and convenient transportation mode.

This study evaluates the potential feasibility of a bike share program in the context of these goals.

Report Organization

This report is divided into seven sections:

Section 1 introduces the concept of bike share and its benefits.

Section 2 provides a context for bike share implementation by providing examples of existing bike share programs in jurisdictions with similar characteristics.¹

Section 3 evaluates existing conditions in the County and presents the opportunities and challenges for Howard County related to geography, employment, demographics, bicycle infrastructure and transit mode share.

Section 4 examines existing policies and regulations that may have an effect, positive or negative, on the implementation of such a bike share program.

Section 5 reviews local public and stakeholder sentiment towards bike share implementation.

Section 6 details how the demand analysis was developed.

Section 7 provides an overall evaluation of the feasibility on implementing a bike share system.

¹ It is important to note that to date, no bike share program has been implemented in jurisdictions that exhibit characteristics of a suburban environment, such as those present in Howard County.

1.BACKGROUND

WHAT IS BIKE SHARE?

Bike share is a mobility option that allows users to access a fleet of public bicycles throughout a community. Bike share is an ideal mode of transportation or recreation for short trips that allow users to make as many trips as often as they like, without additional charges, provided they check the bicycle back in within the 30 to 60 minutes “free period.” Following the free period, most operators charge incremental fees to encourage turnover of the bicycles. This in turn promotes high turnaround of available spaces for other users to park their bicycles. Most systems also require low-cost subscription fees, ranging from a few dollars for one-day access to \$50 to \$100 for annual membership.

CHARACTERISTICS

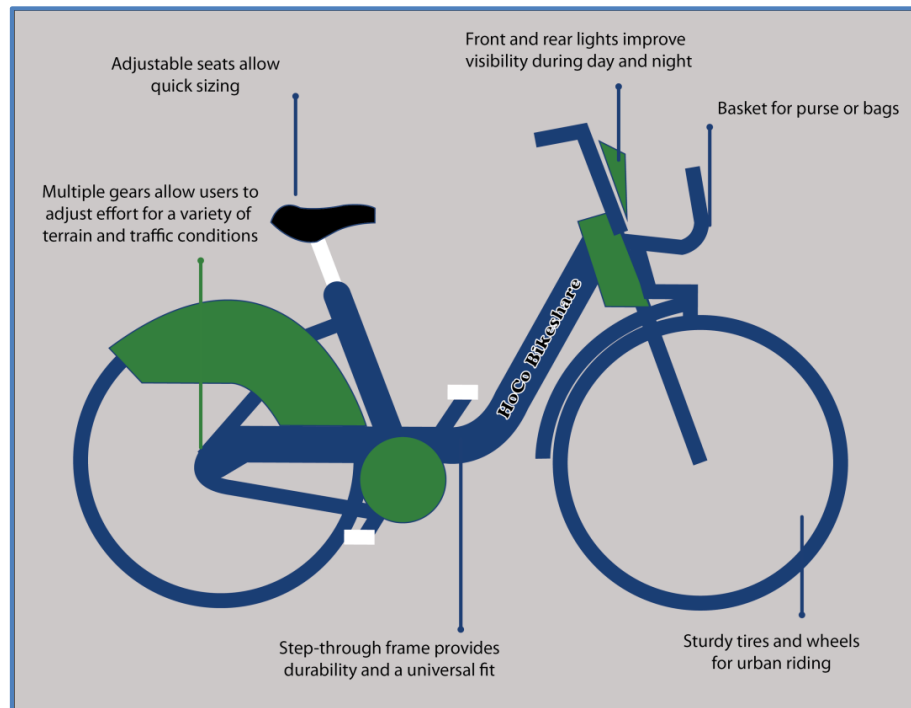


Figure 1 - Characteristics of a bike share bicycle

Most bike share systems are oriented to short-term, point-to-point trips. The majority of reported U.S. bike share trips have averaged between 15 to 35 minutes and one-to-three miles in length.² The structure of bike share differs from typical bicycle rentals; bike share systems encourage short trips and high turnaround of bicycles through the use of incremental fees; and in the types of bicycles available to users. Bike share bicycles and stations are designed to be easy to operate with simple, durable components, adjustable seats, and easy to understand instructions.. Figure 1 provides a description of some of the features found on bike share bicycles.

ELEMENTS OF BIKE SHARE

Currently most U.S. bike share programs have utilized automated and self-service kiosks to access bikes, however, as bike share implementation has evolved, many cities are considering systems that have technology on the bicycle itself.

Following is a discussion of the elements of each technology:

SMART DOCK

Smart dock or “station-based” technology includes a fixed station, either solar-powered or hard-wired, that houses all secured bicycles and facilitates rentals.

Figure 2 presents the elements of smart dock technology, which include:

- **Station:** a collective grouping of the following elements:
 - **Kiosk:** electronic terminal where all rental transactions are made.
 - **Informational Panel:** a display that can be used to provide maps, information about the system, and space for advertising.
 - **Dock:** mechanism that holds the bicycles. Each dock has a mechanized system that locks and releases the bicycles.
 - **Platform:** structure that holds the kiosk, information panel, and docks. Most systems are modular, allowing various sizes and arrangements.

² Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

- **Bicycle:** bicycles are specifically designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.
- **RFID Card/Fob:** Radio frequency identification technology, usually in the form of a card or fob, allows users to check out a bicycle directly from the dock and speeds up transactions. This also provides an added layer of security and accountability to each transaction.

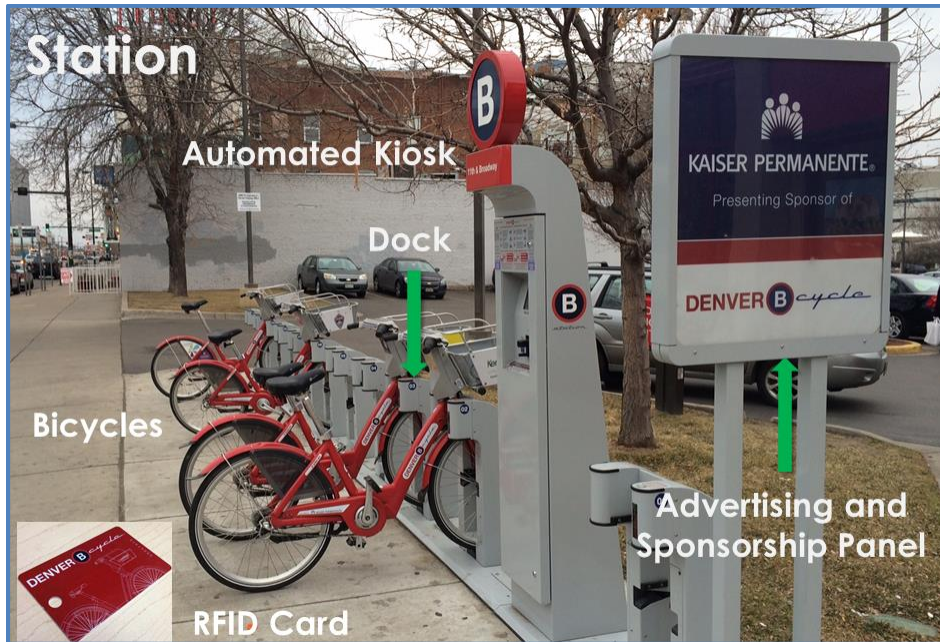


Figure 2 - Elements of Smart Dock Bike Share Systems

SMART BIKE

An emerging technology that has only been introduced in a limited fashion in the U.S. to date is the “smart-bike” system where all features (i.e., locking mechanism, GPS, lockbox) are placed on the bicycles rather than at each individual station throughout the system. Smart bike systems, which are significantly lower-priced compared to smart dock systems, have the potential to provide increased flexibility for the user in terms of parking, however remain untested in large scale implementation to date.

Figure 3 presents the elements of a smart-bike system.

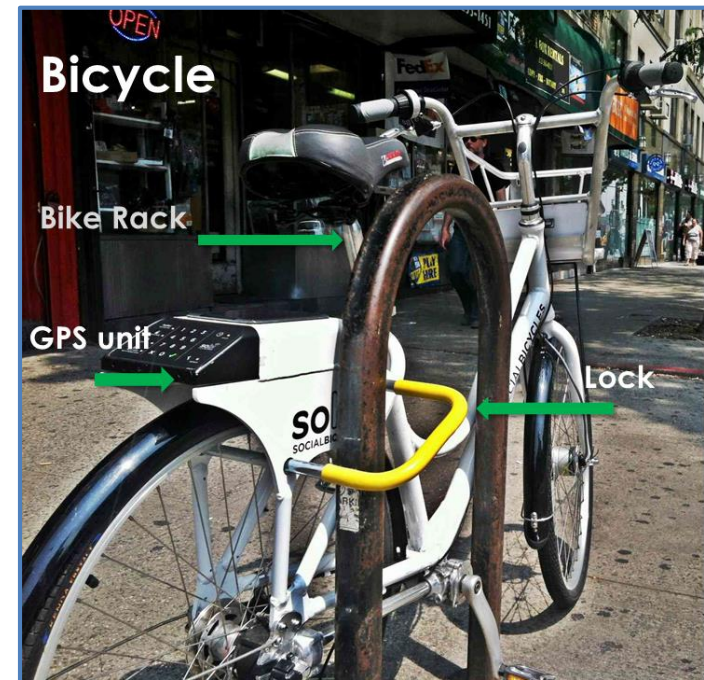


Figure 3 - Elements of Smart-Bike Bike Share Systems

The main components of smart bike systems include:

- **Bicycle:** similar to the smart dock systems, bicycles are specifically designed for short trips and constructed of customized components to limit their appeal to theft and vandalism.
- **Lock:** The lock is a hardened-steel shackle that allows the user to lock and unlock utilizing a code.
- **GPS Unit or Lockbox:** The lockbox is securely welded to the frame and it has a simple keypad interface where users can enter a PIN code, place the bicycle on hold and flag a repair. The unit also has real-time GPS and wireless communication technology.
- **“Dumb Dock” or regular rack:** this is the point to which the bicycle is locked, and contains no technology. Depending on the technology, it could be a bike rack that has no proprietary parts or it could be a steel post that is designed to host the bike share bicycle.

BENEFITS OF BIKE SHARE SYSTEMS

As compared to other transportation programs, bike share systems remain a relatively inexpensive and quick-to-implement transportation option that can deliver a variety of health, economic and transportation benefits.³ For Howard County and Columbia Association, bike share may help:

- Promote physical health and reduce health care costs.
- Reduce greenhouse gas emissions.
- Expand and enhance existing transit services.
- Reduce dependence on automobile transportation.
- Provide an economic uplift to local businesses.
- Reduce overall household transportation expenditure.

The ensuing section further explores these benefits.

HEALTH BENEFITS

The health benefits of cycling are well documented and include helping address preventable diseases including obesity, heart disease, and diabetes.⁴

Bike share represents an opportunity for residents to incorporate active transportation into their daily routines and help lower medical and health care costs. Bicycling for 30 minutes a day can reduce the risk of heart disease by 82% and reduce the risk of diabetes by up to 58%.^{5,6}

Recognizing the benefits to health outcomes, the Centers for Disease Control and Prevention (CDC), has provided funding to several different bike share systems and several private health insurance companies have underwritten bike share programs. For example, Blue Cross Blue Shield recently partnered with Divvy (Chicago) committing a \$12.5 million, five-year sponsorship investment to support, strengthen and expand the bike share system.⁷

3 Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration, United States Department of Transportation. September 2012.

4 Lindström, J. et al. The Finnish Diabetes Prevention Study: Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care*, December 2002, vol. 26 no. 12 3230-3236. Accessed online at <http://care.diabetesjournals.org/content/26/12/3230.full> on December 13, 2013.

5 British Medical Association (1992). *Cycling Towards Health and Safety*. Oxford University Press.

6 Lindström, J. et al. The Finnish Diabetes Prevention Study: Lifestyle intervention and 3-year results on diet and physical activity. *Diabetes Care*, December 2002, vol. 26 no. 12 3230-3236. Accessed online at <http://care.diabetesjournals.org/content/26/12/3230.full> on December 13, 2013.

ENVIRONMENTAL BENEFITS

Bike share can also have an impact on curbing and reducing greenhouse gas emissions by promoting bicycling as an alternative to single occupancy vehicles. When combined with transit, ridesharing, and other alternatives, bike share programs can help reduce dependence on single occupancy vehicles (SOV's), reduce congestion and increase environmental consciousness.

In jurisdictions with existing bike share programs, member surveys have shown that approximately 20 to 40% of annual member bike share trips replace what would have been a single-occupancy vehicle trip. For example, Capital Bikeshare members replaced approximately 4.4 million vehicle miles in 2011, representing a four % decrease in the city's annual driving mileage.⁸ Similarly, since its inception, San Antonio Bike Share users have ridden over 400,000 miles resulting in a reduction of over 380,000 lbs. of carbon dioxide emissions.⁹

Bike share has also helped increase consciousness about environmental issues in various communities. For example, most bike share systems offer member logins where people can track the amount of greenhouse gas emissions avoided through their bike share trips. Additionally, employers have been known to use this data to help track the company's greenhouse gas emission reductions and to promote contests among employees for distance ridden, carbon offset and even calories burned.

MOBILITY, TRANSPORTATION, AND COMMUNITY BUILDING BENEFITS

Bike share has helped mobility and connectivity in communities across the U.S. by increasing the number of transportation options available to residents, workers and visitors. Bike share provides a faster and more manageable option for trips too far to walk or too short to wait for transit. Bike share has also helped provide the following mobility, transportation, and community engagement benefits:

7 Mayor Emanuel, Blue Cross and Blue Shield of Illinois Announce Partnership to Support Divvy Bike Share System. Press Release, City of Chicago. Obtained from http://www.cityofchicago.org/city/en/depts/mayor/press_room/press_releases/2014/may/mayor-emanuel-blue-cross-and-blue-shield-of-illinois-announce-p.html on May 15, 2014.

8 Federal Highway Administration, Highway Statistics 2011: Urbanized Areas – 2010 Miles and Daily Vehicle – Miles Traveled. Accessed online at <http://www.fhwa.dot.gov/policyinformation/statistics/2011/hm71.cfm> on December 27, 2013.

9 San Antonio Bike Share website. <http://sanantoniobikeshare.org/>.

Increase the reach and capacity of a community's existing transit system.¹⁰

A bike share system can complement existing transit services by providing first- and last-mile connections, effectively extending the reach of fixed-route services, and by helping relieve crowding on transit routes that are at capacity.¹¹ In the Washington DC area, over half (54 %) of respondents to Capital Bikeshare's member survey stated that at least one of their bike share trips in the previous month had started or ended at a transit station (i.e., Metro station) and about a quarter (23 %) of respondents used bike share to access the bus in the previous month.¹²

- **Encourage active transportation by lowering barriers to entry.**

Bike share has proven one of the most effective ways to quickly and affordably introduce new riders to bicycling, introduce residents to bicycling as viable mode of transportation, and help support further investment in active transportation.

Bike share's ability to reduce some of the common barriers to bicycle use, including allowing new users to try bicycling without needing to own or store a bicycle, has had a significant impact in attracting new riders. In Minneapolis for example, 33% of new members surveyed in 2010 by Nice Ride Minnesota had ridden less than once per month before joining.¹³

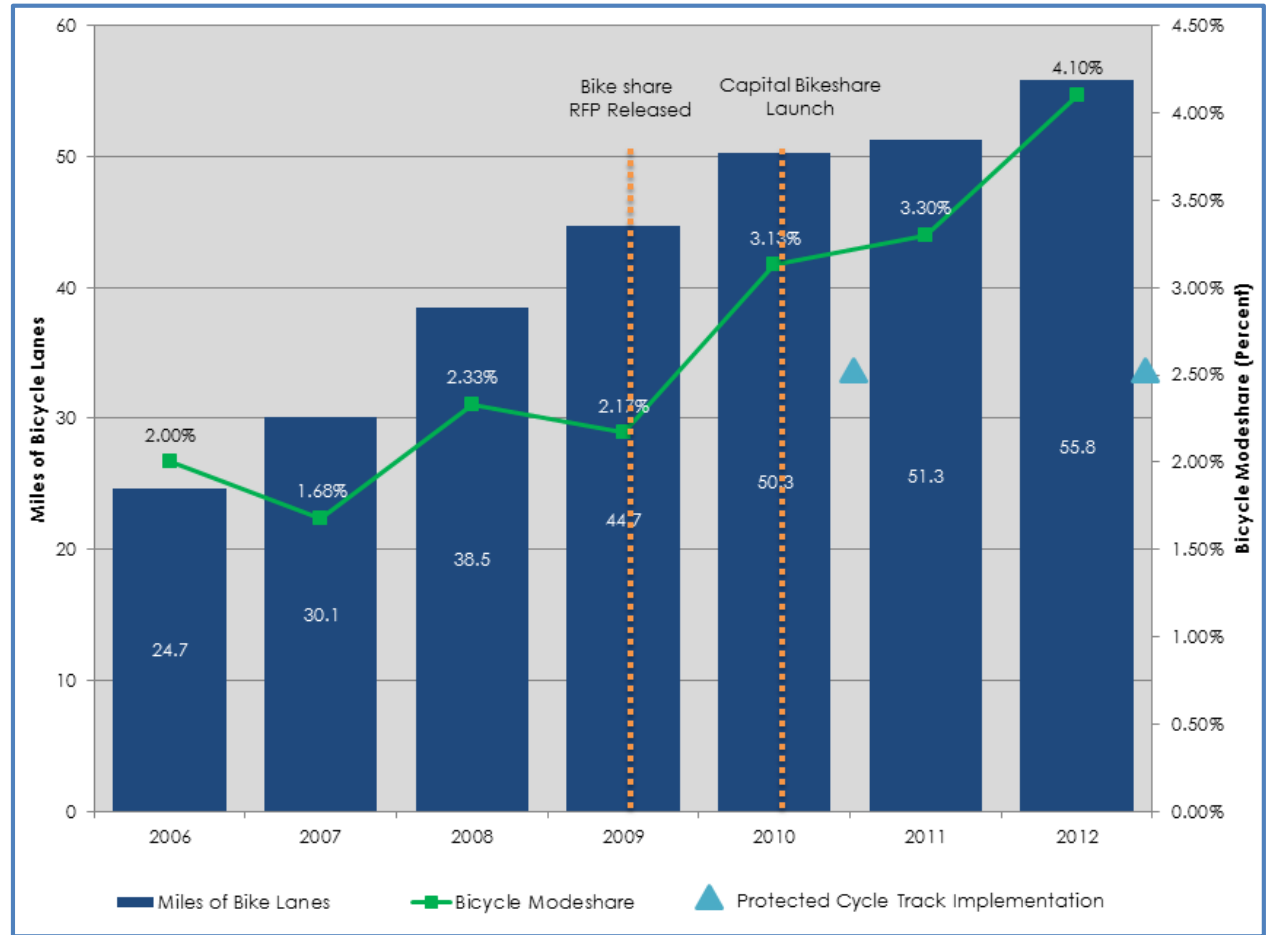


Figure 4 - Increase in bicycle lanes installation, mode share and implementation of Capital Bikeshare in Washington DC

- **Provide an impetus for increasing investment and implementation of bicycle friendly facilities**

Jurisdictions with bike share systems have also experienced an increase in funding and implementation of bicycle friendly facilities. For example **Figure 4** features the increase in the amount

¹⁰ "Look Ma, No Spandex: Once-Reluctant Rider Won over by Ease of Capital Bikeshare." Accessed from http://www.washingtonpost.com/local/trafficandcommuting/the-spandex-shy-can-relax-once-reluctant-rider-won-over-by-ease-of-capital-bikeshare/2014/04/14/d7bba564-bc11-11e3-9c3c-311301e2167d_story.html on April 16, 2014

¹¹ Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

¹² LDA Consulting (2013). 2013 Capital Bikeshare Member Survey Report. Accessed online at <http://capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf> on December 13, 2013.

¹³ Two-thirds of members also said they had increased their amount of bicycling since joining Nice Ride. Figures taken from Nice Ride 2010 Annual Report.

of on-street bicycle lanes juxtaposed with the increase in bicycle mode share. Also shown are the implementation and launch dates for Capital Bikeshare.¹⁴ While this correlation remains to be studied in depth, there was an increase in bicycle facilities, investment and mode share prior to the launch of Capital Bikeshare, and that increase, particularly of mode share, has continued since implementation. Capital Bikeshare may have helped increase the public's desire for more comfortable facilities and may help drive an increase in dedicated investment for expanding the existing network of bicycle friendly facilities.

- **Contribute positively to people's attitude towards the Jurisdiction.** Jurisdictions that have already experienced bike share implementation have also found there has been a shift in the way residents and visitors feel about their community. For example, 95% of Nice Ride Minnesota users surveyed in 2011 agreed or strongly agreed that bike share had made the Twin Cities a more enjoyable place to live.¹⁵ Furthermore, residents in various cities have felt that bike share stations create additional public spaces for people to gather, as evidenced with the installation of bike share stations in New York City, where it was observed that the stations created an additional social space where people meet and gather as well as acting as conversation starters.¹⁶

ECONOMIC BENEFITS

Bike share systems have been known to provide economic benefits at the community, business and individual levels:

- At a **community** level, bike share is recognized as a means for attracting or retaining workforce talent and in providing visitors with a unique way to experience the community. Various communities have showcased their bike share systems as part of efforts to help revitalize or activate their downtown area(s). In addition, bike share has helped to provide new and different ways for tourists to experience a place, while attracting their

spending power. Finally, bike share systems help create a small number of local jobs through the operations and maintenance of the system.

- For **businesses**, bike share may support increased revenues for local businesses. In cities with existing bike share programs, businesses located near bike share stations have seen an economic uplift. A 2013 study of the Nice Ride Minnesota bike share system (Minneapolis / St. Paul) found that bike share users spent an additional \$150,000 at local businesses over the course of one bike share season compared to the prior year before bike share was implemented.¹⁷

Bike share also represents a mechanism for businesses to promote their brand as one that supports sustainable transportation practices. Most bike share programs offer sponsorship or advertising opportunities on the stations and bicycles. This can range from one large system sponsor to many smaller station-based sponsors. In some communities, sponsors become involved in bike share promotions, for example by offering discounted goods or services to bike share members.

- For **individuals**, bike share has reduced the costs of transportation and health care, which combined make up over 22% of annual average household expenditures in the United States, according to one study¹⁸ Compared to the cost of operating an automobile, a bike share membership is relatively inexpensive with most programs costing between \$50 and \$100 per year. In comparison, the median cost of annual car ownership is approximately \$9,100.¹⁹ In the Washington DC area for example, 87% of annual members reported having saved money on weekly travel costs by using Capital Bikeshare. This resulted in an average of \$800 per year saving on personal transportation costs for these users.²⁰

14 Darren Buck. Capital Bikeshare program associate. District Department of Transportation. Email. (Tue 6/10/2014 1:53 PM)

15 Nice Ride Minnesota Annual Report 2011. Accessed online at: https://www.niceridemn.org/_asset/9n2z8n/

16 Nelson, David M. and David Leyzerovsky. The Social Life of CitiBike Stations. Project for Public Spaces. <http://www.pps.org/blog/the-social-life-of-citibike/>. December 3, 2013.

17 Schoner, J.E., Harrison, A. and Wang, X. (2012). Sharing to Grow: Economic Activity Associated with Nice Ride Bike Share Stations. Humphrey School of Public Affairs, University of Minnesota.

18 U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2010.

19 For comparison, the median annual cost of car ownership is approximately \$9,100 based on information from www.consumerreports.org accessed on December 12, 2013.

20 LDA Consulting (2013). 2013 Capital Bikeshare Member Survey Report. Accessed online at <http://capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf> on December 13, 2013.

SAFETY BENEFITS

The safety of cycling in a community is a significant concern to bike share users. Although still relatively new, bike share has an extremely impressive safety record. To date, no system in the United States has recorded a fatality and the rates of injury crashes are typically lower than private bicycling, as evidenced by **Figure 5**.^{21 22}

The safety benefits of bike share include:

- **Introducing more riders to a community for a “safety in numbers” effect.**

Along with the high visibility of distinctive bicycles and stations, the high volume of riders result in greater awareness of bicyclists by drivers. In fact, the “safety in numbers effect” is well established. A study published in the journal *Injury Prevention* in 2003 showed that the “likelihood of a person walking or bicycling being struck by a motorist varies inversely with the amount of walking and bicycling”.²³ This injury rate reduces exponentially with the number of cyclists using the road system (in this case using journey to work mode share as a proxy for the overall amount of cycling).²⁴

- **Exposure of riders to road rules and safety tips through safety messaging at bike share stations and websites.**

Bike share provides a unique opportunity to communicate with cyclists about road rules and regulations and safety tips. Means of communicating safety messages have included website, social media, at the bike share station during registration, on the bicycle handlebars and stem, and on the map panels in stations. Such communication leads to more educated and safer riders who typically take fewer risks than the traditional, private bicyclist.

- **Increased use of safer bicycles that are in good repair and feature permanent lighting systems.**²⁵

The strong safety record of bike share is also impacted by the introduction of bicycles with a number of safety features (see

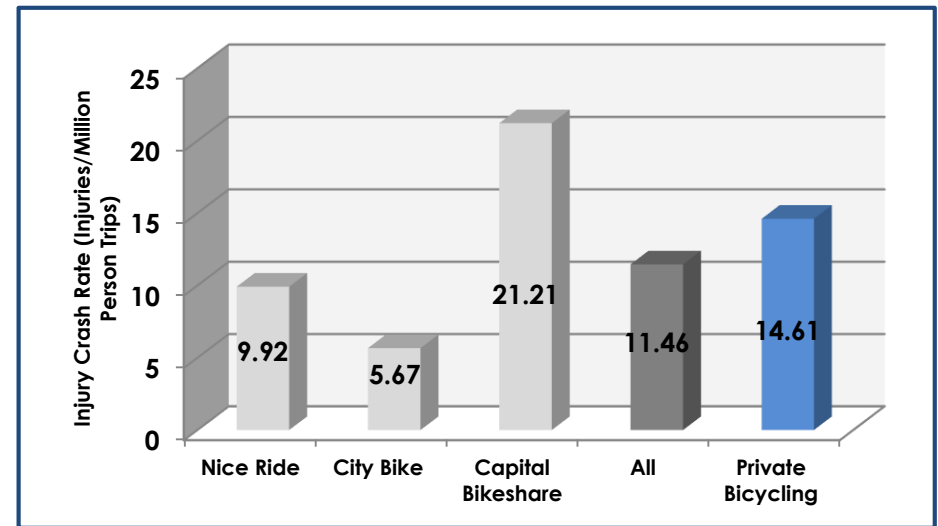


Figure 5 - Comparison of Injury Rates for Bike Share and Private Bicycling

Figure 1) including front and back lights, brakes, and reflectors, an upright position of the rider; and a heavier bicycle (typically 40-45 lbs.) with wide handlebars where riders generally keep slow speeds and do not weave in traffic.

Despite early concerns about limited helmet use amongst bike share users, safety statistics suggest that bike share programs have experienced very low crash rates compared to crashes among bicyclists riding their own (non bike share) bicycles.²⁶

Finally, as many more bike share systems have come into being, jurisdictions have contractually required that bike share operators undertake regular maintenance of the bicycle fleet to ensure the safety of riders.

21 Only Capital Bikeshare has a higher injury crash rate than private bicycling. It is uncertain why the injury crash rate is higher in Capital Bikeshare than in other systems and higher than the private bicycling rate.

22 Injury rates for private bicycling obtained from: Beck, L. et al. (2007). Motor Vehicle Crash Injury Rates by Mode of Travel, United States. Published in the American Journal of Epidemiology.

23 Jacobsen, P.L. (2003). Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. *Injury Prevention* 2003;9:205-209.

24 Jacobsen, P.L. (2003). Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling. *Injury Prevention* 2003;9:205-209.

25 Atlanta Bicycle Coalition (2013). Atlanta – Decatur Bike Share Feasibility Study. Accessed online at: http://issuu.com/atlantabike/docs/atl-dec_bikeshare_book_lowres# on January 2, 2014.

26 Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

2.COMPARABLE PROGRAMS

Bike share implementation in the U.S. is in its infancy, with most programs in large or mid-sized cities. To date, there are few examples of programs in lower density suburban areas and most have been operated for less than a year. Four existing U.S. bike share programs were selected based on their demographic, economic and geographic similarities to Howard County as well as the bike share system's operational and ownership model. The selected programs included:

- **Capital Bikeshare – Montgomery County** (Washington, DC Area)
- **Bay Area Bike Share - South Bay Satellites** (San Francisco Bay Area)
- **Greenville B-cycle** (Greenville, SC)
- **Spartanburg B-cycle** (Spartanburg, SC)

The profiles below present a summary of shared characteristics for each of the aforementioned programs.

CAPITAL BIKESHARE

(Montgomery County Only)

www.capitalbikeshare.com

Montgomery County launched its Capital Bikeshare system in September 2013, becoming the forth jurisdiction to join the regional bike share program after Washington DC, Arlington County, and Alexandria. The system in the county is comprised of three nodes:

- Friendship Heights and Bethesda
- Silver Spring and Takoma Park
- Rockville and Shady Grove

The Bethesda/Friendship Heights and Silver Spring/Takoma Park portion of the system serve high density Metro-adjacent neighborhoods in Montgomery County with population densities of approximately 7,000 people per square mile.²⁷ The Rockville system is unique as it was funded by a federal grant designed to facilitate reverse commutes to major employment centers in the area outside walking distance to Metro. The land uses in Rockville are lower density than the Down-county system (approximately 3,000 people per square mile), with large distances between some stations.

As the system has been in operation for less than a year, usage and member statistics are unavailable or incomplete. Ridership data is currently only available for 8 months and does not include most of the spring and summer months, which tend to have higher ridership.

²⁷ Average density in the two Downcounty Areas. The figure is high largely because stations are located at high density metro adjacent development such as Friendship Heights and Bethesda.

²⁸ Approximation of Montgomery County fleet as of May 2014 based on number of active docks



According to the system program manager, the low initial ridership was projected, and system utilization is expected to improve substantially during the spring and summer.

System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Jurisdictional
Operator:	Alta Bicycle Share
Operations:	Year-round (365 days)

System Size

Bikes: ²⁸	365 bikes
Stations:	48
Docks:	729
Service Area (Sq. Mi.): ²⁹	13 sq. mi.
Station Density: ³⁰	3.8 stations / sq. mi.

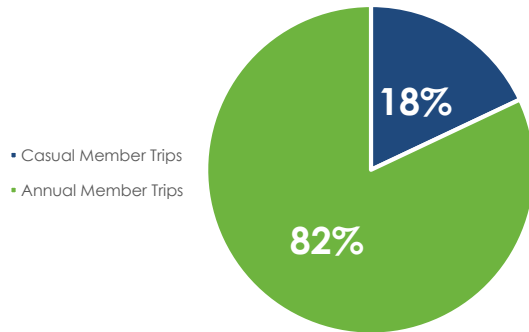
²⁹ Service area is calculated as a quarter mile from the outer station of the three system nodes

³⁰ Stations per square mile in service area.

Demographics

System Population: ³¹	143,286
Metro Area Population: ³²	5,582,170
Estimated Annual Tourists:	Not available. Tourists seem to be a major ridership driver in Washington, DC but less so in suburban jurisdictions
Average Population Density:	4,822 ³³

TRIPS BY MEMBER TYPE



Membership and Ridership³⁴

Casual Subscriptions:	Not available
Annual Members: ³⁵	1,107
Casual Subscriber Rides:	2,447
Annual Member Rides:	9,038
Total Rides:	11,485
Rides per annual membership: ³⁶	8.6
Rides per casual subscription:	Not available
Population per bike:	589
% population with annual membership:	0.8%
Casual subscriptions per station:	Not available
Tourists per casual subscription:	Not available

Revenue Model

Sponsorship, membership and usage fees are reinvested into the system through a collaborative agreement of the regional jurisdiction members. In the current agreement, jurisdictions pay a flat per-dock fee to the operator.

Capital Funding Sources³⁷

Initial System (450 Bikes, 50 Stations)

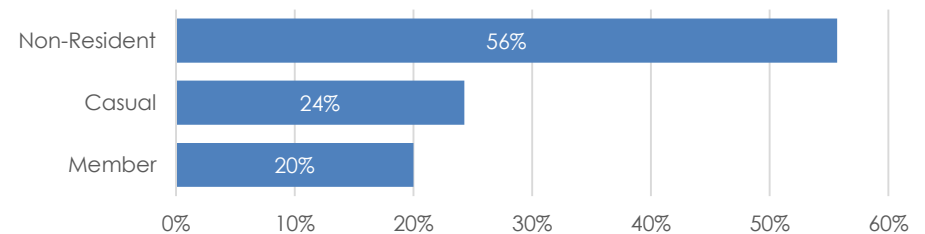
JARC Grant	\$1.30 million
Private Contributions	\$0.25 million
<u>MDOT Grant</u>	<u>\$ 1.00 million</u>
Total Capital	\$2.52 million

Membership Fees & Usage Fees

Annual:	\$75
Annual Corporate:	\$50
Annual Discounted: ³⁸	\$84
Monthly:	\$25
72 Hours:	\$15
24 Hours:	\$7
Usage Fees- Annual	First 30 minutes free. Then forth \$1.50 (1 hr.); \$4.5 (1.5hrs); \$6 (per 30 min); max per day of \$70.50
Usage Fees- Casual	\$2 (1 hr.); \$6 (1.5 hrs.); \$8 (per 30 min); max per day of \$94

Breakdown of User-Generated Revenue³⁹

REVENUE BY MEMBER TYPE



Operating Costs⁴⁰

Operating expense per dock per month:	\$117
Operating expense per ride: ⁴¹	~\$59
Fare box recovery: ⁴²	40% recovery ratio

³¹ Population of census block groups overlapping service area

³² Washington-Arlington-Alexandria MSA, Census 2010

³³ Density for all Montgomery County

³⁴ Capital Bikeshare Monthly Reports, September 2013– April 2014 (8 months)

³⁵ New memberships since Sept. 2013. Approximately 600 existing Capital Bikeshare members resided in Montgomery County before system launch.

³⁶ Only represents trips taken in Montgomery County

³⁷ Capital Bikeshare website

³⁸ Or \$84 in monthly installments of \$7.

³⁹ Capital Bikeshare Monthly Report- April 2014

⁴⁰ Interview with program manager

⁴¹ Only includes eight months of ridership data available (September – April).

⁴² Projected rate for FY2014

BAY AREA BIKE SHARE

(South Bay Satellites Excluding San Francisco)

www.bayareabikeshare.com



Bay Area Bike Share is a regional bike sharing system that was launched in August 2013 and currently is in its pilot stage. The system consists of 70 stations, of which 34 are located outside San Francisco in Palo Alto, Redwood City, Mountain View, and San Jose. Bay Area Bike Share is envisioned as a last-mile solution for connecting riders to the CalTrain commuter rail line, and much of the suburban system is clustered around CalTrain and nearby destinations.

The system is administered by multiple partners. The participating communities had initially all pursued public funding independently for bike share; these grant requests were eventually unified and submitted by the Bay Area Air Quality Management District which today is the equipment owner. Valley Transit Authority oversees day-to-day operations in Santa Clara County, while Redwood City oversees the system within its boundaries in San Mateo County.

As the system pilot is less than a year old, conclusive performance data are still not available for the system. Initial ridership in the South Bay satellite cities is low compared stations in San Francisco. Officials involved with the program attribute low ridership to the dispersed layout of the system (spans approximately 50 miles) and suburban land uses. Bay Area Bike Share is still working to expand to major employment sites and destinations such as Stanford University and the corporate campuses of major Silicon Valley technology firms.

43 Approximation of Bay Area Bike Share fleet as of February 2014 calculated as 50% of dock count

44 Service area is calculated as a quarter mile from the outer station of the three system nodes

45 Stations per square mile in service area.

46 Population of census block groups that overlap service area

47 US Census 2010, combined population of the San Francisco-Oakland-Hayway MSA and San Jose-Sunnyvale-Santa Clara MSA.

System Characteristics

Equipment:	PBSC Urban Solutions (Bixi)
Equipment Type:	Solar/modular
Equipment Ownership:	Bay Area Air Quality Management District
Operator:	Alta Bicycle Share
Operations:	Year-round (365 days)

System Size

Bikes: ⁴³	278 bikes
Stations:	34
Docks:	556
Service Area (Sq. Mi.): ⁴⁴	7.50 sq. mi.
Station Density: ⁴⁵	4.53 stations / sq. mi.

Demographics

System Population: ⁴⁶	135,330
Metro Area Population: ⁴⁷	6,172,302
Estimated Annual Tourists: ⁴⁸	Not Available. Tourists seem to be a major ridership driver in San Francisco but less so in suburban jurisdictions
Average Population Density:	8,092 / sq. mi. ⁴⁹

Membership and Ridership⁵⁰

Casual Subscriptions:	1,227
Annual Members:	425
Casual Subscriber Rides:	3,250
Annual Member Rides:	10,912
Total Rides:	14,162
Rides per annual membership:	26
Rides per casual subscription:	2.65
Population per bike:	487
% population with annual membership:	0.31%
Casual subscriptions per station:	96
Tourists per casual subscription:	Not available

Capital Funding Sources

Initial System (700 bikes, 70 stations)⁵¹

CMAQ	\$7.1 million
Air District Funds	\$2.8 million
Local Match	\$1.3 million
Total Capital	\$11.2 million

The funds will cover capital, launch, and operating during pilot phase (2-3 years)

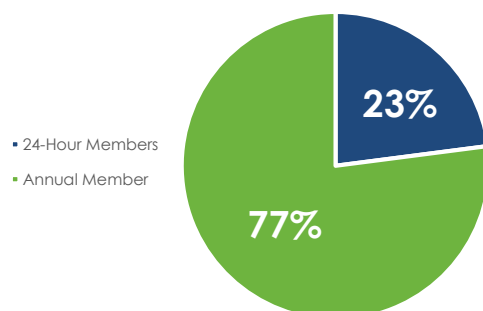
48 VTA believes system attracts few tourists outside San Francisco

49 High density caused by clustering of stations in small areas that have multifamily housing.

50 Six Months of Data. Bay Area Bike Share (08-28-13 through 02-28-14)

51 Entire system, including San Francisco stations

TRIPS BY MEMBER TYPE



Revenue Model

As the system is still in its pilot phase, Bay Area Bike Share is funding the system solely through its capital grants. Operating revenue will be used to fund operating shortfalls once eligible grant funding is exhausted during the pilot phase. User revenue is not disaggregated to local jurisdictions and all expenses are paid through regional grants. The only jurisdiction contributions to date are local matching grants.

Bay Area Bike Share is still in its pilot phase. At the conclusion of the pilot, the system will likely transition to a different revenue model and even possibly ownership model. Operation costs are tied to bike utilization rates, with a minimum and maximum annual operating cost.

Membership Fees & Usage Fees

Annual:	\$88
Annual Corporate	\$75
3-Day:	\$22
24-Hour:	\$9
Usage Fee:	First 30 minutes free. 30-60 min: \$4; additional 30 minutes: \$7

Operating Costs⁵²

Operating expense per dock per month: ⁵³	\$98
Operating expense per ride: ⁵⁴	\$5.56 system wide, approximately \$23 for suburban trips
Fare box recovery: ⁵⁵	N/A

⁵² Operated costs are for entire system; costs are not available by jurisdiction. Projected costs.

⁵³ Varies by ridership. This figure assumes fewer than 1.5 trips per bike per day in first year.

⁵⁴ Average across entire system for first six months. Suburban cost estimated by assuming suburban operating costs are 42% of total costs (proportion of suburban docks in system). Figure may be inflated as low ridership may reduce operating costs.

GREENVILLE B-CYCLE

greenville.bcycle.com



Greenville B-cycle is a six station bike share program focused on Greenville, South Carolina's downtown and adjacent neighborhoods. The system is managed by Upstate Forever, a community non-profit, and was launched in April 2013. Greenville B-Cycle plans to expand over the next four years to 10 stations. Greenville is notable as one of the smallest cities in the United States to feature a bike share system. While the metropolitan region has a high concentration of major universities, including Clemson University and the University of South Carolina Upstate, the city of Greenville itself is not a college town. The city's downtown has benefited from decades of smart planning that has resulted in a walkable streetscape and a thriving retail sector, and today downtown is a major regional destination. A 17.5 mile multi-use trail passes through downtown. The system was developed to encourage physical activity / recreation opportunities and is sponsored by Greenville Health System. The system also hopes to promote improved job access for lower-income households through bike share; currently only one station is located outside the downtown core and that station experiences very low utilization.

System Characteristics

Equipment:	B-cycle
Equipment Type:	Solar/modular
Equipment Ownership:	Non-Profit
Operator:	Upstate Forever and contractors
Operations:	Year-round (365 days)

System Size

Bikes: ⁵⁶	28 bikes
Stations:	6
Docks:	52
Service Area (Sq. Mi.): ⁵⁷	1.16 sq. mi.
Station Density: ⁵⁸	5.1 stations / sq. mi.

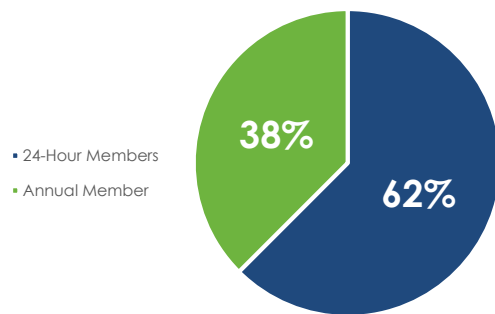
⁵⁵ Cost recovery data not yet available

⁵⁶ Approximation of Greenville fleet as of May 2014 based on number of active docks

⁵⁷ Service area is calculated as a quarter mile from the outer station of the three system nodes

⁵⁸ Stations per square mile in service area.

TRIPS BY MEMBER TYPE



Demographics

System Population: ⁵⁹	7,964
Metro Area Population: ⁶⁰	850,965
Estimated Annual Tourists: ⁶¹	Not available
Average Population Density:	2,059 / sq. mi.

Membership and Ridership⁶²

Casual Subscriptions:	2000
Annual Members: ⁶³	245
Casual Subscriber Rides:	2,000
Annual Member Rides: ⁶⁴	~1,200
Total Rides: ⁶⁵	~3,200
Rides per annual membership:	10
Rides per casual subscription:	1
Population per bike:	284
% population w. annual membership:	3.1%
Casual subscriptions per station:	333
Tourists per casual subscription:	Not available

Capital Funding Sources⁶⁶

Initial System (28 Bikes, 6 Stations)

JARC Grant	\$130,000
Local Match	\$222,000
Total Capital	\$352,000

Revenue Model

User fees cover about 1/3 of system costs. Greenville Health System sponsorship and small scale sponsorships provide another 1/3 of revenue. Grant contributions from various local partners cover the remaining costs. Upstate Forever manages the system

with operating assistance from local businesses with extensive reliance on in-kind contributions to reduce operating costs.

Membership Fees & Usage Fees

Annual:	\$60
Weekly:	\$15
24-Hour:	\$5
Usage Fee:	First 60 minutes free. \$4 per extra hour. Max of \$75 / day

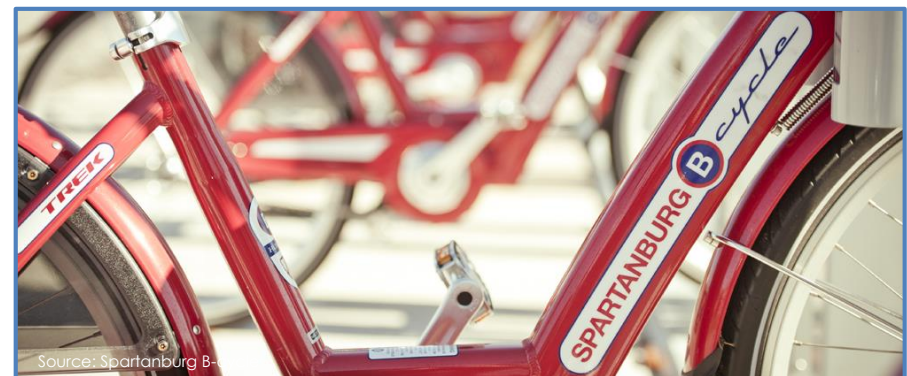
Operating Costs⁶⁷

Operating expense per dock per month:	\$96
Operating expense per ride:	\$18.75
Fare box recovery: ⁶⁸	Approximately 33%

SPARTANBURG B-CYCLE

spartanburg.bcycle.com

Spartanburg B-cycle launched in July 2011 and became the first bike share program in the Southeast with 2 stations and 20 bicycles. Spartanburg B-cycle is an initiative of Partners for Active Living and is a part of a community-wide collaboration called Bike Town



Spartanburg, which is dedicated to sustaining and improving Spartanburg's national designation as a Bicycle Friendly Community by the League of American Bicyclists.

System Characteristics

Equipment:	B-cycle
Equipment Type:	Solar/Wired modular
Equipment Ownership:	Nonprofit

⁵⁹ Population of census block groups overlapping service area

⁶⁰ U Greenville-Anderson-Mauldin MSA, US Census 2010

⁶¹ Precise statistics are not available but Upstate Forever see tourists as the largest user group

⁶² Provided by Upstate Forever. Represent first year of operations (April 2013 to March 2014)

⁶³ Approximately 50% of members never activated their membership

⁶⁴ Figures provided were rounded up by Greenville B-cycle program managers

⁶⁵ Figures provided were rounded up by Greenville B-cycle program managers

⁶⁶ <http://www.greenvillesc.gov/RideGreenlink/forms/JARC/FY2012JarcProjects.pdf>. Local contribution includes funds from Greenville Health System (\$60,000 a year for capital and operations)

⁶⁷ First year of operations- Costs per bike inflated by initial ramp-up of operations

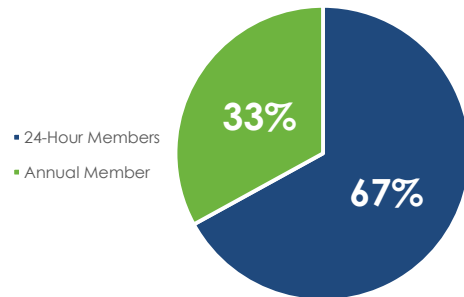
⁶⁸ Fare box revenue is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees

Operator:	Partners for Active Living
Operations:	Year-round (365 days)

System Size⁶⁹

Bikes:	40
Stations:	4
Docks:	517
Service Area (Sq. Mi.): ⁷⁰	0.78
Station Density: ⁷¹	5.12

TRIPS BY MEMBER TYPE



Demographics

System Population: ⁷²	37,401 (2012)
Metro Area Population: ⁷³	1,362,073. (2012)
Estimated Annual Tourists:	Not Available
Population Density:	1,892 people / sq. mi

Capital Funding Sources⁷⁴

Initial System (40 Bikes, 4 Stations)

Sponsorship	\$455,000
Grants	\$124,000
Total Capital	\$579,000

Membership and Ridership⁷⁵

Casual Subscriptions:	1,384
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PROGRAM COMPARISON⁷⁹

Annual Members:	97
Casual Subscriber Rides:	1,521
Annual Member Rides:	755
Total Rides:	2,276
Rides per annual membership:	7.8
Rides per casual subscription:	1.1
Population per bike:	935
% population w. annual membership:	0.26%
Casual subscriptions per station:	346
Tourists per casual subscription:	Not available

Revenue Model

Sponsorship, membership and usage fees are all reinvested into the system. No profit sharing with the jurisdiction. Jurisdiction helps by providing in-kind services in the form of electricity and staff time for reviewing proposed locations.

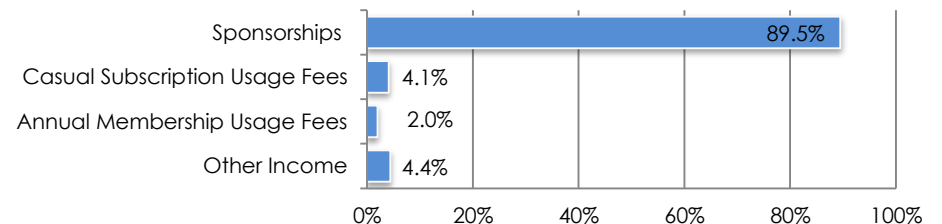
Membership Fees & Usage Fees

Annual:	\$30 First 60 minutes free
Annual Student:	\$20
Monthly:	Additional 30 minute increments:
24 Hours:	\$15 - Annual: \$1 (1 hr.); (max \$35/day)
	\$5

Operating Costs⁷⁶

Operating expense per dock per month:	\$15.6
Operating expense per ride:	\$42.52
Fare box recovery: ⁷⁷	32%

Breakdown of Revenue⁷⁸



⁶⁹ As of July 2013

⁷⁰ Service area is calculated as the area encompassing every station plus a ¼ mile buffer around each station.

⁷¹ Stations per square mile in service area.

⁷² 2012 US Census Estimates. State & County QuickFacts.

⁷³ US Census Estimates. Figures include Greenville-Spartanburg-Anderson CSA population

⁷⁴ Anne Piacentino. Active Lifestyles Coordinator. Partners for Active Living

⁷⁵ Anne Piacentino. Active Lifestyles Coordinator. Partners for Active Living (September 2012-September 2013)

⁷⁶ Partners for Active Living 2011 IRS Form 990.

⁷⁷ Fare box revenue is the percent operating costs recovered from annual memberships, casual subscriptions, and usage fees

⁷⁸ Partners for Active Living 2011 IRS Form 990.

⁷⁹ Most recent data available. (Reported 2012 or 2013)

	Montgomery County, MD	South Bay Cities San Francisco Bay Area	Greenville, SC	Spartanburg, NC
System Name	Capital Bikeshare	Bay Area Bike Share	Greenville, B-Cycle	Spartanburg, B-Cycle
Start Date	September 2013	August 2013	March 2013	July 2011
Number of Bikes	450 bikes (365 in deployment)	278	28	40
Number of Stations	50 (48 in deployment)	34	6	4
<i>Bikes per station</i>	7.6	16.3	4.7	10
<i>Service Area (Sq. Mi.)*</i>	13 sq. mi.	7.5 sq. mi.	1.16 sq. mi.	0.8 sq. mi.
<i>Station Density**</i>	3.8 stations / sq. mi.	4.53 stations / sq. mi.	5.1 stations / sq. mi.	5.0 stations / sq. mi.
Casual Membership	-	1,227	~2,000****	1,384
Annual Membership***	387	425	245	97
Annual Member Trips***	6,786	10,912	~1,200****	755
Annual Casual Trips***	1,488	3,250	~2,000****	1,521
Total Annual Trips	8,274	14,162	~3,200****	2,276
<i>Annual Trips per Bike</i>	47	102	114	56.9
<i>Average Trips per Bike per Day</i>	0.13	0.28	0.31	0.16
Equipment ownership	Owned by county	Owned by regional air management district	Non-Profit Owned	Non-Profit Owned
Business Model	Multiple jurisdictional owners with unified vendor operations	Regional ownership with vendor operations	Non-profit owned and managed with some operating functions contracted	Non-Profit Managed

Table 1 - Existing Programs in Comparable Cities

* Service area refers to the area of the city in which bike share stations are located

** Number of stations per square mile within the service area

*** Less than a year worth of data available for Montgomery County (8 months of data) and Bay Area Bike Share (6 months of data)

**** Figures provided were rounded up by Greenville B-cycle program managers

3.COMMUNITY ANALYSIS

The implementation of a bike share program is highly dependent on the existing conditions within a jurisdiction. It is therefore important to fully understand the context under which a potential bike share program could be implemented. The following chapter provides a summary of existing physical, demographic and political conditions within the County. Each subsection includes a review of challenges and opportunities which could have an effect on bike share implementation.

GEOGRAPHY AND EXISTING ROADWAY CONDITIONS

Howard County is located in central Maryland between the cities of Baltimore and Washington DC. With a total area of approximately 250 square miles, Howard County is bounded by Anne Arundel County and Prince George's County in the south and east, Montgomery County in the west and south, and the Patapsco and Patuxent rivers in the northeast and southwest respectively.

Several aspects of the geography create challenges for a potential bike share system. Howard County's topography is marked by rolling hills, which make bicycling throughout some parts of the region challenging (see **Figure 6**). Existing research indicates that while slopes at a grade of five percent or higher are considered a major barrier for bicyclists, slopes between one through five percent can also serve as a deterrent to bicycling.⁸⁰ Road conditions vary throughout the County, with many roads in the Central and Eastern areas of the County experiencing poor cycling conditions due to high traffic volumes and speeds and/or lack of space on the roads.⁸¹

Howard County is home to various unincorporated areas including Columbia, ElkrIDGE and Ellicott City, all of which have varying development patterns and street connectivity. While most large arterial roadways have poor cycling conditions (due to large traffic volumes and high speeds), many collector roads and neighborhoods streets have good cycling conditions. An additional bicycling issue includes the

barriers to connectivity in the form of major highways with few bicycle-friendly crossings, railroad lines, large natural areas and stream valleys with steep topography such as the Patapsco River.⁸² A relatively connected network of pathways and trails connects the more populated areas in the eastern part of the County (see **Figure 16** for more details). Coupled with the temperate climate, the existing network of pathways and trails facilitate a year-round active lifestyle for residents.

Challenges:

- Difficult topography makes bicycling challenging in some parts of the County.
- Street connectivity is difficult in some areas due to barriers, such as highways, railroad lines and existing topography

Opportunities:

- Relatively well connected network of pathways and trails throughout eastern parts of the County.
- Older communities have a more interconnected street grid.
- Temperate weather throughout the year.

DEMOGRAPHICS

The implementation of a bike share program is highly influenced by the population and employment characteristics of a particular region. Bike share systems are most successful where there is a high concentration of jobs, people and activities in the same area.

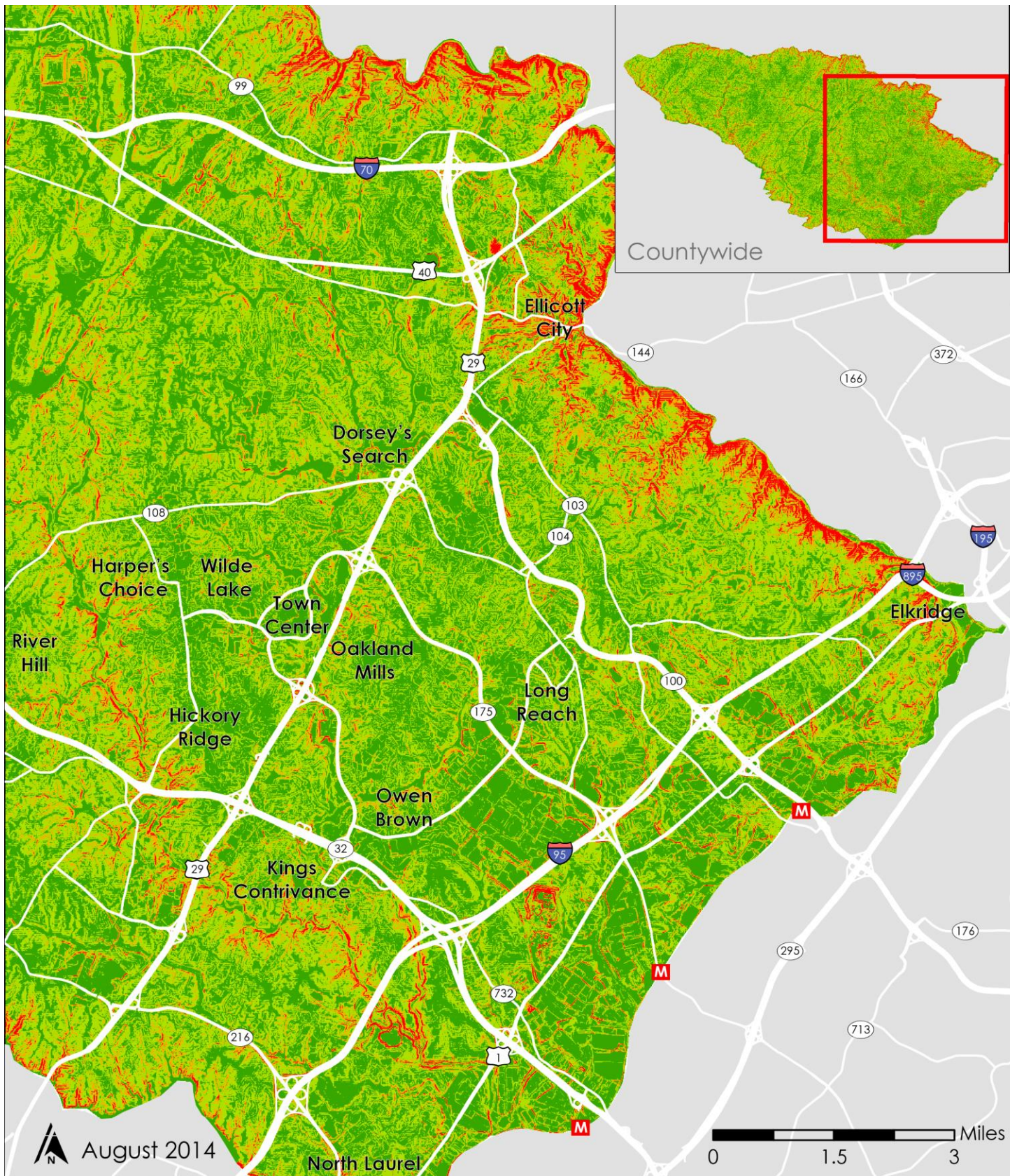
POPULATION DENSITY

Located between the metropolitan areas of Baltimore and Washington, Howard County has a population that is highly marked by trends in these two greater metropolitan areas.

80 Midgely, Peter. "Bicycle Sharing Systems: Enhancing Sustainable Mobility in Urban Areas." Background Paper No. 8. United Nations Commission on Sustainable Development. Pg. 7-8. May 2011. Retrieved from http://www.un.org/esa/dsd/resources/res_pdfs/csd-19/Background-Paper8-P.Midgley-Bicycle.pdf on August 25, 2014.

81 BikeHoward. Howard County Bicycle Master Plan Draft. May 2014. Obtained from <http://bikehoward.files.wordpress.com/2012/06/bike-howard-draft-may-20141.pdf>

82 BikeHoward. Howard County Bicycle Master Plan Draft. May 2014. Obtained from <http://bikehoward.files.wordpress.com/2012/06/bike-howard-draft-may-20141.pdf>



Topography

BIKE HOWARD

Bike Share Feasibility Study



Source: Howard County DPZ Staff. DATA DISC 3.

M MARC train

Percent Slope

- More than 5%
- 3 - 5 %
- 1 - 3 %
- Less than 1%

Figure 6 - Howard County Topography

Table 2 - Select Population Characteristics⁸³

	Area (Sq. mi)	Population	Density (People / Sq. Mi.)
Howard County	250.75	288,754	1,152
Columbia ⁸⁴	28.26	83,430	2,951
Elkridge	12.77	12,773	2,245
Ellicott City	29.89	59,830	2,001
Route 1 Corridor	22.18	43,954	1,981
Laurel	8.01	21,886	2,733
Greenville	28.67	60,709	2,117
Bay Area (not including San Francisco)	231.83	1,204,708	5,196
Spartanburg	19.8	37,401	1,891
Montgomery County	491.25	1,004,476	2,044

At just over 288,000 people (based on the most recent Census estimates) the County as a whole has a density of approximately 1,151 people per square mile. However, the population density is higher in certain population centers in the County, as shown in **Table 2**. The residential densities are similar to those presented in **Table 2** from comparable jurisdictions with existing bike share programs. **Figure 9** presents the population density in Howard County. Note that Columbia Town Center and Ellicott City both have lower population densities compared to other surrounding areas (refer to **Table 2** and **Figure 9** for more details).

AGE, GENDER AND INCOME

Figure 7 presents the age and gender distribution of Howard County.⁸⁵ The median household income is \$107,821, making it one of the wealthiest counties in the State of Maryland. The high average income level represents an opportunity for bike share implementation, as historical data has shown that early adopters of bike share systems tend to be more affluent.⁸⁶ On the other end of the income spectrum, however, the percentage of residents under the poverty level (\$35,000 for a family of four) is just over 10%. Bike share represents an opportunity for Howard County to provide a transportation option to low-income residents (who may have difficulty in connecting to jobs and activity centers). **Figure 8** presents the complete income distribution for Howard County residents.⁸⁷

The age demographic, average of 38.9, presents a challenge, as it is older than the average bike share member.⁸⁸

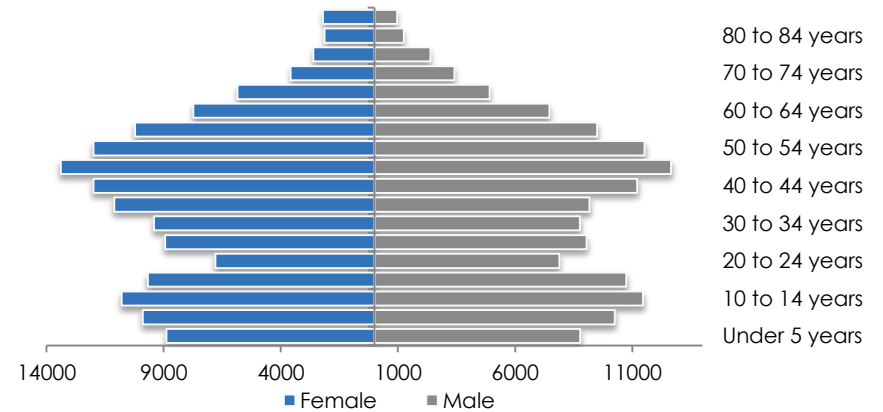


Figure 7 - Gender and Age

MEDIAN HOUSEHOLD INCOME \$107,821

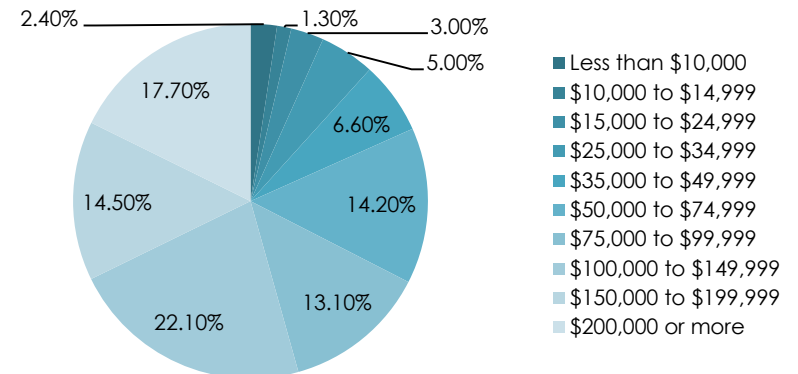


Figure 8 - Income Distribution

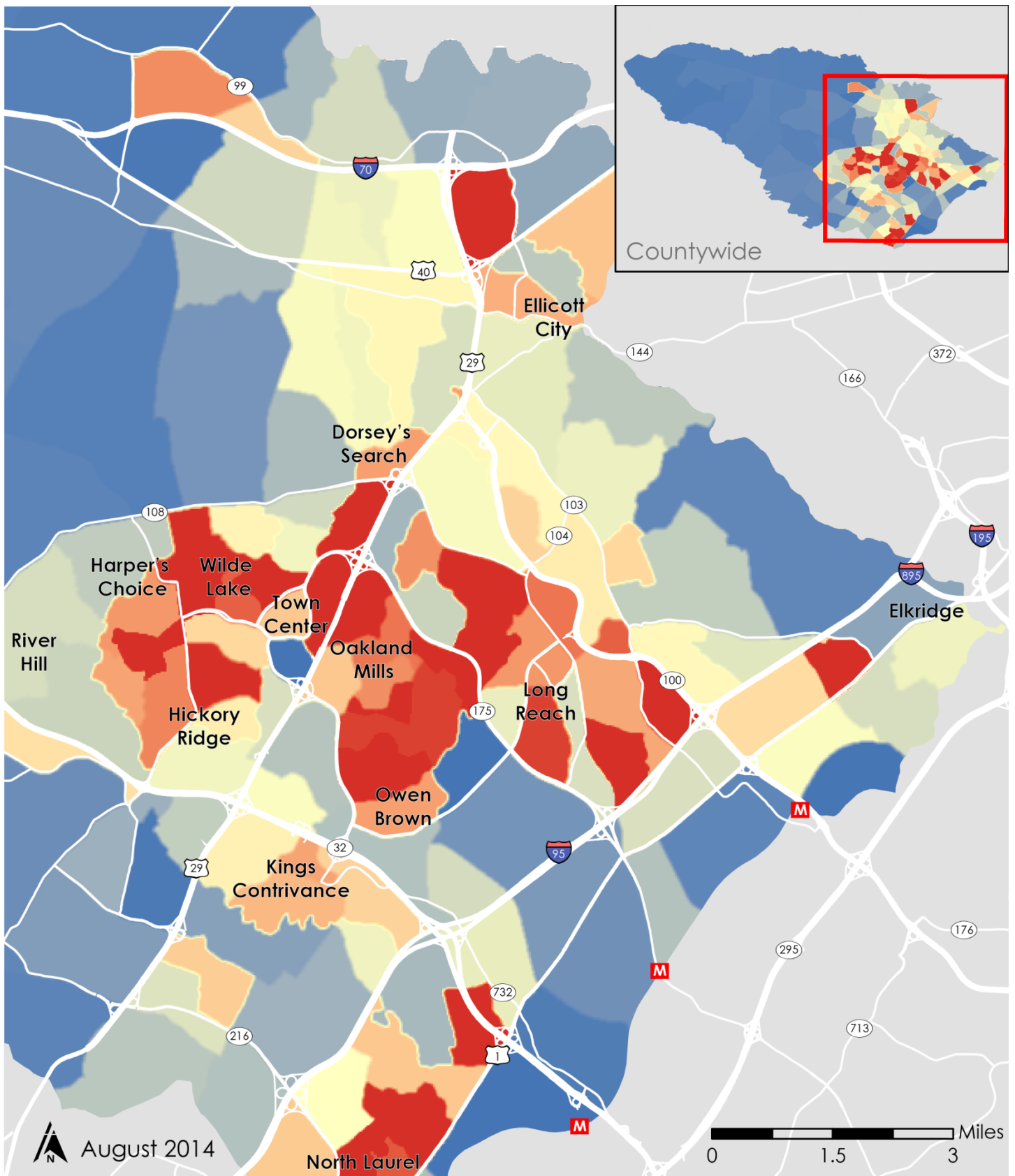
⁸³ Area, population and density are based on City sizes not on bike share system size
⁸⁴ As calculated by Census Tracts.

⁸⁵ US Census Bureau. 2008-2012 American Community Survey 5-Year Estimates. S0101 Age and Sex.

⁸⁶ Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

⁸⁷ US Census Bureau. 2008-2012 American Community Survey 5-Year Estimates. DP03 Selected Economic Characteristics

⁸⁸ Average age of bike share members is 28 years of age, according to the Federal Highway Administration.



Population Density

BIKE HOWARD

Bike Share Feasibility Study



Source: 2008-2012 American Community Survey 5-Year Estimates, File S0101 Age and Sex, U.S. Census Bureau.

M MARC train

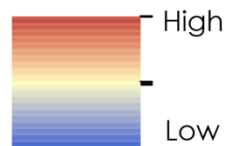


Figure 9 - Howard County Population Density

The racial and ethnic composition of the County as shown on **Figure 10** below is comparable to the overall Maryland population: approximately 62% White, 17% African American, 14% Asian and 6% Hispanic/Latino. To date, the majority of bike share riders have been middle- to upper-class Caucasians in bike share systems around the U.S.⁸⁹ Recognizing this pattern, communities have increasingly focused on bringing a more diverse rider base to bike share. **Figure 11** shows the geographic distribution of low-income and minority populations, demonstrating high density in Jessup, North Laurel, Oakland Mills, Owen Brown, Harpers Choice and North Ellicott City. As these areas are near areas of high population and employment density, and public transit, there may be an opportunity to provide an affordable transportation option for these communities.

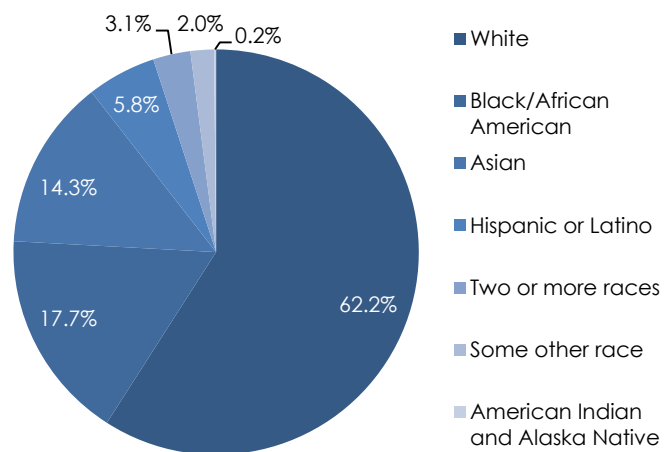


Figure 10 - Demographic Distribution

EMPLOYMENT

The density of jobs in a particular area impacts usage patterns of bike share systems by expanding potential transportation options for commuting and daytime trips.

Approximately 30% of Howard County residents are employed in Howard County, 30% employed in the DC metropolitan area, 30% employed in

the Baltimore Area and 10% in other areas, including Anne Arundel County and employment related to Fort Meade and NSA.⁹⁰

The major employers in the area are depicted in **Table 3. Figure 12** provides a representation of areas of the County (areas in red and orange) that exhibit the highest concentrations of employment. Columbia, Ellicott City and some other locations in the eastern part of the County display the highest employment concentrations.

The specific areas with the highest concentration of at-place employment include Howard General Hospital, Howard Community College, Ellicott City (where most county employees are concentrated), and at Johns Hopkins APL campus and at Columbia Gateway.

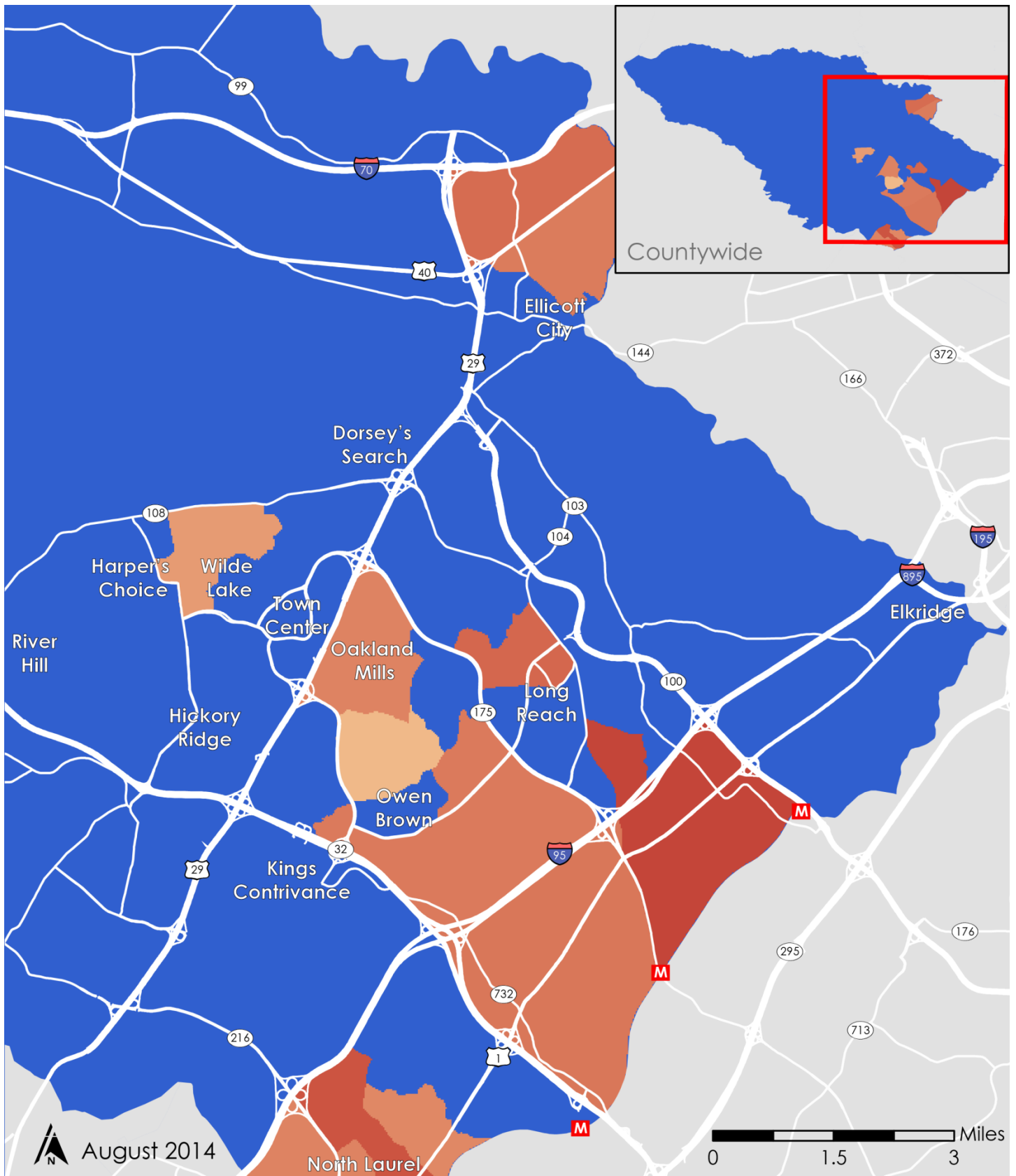
Employer	Estimated Employees
Howard County Public Schools	7,553
Johns Hopkins APL	4,700
Howard County Government	2,877
Verizon Wireless	2,877
Lorien Health Systems	2,200
Howard County General Hospital	2,000
Howard Community College	1,728
SAIC	1,060
Giant Food	1,050
The Columbia Association	900

Table 3 – Top Employers in Howard County⁹¹.

⁸⁹ Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

⁹⁰ Howard County Comprehensive Annual Financial Report For the Fiscal Year Ended June 30, 2013.

⁹¹ Howard County Comprehensive Annual Financial Report For the Fiscal Year Ended June 30, 2013.



Equity
BIKE HOWARD
 Bike Share Feasibility Study

Source: 2008-2012 American Community Survey 5-Year Estimates, File DP05 Demographic and Housing Estimates; DP03 Selected Economic Characteristics. U.S. Census Bureau.

MARC train

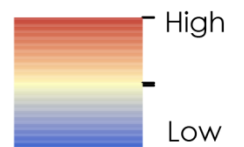
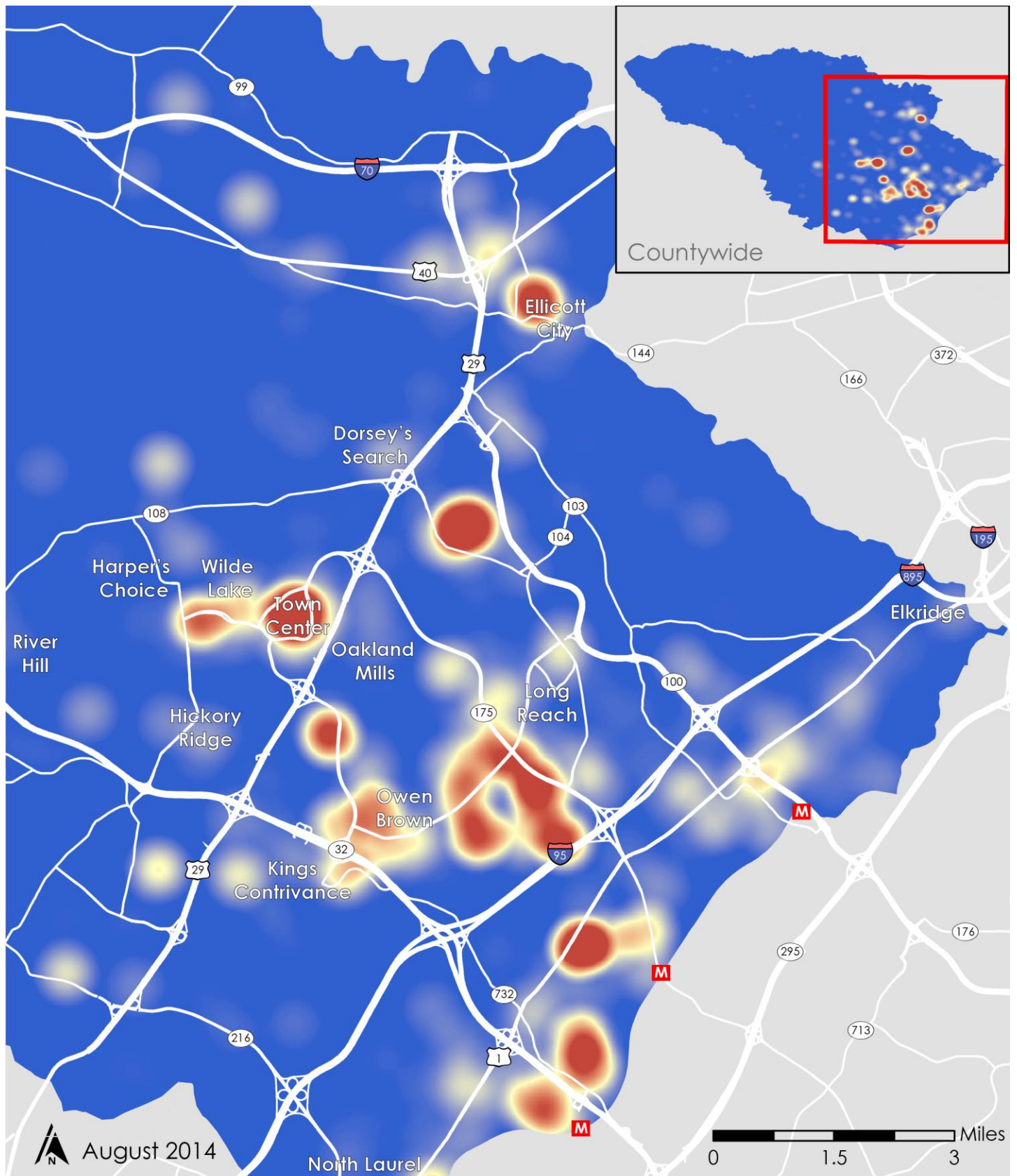


Figure 11 - Howard County Social Equity Analysis (Concentration of Minority and Low-Income Populations)



Employment Density

BIKE HOWARD

Bike Share Feasibility Study



Source: US Census Bureau. Longitudinal Employer-Household Dynamics. Area Profile Analysis in 2011 by Primary Jobs

M MARC train

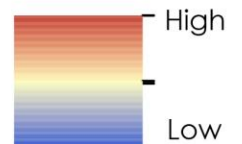


Figure 12 - Howard County Employment Density

FUTURE DEVELOPMENT

The above data represents current conditions in Howard County. However, there is significant planned residential, retail, restaurant and office development in Downtown Columbia over the next few years. Following is the planned development:

- Six new and reconfigured downtown neighborhoods including Warfield, The Mall, The Lakefront and Lakefront Core, The Crescent, Merriweather-Symphony Woods, and Symphony Overlook.
- New and improved connections to existing Town Center neighborhoods of Vantage Point, Banneker, Warfield Triangle and Lakefront.
- Mixed-use development with up to 5,500 new residential units, 4.3 million square feet of commercial office space, 1.25 million square feet of retail space and 640 hotel rooms. Increased street connectivity with dedicated facilities for all modes, including new sidewalks, bicycle facilities, bike parking, on-and off-street parking facilities for automobiles.
- Expanded green space throughout the Mall neighborhood.
- Increased access and connectivity to The Lakefront and Lakefront Core around Lake Kittamaqundi and the public spaces adjacent to the lake.
- Pathway connection between the Lakefront and Symphony Woods, and Blandair Park to Howard County General Hospital.
- Mix of retail, office, hotel/convention and residential uses in the new Symphony overlook neighborhood.

These developments will significantly increase both employment and residential density in Downtown Columbia.

Challenges:

- Lower population and employment densities in Western areas of the County and areas outside the more urbanized central and eastern parts of the County may present a challenge for implementing bike share.

- Areas with high employment densities (Columbia Town Center and Ellicott City) are not currently co-located with areas of high residential density.

Opportunities:

- Areas in parts of the County exhibit high employment densities and residential densities similar to peer cities with bike share systems.
- High average income demographic is characteristic of early adopters of bike share system.
- Significant planned development in the near future in Downtown Columbia will increase both residential and employment density.
- There are a number of geographic areas that exhibit relatively high concentrations of low-income and minority populations (i.e., Jessup, North Laurel, Oakland Mills, Owen Brown, Harpers Choice and North Ellicott City as shown in **Figure 11**) which may benefit from increased mobility and connectivity to jobs provided by a bike share system.

TRANSPORTATION MODE SHARE

As a mainly suburban county, 81% of Howard County residents utilize single-occupancy vehicles to get to and from work as noted on **Figure 13**.⁹² This level is on par with suburban areas around the country.⁹³

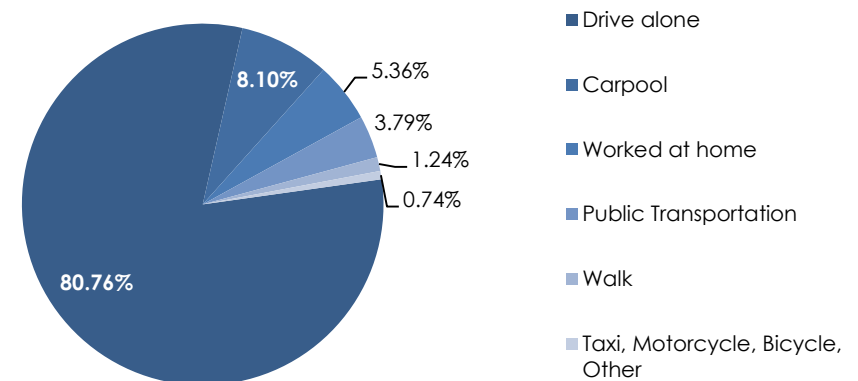


Figure 13 - Transportation Mode Share in Howard County

⁹² US Census Bureau. 2008-2012 American Community Survey 5-Year Estimates File B08101 Means of Transportation to Work By Age.

⁹³ US Census Bureau. 2008-2012 American Community Survey 5-Year Estimates File B08101 Means of Transportation to Work By Age.

Automobile dependence may also be influenced by existing parking regulations, as on- and off-street parking is abundant and affordable throughout the County.

Public transportation throughout the County is currently provided by the Maryland Transit Administration (MTA), Howard County Transit, Regional Transit Agency and by Central Maryland Regional Transit in the form of commuter buses, local buses and MARC commuter trains. With three MARC train stops along its eastern border, Howard County residents are linked to jobs in the Washington DC and Baltimore areas. In urban areas, placement of bike share stations linking or in close proximity to transit facilities is recommended to help increase the number of connections to and from transit. However, in Howard County, commuter train stations tend to be located far from the areas of sizeable population and employment density, reducing the potential for first- and last-mile connections to these stations. It is important to note that these locations are zoned for future Transit Oriented Developments with the potential to increase both residential and commercial densities around MARC stations.

Existing bus transit operations include over 10 different transit routes with fares from \$1-\$2, resulting in a transit mode share of approximately 4%. While there are various transit services linking Howard County residents to jobs in Washington DC and Baltimore, there are several drawbacks to the system, including long headways, no weekend service, and only partial coverage of the County. **Figure 14** maps the geographic locations within the County with the highest ridership and most frequent service. As Downtown Columbia is the central node of all the bus services in the County (and bus stops in the area experience the some of the highest ridership in the County),⁹⁴ implementing bike share in this area may open the opportunity for first- and last-mile connections to and from this location. The high density of transit use in Columbia Town Center, and lack thereof in Ellicott City, is reflected in **Figure 14**.

Challenges:

- High dependency on single occupancy vehicles for most of commute to work trips recorded (see **Figure 13**).

- Low parking rates and availability of free on-street parking encourage increased use of SOV's.
- Infrequent bus transit service and limited number of routes throughout the County.
- MARC commuter rail stations are relatively far from the areas that exhibit the highest residential and employment density, and connectivity to them is challenging.

Opportunities:

- Downtown Columbia is the central node of many of the bus services in the County, opening the opportunity for first- and last-mile connections to and from this location.
- County residents without access to a vehicle represent an important demographic for bike share implementation, as it could help serve as a convenient and flexible complement to existing public transit services.

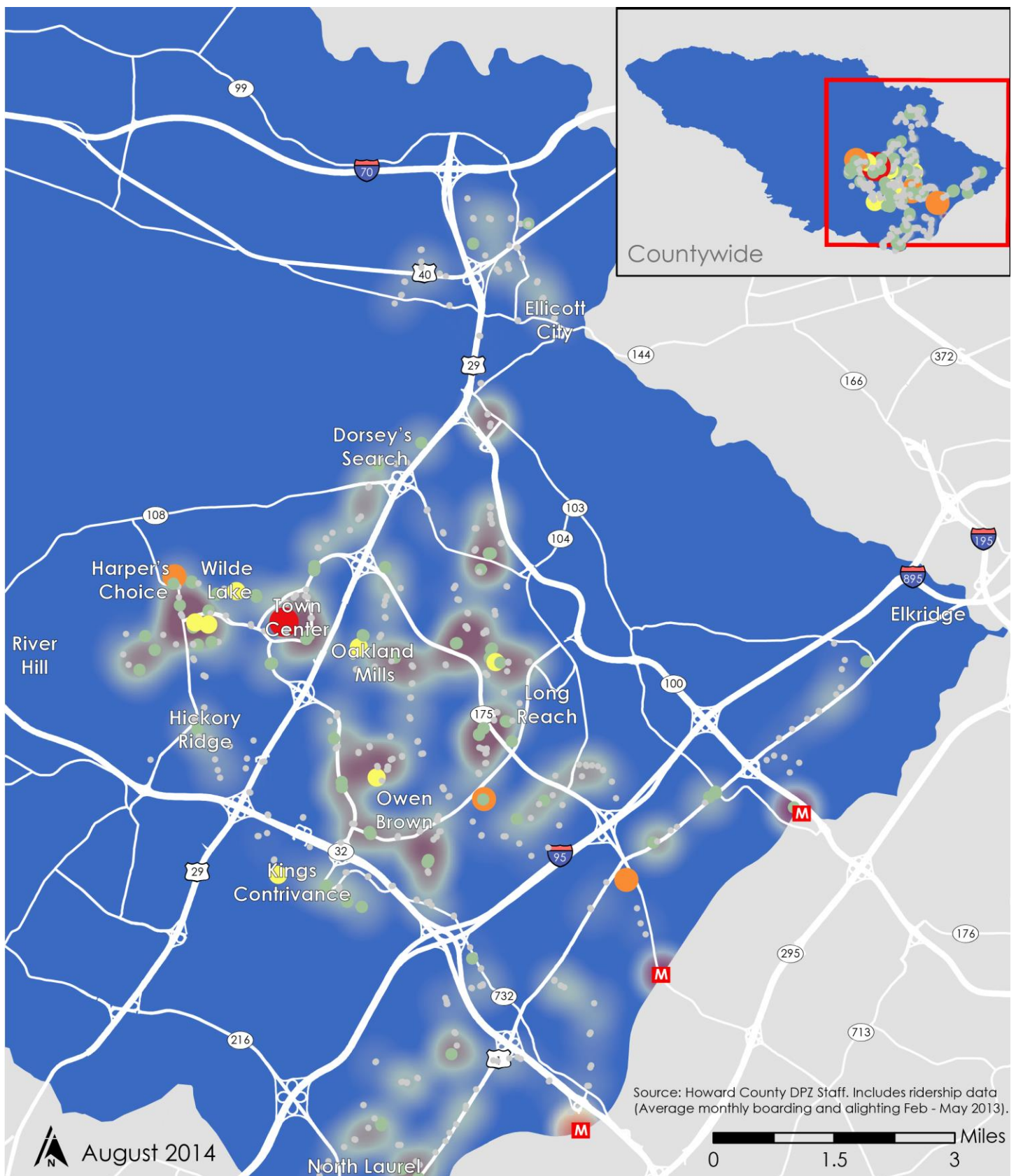
BICYCLE INFRASTRUCTURE

A well connected network of bicycle-friendly facilities encourages increased bike share ridership, and while a fully implemented network is preferred, experience by other jurisdictions has indicated that it is not necessary to have a complete network to implement a bike share program.⁹⁵ Existing peer jurisdictions have been able to implement both a bike share program while continuing to expand their bicycle infrastructure in parallel. However, as Columbia Association and Howard County look to implement a bike share program, it will be important to provide a core network of low-stress connections between various areas of the County to encourage bicycle trips between them.

Bicycle conditions in Howard County are highly varied. While many rural roadways are narrow and largely without shoulders, many have low traffic volumes and remain popular bicycling destinations for recreational bicyclists.

⁹⁴ Data provided by Howard County Department of Planning and Zoning. Includes ridership data. (Average monthly boarding and alighting Feb - May 2013).

⁹⁵ Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.



Proximity to Transit vs Ridership

BIKE HOWARD

Bike Share Feasibility Study



Bus Boarding and Alighting

0 - 1,122
1,123 - 4,506

4,507 - 11,298
11,299 - 27,728
27,729 - 21,3012

MARC train

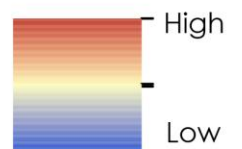


Figure 14 - Howard County Transit Availability vs. Ridership



Figure 15 – Downtown Columbia Trail Along Little Patuxent Parkway (under construction)

In the Central and Eastern parts of the County, most large arterial roadways exhibit difficult cycling conditions due to large traffic volumes, high traffic speeds and/or lack of space available for cycling. However, collector roadways and neighborhood streets tend to display comfortable bicycling conditions due to their low traffic volumes, low speeds, and the presence of traffic calming infrastructure.

The County and Columbia Association have an extensive network of off-road facilities including trails and shared use pathways centered on Columbia and extending south to Savage along the Little Patuxent River. While most pathways provide a comfortable riding experience, the pathway system is narrow and steep in places. **Figure 16** depicts a heat map of areas of the county with the most concentration of bicycle friendly facilities including sharrows, bicycle lanes, and trails/pathways. Additionally, there is little way-finding, making it difficult for residents and visitors to navigate the system. The County has also implemented a small number of on-road facilities such as bicycle lanes, and many of its roadways include paved and striped shoulders that are sufficiently wide for some cyclists to use. **Table 4** provides an estimate of the number of miles of existing facilities.

One of the County's major issues related to bicycling is the high number of the barriers to connectivity, including major highways (e.g., Interstate 95, Route 29) with few comfortable connecting crossings between activity centers. Furthermore street design in major roadways like Route 32 and Snowden River Parkway encourage motorists to speed while not currently offering safe connections for pedestrians and bicyclists. Finally, the existing network of off-road facilities that includes pathways and trails currently offers limited connectivity to some activity centers.

To increase connectivity between activity centers around the central Columbia core, the Howard Hughes Corporation is working to construct a new 3.25 mile trail system connecting Howard County General Hospital to Blandair Park. This trail is expected to provide a seamless and comfortable connection for pedestrians and bicyclists alike and help increase access to and from key locations within Columbia. Phase 1 of the project is currently underway (see **Figure 15**) and later phases are in the design review process.

Facilities	Estimated Miles
Paved Pathways	151
Bicycle Lanes	3
Paved and Striped Shoulder	42

Table 4 – Existing Bicycle-Friendly Facilities⁹⁶

Finally, it has been documented in local plans that that many of the existing pathways are missing site appropriate signage guiding riders to points of interest and destinations.⁹⁷ Columbia Association and Howard County have begun implementation of a robust way-finding program based on the recommendations contained in the County Bicycle Master Plan.

Challenges

- Existing major highways act as barriers to connectivity.
- Incomplete way-finding and signage program.
- Street design encourages high speed of motorists.

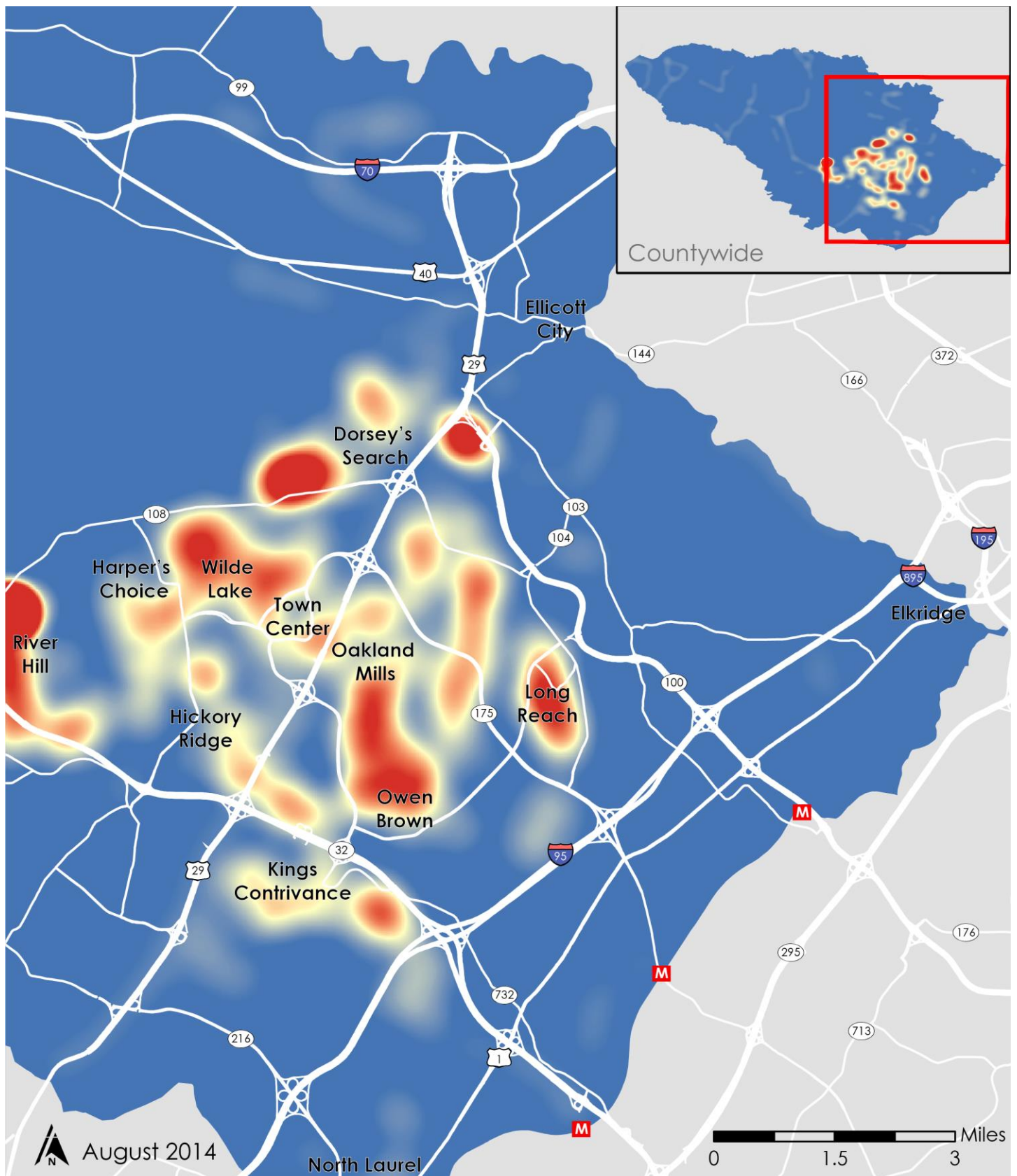
Opportunities:

- Limited but increasing bicycle friendly facilities network.
- Transportation plans calling for the expansion of bicycle and pedestrian facilities throughout the County.

⁹⁶ BikeHoward. Howard County Bicycle Master Plan. DRAFT. February 2014

⁹⁷ BikeHoward. Howard County Bicycle Master Plan Draft. May 2014. Obtained from <http://bikehoward.files.wordpress.com/2012/06/bike-howard-draft-may-20141.pdf> and Columbia

Association Active Transportation Action Agenda. Obtained from <http://www.columbiaassociation.org/transparency/master-plans/active-transportation> on August 15, 2014.



Proximity to Existing Bicycle Infrastructure

BIKE HOWARD
Bike Share Feasibility Study



M MARC train

Source: Howard County Bicycle Master Plan and
Howard County DPZ Staff

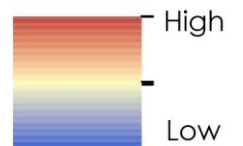


Figure 16 - Howard County Proximity to Existing Bicycle Infrastructure

TOURISM



Figure 17 - Ellicott City is one of the most visited destinations in Howard County

In addition to residents, bike share represents a potential opportunity for Howard County to provide car-free recreational opportunities for visitors. These riders are important to a bike share system, as tourist-generated revenue generally provides approximately two-thirds (2/3) of user-generated revenues in peer jurisdictions with existing bike share programs.⁹⁸

According to the Howard County Tourism and Promotion Office (*Visit Howard County*), Howard County tourism generated over \$549 million in sales related to lodging, food and beverage, retail, recreation and transportation expenditures in 2012.⁹⁹ In the County, the major visitor destinations include Merriweather Post Pavilion, Historic Ellicott City, State Parks and various high usage trails. With over 3.25 million visitors attending events and local attractions like Merriweather Post Pavilion, Patapsco Valley State Park, Howard County Fair and over 20 different agro-tourism attractions, the County's tourism revenues continue to rise at a rate of over 4% each year. The County is also home to various outdoor and healthy living events such as the Columbia Invitational, Lifetime Indoor

Triathlon, Columbia Triathlon and the OBGC Labor Day, which help bring more than 7,000 tourists to the County. **Figure 18** presents the tourism industry sales for the past 5 years.¹⁰⁰

While there are only a few hotels and conference spaces located within Downtown Columbia, there are plans to continue expanding this infrastructure and to help redevelop Downtown Columbia into a more visitor-friendly location. Furthermore the existing (and under construction) trail network will provide the opportunity for visitors to use bike share to access various locations within the Downtown.

These events and destinations present opportunities for visitors to utilize a bike share system during their stay in Howard County. The biggest challenge is to communicate with this hard-to-reach population as to the presence and location of bike share system. Reaching this population may require targeted marketing via strategic partnerships with local groups and tourist destinations. The County has a well-organized Tourism and Promotions office, which may be able to provide some in-kind services related to marketing and promotion of the bike share system.

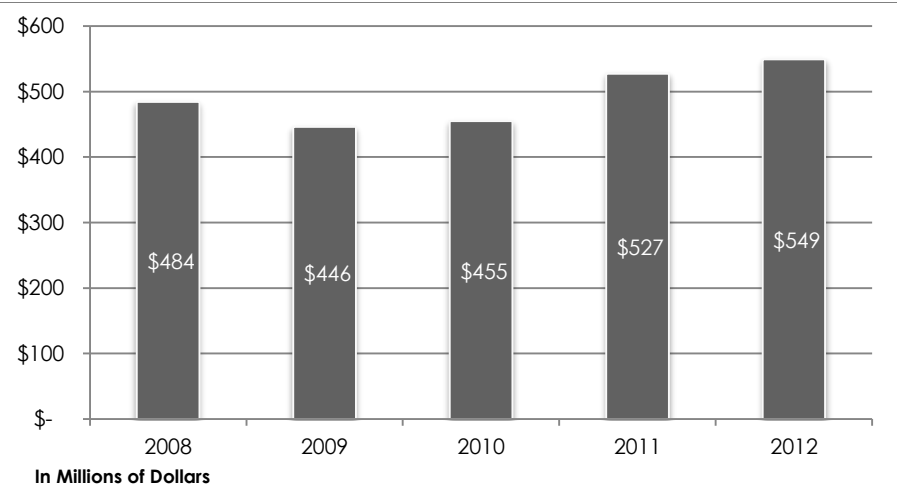


Figure 18 - Tourism Industry Sales

⁹⁸ San Antonio B-Cycle. Annual Report.

⁹⁹ Rachelina Bonacci. Chief Executive Officer. Howard County Tourism and Promotion. June 4, 2014.

¹⁰⁰ Rachelina Bonacci. Chief Executive Officer. Howard County Tourism and Promotion. June 4, 2014.



Figure 19 – Little Patuxent Branch Rail Trail is one of many Active Living destinations

Challenges:

- Reaching the visitor population may require targeted marketing via strategic partnerships with local groups and tourist destinations.

Opportunities

- The County has a number of significant destinations and events that attract a steady number of tourists who may be potential users of a bike share program.
- The County has a well-organized Tourism and Promotions office which may be able to provide some in-kind services related to marketing and promotion of the bike share system.
- Columbia Association and the County's trails and greenway network provides a strong recreational opportunity for visitors.
- There are regional destinations in the vicinity of Downtown Columbia (ex., Columbia Mall, Merriweather Post Pavilion, Howard Community College) and a short distance from the core of the pathway system, offering the opportunity for visitors to use bike share as an active transportation option connecting to these locations.

SUMMARY OF EXISTING CONDITIONS

There are several aspects of Howard County which make it conducive to a potential bike share system. These include (1) a climate conducive to year-round cycling; (2) residential density in certain areas comparable to peer jurisdictions that have implemented bike share; (3) large employment centers; (4) a strong network of bicycle paths around the County; (5) high income demographic; (6) a low-income demographic that could benefit from a system; and (7) significant tourism to the County. However, there are also difficult challenges which include (1) an auto-oriented culture; (2) streets with high traffic volume and speeds, and limited room for bicycles; (3) low use of public transit; (4) older age demographic; and (5) few areas where employment and residential density overlap.

The current conditions are conducive for a system that may be used recreationally by residents and visitors. Because of the lack of more mixed

use areas, high use of public transit, destinations around public transit stops and safe cycling connectivity between them, it is unlikely that a bike share system would be used for transportation, which is prevalent in bike share systems in more dense urban areas.

There are several developments happening that may potentially shift the use of a bike share system in Howard County towards one that is used for daily transportation needs. These developments include the construction of a bike trail to increase connectivity between activity centers around the crucial central Columbia core, as well as significant residential and commercial development in and around Downtown Columbia that will increase population and employment density in this area.



Source: Boulder Bicycle

4. POLICY REVIEW

LOCAL AND REGIONAL PLANS

Plans and policies can be important measures of program compatibility with local initiatives. The following existing and future bicycle infrastructure related plans and policies that may influence the implementation of a bike share program in Howard County were reviewed for this study. Overall, the plans are supportive of bike share, either explicitly or implicitly. A short summary of the relationship of each of the following plans to bike share is included below:

- **Maryland Bicycle and Pedestrian Plan 2014** - specifically recommends bike share implementation as a 2013-2018 strategy to integrate active transportation and transit.
- **PlanHoward 2030** – does not deeply discuss bike share, but recommends the promotion of “rideshare and bike share systems, HOV programs, and expanded park and ride lots”¹⁰¹ to help reduce traffic congestion, energy consumption, and greenhouse gases.
- **2009 Howard County Short-Range Transportation Development Plan** – does not explicitly mention bike share, but recommends the implementation of new transit service and expanded public transportation coverage throughout the central and eastern parts of the County.
- **Bike Howard** – The Howard County Bicycle Master Plan 2014 (DRAFT) – briefly mentions bike share. However, implementation of a bike share program can help achieve several of the plan's goals. In addition, completion of the Master Plan recommendations can greatly increase the opportunity for success of a potential bike share system.
- **Downtown Columbia Plan** – does not explicitly mention bike share, but promotes the development of a multi-modal transportation system through transit, bicycle, and pedestrian improvements. Also recommends the development of a Transportation Demand Management plan, in which bike share can play an important role.
- **Connecting Columbia: Active Transportation Action Agenda (2012)** - recommends improving the quality of existing bicycle lanes and

shared-use pathways, implementation of new pathway connections to link neighborhoods and commercial centers, and for increasing the comfort, security and safety of path users.

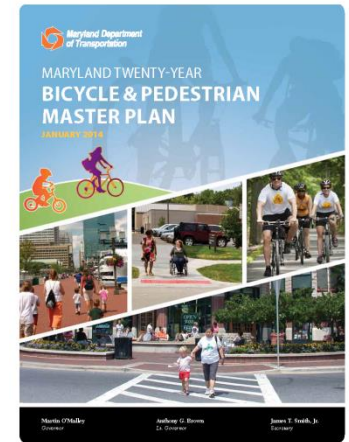
A detailed review of these plans is included in Appendix 1.

POLICIES AND COUNTY ORDINANCES

As bike share programs are relatively new, the form of equipment, installation, and operations are not typically codified into existing zoning, permitting, and other ordinances. Howard County must therefore consider what policies and ordinances will require some updates or modifications to allow for the implementation and promotion of bike share. Furthermore, the County will need to understand the process under which potential bike share stations will be permitted and installed and will also need to understand whether the current regulations surrounding advertising and sponsorship will allow for such revenue generating avenues to help implementation of the program.

SIGNAGE

Signs are a key component of a bike share operation, as they provide information and maps of the system and directions to nearby bike share locations. In Howard County commercial districts, directional signs are permitted by a variance in all areas except in Downtown Columbia, assuming the sign or signs are necessary for the public convenience and are consistent with the intent of the ordinance. These signs must be located at intersections with a maximum allowable area of 12 square feet and there may not be more than four signs for any single business.¹⁰² These signs may be located in the public right-of-way with approval from the Department of Inspections, Licenses and Permits.¹⁰³



¹⁰¹ Plan Howard 2030. February 2013. Page 175.

¹⁰² Howard County Code of Ordinances, Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8.

¹⁰³ Howard County Code of Ordinances, Title 3-Buildings, Subtitle 5. Sec. 3.505A (b)3.

In Downtown Columbia, commercial directional signs are allowed and must conform to the Downtown Neighborhood Design Guidelines.¹⁰⁴ Pedestrian directional signs can be placed on private land or in the public right-of-way and must conform to design standards that direct and inform pedestrians.¹⁰⁵ Public signs, or signs in a non-commercial nature in the public interest, are exempt from the provisions set forth for other signs. These signs include directional, regulatory, and information signs.¹⁰⁶ In all commercial districts and in all areas within Downtown Columbia, signs used to advertise a product or service at the site and location of the sign are permitted as "accessory to the building or use."¹⁰⁷

The code limits the size of informational signs to two square feet for each linear foot of building frontage,¹⁰⁸ suggesting that this section would need to be revisited for relevance to bike share signage. The code also limits signs from encroaching in the public right of way. Given the County Code of Ordinances, it is the consultant's opinion that signs on a bike share station that provide the name or other information about bike share would be permitted by the code, pending additional interpretation of the Code.

ADVERTISING

Howard County's municipal code identifies outdoor advertising as billboards or poster panels which advertise products or businesses not connected with the site or building on which they are located.¹⁰⁹ Furthermore, the code limits outdoor advertising to be temporary in nature and located on unimproved property in industrial or manufacturing districts. This extends to any outdoor advertising, for example advertising on bus shelters.

General advertising (e.g., for commercial products or businesses) on a bicycle station would be considered outdoor advertising and would not be allowed by the current code. Also, in Downtown Columbia, advertising signs that are three square feet or larger and on vehicles are also prohibited by the code.¹¹⁰ Unless revised, these policies will limit the County's ability to use advertising as an additional revenue source for implementing bike share.

Please note that interpretation of all zoning and advertising regulations were based on a preliminary review. It is recommended that all County regulations and ordinances be reviewed with the County attorney prior to system implementation. Additionally, Howard County engineering, planning and permitting staff should consider creating a general blanket permit to help regulate and expedite the placement of bike share facilities. Finally, it is recommended that Howard County staff work with local officials to establish a specific set of guidelines to allow for the use of bike share sponsorship and advertising.

Challenges

- Howard County's current signage ordinances may need to be updated to allow for the use of bike share advertising /informational panels on bike share stations or bicycles. Additionally, these adjustments may need to reflect the location and placement of bike share signs.
- Signage ordinances may need to be amended to allow for the use of sponsorship and advertising on bike share stations and bicycles.
- Pathway and complete street improvements are recommended to be completed as properties are redeveloped, which could leave gaps in the active transportation network.

Opportunities

- Comprehensive transportation plans aim to achieve multi-modal and active transportation goals, which will benefit implementation of a bike share system.
- State and local plans address a need to improve the bicycle network.
- Howard County recommends further expansion of its ride share and transportation demand management programs, which can include a bike share element.
- There are several federal or local funding opportunities that could contribute to a bike share system, further research is necessary.
- The multi-use, TOD, and TNC Districts all encourage mixed use development. Bike share stations located in areas with multiple uses can be used for both origin and destination bike share trips,

104 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8.

105 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8c.

106 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.503 (a).

107 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.500 (b).

108 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c) (1).

109 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.500 (d).

110 Howard County Code of Ordinance. Title 3-Buildings, Subtitle 5. Sec. 3.505 (a)10.

which can benefit the bike share system. These districts also directly or indirectly encourage walkable neighborhoods, which can also benefit bicycling.

- Developers who are interested in applying for a Community Enhancement Floating Zone (See Appendix 1) designation could be connected with a bike share operator to increase options for potential locations for bike share stations.



5. PUBLIC ENGAGEMENT

As part of the study, the consultant team, Howard County and Columbia Association reached out to various representatives and stakeholders within the community, as well as the general public, to help determine the overall feasibility of implementing a bike share program in the County. The public engagement process encouraged input utilizing various media to shape the direction of the project and answer many questions about local sentiment towards implementation of a bike share program. The following chapter provides a summary of public and stakeholder engagement performed during the study. A full account of public engagement can be found in Appendix 2.

STAKEHOLDER ENGAGEMENT

A series of interviews and targeted meetings were conducted in May 2014 with community and regional stakeholders. The purpose of these meetings was to explore the possible opportunities and challenges of implementing a bike share program in the County. A number of representatives from different County agencies were invited to participate in the following stakeholder group meeting or interviewed individually:

- **Public-sector partners** – Howard County Office of Transportation, Howard County Department of Planning and Zoning, Howard County Department of Licensing and Permits, Columbia Association, Howard County Department of Recreation and Parks
- **Local non-governmental organizations:** Bicycle Advocates of Howard County, Transportation Advocates, Horizon Foundation
- **Representatives from Howard County's economic development and tourism offices** – Howard County Economic Development Authority, Howard County Tourism, Howard Hughes Corporation, Howard County Chamber of Commerce
- **Large Employers** – Howard County Community College, National Security Agency (NSA), Howard General Hospital

PUBLIC INPUT

Public feedback was received utilizing a number of engagement tools, including a project website; an online survey which allowed residents to share their thoughts on possible bike share implementation and their bicycle riding patterns; a crowdsourcing map that enabled community

members to select potential bike share locations; a community workshop, where the public at large was able to ask questions about how bike share systems operate throughout the country; and targeted interviews with local stakeholders and agencies (see previous section). Participants were asked to discuss what they saw as the opportunities and challenges faced by bike share in the County and consequentially the discussion brought up a number of goals participants felt bike share should strive to achieve. A number of common themes emerged from each of the meetings which helped frame the discussion of the feasibility of bike share in Howard County. The following is a summary of opportunities and challenges that emerged from these targeted meetings. A full account of each meeting can be found in Appendix 2.

COMMUNITY WORKSHOP

A public meeting was held on May 1, 2014 at the Owen Brown Community Center. The meeting was attended by 25 community members, including bicycle advocates and bicycle shop representatives, as well as officials from the Maryland Department of Transportation. The workshop included a short presentation outlining the scope of the project, an introduction to bike share and systems around the U.S., and a short summary of preliminary findings. In this open house participants were also asked to comment on what the goals and objectives for a potential bike share program in Howard County should be. Finally, participants were asked to suggest potential station locations in printed maps and through the use of the online crowdsourcing map.

ONLINE SURVEY

To reach out to additional Howard County residents, an online survey was created. The survey was designed to understand bicycling practices of residents in Howard County, and to help gauge public sentiment about bike share and its potential implementation in the County. The survey included 30 questions and was promoted through various online sources including the project website, social media as well as print and online news media.

The survey was divided into four major categories: i) current bicycle usage; ii) opinions about bike share; iii) potential goals and objectives; and iii) demographic and employment information. The survey was

open from April 3 through June 13, 2014 and received a total of 152 responses.

FEEDBACK SUMMARY

Following is a summary of feedback received from the public engagement exercises described above. Views from both the public and stakeholders towards implementation of a bike share program throughout the County were mixed. The public survey results showed 48.1% of respondents responding positively to the possibility of implementing a bike share program and 51.9% reacting negatively.

Opportunities

Opportunities cited were:

- Bike share can be a means to further promote active living and healthy initiatives.
- By increasing connectivity and access to various “active living” destinations, a bike share program could allow residents to explore local parks, lakes and trails.
- The County has an extensive trail network that connects to recreational facilities, village centers, parks and destinations, especially throughout Columbia.
- Bike share could provide a last-mile connection to transit, taking commuters to and from the MARC train to their homes, destinations and work places, including the National Security Agency (NSA) in Ann Arundel County.
- Residents could potentially use bike share for non-work trips as well, providing improved access to the County’s extensive library system, local recreation centers, and retail destinations.
- Bike share can be an additional amenity that sets the community apart from its peers around the region to help attract and retain a well-educated, mobile, and highly-competitive workforce.
- As the County attracts hundreds of thousands of visitors a year to festivals and concerts, bike share could encourage people to explore more areas of the County when they visit.
- Bike share could provide additional mobility options for low-income households without access to an automobile and help connect residents to jobs, services, and retail they otherwise could not reach.

Challenges

Challenges cited were:

- It is unknown how bike share could function in a lower density, suburban area with wide arterial roads which in some instances act as barriers for bicyclists and pedestrians alike.
- Bike share stations initiated in 2013 in the suburban areas of Montgomery County, MD are, to date attracting little ridership
- As driving is the most convenient way to get around in Howard County, there is less incentive to adopt bike share as a means of travel compared to places like Washington DC.
- Although the County has a large number of existing separated trails and pathways, it has only a small number on-street cycling facilities in the shape of bicycle lanes and sharrows.
- The existing width on many of streets and arterials, which can encourage higher driving speeds and can be a hostile environment for biking.
- The lack of wayfinding on the trail system makes it hard to navigate even for longtime residents.
- The County’s hilly topography was identified as another barrier to biking.
- There are regulatory hurdles to implementation in Howard County. These include the existing Sign Code, which currently prohibit selling ad space on bike share stations, a potential source of operating revenue, and village center covenants make it difficult to create one unified station design that conforms to these varied restrictions.

Goals and Objectives

The following goals and objectives emerged from input from stakeholders and the general public as the most important to focus on::

- Improving public health by encouraging physical activity
- Promoting a safe cycling culture in the County
- Providing a transportation alternative to driving while enhancing the mobility of residents and visitors
- Reducing parking demands in places like the Howard County Community College and downtown Columbia
- Encouraging visitors to explore the County, especially tourists attending local concerts or fairs
- Providing a last-mile connection to transit

- Making Howard County more economically competitive by focusing on the livability aspects of bike share
- Expanding the on-road bicycle facility network

Integration with Other Systems

As many Howard County residents work in Baltimore and Washington DC, there was interest in integrating with one or the other, but not a strong inclination in either direction. As of Spring 2014 there were 68 Howard County residents signed up as annual members of Capital Bikeshare. However, participants noted that integration concerns should not limit the technology options considered during this study, specifically suggesting that smart bikes (bikes that do not need stations) remain a consideration for the County despite the fact that they may not be integrated with the DC or Baltimore systems, under current technological conditions.

Private-Sector Funding Opportunities

Feedback from stakeholders included discussion of potential funding sources for capital and operations. Stakeholders felt that there were a number of potential funding partners in the community that could help support a potential bike share system. Major institutions like Howard County Community College and the General Hospital would make excellent partners as they have existing transportation needs that bike share could support. In addition, the County has a strong employer base that might be interested in sponsoring in bike share including APL, Verizon or Lorien Health Systems, which make up three of the largest employers in Howard County (see Employment section). Developers may also be interested in funding bike share as a way to reduce parking requirements or offer additional amenities to their residents. Finally, with a vast number of non-profit organizations and foundations focused on active living and health initiatives, stakeholder recognized that active living funding should be targeted.

Potential Bike Share Usage

According to the online public survey, 44.3% would use the bike share system to run errands; 40.2% would use it to exercise; 36.1% of residents would use bike share bicycles to go shopping or eating out; and, a combined 30.3% responded positively to using the system to directly commute to work or in combination with existing transit options (i.e., MARC, local bus or commuter bus). Almost half (49.6%) of residents would

not use a bike share program were it available throughout Howard County.

Pricing

Results of the online survey indicated that Howard County residents indicated they would pay an average of \$58 and \$12 for annual and daily memberships respectively. This annual membership is lower than the current Capital Bikeshare price (\$75), but the daily pass is higher than the existing Capital Bikeshare price (currently at \$7 per day). Such pricing is indicative of a recreation-oriented system that would be used occasionally by residents, but not on an everyday basis for transportation needs.

Station Locations

A crowdsourcing map was launched on April 3, 2014 as a companion to the project website. The “wikimap” allowed users to suggest locations for possible bike share stations and to provide commentary on other people’s suggestions. The map remained open for comment until June 13, 2014. Two hundred and forty five (245) unique station location suggestions were received in this time period. **Table 5** provides a list of the top 10 most suggested station locations. **Figure 20** shows a map of the suggested station locations.

Table 5 - Top 10 Most Suggested Station Locations

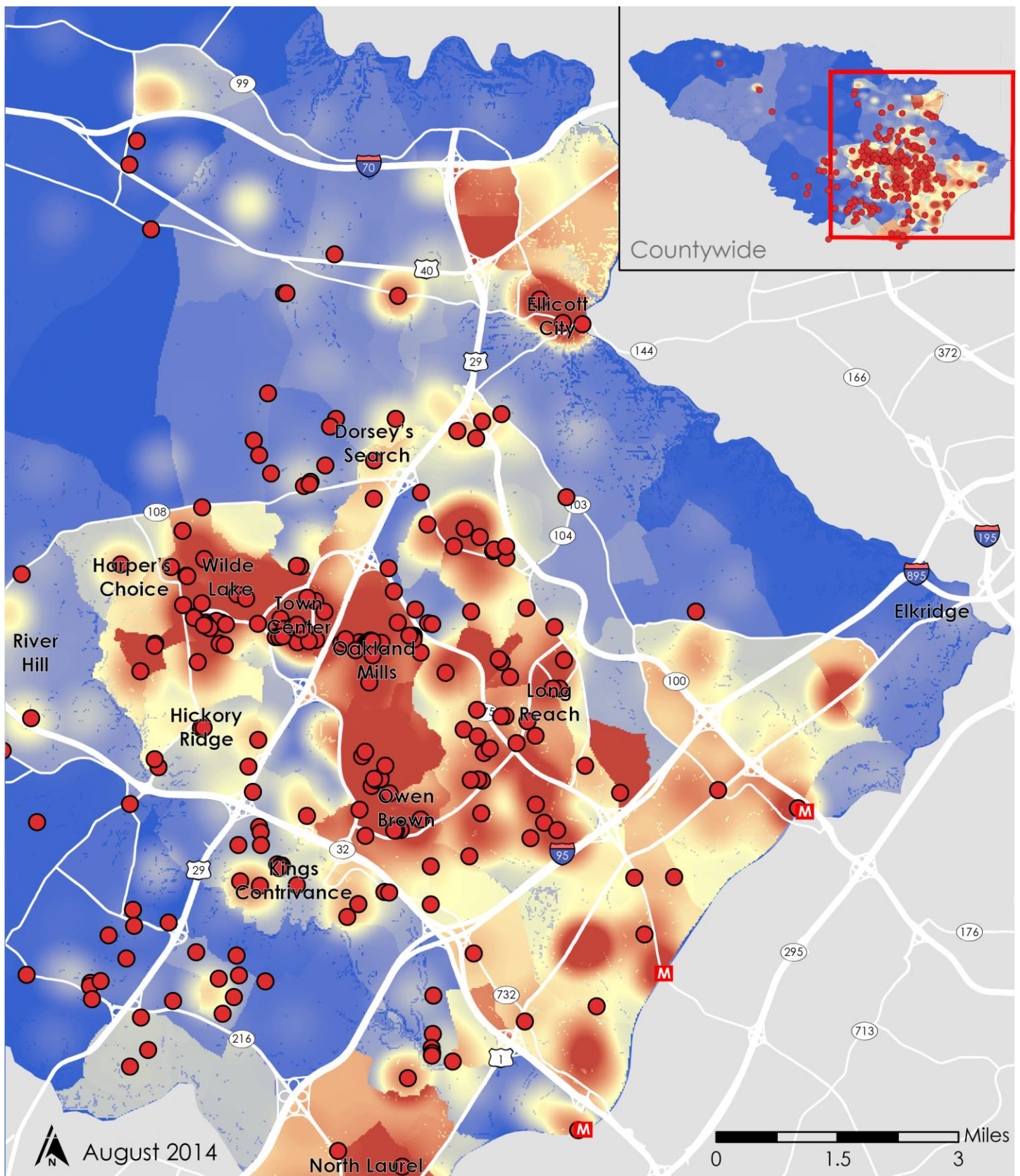
Location	Likes
Downtown Columbia/ The Mall at Columbia	15
Merrweather Post Pavilion	12
Wilde Lake Village Center	10
Howard County Community College	8
Howard County General Hospital	8
Centennial Lake	6
Dorsey's Search Village Center	6
Oakland Mills Village Center	4
Maple Lawn	4
Savage MARC Station	4

The largest number of station suggestions were located throughout many of the destinations within Columbia. Downtown Columbia, Merrweather and Wilde Lake Village Center received significant support (as evidenced by **Figure 20**). Following the public comment period, station

suggestions were aggregated with demographic and infrastructure data to produce a demand analysis map (see the Demand Analysis section).

Stakeholder discussion about station location generally focused on Columbia along the corridor that includes downtown Columbia, Howard County Community College, and Howard County General Hospital, which are undergoing significant growth and development, and have parking constraints. Lakes and recreation areas around Columbia, such as Lake Elkhorn, Lake Kittamaqundi, Wilde Lake and Centennial Lake, were also identified as potential locations to facilitate “lake-to-lake” trips. Finally, participants saw opportunities for bike share along the Route 1 corridor, in Maple Lawn, and between MARC stations and the National Security Agency (NSA).





Publicly Suggested Locations

BIKE HOWARD
Bike Share Feasibility Study



Figure 20 - Howard County Publicly Suggested Station Locations

6. DEMAND ANALYSIS

Evaluating various factors that impact potential bike share demand is an important element in determining the feasibility of a bike share program. This section explains how the demand analysis was undertaken and the different data sources used.

The demand analysis was performed using data obtained from the U.S. Census and the Howard County Department of Planning and Zoning (DPZ). Using these datasets, a heat mapping analysis assigned points to various factors to identify areas with the highest potential demand for bike share ridership in the County. Points were assigned to different geographic areas based on the concentration of people, jobs, attractions, available infrastructure, and other factors.

INDICATORS

Experience from existing bike share programs in the U.S. suggests that a mix and density of population, jobs and activities maximizes the potential for bike share usage. To this end, nine indicators were selected to measure the suitability of a bike share program in Howard County. These are listed in Table 6 along with the sources and scale of the data used.

To determine where bike share would be most successful, a weighted sum analysis was conducted in GIS for all of the variables listed below. A more detailed explanation of why each variable was selected follows.

- **Employment density** – job density measurements indicate where most people are during the day. As with most transportation infrastructure, higher density yields greater efficiencies.
- **Population density** – high population densities provide a pool of potential bike share riders. Trips originating from home may include commuting, recreational, or personal business trips.
- **Proximity to destinations** – various destinations act as trip generators for bike share users. Seven different attraction types

were considered including locations for Howard Community College, Downtown Columbia, libraries, parks, pools, shopping centers, village centers. These were assigned different scores based on their relative size and attractiveness to bike share.

- **Bicycle mode share** – bicycle mode share within the County was used to understand areas that may be more conducive to new bicycle and bike share trips.
- **Proximity to transit** – in U.S. cities with existing programs, bike share has been able to provide an on-demand “last mile” extension of the existing transit system. In these cities, a high percentage of bike share trips are linked to other transit trips.
- **Proximity to existing bicycle infrastructure** – the presence of on- and off-street bicycle facilities is correlated with higher rates of bicycling or willingness to bike¹¹¹ and a well-connected network of bicycle-friendly facilities can encourage increased bike share ridership. The location of bicycle lanes, minor and major trails (minor referring to smaller connecting trails that may not be completely paved) and pathways were used to compile this indicator.
- **Topography** – Terrain and slope can have a significant impact on the amount of bicycling. Bicycle ridership has been shown to be reduced by up to 10-to-15% with a 10% increase in the degree of slope.¹¹² Given bike share bicycles weigh significantly more than most private bicycles (approximately 40-to-50 pounds each) a 5% slope was selected as the threshold for when this variable has an impact on bike share ridership.
- **Equity** – Bike share systems have typically launched in high demand areas such as downtowns and among more affluent populations. However, geographic and social equity have become important considerations for new and existing bike share systems. The analysis considers two variables associated with traditionally underserved populations: median household income and the percentage of non-white populations.

¹¹¹Geller, Roger. Four Types of Bicyclists. Portland Office of Transportation. Retrieved from <https://www.portlandoregon.gov/transportation/article/237507> April 28, 2014.

¹¹²Parkin, J., Ryley, T. J., & Jones, T. J. (2007). Barriers to Cycling: An Exploration of Quantitative Analysis. In D. Horton, P. Rosen, & P. Cox (Eds.), *Cycling and Society* (pp. 67-82). Burlington, Vermont: Ashgate Publishing Company.

Table 6 - Indicators

Indicator	Scale	Data Source	Information Included
Employment Density	Census Tract	US Census Bureau. Longitudinal Employer-Household Dynamics. Area Profile Analysis in 2011 by Primary Jobs.	Number of workers by place of employment
Population Density	Census Tract	US Census Bureau. File S0101 Age and Sex. 2008-2012 American Community Survey 5-Year Estimates	Number of people per Census Tract
Destinations	Geo-located Points	GIS Data (CORE Places) provided by Howard County DPZ Staff	Location of community college, libraries, parks, pools, Downtown Columbia, shopping centers, village centers.
Bicycle Mode Share	Census Tract	US Census Bureau. B08101 Means of Transportation to work by age. 2006-2010 American Community Survey 5-Year Estimates and 2010 Transportation Analysis Zones provided by Howard County DPZ Staff	Percentage of residents bicycling to work
Proximity to Transit	Geo-located Points and Lines	Location of Bus Stops provided by Howard County DPZ Staff. Includes ridership data (boarding and alighting)	Existing bus stops, MARC train locations
Proximity to Existing Infrastructure	Lines	Howard County Bicycle Master Plan and Howard County DPZ Staff	Existing trails, pathways and bicycle lanes ¹¹³
Topography	Slope Angle	Howard County DPZ Staff (Disc 3) Ancillary Data	Topographic data (slope angle)
Equity	Census Tract	US Census Bureau. File DP05 ACS Demographic and Housing Estimates. DP03 Selected Economic Characteristics. 2008-2012 American Community Survey 5-Year data	Number of minority (non-white) residents and number of residents with median household income under \$26,000 for a family of four ¹¹⁴
Public Comments	Geo-located Points	Howard County Bikeshare Crowdsourcing map	Public suggestions for bike share stations

¹¹³ Although many roadways throughout the County include wide enough shoulders to accommodate bicycling, the width of paved shoulders varies from one section of roadway to another, therefore, the analysis did not include paved shoulders.

¹¹⁴ Based on the 2011 Federal Poverty Guidelines located under Howard County Health Department Website. <http://www.howardcountymd.gov/DisplayPrimary.aspx?id=4294969248>.

- **Public Comments** – Public comments received via the crowdsourcing website¹¹⁵ and from the public meeting were used to identify those locations in the County where the public would like to see bike share stations.

METHODOLOGY

A demand analysis or “heat map” was constructed using the data above and following the following process (see **Figure 21**):

1. Developed GIS maps for each of the nine demand indicators (see above). Individual variable maps are included in Appendix 4.
2. Within each indicator, different areas or features were scored based on their relative performance against other areas, e.g., census tracts with population densities in the top quartile were scored higher than those in the middle and bottom quartiles.
3. Weightings were assigned to each indicator based on previous research and bike share planning to account for the relative influence each is expected to have on potential bike share ridership in Howard County. Weighting factors and methodology are shown in **Table 7**.
4. Weighted scores for each indicator were combined to create an aggregated score and then mapped to create a heat map for Howard County.

To account for the difference between area and point or linear variables, a half mile buffer was added around point and linear features, which is thought to be the distance a potential bike share rider might walk to access a bicycle.¹¹⁶

The final heat map for Howard County is shown on the figure below and shows that the areas of the County with the highest potential for bike share use include:

- Town Center and Downtown Columbia
- Howard County Hospital and Howard County Community College campus
- Village of Oakland Mills

¹¹⁵ <http://wikimapping.net/wikimap/HoCoBikeshare.html>

¹¹⁶ Bike Sharing in the United States. State of the Practice and Guide to Implementation. Page 18. Federal Highway Administration. September 2012.

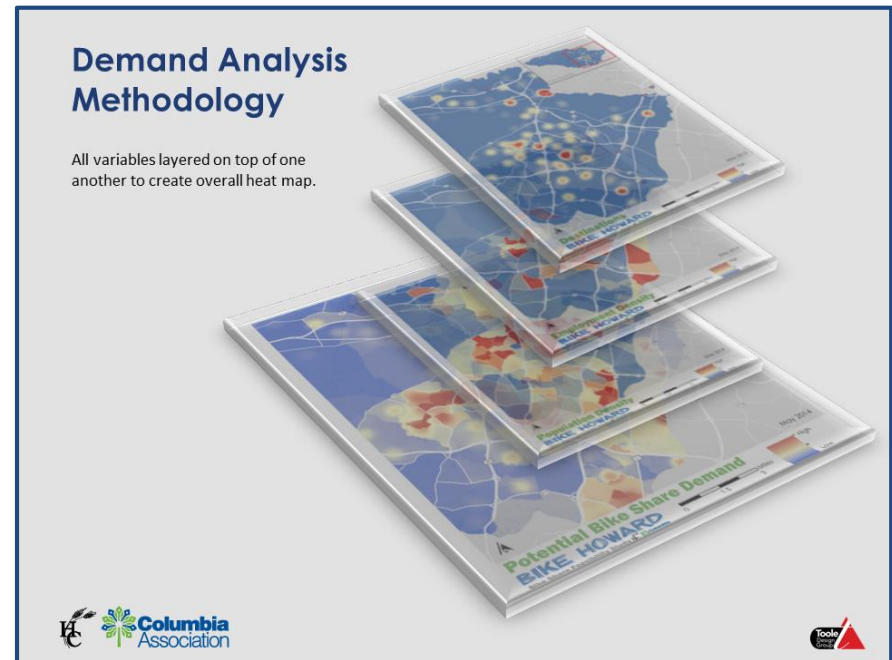


Figure 21 - Demand Analysis Methodology

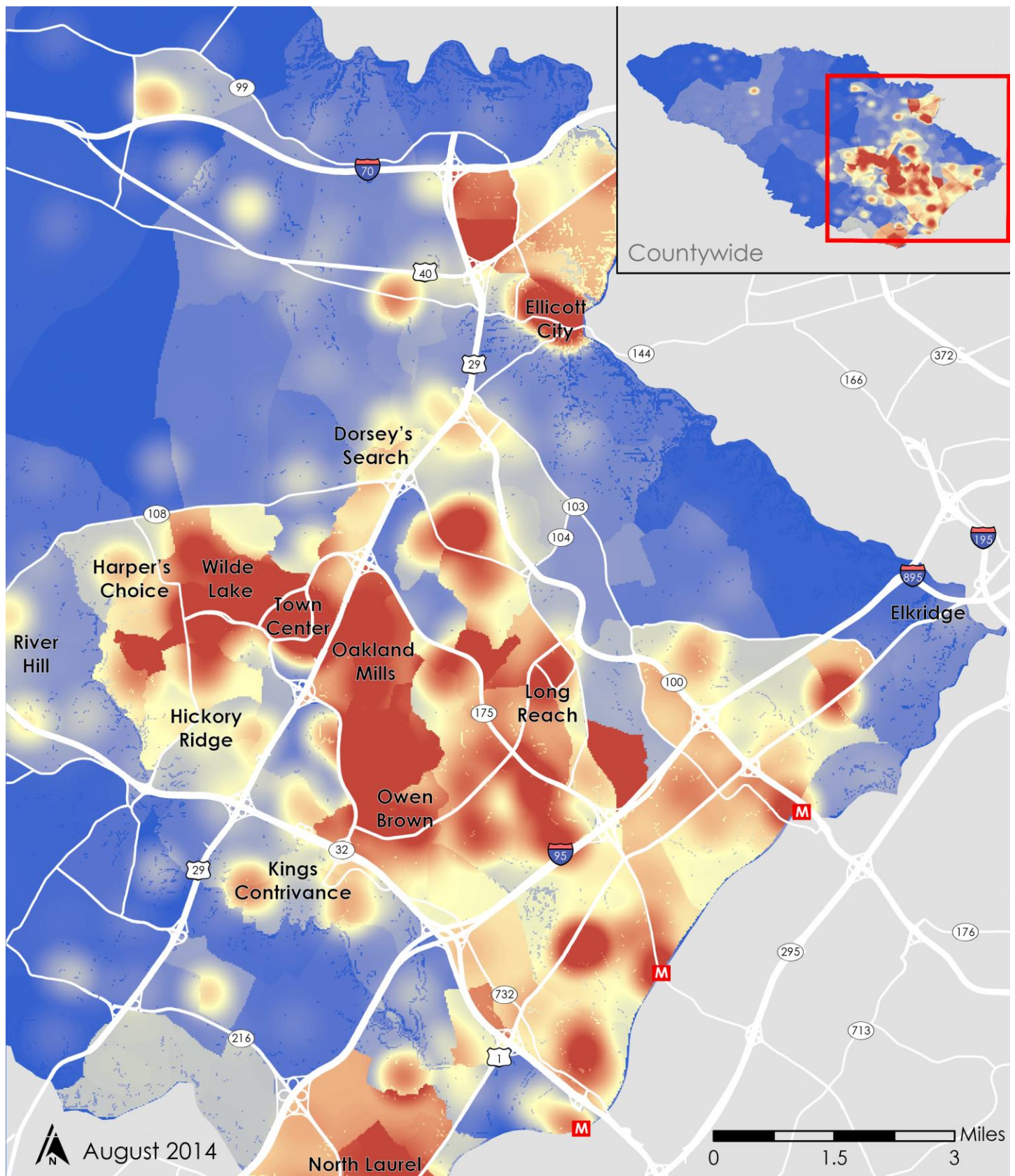
- Village of Owen Brown
- Village of Wilde Lake
- Historic Ellicott City
- US-1 Corridor
- North Laurel/Savage

In future phases of the study, the results of the demand analysis will be used to identify the initial service area, as well as inform potential system phasing, and identify general areas for bike share station locations.

Table 7 - Heat Mapping Scoring and Methodology

Variable	Points	Weights ¹¹⁷	Methodology
Employment Density	20	19%	Census tracts grouped into quartiles based on their employment density. Census tracts assigned scores based on which quartile they fall, e.g. top quartile = 20/20, bottom quartile = 2.2/20.
Population Density	20	19%	Census tracts grouped into quartiles based on their population density. Census tracts assigned scores based on which quartile they fall, e.g. top quartile = 20/20, bottom quartile = 2.2/20.
Destinations	17	16%	Point locations based on information provided by Howard County. These locations include: Howard Community College, Downtown Columbia, libraries, parks, pools, shopping centers, Columbia Association Village Centers (e.g., Dorsey's Search, Harper's Choice, Wilde Lake, Town Center, Oakland Mills, Owen Brown, Long Reach). Scores graduated from the maximum score within a ½ mile radius from the point location and decreasing out to ¼ mile radius from the point location.
Bicycle Mode Share	10	10%	Census tracts grouped into quartiles based on their bicycle mode share. Census tracts assigned scores based on which quartile they fall, e.g. top quartile = 10/10, bottom quartile = 1.2/10.
Proximity to Transit	10	10%	Transit stops grouped into quartiles based on annual ridership data. Stops (bus and MARC) assigned scores based on which quartile they fall, e.g. top quartile = 10/10, bottom quartile = 1.5/10. Scores graduated from the maximum score within a ½ mile radius from the point location and decreasing out to ¼ mile radius from the point location.
Proximity to Existing Bicycle Infrastructure	10	10%	Bikeways coded as line segments. 5 points assigned to every line segment that has a bikeway. Scores graduated from the maximum score within a ¼ mile radius from the line segment and decreasing out to ½ mile radius from the line segment.
Public Comments	3	3%	Scores graduated from the maximum score within a ½ mile radius from the point location and decreasing out to ¼ mile radius from the point location.
Equity	12	13%	Census tracts grouped into quartiles based on their median household income (lower than \$26,000) and the percentage of non-white populations. Census tracts assigned scores based on which quartile they fall, e.g. top quartile = 12/12, bottom quartile = 2/12.
TOTAL	102	100%	Combined total of above scores
Topography	-3		Areas of the County with average slopes of 5% or higher received a reduction in score of 3 points.

¹¹⁷ Weightings were assigned to each indicator based on previous research and bike share planning to account for the relative influence each is expected to have on potential bike share ridership in Howard County.



Potential Bike Share Demand

BIKE HOWARD

Bike Share Feasibility Study



M MARC train

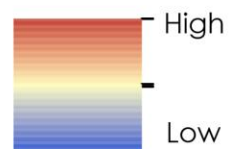


Figure 22 - Howard County Potential Bike Share Demand

7. FEASIBILITY RECOMMENDATION

As discussed in the introduction, during the development of the grant application, Columbia Association and Howard County developed the following goals for a potential bike share program:

1. Improve access to transit systems and expand transportation options for County residents.
2. Increase the convenience and visibility of bicycle use for short distance trips so cycling can more readily become a popular daily transportation mode
3. Enhance public health by reducing air pollution and promoting active lifestyles
4. Enhance the quality of life for Howard County residents by supporting bicycling as a fun and convenient transportation mode

In consideration of geographic, population, employment, existing bicycling infrastructure, local plans and ordinances, as well as public feedback, the overall analysis of feasibility is that a recreation- and health-oriented bike share system (supporting Goals #3 and #4) is currently FEASIBLE. To this end, a recreational- and health-oriented bike share system can be implemented Howard County in the near-term. Reasons why a recreational- and health-oriented system in Howard County can be successful are:

- There is a moderately interconnected network of trails and pathways throughout the most populated areas of the County which are mostly used for recreational purposes. A bike share program may be able to increase use of these facilities.
- While the trail system does not currently have a strong wayfinding system, it is already being improved. A bike share system would further enhance visibility and overall awareness of cycling in Howard County.
- There are a significant number of annual visitors in some parts of the County including Downtown Columbia (including Merriweather Post Pavilion), Ellicott City, and a good number of lakes and parks within Howard County. These visitors would be likely to use a bike share system to enhance their experience of Howard County.

Under current conditions, a transportation focused bike share system (supporting Goals #1 and #2) is found to be NOT FEASIBLE. However, it is anticipated that a more transportation-oriented system can be implemented in the future. It is important to note that a proposed initial system designed with recreation and health in mind will still provide some components of transportation and mobility to residents. Based on examples from around the U.S. especially those in less dense jurisdictions, residents tend to find creative ways to utilize a bike share system serving a utilitarian transportation function, such as workday lunch trips. As discussed earlier, conditions are quickly changing in Howard County and may lead to the transformation of a bike share system from a recreational system to a transportation-oriented system. Should the County consider expanding its focus to serving as a transportation-oriented bike share program, it is recommended that the following issues be addressed:

- Increase connectivity between destinations and to- and from-public transit. With the completion of the Downtown Columbia Trail Project (currently under construction), increased connectivity between activity centers will support bike share ridership for transportation.
- Further develop an interconnected network of on- and off-street bicycle friendly facilities. Ongoing development of on- and off-street safe bicycle infrastructure is strongly recommended, even after implementation. This will allow users to more comfortably ride between existing destinations.
- Increased mixed-use development, as well as the reconfiguration of neighborhoods in and around Downtown Columbia should continue. The current development plans of 5,500 new residential units, 4.3 million square feet of commercial office space, 1.25 million square feet of retail space and 640 hotel rooms supports the fact that people use bike share for different reasons: where they live, work, play and transit. Although this development need not be 100% completed to support a bike share system, it should at least be partially implemented prior to installation of a transportation-oriented bike share system.

CHARACTERISTICS OF A HEALTH- AND RECREATION-ORIENTED BIKE SHARE SYSTEM

As described above, this report has found that a recreational- and health-oriented bike share system can be implemented in Howard County in the near-term. Following are some recommendations as to how such a system may vary from a “standard” dense, urban transportation-oriented system:

- **Station Locations:** Stations should be located mostly at or near trail entrances to bring visibility to these trails and encourage usage. These station locations may be more sparsely located than the station density in most urban bike share systems.
- **Signage:** Each station should have visible signage with easy-to-understand directions about the bike share system, safety tips, rules and regulations, and encouragement of helmet-wearing.
- **Wayfinding:** Each station should have wayfinding maps showing trails, streets with bicycle safety ratings, other bike share stations and nearby destinations (including businesses) accessible by bicycle.
- **Standard Ride Time:** The system should include a longer standard ride greater than 30 minutes to accommodate recreational rides.
- **Helmet Distribution:** The system should include strong partnerships with local shops for helmet distribution for recreational riders, and can consider inclusion of helmet vending machines (which are planned for Seattle’s upcoming bike share system).
- **Pricing Structure:** A simplified pricing structure should be employed that is transparent to recreational users similar to other similar bike share systems such as Broward County, Florida.
- **Bicycle Specifications:** The system may incur more usage if the bicycles are more conducive to longer rides and/or more hilly topographic conditions, either through a lighter bicycle (standard bike share bicycles are 40-50 lbs.) or pedal-assist bicycles (not currently available in bike share systems, but may be in the upcoming years).
- **Visitor Outreach:** Significant outreach to visitors via Visit Howard County, events and hotels.

- **Online Presence Promoting Trails:** Online presence via website and social media encouraging use of the trail system, safety while riding, highlighting events and recreational opportunities.

EVOLVING TO A TRANSPORTATION-ORIENTED SYSTEM

Based on current bicycle infrastructure and mixed use development plans in Howard County, as discussed above, it is expected that a more transportation-oriented system can be implemented in the future. This system will build from the strong culture and visibility created by the recreational system, but will add the following characteristics:

- **Station Density:** A denser network of stations located at a mix of residential, transit, employment and visitor trip sources and destinations to encourage short point-to-point trips;
- **Additional Pricing Options:** An enhanced pricing structure that includes options for high usage members who may use it on a regular basis for employment commuting, as well as corporate sponsorships and memberships for businesses located at or near bike share stations;
- **Access Program:** An access program for lower-income users who may utilize bike share for employment commuting;
- **Online Presence Promoting Commuting:** Strong online presence via a website and social media that encourages additional transportation-oriented ridership of a system;
- **Regional Integration:** Potential integration with other regional systems (Baltimore and/or Washington DC);
- **Business Outreach:** Events and local business partnerships that reach out to employers and residents highlighting uses of a bike share system; and
- **Transportation Partnerships:** Partnerships with the transit agencies and car- and ride-share companies for co-promotions.

It should be noted that although the term “stations” is regularly referred to throughout this section of the feasibility study, there is no recommendation for either a smart-bike or a smart-dock system. Should a smart-bike system be chosen, it is strongly encouraged that this system includes highly visible hubs to make any system more effective. Further analysis of the two different technologies will be undertaken in the Business Plan.

HOWARD COUNTY BIKE SHARE BUSINESS PLAN

PART 2



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CONTENTS

1. Goals, Objectives, and Performance Measures	1	Program Transparency	42
Performance Measures.....	2	Operations Vendor Contracting	43
2. System Size and Phasing	7	Bike Share Equipment Contracting	44
Service Area and Phasing	7	9. Program Impacts	45
Preliminary Station Locations	11	Bike Share's Impact on the Community	45
Potential Future Link to Ft. Meade	11	10. Conclusion.....	47
4. Station Siting Guidelines	13		
5. Business Plan	15		
Ownership and Governance	15		
Preferred Ownership Model.....	17		
Operating Model	19		
Program Technology	20		
Funding Model.....	22		
6. Financial and Ridership Projections	28		
Assumptions.....	28		
Capital Costs.....	29		
State of Good Repair Costs	30		
Operating Costs and Ridership	30		
7. Equity and Marketing.....	33		
Equity Populations in Howard County.....	33		
Addressing Barriers to Use.....	34		
Marketing and Outreach	38		
8. Implementation Considerations	40		
Program Governance	40		
Administrative Needs for Program	41		

1. GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

An important component in determining what the focus and the role of a bike share program should be in a particular community, is to understand what benefits are considered most valuable and determine how success of the program should be measured. To this end, a set of system goals and objectives were developed based on meetings with key County staff, Columbia Association, key regional stakeholders and feedback from the community. This final set of goals and objectives is summarized in **Table 1**.

The goals and objectives reiterate the priority of getting more people on bicycles and through this, help reduce the environmental impact of transportation and improve the health and quality of life of county residents. In designing the initial system, public health and quality of life should be the top focus, while ensuring that the system allows visitors and residents to enjoy Howard County's natural and cultural attractions. While financial sustainability was not considered a high priority, it will be necessary to ensure ongoing support for the system.

Table 1 - Proposed Goals and Objectives

GOAL		OBJECTIVES
PRIMARY GOALS (For recreation oriented system)	Public Health: Enhance public health by promoting active lifestyles	<ul style="list-style-type: none"> Foster an active lifestyle by increasing the share of bicycling and walking in the community. Provide easy access to bicycles for people who may be interested in riding but do not have access to a bicycle. Promote a culture of courtesy and safety among all road users by providing education on safe interactions between modes, and encouraging responsible behavior among cyclists. Support other public health oriented initiatives including the implementation of complete streets throughout Howard County. Maximize ridership and therefore increase the impact of the program on public's health. Support the County's environmental goals by helping relieve congestion and CO₂ emissions.
	Improve Quality of Life through Bicycling: Enhance the quality of life by supporting bicycling as a fun and convenient, environmentally friendly transportation mode that helps relieve congestion in County roadways	<ul style="list-style-type: none"> Create a system that allows visitors and residents to enjoy Howard County's natural and cultural attractions. Increase the awareness and visibility of bicycling in Howard County. Increase bicycling throughout Howard County. Make existing green space in Howard County more accessible. Reduce the environmental impact of transportation consistent with Plan Howard 2020.
SECONDARY GOALS (For transportation oriented system)	Bicycling as Transportation: Increase the convenience of bicycle use for short distance trips and by this help decrease congestion and the environmental impact of single occupancy vehicle trips	<ul style="list-style-type: none"> Create a system that enables bicycle usage for work, shopping and transit in addition to recreation. Ensure that bike share is an affordable transportation alternative which complements other modes. Improve the viability of transit by providing access to bicycling as a first and last-mile option. Relieve congestion by promoting a mode shift from single occupancy vehicle trips to short bicycle trips.
	Increase Mobility: Improve access to transit systems and expand transportation options for county residents	<ul style="list-style-type: none"> Provide increased mobility between origins and destinations in and around Downtown Columbia and between activity centers. Increase connectivity to and from regional transit including MARC, and Commuter Bus. Create a system with stations located to serve areas of higher demand. Ensure that bike share is cost competitive and affordable for all users and is an affordable alternative to other modes of transportation.

PERFORMANCE MEASURES

Measurements are an integral part of the strategic vision for bike share as highlighted in **Figure 1**. Goals and Objectives define what bike share hopes to accomplish in Howard County. Measures are tied to each objective, and provide clear metrics that help measure progress over time. Performance measures not only allow the system owner to monitor bike share program efficiency and effectiveness, but provide critical data points that can be used when applying for new funding or reporting to existing funders. Performance measures were identified for each objective in the strategic vision. Three types of performance measures are defined below:

- **Input measures** track efforts the agency or owner have made, e.g., number of bike share stations within one quarter mile of public parks.
- **Output measures** track the direct result of the program, e.g., number of crashes reported or number of new bike share users.
- **Outcome measures** track how the public reacts to, and has changed their behavior to accommodate bike share, e.g. reported change in miles biked during a typical week before bike share was available.

Although outcome performance measures are very valuable in tracking impact, they are also more difficult to measure. Generally, the evaluating agency must conduct a user survey to gather qualitative measures about participants' attitude and reaction to bike share. The proposed performance measures outlined in **Table 2** include all three types of measures to produce a robust evaluation program.

Table 2 also highlights "CMAQ Performance Measures". Congestion Mitigation and Air Quality (CMAQ) is a federal funding program supporting transportation projects that contribute to lower emissions and regional air quality attainment. These specific measures can be used to demonstrate value for CMAQ funding, as well as track how well the program is meeting CMAQ goals.

The system owner will be responsible for carrying out the proposed performance measurement program. If any of the proposed performance measures fall under the responsibility of an outside vendor, it is recommended that the vendor be contractually required to track the measures. Furthermore, the County should consider producing a report, or website interface that presents updates on each measure, on a semi-

annual or annual basis. Providing performance measurement results to the public will help facilitate better program transparency.

The performance measurement program will be based on three data sources: automatically generated system data, an annual user survey, and County GIS data. It is expected that the program's first year of operations will provide baseline measurement, with future progress measured against past years. All efforts should be made to ensure that the system owner selected is committed to ensuring data transparency. See **Section 8** for more details on reporting requirements and program transparency.



Credit: Toole Design Group

Figure 1 - Hierarchy of Goals, Objectives, and Performance Measures

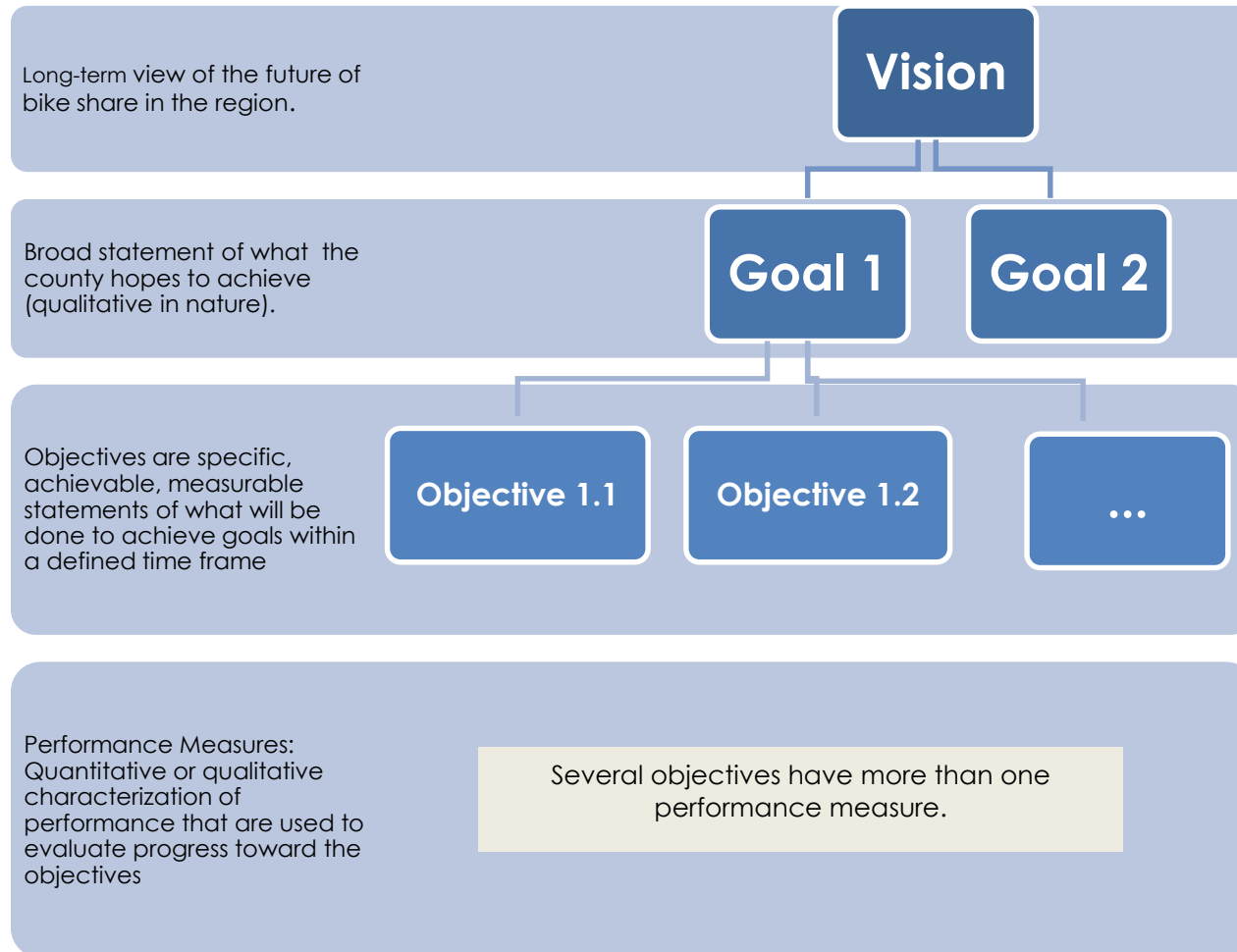


Table 2 – Proposed Performance Measures

Goals	Objectives	Performance Measures	CMAQ Measures
Public Health Enhance public health by promoting active lifestyles	Foster an active lifestyle by increasing the share of bicycling and walking in the community.	<ul style="list-style-type: none"> Total miles biked per year per member (operator data, over time) Reported change in miles biked and walked during a typical week before bike share was available and current survey year (Annual User Survey) Bicycle commute mode share in Howard County (American Community Survey) 	
	Provide easy access to bicycles for people who may be interested in riding but do not have access to a bicycle.	<ul style="list-style-type: none"> Percentage of regular users who do not have access to a bicycle at home (Annual User Survey) 	
	Promote a culture of courtesy and safety among all road users by providing education on safe interactions between modes, and encouraging responsible behavior among cyclists.	<ul style="list-style-type: none"> Percentage of respondents who regularly wear a bicycle helmet (Annual User Survey) Number of crashes reported through operator (operator report) Number of outreach events; Safe Routes to School educational campaigns carried out by partner and bike advocacy organizations Number of public communications (social media, emails) about safety Percentage of bicycles that underwent a safety check at a minimum of once a month (operator data) Percentage of bicycles that underwent an annual overhaul (operator data) Percentage of reported damaged bicycles that were checked within 24 hours of report (operator data) 	
	Support other public health oriented initiatives including the implementation of complete streets throughout Howard County.	<ul style="list-style-type: none"> Miles of bike lanes within a quarter mile of a bike share station. 	
	Maximize ridership and therefore increase the impact of the program on public's health.	<ul style="list-style-type: none"> Number of rides by members and visitors (operator data) Average length of rides by members and visitors (operator data) Number of "induced" trips due to bike share (trip would not occur if bike share was not available) (Annual User Survey). Number of active users and total miles biked per year per member calculated as total calories burned (operator data) 	
	Support the County's environmental goals by helping relieve congestion and CO ₂ emissions.	<ul style="list-style-type: none"> Share of respondents who would have made their most recent bike share trip by private auto, if bike share were not available (Annual User Survey) multiplied by average trip distance to estimate total VMT reductions and emission reductions. 	X

Goals	Objectives	Performance Measures	CMAQ Measures
Improve Quality of Life through Bicycling: Enhance the quality of life by supporting bicycling as a fun and convenient transportation mode	Create a system that allows visitors and residents to enjoy Howard County's natural and cultural attractions.	<ul style="list-style-type: none"> Percentage of bike share stations that are within a quarter mile of Howard County's natural and cultural attractions (point file of historic sites and parks from Howard County and operator data) Proportion of bike share users with a billing address outside of Howard County (operator data) Proportion of bike share users with a billing address within Howard County (operator data). 	
	Increase the awareness and visibility of bicycling in Howard County.	<ul style="list-style-type: none"> Number of new bike share users each year (operator data) Respondent description of how they learned about Howard County Bike Share (Annual User Survey) 	
	Increase bicycling throughout Howard County.	<ul style="list-style-type: none"> Total miles biked per year per member (operator data, over time) Reported change in miles biked during a typical week before bike share was available and current survey year (Annual User Survey) 	
	Make existing green space in Howard County more accessible.	<ul style="list-style-type: none"> Number of parks within a quarter mile of a bike share location 	
	Reduce the environmental impact of transportation consistent with the Plan Howard 2020.	<ul style="list-style-type: none"> Reduction in VMT from bike share, (Annual User Survey) ask "If bike share were not available, how would you have made this trip" in reference to last trip 	X
Bicycling as Transportation: Increase the convenience of bicycle use for short distance trips	Create a system that enables bicycle usage for work, shopping and transit in addition to recreation.	<ul style="list-style-type: none"> Typical trip purpose as reported by users (Annual User Survey) Average trip distance (operator data) 	X
	Ensure that bike share is an affordable transportation alternative which complements other modes.	<ul style="list-style-type: none"> Membership pricing as compared to other transportation options Average cost per trip per user (operator data) User estimated cost savings from using bike share (Annual user survey) 	
	Improve the viability of transit by providing access to bicycling as a first and last-mile option.	<ul style="list-style-type: none"> Percentage of bike share stations within a half mile of MARC stations and within a quarter mile of major Howard County bus stops and transfer centers (operator data) User survey data about use of bike share to access transit (Annual User Survey) Percentage of time stations are full or empty (operator data) 	X
	Relieve congestion by promoting a mode shift for short trips (1-3 miles) from single occupancy vehicle to bicycle.	<ul style="list-style-type: none"> Share of respondents who would have made their most recent bike share trip by private auto, if bike share were not available (Annual User Survey) Count of regular, Howard County bike share users, measured by users with Howard County billing zip code (operator data) Average trip distance (operator data) 	X

Goals	Objectives	Performance Measures	CMAQ Measures
Increase Mobility: Improve access to transit systems and expand transportation options for county residents	Provide increased mobility between origins and destinations in and around Downtown Columbia and between activity centers.	<ul style="list-style-type: none"> Miles per bike calculated from origin/destination analysis for Downtown Columbia and designated activity centers (operator data) Density of bike share station network Average distance between bike share stations 	X
	Increase connectivity to and from regional transit including MARC, and Commuter Bus.	<ul style="list-style-type: none"> Proportion of bike share stations within half-mile of MARC and within a quarter-mile of MTA commuter bus and Howard County Transit bus stops. 	X
	Create a system with stations located to serve areas of higher demand.	<ul style="list-style-type: none"> Proportion of high demand area in the county, in acres, as described in the feasibility analysis/demand model, currently served by bike share. (operator data) 	
	Ensure that bike share is cost competitive and affordable for all users and is an affordable alternative to other modes of transportation.	<ul style="list-style-type: none"> Average cost per trip per user (Annual User Survey and operator data) Difference between the average cost per trip per user and the average cost per transit trip per user (Howard County Transit; operator data) Percentage of members who are low income (up to 150% of federal poverty line) 	

2. SYSTEM SIZE AND PHASING

This section presents recommendations on the proposed size, phasing and extent of the program. Areas where bike share is likely to be most successful in Howard County were defined based on the program's intended goals (see Goals and Objectives section), feedback received from the community engagement process, and a heat mapping analysis that looked at existing population and employment densities, the location of attractions, existing transit and bicycling infrastructure, and the concentration of minority and low-income populations (please refer to the Feasibility Study for more information).

From these inputs, the project team identified areas in the County that have the most potential to likely support bike share. Capital and operating funding capacity (so as not to plan a system that was too large to realistically be funded) were also considered to develop the phasing plan described below.

It is expected that that the proposed bike share system will serve Downtown Columbia, Ellicott City, and North Laurel. The villages of Harpers Choice, Wilde Lake, Hickory Ridge, Oakland Mills, Owen Brown, Long Reach, as well as Maple Lawn would also be served. These areas represent the highest potential for bike share use based on the concentration of people, jobs, attractions, available infrastructure, and other factors. These areas and proposed phasing are explained below.

The proposed bike share program is expected to be rolled out in seven distinct phases including three satellite areas. When fully implemented, the program is projected to serve 32 percent of county residents¹ (based on place of residence) and 39 percent of all jobs² (based on place of employment). The sections below describe the service area and phasing recommendations.

SERVICE AREA AND PHASING

As noted in the Feasibility Analysis, the initial system for Howard County will focus on providing a recreation oriented service, which would allow for a less dense system of stations to be implemented. However, a system that is too small or that provides stations that are too far apart may limit

the effectiveness of its service. With this in mind, the proposed system represents a supportive and sizeable network of stations and bicycles providing effective service between a mix of recreational trip origins and destinations. Furthermore, as the system will connect various activity centers in the core of the County, it is expected that it will be used for transportation purposes from its outset. In the long term the system is anticipated to transform into a more transportation oriented system for all users, as the system matures and Downtown Columbia builds out.

STATION DENSITY

The average station density for the fully implemented system is expected to be around 1.4 stations per square mile for a total of 36 stations located throughout a coverage area extending to around 24 square miles. The final proposed size of each phase (i.e., area and number of stations) was developed based on examples from system wide station densities in peer cities, following the directive set forth by the proposed goals and objectives aforementioned. However, as the initial system will focus on connecting health and recreation attractions, the proposed density, is expected to be lower than those in peer jurisdictions.

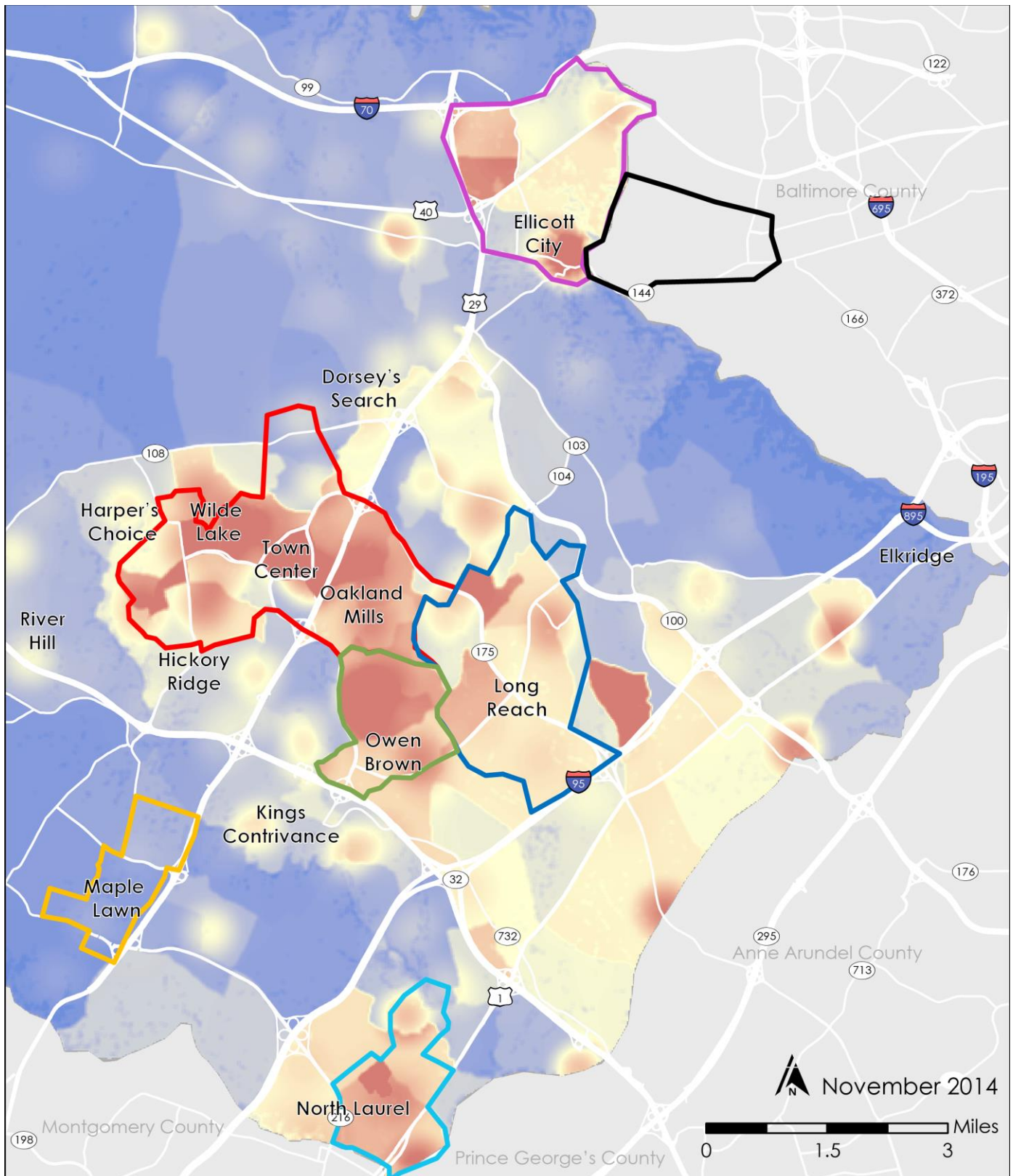
System-wide station densities in peer cities range from around three to five stations per square mile, but vary depending on the intensity of land use (see **Table 3**). In most jurisdictions, station densities are higher in areas that experience with higher housing and employment density, as well as a variety of land uses. These factors tend to help generate higher ridership for bike share.

Table 3 - Peer Cities Comparative Numbers

	Bicycles	Stations	Service Area (Sq. Mi.)	Station Density (stations/sq. mi.)
Montgomery County, MD	450	50	13	3.8
San Francisco Bay Area	278	34	7.5	4.5
Greenville, SC	28	6	1.1	5.1
Spartanburg, NC	40	4	0.8	5
ALL PEER SYSTEMS AVERAGES	199	23.5	5.6	4.6

¹ Based on place of residence. US Census 2013 figures.

² Based on place of employment. LEHD figures 2011.



Proposed Phasing BIKE HOWARD

Bike Share Feasibility Study



- Phase 1A
- Phase 1B
- Phase 1C
- Phase 1 Flex
- Satellite 1
- Satellite 2
- Satellite 2 Flex

Potential Demand

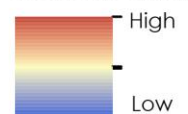


Figure 2 - Proposed Phasing

Because of the existing suburban characteristics in Howard County it is recommended that stations are placed at a lower but consistent density so that users have an expectation that stations are available within a reasonable distance within the system area. This will also provide some redundancy so that if a station is empty or full, a user may go to a nearby station and find an available bicycle or an empty dock. In some cases, where there may not be other stations nearby, additional capacity (i.e., adding more docking points) should be considered to avoid users being faced with empty or full stations. As the system matures and the land use context changes in Howard County, it is recommended that the County consider installing in-fill stations that may help increase the availability of bicycles and open docks.

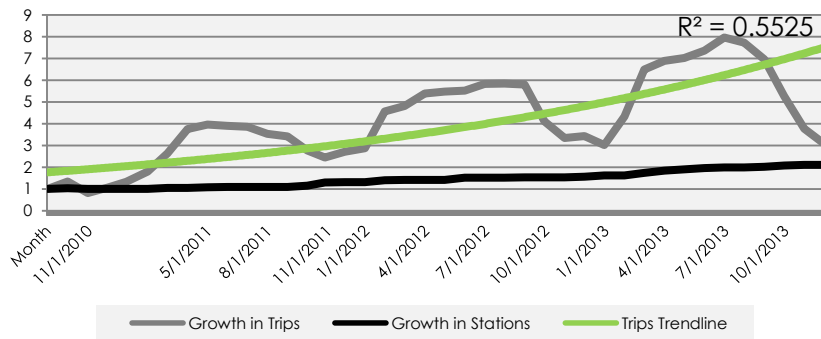


Figure 3 - Growth in Capital Bikeshare Ridership Compared to the Increase in System Size

While there are no definitive guidelines for the optimal size of a bike share system, recent research on bike share growth has indicated that ridership tends to increase disproportionately with the number of stations. For example, in Capital Bikeshare the ridership has increased at a higher rate than the increase in the number of stations since the system launched as can be noted in **Figure 3**.³ In creating a critical mass for the system, too few stations will serve only a limited number of destinations and be less useful to potential riders. Following these general guidelines, the recommended phasing can be found in **Figure 2** and summarized in **Table 4**.

Table 4 - Proposed Phasing

	Area	Stations	Stations (Sq. mi.)	Bicycles	Docks	Install Year
Phase 1A	6.9	14	2.0	140	238	Year 1 (Fall)
Phase 1B	5.1	7	1.4	70	119	Year 2 (Fall)
Phase 1C	1.6	3	1.9	30	51	Year 2 (Spring)
Phase 1 Flex	2.0	2	1.0	20	34	Year 3 (Fall)
Satellite 1 - Laurel	2.1	4	1.9	40	68	Year 4 (Fall)
Satellite 2 - Ellicott City	4.3	4	0.9	40	68	Year 4 (Fall)
Satellite 2 Flex (Catonsville)	2.3	2	0.8	20	34	Year 4 (Spring)
TOTAL	24.4	36	1.4	360	612	

Phase 1A (14 stations / 140 bicycles)

The proposed Phase 1A provides for the installation of 14 stations primarily located in Downtown Columbia and extending west to include parts of the villages of Wilde Lake and Hickory Ridge. This phase would also include stations to the east of Downtown Columbia in the village of Oakland Mills.

At just under seven square miles, this phase would provide service to around three percent of the County's total land area at a total density of two stations per square mile. This phase would also provide service to around 10 percent of the county's residents (by location of residence) and jobs (by place of employment). The mix of uses, increased number of activity centers, and higher densities in this area give it the highest potential for bike share demand.

It is expected that Phase 1A will also serve both Howard Community College and Howard General Hospital which are both high employment centers. Generally, colleges and university campuses are prime locations for implementing early phases of bike share programs as college students tend to be early adopters. Additionally, bike share service at Howard General could offer a convenient link to restaurants and food options for both visitors and employees within Downtown Columbia.

³ Buck, Darren. Bicycle Program Specialist District Department of Transportation.

Phase 1B (7 stations / 70 bicycles)

Phase 1B calls for the installation of seven stations extending service to Long Reach, the commercial areas at Route 108 and Snowden River Parkway, and high employment locations within the Columbia Gateway complex. When completed, this phase is expected to serve an area of approximately five square miles at a density of 1.4 stations per square mile. While there is considerable retail and office space near Snowden River Parkway, a lower density of stations is anticipated in these areas reflective of lower density land use and the existing bicycle infrastructure. Furthermore, this service area would serve an additional two percent of the total County area and would provide service to an additional 14.4 percent of jobs and around four percent of residents.

Phase 1C (3 stations / 30 bicycles)

Phase 1C expands service to Maple Lawn and the Applied Physics Lab. The proposed phase would include three stations and 30 bicycles serving a total area of just over 1.5 square miles at an overall density of 1.9 stations per square mile. This phase is expected to serve one percent of the total County area, around two percent of jobs and just under five percent of county residents.

The proposed bike share system also includes four satellite and “flex” areas which would be added as the County expands its network of comfortable bicycle facilities and increases connectivity between areas. It is expected that as the County provides increased connection to transit and activity centers, the pool of potential bike share users will grow. It is important to note however, that while increased comfortable connections between these and previous phases is desired, this is not a requirement for fully implementing these phases.

Phase 1 Flex (2 stations / 20 bicycles)

Phase 1C expands service to the Village of Owen Brown through the installation of three additional stations. The proposed phase would serve a total area of two square miles located at a station density of one station per square mile. A lower density of stations is also expected on this phase. Finally, the proposed service area would serve an additional one percent of the total County area and would provide service to an additional 4.7 percent of jobs and three percent of residents. Phase 1 Flex could be implemented as either part of Phase 1A

or Phase 1B depending on bicycle infrastructure development in these areas.

Satellite 1 – Laurel (4 stations / 40 bicycles)

This phase would include a total of four stations and serve an area of around two square miles. The proposed phase would extend service to North Laurel, Southern Savage, and the historical Savage Mill. When completed, this phasing area is expected to serve 4.8 percent of residents and two percent of the total jobs in the County. The County may consider developing this phase as a stand-alone system because if the distance between this proposed phase and the core of the proposed program.

Satellite 2 – Ellicott City (4 stations / 40 bicycles)

Satellite 2 expands service into Ellicott City and would include an area of 4.3 square miles with a density of around one station per square mile. This phase would serve two percent of the total county area, 5.3 percent of residents and 5.4 percent of jobs. In response to the topography of the area, the County should consider utilizing electric assisted bicycles to help users cope with the varying slopes. Should the County elect to use electric assist bicycles for this phasing, it must consider what the logistics and potential problems of mixing electric bicycles with regular bicycles and stations will be. For this reason and because of the distance between this proposed phasing and the core of the system, the County may consider developing this phase as a stand-alone system.

Satellite 2 Flex – Catonsville (2 stations / 20 stations)

As this proposed area has many commonalities with that one served by Satellite 2 (Ellicott City), it is recommended that this flex area expand service into Catonsville along the existing Trolley Trail. The proposed area would include two stations and cover around two square miles. Should this proposed expansion be considered, it is recommended that the County work with neighboring Baltimore County to coordinate the implementation of this satellite system.

The proposed phasing includes links to existing bicycling facilities, major regional destinations, and a number of activity centers which exhibit concentrations of commercial, employment, institutional and residential land uses. As the County continues to expand its network of bicycle friendly facilities, it is expected that the proposed bike share system will provide a

complementary service introducing residents to bicycling as an affordable and healthy transportation option.

PRELIMINARY STATION LOCATIONS

Stations should generally be placed in safe, convenient, and visible locations. Station locations may include the public right-of-way in the street, on sidewalks, or in parks and other public lands. The County may also consider locating stations on private property through the use of a License Agreement with the property owner. In all instances stations should be available at all times to the public and to the operator for the purposes of maintenance and bicycle redistribution.

General station locations as shown in **Figure 4** were determined based on public and stakeholder input, as well as heat map analysis performed as part of the Feasibility Analysis. The proposed locations were further refined with the feedback from County and Columbia Association representatives. The proposed locations for bike share stations contained in this report are to be used only as a general guide. **Final station placements will require additional public outreach and field work** to determine and confirm availability of space, and right of way ownership among others.

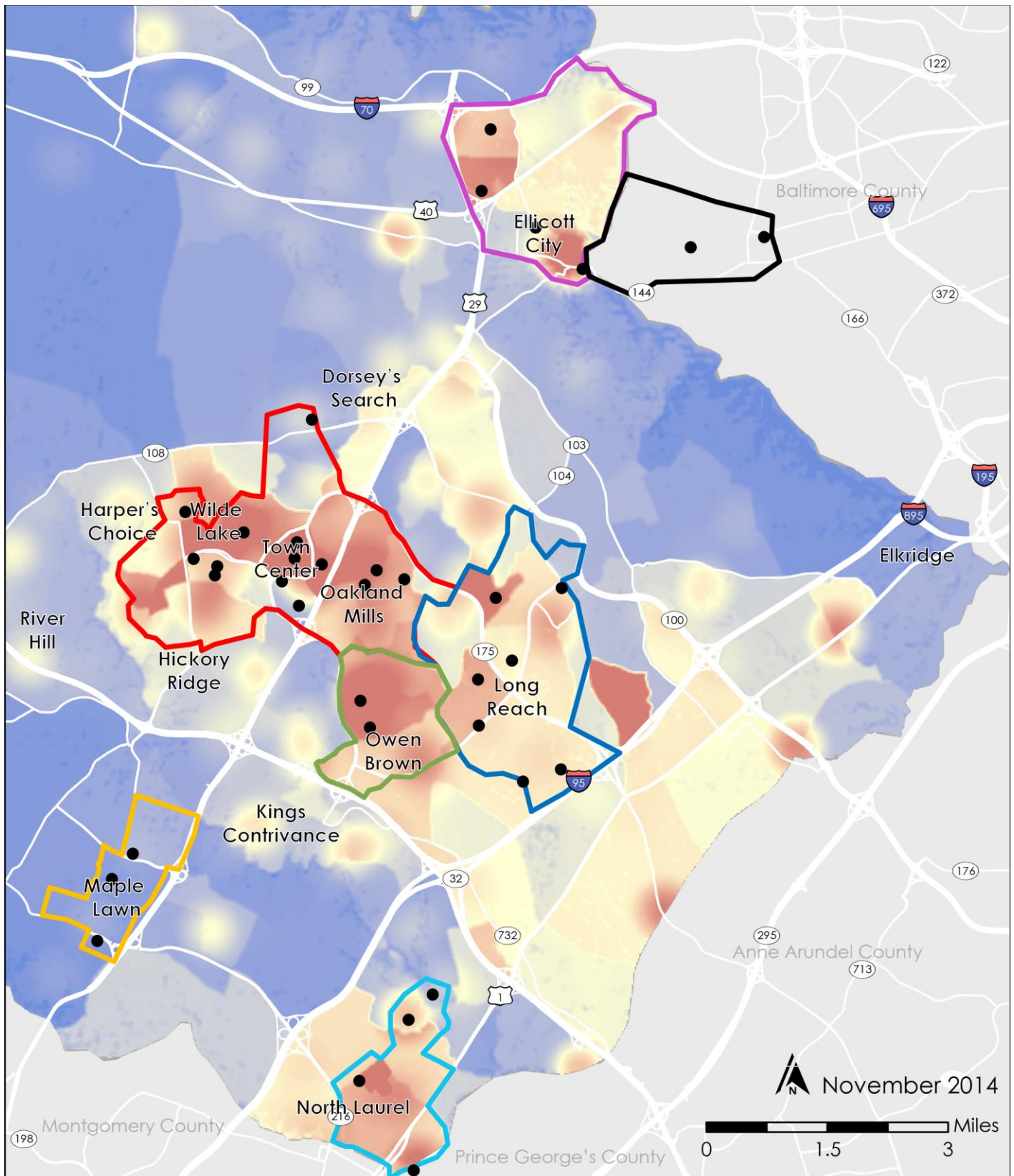
POTENTIAL FUTURE LINK TO FT. MEADE

While this project focused on analyzing the potential implementation of a bike share program in Howard County, it is important to note that providing links to other jurisdictions and to major regional employers will be of great significance for the County. The team analyzed whether bike share could serve as a last mile commuting opportunity to employers from the Savage MARC station. Fort Meade is a military base three miles from the Savage MARC station and has the potential for bike share to provide a first- and last-mile connection. After analysis, the team has not included Fort Meade as part of the system area, but recommend it for future consideration. Some of the issues regarding bike share at Fort Meade include:

- The proposed bike share station at the Savage MARC station may be able to provide a last-mile connection to Ft Meade for commuters. However, this will require that any the technology used at a potential program in Ft. Meade be compatible with the proposed program technology in Howard County.

- A review of existing facilities connecting to the Fort Meade Campus to the Savage MARC station revealed that existing roadways do not provide comfortable connectivity. Furthermore, existing highways including the Baltimore Washington Parkway (295) and Route 32 act as bicycling barriers, making bicycle connections in the area very limited.
- As public access within Ft. Meade is restricted due to security concerns, stations located within this campus would need to be treated differently (i.e., not shown in the system maps or public feeds) just as the Capital Bikeshare station within the White House is treated. Furthermore, to provide the most appropriate operations, an agreement with the operator of the program, the County, and the NSA should be reached to allow operations staff regular access to the Ft. Meade campus for station and bicycle maintenance and rebalancing
- Experience from existing bike share programs indicates that bike share does not work well to serve single trip purposes. Should a bike share program be considered for Ft. Meade, the program should be part of a more dynamic network of stations and multimodal system with varied origins, destinations, time of travel, as well as direction of travel

Based on the aforementioned concerns it is recommended that County staff along with Anne Arundel County, and Ft. Meade transportation planning staff further explore a potential joint effort to implement a bike share program. Should a bike share program extension be considered, it will be important that Anne Arundel County provide more comfortable connections between the Savage MARC station and Ft. Meade.



Proposed Station Locations

BIKE HOWARD
Bike Share Feasibility Study



- Phase 1A
- Phase 1B
- Phase 1C
- Phase 1 Flex

- Satellite 1
- Satellite 2
- Satellite 2 Flex
- Proposed Station Location

Potential Demand

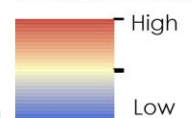


Figure 4 - Preliminary Map of Station Locations

4. STATION SITING GUIDELINES

As previously noted, the final proposed station locations will need to be verified in the field prior to deployment of the system. Station locations may also need to be relocated depending on right-of-way availability and ownership, physical space availability away from utilities and other obstacles, operating requirements such as solar and wireless communication access, and consultation with adjacent land owners.

Bike share stations are modular and their capacity can be expanded or decreased over time in response to the characteristics of the market. The footprint for an average linear 17 dock station is approximately 6-feet wide by 47-feet long. In many jurisdictions where space availability has been constrained L shaped stations and double sided stations have also been considered. In most cases it is recommended that additional width be provided behind the back of the bicycle to allow it to be pulled out of the dock without encroaching into the traffic lane behind it. On lower volume streets, 1- to 2- feet may be sufficient, however, on busier streets it is recommended that at least 6-feet be provided to allow for 2-feet of clearance behind the bicycles, unless there is a buffer such as a bike lane or painted separation adjacent the station. Additional width should be provided where the bicycles back up to a constrained condition such as a wall, heavy traffic street, etc. Additional length is required for larger stations.

Other general considerations include:

- Sites must have unrestricted public access at all times to allow for maintenance and unrestricted check out of bicycles.
- Sites should ensure maximum visibility to help increase the use of bike share.
- Sites must not impede the use of any existing facilities, such as bus stops or fire hydrants.
- Sites need to meet the necessary solar (or non-solar) and cellular signal requirements specified by the equipment vendor.
- Sites must have a hard, level surface.
- Sites should consider access for installation and for regular maintenance and rebalancing.
- Where possible, sites should make use of existing lighting.
- Except in specific circumstances, stations should be located as close as possible to the corner / crosswalk.

Below are some additional considerations for siting bike share stations on sidewalks, on-street spaces, off-street locations, and on parks, plazas or other county properties. Standard safety treatments for each of the proposed locations may include street markings, bollards, or other safety equipment. The final treatments should be developed in consultation with the County's Public Works. Final sites must be reviewed to ensure they meet appropriate safety criteria.

Sidewalk Site Requirements



Generally, sidewalk sites should not interfere with existing pedestrian travel patterns and must maintain sufficient clearance to fixed objects and utilities. Additionally, sidewalk sites should not impede access to and from buildings especially with relation to emergency services. Sites should be placed in line with other street furniture wherever possible. Furthermore sites may not be placed:

- Within 5-feet of a crosswalk.
- Within 10-feet of driveways.
- Within 15-feet of fire hydrants.
- Within 5-feet of stand pipes.
- Within 2-feet of fixed objects such as lamp posts.
- Within 15-feet of a bus stop and ensuring sufficient distance from rear bus egress doors (if the station is placed on the curbside. Stations can be closer if placed on the non-curbside.

Sites should be set back a minimum of 2-feet from the curb when adjacent to on-street parking to allow for the opening of automobile doors. A minimum of 18-inches is acceptable where parking is not allowed.

On-Street Site Requirements



Figure 5 - On-street Station

On-street sites typically make use of converted parking spaces; however restricted parking areas may also be considered where these sites do not impact sight lines. Generally, on-street stations locations should first be considered in low traffic volume streets. However, higher traffic volume streets can be considered where there is sufficient width for a user to pull a bicycle from the station without encroaching into the traffic lane, or where there is a buffer provided between the station and moving traffic, e.g., a bike lane or painted buffer. Sites should be arranged with the docks on the curbside of the station and bicycles pulling into the street. Finally, sites should not be placed:

- In “no-stopping” zones.
- Within 15' of the end of a bus stop.
- Within 15-feet of a fire hydrant.
- Within 10-feet of signed loading zones, driveways or curb cuts.
- Within 5' of a crosswalk.

Stations may be placed in no parking and no standing zones as long as the station does not impact sight lines. A minimum of 6-inches should be left between the back of the station and the curb to allow for drainage flow.

Parks, Plazas and County Property



Figure 6 - Station in Public Plaza

Bike share stations may be placed at plaza or park properties or, by agreement, on private property. Sites may be placed on Parks Department or other City property at the discretion of the relevant agency. In general, sidewalk siting guidelines apply to these sites.

Off-Street on unpaved areas

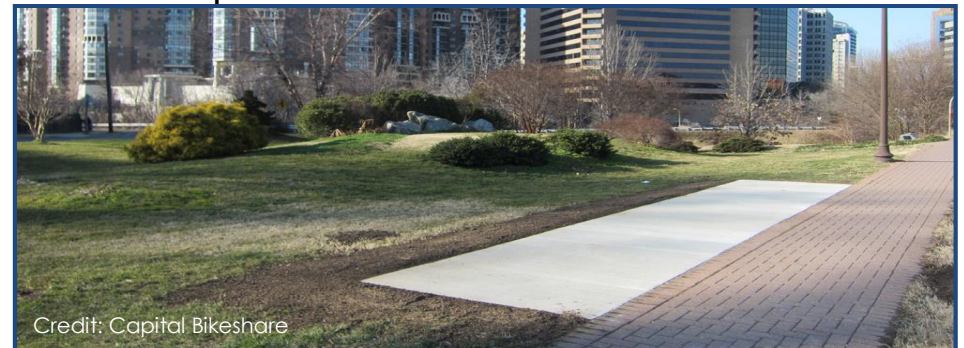


Figure 7 - Concrete Pad Improvement for Bike Share Station

Sites may be placed on off-street areas depending on space availability. It is recommended that some improvements are made to the terrain (e.g., building of a concrete pad, electric grid connection) where the station is implemented.

5. BUSINESS PLAN

Bike share programs in the US are operated and structured in various ways. Each community exploring bike share must define its own model by considering the individual program strategic goals, financial constraints, and political realities.

For Howard County the development of a business model includes defining the ownership and governance model, defining the operating model and analyzing the capital and operating costs, and ultimately the funding needs of the system. This plan outlines the key decision points the County faces in implementing the program. The final shape of the program will involve discussions with a broad group of stakeholders in government, the business community, and non-profits.

OWNERSHIP AND GOVERNANCE

A key purpose of this study is to support the selection of a governance structure by identifying the options for program governance and describe their strengths and weaknesses. In general, the following functions are required to mobilize and operate a bike share system:

- Obtain political, public, and other support.
- Raise funds for initial capital and early operating costs.
- Procure the equipment vendor and the operator.
- Administer contracts with the equipment vendor and the operator.
- Own and maintain the system and its assets.
- Evaluate and expand the system.

These functions can be undertaken by one or more organizations. Existing U.S. bike share programs operate under different business models depending on the jurisdiction's funding environment, institutional capacity, and local transportation needs.

In North America, most systems fall into three broad ownership categories: public, non-profit, and for-profit. There is a great degree of diversity within these categories in the way they are implemented and operated, as shown in **Figure 8**. For example, a publicly owned system may be owned by local government (e.g., city or county), a public agency (e.g.,

Metropolitan Planning Organization, state agency), or an independent public authority (e.g., transit authority). A non-profit system can be owned by an existing organization or a new non-profit can be established with the sole purpose of operating bike share. Finally, For-Profit/Private systems can include both systems established independently of government support or through a public solicitation for bike share.

With each model comes strengths and weaknesses (see **Table 5**). For-profit bike share systems tend to succeed in highly specialized markets, such as tourist destinations, or in high density environments where there is a great deal of ridership demand. Some private entities like colleges and property owners have established small scale bike share systems that are closed to the general public, a model that does not fit with the vision for Howard County's bike share program.

Non-profit bike share systems are fairly common. Many early bike share programs in North America were established by non-profits, and non-profits are still prominently represented among new bike share programs. In smaller jurisdictions smaller bike share programs will be implemented an existing non-profit. In comparison, larger jurisdictions tend to establish a new non-profit organization responsible for running the bike share program.

Finally many bike share systems, including most of the country's larger programs, are publically owned. Public ownership is especially common when the program depends on extensive public financial support.

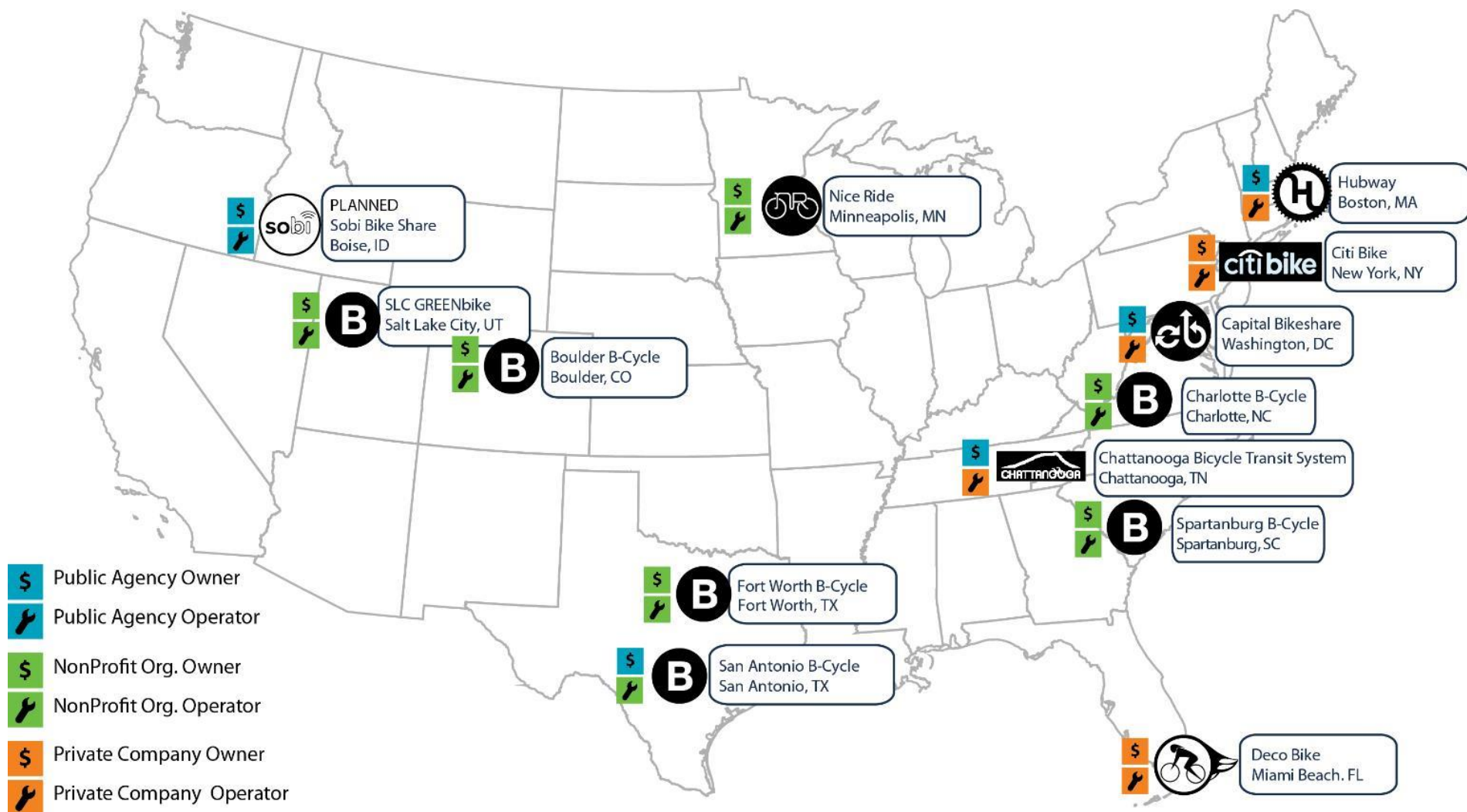


Figure 8 – Example Ownership and Operating Structures Across the US

Table 5 – Ownership Structures Among Bike Share Programs

	Public	Non-Profit	Private
Funding Sources	City, State and Federal Funds; Bond Revenue; Private Fundraising and Sponsorship	Private Fundraising and Sponsorships; City, State, and Federal Grants	Private Fundraising and Sponsorships for Capital; Operations Typically Self-Sustainable.
Strengths	<p>Allows for maximum public control of program outcomes</p> <p>Can take full advantage of public funding</p> <p>Quick start-up as no new organization must be created</p> <p>Administrative costs can be absorbed by public entity</p>	<p>Dedicated bike share organization more nimble than public owner</p> <p>Can more easily attract private donations</p> <p>Non-profits retain a degree of public oversight through board representation or informal relationships</p>	<p>No financial burden on the public; minimizes public risk</p>
Weaknesses	<p>Less nimble in procurement and decision making</p> <p>Sensitive to changing political support</p> <p>Public sector less experienced in donor development and fundraising</p>	<p>Extensive effort devoted to fundraising</p> <p>Without an existing non-profit, a new organization must be created, requiring additional time for startup and additional program overhead costs</p>	<p>Depends on user revenue to fund operations. Not feasible outside places of high demand and large advertising markets</p> <p>Less public control over system quality and station location</p> <p>Because of overriding financial concerns, stations concentrated in high-demand areas</p>
Examples	<p>Capital Bikeshare (Washington, DC and suburbs)</p> <p>Bay Area Bikeshare (San Francisco and suburbs)</p>	<p>Greenville B-cycle (Greenville SC)</p> <p>Spartanburg B-cycle (Spartanburg, SC)</p> <p>NiceRide MN (Minneapolis)</p>	<p>DecoBikes (Miami)</p> <p>CitiBike (New York)</p>

PREFERRED OWNERSHIP MODEL

Among the ownership models outlined above, it is recommended that the County consider the following options, which are considered the most feasible:

- Existing non-profit
- New non-profit
- Public agency

At this stage in the planning process, there may be potential for implementing a privately owned system on a small scale (such to serve employees at a local office park or students on the community college campus). However a privately owned system is not likely to be feasible on the scale proposed in this study.

The County's closest peers in terms of size, land use, and population density tend to be non-profit or publically owned systems. Below is a more detailed analysis of each of these options.

EXISTING NON-PROFIT

Some smaller scale bike share programs are owned by existing non-profits, such as Greenville SC, Des Moines IA and Spartanburg SC. This ownership model is prevalent in communities where there is an existing non-profit championing bike share. A suitable non-profit owner should exhibit the following characteristics:

- The non-profit should have a clear and sustained interest in overseeing a bike share program. Ownership of the program is a long-term commitment and bike share should fit within the vision and mission of the organization. The ideal non-profit does not necessarily need to be a bicycling focused organization. For example, Upstate Forever, the owner of Greenville B-cycle, is an environmental non-profit that saw bike share as an extension of its mission to promote sustainability and healthy living in Greenville, SC.
- The organization should have capacity to administer the program. As will be detailed in the following section, many system owners do not directly operate their bike share programs; however, regardless of the operating model, the owner will need to oversee the program and sustain fundraising efforts over the

long-term. Preferably the non-profit should have the staff capacity to oversee the program, along with experience in program administration.

- An ideal non-profit will have a suitable network of partners to support operations of the system. Partners through in-kind contributions and volunteer support can play a role in lowering costs and sustaining operations. The selected non-profit will have to work closely with the public sector in the siting and permitting process.

NEW NON-PROFIT

Many communities have elected to establish a new non-profit to oversee their bike share programs, such as Denver, Pittsburgh and Minneapolis. Funding for equipment typically comes to the non-profit in the form of public, private and philanthropic sources. The Board of Directors of the non-profit often includes city, regional agency, sponsor, and field experts such as legal or accounting professionals who contribute in-kind services. A non-profit can be set up for regional expansion, and can either undertake direct operations (for example, Minneapolis and Denver) or contract out operations (for example, Seattle). Similarly, it could choose to contract out any other functions to a third party. Operational costs for a non-profit that undertakes operations directly will typically be lower than a privately operated system, but capacity building can be a lengthy and difficult process.

PUBLIC OWNERSHIP

Public ownership is a fairly common ownership model in North America for larger systems, and is the model used by neighboring Capital Bikeshare. Bike share programs can be owned by different public entities, from the local government (e.g. the County), to a suitable regional or state agency. Public ownership has many of the same benefits of ownership by an existing non-profit. The owner agency can absorb some or all of the administrative costs for the program, reducing the operating costs that must be supported by the bike share program. Public ownership also allows for the greatest public control over the system, ensuring that the system reflects the community's wishes and vision for bike share. If the system depends on extensive public financial support, a publically owned system may be the most feasible as restrictions may limit a non-profit's use of federal, state, and local funding sources. The ideal public owner would have the following characteristics:

- The owning agency should have a history of cooperation with county departments that will play a major role in implementing the program, such as public works and planning. Good inter-governmental communication is necessary to ensure permitting and siting of stations runs smoothly.
- The agency should have the expertise to oversee a program. All publically owned bike share programs in operation in the United States use private vendors to handle day to day operations (however, some transit agencies are planning on undertaking direct operations in future launches, such as Boise ID, Topeka, KS and Dayton, OH). The system owner should be knowledgeable in vendor administration and contract oversight.
- The owning agency should have an active presence in Howard County. Launching and operating a bike share program will require close coordination with the public, and the owner should have a good understanding of local conditions.
- The owning agency should have the staff capacity to administer the program.

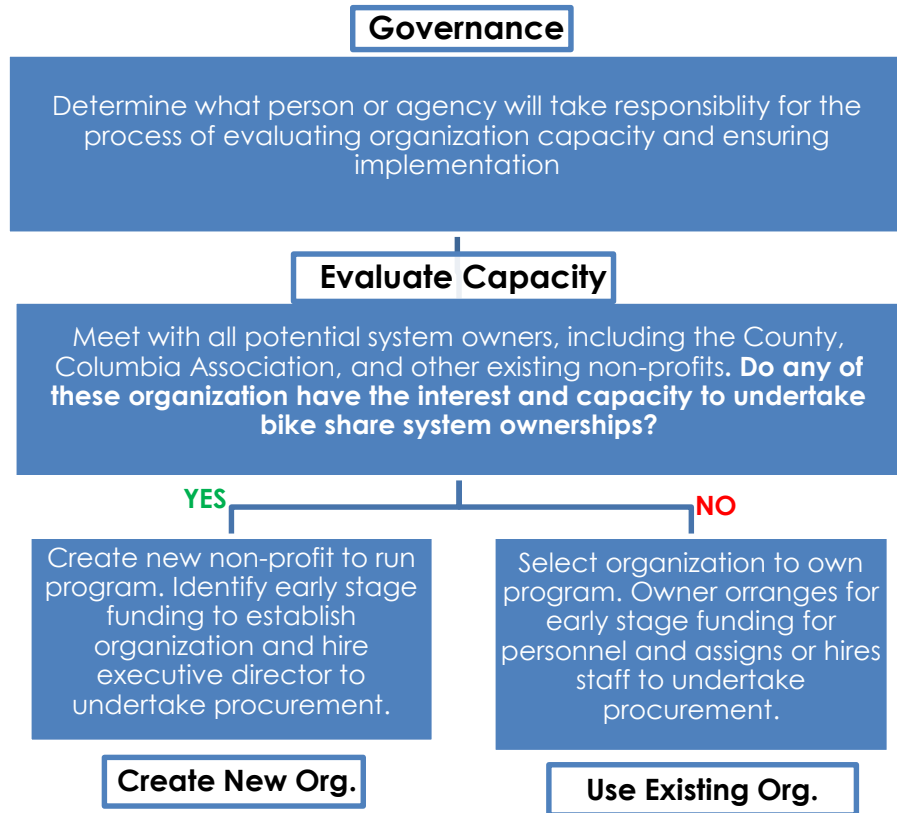


Figure 9 – Volunteers Build Bicycles for B-cycle Kansas City

STEPS IN DETERMINING SYSTEM OWNERSHIP

Based on this analysis, three of the four potential governance structures are viable options for Howard County - it is not recommended that a private bike share system be pursued because it is unlikely that the Howard County market could support a completely private system. To determine which option should be implemented, the process featured on **Figure 10** can be followed:

Figure 10 – Process to Identify Owner



The key step is the first one – an agency, person or other organization must take responsibility for determining system management and ownership. This organization must hold individual and group meetings to educate potential managing bodies and find the right “home” for the Howard County bike share system. Following are some key discussion points that should be highlighted during these meetings:

- Does managing a bike share system align with the key goals of your organization?
- Does your organization have similar programs that would help to bring some expertise into the procurement, contracting and management of a bike share system?
- Are there functions of your organization that could be leveraged to assist in bike share implementation, such as site planning and/or marketing?
- Does your organization have the interest and current capacity, or are you willing to create the capacity, to manage the bike share system?
- Are your attorneys comfortable that your organization's current insurance will cover any potential risks associated with managing a bike share system, and if not, are you willing to acquire additional insurance to protect from such risks?
- From a public perspective, is your organization interested in being the public face of bike share, and taking credit for its successes, and responsibility for its challenges?

It is possible that some organization may be interested in helping form a non-profit, or being a funding partner, but does not have interest in full management. It could be that this organization is an early-stage “home” for a non-profit before it becomes completely independent.

OPERATING MODEL

There are two common operating structures for bike share: direct operations and contracted operations (See **Table 6** for more details). A number of North American bike share systems are directly operated, meaning that the system owner also operates the system. Directly operated systems are most common among non-profit owned systems like Nice Ride in Minnesota, and for-profit systems like DecoBike in Miami. While direct operations allow the owner the greatest degree of control

and potentially lower operating costs, direct operations require system owners to develop extensive expertise in bike share operations.

An alternative is to outsource operations to a third party vendor. The responsibility of the vendor can vary but typically includes most of the day-to-day operating functions like maintenance, rebalancing of bicycles, and customer service. The benefit of contracted operations is that system owners with no prior bike share experience can quickly launch a system. Vendors help reduce the risk of rolling out a bike share system by bringing operating expertise to the program.

As with many aspects of business models for bike share, not all systems fall neatly within these two operating structures. For example, a system may contract out only limited operating functions like maintenance, or it can be directly operated by the system owner and have a bike share vendor support start-up.

Table 6 – Direct Operations vs. Contracted Operations

Model	Pros	Cons	Examples
Directly Operated	Provides the system owner greater control over system costs and delivery of bike share to the market.	Significantly increases the operational burden of bike share on the system owner. Requires that the operating entity have a degree of bike share expertise.	NiceRide Minnesota, Deco Bikes Miami
Contracted Operations	Reduces the risk borne by the system owner. Allows systems to rely on the expertise of vendors with nationwide experience. Minimizes owner staffing needs. Insurance requirements and liability can be transferred to vendor.	Owner removed from daily operations of the bike share system. Potential for higher costs because vendor profits account for a portion of operating costs.	Chattanooga Bicycle Transit System, Hubway (Boston)

As bike share is a quickly evolving industry, operating structures continue to evolve as well. The ideal operating model for Howard County will depend on the selected owner of the system. If the organization leading the bike share program has the proper capacity and expertise to run the system, direct operations may be feasible.

Based on initial assessment, **a vendor operated system is the more likely operating structure.** The county already utilizes this operating structure for its transit operations. Moreover, no organization has yet been identified to lead the system that has the experience necessary to run a bike share program. A directly operated program should not be ruled out if an organization with suitable interest and capacities is identified.

PROGRAM TECHNOLOGY

Bike share technology is rapidly changing as new companies continue to enter the North American bike share equipment market. Since the launch of Montreal's Bixi bike sharing system in 2009, most new systems have featured solar powered stations with automated docks that secure bicycles (see **Figure 11**). Users can typically track bicycle availability over a smart phone or online, and access bicycles through a payment device⁴ or at a station kiosk. These systems have proven successful because of their durability and theft deterring design. One major downside of many dock based bike share systems is that they are expensive to purchase and install.

Recently, a number of firms have begun introducing smart-bike systems and "dock-light" systems that utilize no docks or simplified docks. These systems feature smart-bikes with built-in locking and communication equipment (see **Figure 12**). Smart-bike systems benefit from lower capital costs, simplified station site planning and installation, and allow operators to more easily move equipment around. At the time of the writing of this report, smart-bike systems are still largely unproven in North America outside small scale private systems. In 2015, several systems are scheduled to launch with the smart-bike technology, including Coast Bike Share in Tampa and Hoboken and Weehawken, New Jersey, among others. See the Capital Cost section for a discussion on the cost differentials between a smart-bike and dock-based system.

⁴ Most often riders can access the system through an RFID-enabled membership fob/card but other technologies are available such as system access over the phone or through a NFC enabled device.



Figure 11 – Dock Based Bike Share System

It is recommended that the procurement process be as open as possible to allow for companies with different technology types to respond, as long as the systems meet the County's needs. Because of the rapid evolution in the marketplace, the system owner should be flexible in evaluating and selecting from a wide range of manufacturers and systems. The following is a list of proposed features that may be considered for the equipment to include:

- Durable design that is able to withstand heavy usage.
- Robust locking mechanism with secondary lock to allow riders to lock bicycles up during their journey, not just at stations. As the system will focus on longer recreational trips, riders will be more likely to make intermittent stops during their journey.
- Ability to pair stations with a payment kiosk. Kiosks will make it easier for walk-up customers to access the system.
- Simple user interface at kiosks, on the web, and on smart phones.
- Easily replaceable parts and components.



Figure 12 – Smart-Bike Bike Share System

As a community that prides itself in being family friendly, it is recommended that the County accommodate the needs of families with children in the proposed bike share program. In procuring an equipment vendor, the program owner may want to explore a solution that allows users to accommodate children. There are a few ways that the system can be made family friendly:

- Make the bicycles compatible with child carrying devices like trailers.
- Allow for the deployment of child-size bicycles at select locations.

This study's stakeholder team felt that due to current technology limitations, liability and safety concerns, it would only be feasible to provide child bicycles at staffed locations. Paris's Velib offers a model for making bike share more family-friendly. Child-size bicycles are available at staffed locations in city parks, with attendants enforcing helmet compliance (**Figure 13**). Therefore, a child programming aspect may be required for the operations vendor procurement.



Figure 13 – Velib's Child-Size Bicycles

FUNDING MODEL

Bike share programs rely on a diverse range of funding sources to support both capital and operating expenses. Based on data from comparable systems around the country, user fees are anticipated to cover less than 33 percent of operating expenses in Howard County. Public funding and private support through sponsorships, donations, and advertising will be necessary to meet the program's funding needs.

FEE STRUCTURE

Most bike share systems in North America utilize a subscription model of pricing, where users purchase memberships that are valid for periods of time ranging from one day to one year. Once a membership is purchased, a user is afforded an unlimited number of trips at no extra cost as long as the trip is below a certain timeframe, typically between 30 to 60 minutes. Once that timeframe has concluded, riders incur usage overage charges. The benefit of this model is that it encourages a quick turnover of bicycles and ensures that bicycles are available for the largest number of users each day. This pricing structure also benefits regular users,

as annual members become familiar with how the system works and are therefore less likely to take lengthy trips that incur additional usage fees.

There are a number of new pricing innovations in bike share. One possible pricing structure is to charge users a price per trip (either as a flat per trip price or per minute) instead of a subscription. Another is to allow subscribers a certain allotted number of free riding minutes each day that can be spread over multiple trips, instead of allowing unlimited trips under a certain length; this can be especially attractive if smart-bike technology is selected for the program as the user may be able to lock the bicycle somewhere without a station while the "clock is still ticking." Finally, to better moderate the distribution of bicycles throughout the system, variable pricing could be implemented to encourage riders to take trips against the peak flow or even uphill (Vélib in Paris gives a 15-minute time bonus when a user rides a bicycle from a lower to a higher elevation). This may be a good option as the county prepares to serve those areas of the County with more challenging topography.

As nearly all North American bike share systems rely on the subscription model, there is a lack of data to analyze how different pricing models and price points would impact user demand. Overall, there seems to be an upward trend in system pricing, with many newer systems charging more for subscriptions than earlier programs such as Capital Bikeshare and NiceRide MN. The higher price points at programs like CitiBike do not appear to impact demand.

While annual subscriptions have been the most popular membership type among bike share systems, changing the pricing model to monthly payments might make the system more attractive to users while also allowing the program owner to increase subscription revenue. People are accustomed to making transportation decisions on a monthly basis, from monthly car lease payments to monthly transit passes. A high one-time annual fee may be a barrier to entry, but users may be willing to pay the same or more annually for a bike share membership if billed on a monthly basis.

The subscription model used by many bike share systems can also be difficult for users to understand. Many systems use an escalating fee structure that can cause users to quickly rack-up very high fees. Complicated fee structures can discourage a person from using a system all together and penalize most riders who are new to the bike share

program. Many newer systems have simplified their fee structures from the escalating usage fees charged by Capital Bikeshare or Hubway.

The Howard County program should devise a fee structure that best fits the anticipated rider profile of the system. As a health and recreation focused system, bike share in the County will likely attract a larger proportion of casual users than more commute-oriented systems. The pricing model should be easy to understand for walk-up users making the spur of the moment decision to use a bicycle. Furthermore, as families will be an important demographic to attract to bike share in Howard County, the program should explore offering family memberships, or single trip discounts for the children or spouse of an annual member.

Many bike share systems generate much more revenue per trip from casual users than annual members. In the peers explored in this study however the reverse was true; annual members took on average fewer than 20 trips a year. The final fee structure should equitably distribute costs by member type. Overpricing annual membership compared to casual memberships will eliminate the incentive to become a bike share member. Overpricing casual memberships will make spur of the moment trips less attractive and potentially alienate new customers.

RECOMMENDED PRICING MODELS:

It is recommended that the County explore implementing one of two pricing models: a subscription or per trip pricing scheme. **Table 8** shows the suggested price points for each model. The subscription based pricing model is based on competitive rates seen in other peer programs (See **Table 7**). The trip based pricing model is calculated to achieve a similar cost recovery as the membership model⁵. Both models allow for 60 minutes of ride time before users have to pay additional usage fees, a longer period than the 30 minutes of ride time offered by most peer bike share programs (the Financial Projections section provide a more detailed discussion on how user revenue is calculated).

Subscription-Based Model

The first option for Howard County is to implement a subscription based pricing model like those found in most North-American bike share programs. The subscription based model may charge users a flat fee for

every 30 minutes of additional ride time over 60 minutes, as opposed to the escalating fees charged by systems like Capital Bikeshare. Escalating fee structures can be confusing to customers and can lead to novice users being charged exorbitant fees.

Table 7 – Pricing Structure of Sample North American Bike Share Systems

	Capital Bikeshare	Greenville B-cycle	San Antonio B-cycle	Columbus CoGo	Tampa Coast Bikeshare
Annual Membership	\$75	\$60	\$80	\$75	\$79
Short Term Memberships	\$7 for 24-hour membership	\$5 for 24-hour and \$15 weekly	\$10 for 24-hour and \$24 weekly	\$6 for 24-hour pass	\$5 per hour
Other Memberships	\$15 for a three day; \$25 dollars for a one month				\$30 monthly
No-Fee Period	First 30 minutes of a trip	First 60 minutes of a trip	First 30 minutes of a trip	First 30 minutes of a trip	Members receive 60 minutes of free riding per day
Overage Fee Structure	Fees escalate each additional hour from \$1.50 to \$94.00	\$4 per each additional half hour	\$2 per each additional half hour	\$3 per each additional 30 minutes	\$2.50 per 30 minutes

In this model, the fees have been priced as follows: A \$5 daily subscription, \$75 annual subscription, and usage fees of \$5 for every additional 30 minutes of ride time over the allowed 60 minutes. Howard County may choose to provide other membership types like multi-day and monthly passes.⁶

“Pay as You Go” Pricing:

The second model is to develop per trip pricing for bike share in Howard County. In this model riders could still purchase an annual subscription that allows for unlimited trips under 60 minutes. Casual riders however

⁵ Both pricing models assume the same ridership and split between annual and casual memberships. Data is unavailable on how the different pricing structure would impact ridership.

⁶ These options have not been modeled out as in peer cities they make a small percentage of total revenue.

would not be required to purchase a short-term membership and could instead pay a standard rate based on how long their trip is.

In order to make up for the reduced revenue from eliminating casual subscriptions, the program would need to charge at least \$3 per 30 minutes of ride time (e.g. 10 cents per minute)⁷ based on the revenue model detailed in **Section 6**. The high hourly cost is due to riders being charged the same rate regardless of how long their trip is. In the subscription model, the average rider would incur an estimate \$2.25 per trip in usage fees.

Table 8 – Example Pricing Across to Models to Achieve Comparable Cost Recovery

	Subscription Model	Pay As You Go Model
Casual Membership	\$5	10 cents a minute / \$3 per half hour
Casual Usage Fees	\$5 per 30 minutes (over 1 hour)	none
Annual Membership	\$75	\$75
Annual Usage Fee	\$5 per 30 minutes (over 1 hour)	10 cents a minute / \$3 per half hour
Allowable Fee-Free Ride Time	60 minutes	60 minutes (members only)

ADDITIONAL PRICING OPTIONS

Howard County may also consider developing special subscription options to target particular user markets:

- **Student Passes:** Howard County Community College is a major potential generator of bike share trips. The system could partner with the college to provide students access to the system through a bulk pass or discount pass program. In this model the college would purchase a bulk block of subscriptions at a reduced rate that than can be passed on to students.
- **Family Memberships:** Families should be accommodated in Howard County's pricing scheme. The program could offer special family memberships that cover multiple users at a discount to purchasing the same quantity of individual memberships.

⁷ Data was not available to study the projected difference in a per minute pricing vs. pricing in 30 minute cohorts. While the model assumes the overall revenue would be the same, real-world revenue could differ based on typical ride times (i.e. if a large number of riders are taking trips just over the half hour mark)

- **Corporate Pass Program:** The program should strive to sell discounted bulk passes to major employers. A strong corporate pass program will ensure a stable source of revenue and potentially grow the user base of bike share riders.
- **Developer / Housing Association Partnerships:** The bike share program should explore partnering with local developers or Columbia Association to provide new residents discounted or complimentary passes. Such a program could be billed both as a residential amenity and a way to farther promote bike share among residents.

PUBLIC FUNDING

County, state, and federal funds are all important sources of funding for bike share. Like all modes of public transportation, bike share usually relies on public support for operations and/or capital funds. Communities choose to subsidize bike share for various economic, mobility, and public health benefits.

Because of limitations on using federal funds for ongoing operations, state and local funding is more commonly used to cover operating expenses. Federal funding for bike share typically comes from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) and is used to cover capital expenses; many systems have relied on Congestion Mitigation and Air Quality (CMAQ) funding. Different restrictions apply depending on which federal agency funds are sourced from. For example, FTA funds may only be used for docks and other equipment but not for the bicycles themselves. Moreover bike share projects are only eligible for FTA funds if they have a *de-facto* relationship to transit within three miles. FHWA funds have fewer restrictions and grant revenue can be used to purchase bicycles as well as other equipment.⁸

When utilizing federal funds additional restrictions may apply. FHWA and FTA funds are subject to *Buy America* regulations, which ensure that transportation projects are built with American-made products. Capital equipment funded through FHWA Buy America requirements stipulate that the product must be produced with at least 90 percent domestically made steel or iron content. FTA Buy America restrictions go even further

⁸ Frequently asked Questions and Answers concerning Bike Sharing Relative to the United States Department of Transportation available online at: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/faq_bikeshare.cfm, as of May 13, 2014.

and require each end product and its components be assembled in the United States.

In securing state and federal grants, Howard County may consider partnering with other bike share operators in Maryland. A regional bike share grant could be more competitive than a single application and allow Howard County to share the time and effort in developing a grant application. Federal discretionary grant programs like TIGER in the past have looked favorably on regionally-coordinated submissions.

Finally Howard County has the unique opportunity to participate in federal funding associated with transportation demand management at Fort Meade, in Anne Arundel County. The Fort is exploring the implementation of bike share as a means to connect employees to nearby destinations and public transportation, including the Savage MARC station in Howard County.

PRIVATE FUNDING

Private funds can include a range of sources such as advertising, sponsorship agreements, and charitable donations. Sponsorship agreements have the potential to be a major funding component for the County. As bike share is a relatively new mode of transportation, no best practice has been established for valuing and securing sponsorships. To date, every system has developed a distinctive sponsorship strategy, from large commercial title sponsorship agreements to funding arrangements with non-profit partners. To meet the program's fundraising targets, the Howard County bike share program will have to explore a mix of sponsorship strategies, from engaging the county's non-profit institutions to bringing in corporate sponsors to help fund the system in exchange for branding rights.

During the development of this study, the study team met with the Howard County Economic Development Authority, Howard County Tourism, and representatives from local non-profits, to better understand the local sponsorship market. Participants saw value in the program, especially its ability to connect activity generators like Downtown Columbia and the Howard Community College. The discussion gave the study team a better perspective of the type of sponsors the program can work to pursue.

Overall Howard County is a unique sponsorship market compared to its peers. The County has a strong employment base built around technology, government services, and healthcare. The County is also home to a number of potential non-profit partners such as Columbia Association and Horizon Foundation. However, the County faces a number of challenges in raising private funding for bike share. The existing sign regulations limit the brand and marketing opportunity of system or station sponsorship, and make the task of valuing sponsorship space more challenging. While the County is fortunate to have a strong corporate base, many major employers may not have an interest in local marketing and brand promotion. Finally sponsorship and advertising revenue is location driven; the overall lack of foot traffic in the county compared in an urban setting, compounded by placement of stations in non-commercial areas may impact the amount of private revenue the system can raise.

TITLE AND PRESENTING SPONSORSHIP

Exclusive title sponsorship is a valuable, but rare, type of sponsorship revenue source. The sponsorship contract should last for multiple years, capturing the full value of brand exposure at program launch and over time. A title sponsor will likely require a certain degree of branding exclusivity, with stations and bicycles featuring a company logo or color scheme.

A title sponsor may agree to allow other sponsors on a limited basis. For example in New York City, although Citibank is the overall system sponsor, MasterCard contributes sponsorship funds to be the official payment partner, and station payment consoles all feature the MasterCard logo. In Salt Lake City, Select Health is the presenting sponsor for GreenBike, but Rio Tinto has naming rights for the bike baskets.

Companies may also be attracted to title sponsorships as a philanthropic investment in their community, or as a means to increase brand exposure in the market. Early bike share systems approached sponsorships from a largely philanthropic perspective.

As mentioned above, however, title sponsorships are rare. A more common and more likely scenario for Howard County is a presenting sponsor. In these systems, branding is already developed, e.g., the bright colored bicycles and the name Nice Ride Minnesota in Minneapolis. A single sponsor (such as in Minneapolis or Boston) or multiple sponsors (such

as in Montreal) purchase the right for system-wide logo placement, typically on all bicycle fenders or at all stations, and may negotiate for other sponsorship elements. In Minneapolis, Charlotte and Chicago, Blue Cross Blue Shield has their logo and colors on every bicycle fender as well as placement on the program website and other media. However, other sponsorship opportunities are available to other organizations and bicycle and station sponsors can augment larger presenting sponsors.

The success of sponsorship agreements around the country suggest that sponsorships are much more lucrative when sold as a marketing and brand exposure tool than simply a philanthropic investment in the community. The challenge for Howard County is two-fold however:

- Existing sign restrictions limit the extent of branding on bike share assets. The program will have to provide a sponsor suitable branding opportunities without violating signage regulations.
- Many major employers in the County are involved in industries such as security and government contracting that do not have a need for local brand exposure.

The County may have to look beyond the largest local employers to find organizations with both the means to support a major sponsorship and enough interest in building brand awareness in the community. The healthcare industry is a potential target for sponsorships as health expenditures and marketing are largely local; health insurance companies are the most common corporate sponsors among peer bike share systems.

Assigning a value to title and presenting sponsorships is very challenging as sponsorship values vary widely among other systems. The County faces challenges to obtaining a major sponsorship but also has a number of strengths. With strict outdoor advertising restrictions, there are limited competing outdoor marketing opportunities in the community. Furthermore as one of the nation's wealthiest counties, Howard County is a very lucrative market. See **Table 9** for a list of sample sponsorship figures nationwide.

STATION OR BICYCLE SPONSORSHIP

Station sponsorships are another very common type of sponsorship agreement. With a station sponsorship an organization may agree to fund the capital costs and/or operating costs of a new bike share location. Before selling station sponsorships, the system owner should specify the exact assets to which a station sponsor will have access and/or rights to. To date, most exposure for station sponsorship is limited to the map panel of the station so it does not clash with the title sponsor branding. Some systems, instead of providing station sponsorships, allow organizations to sponsor bicycles, such as SLC GreenBike, where Rio Tinto has sponsored every bicycle.

Table 9 – Example Sponsorship Agreements

Organization	Value	Extent
Bike Share Systems		
Greenville B-cycle & Greenville Health System (Greenville, SC)	\$60,000 per year	6 stations
Spartanburg B-cycle (multiple philanthropic partners)	\$455,000 in capital support	4 stations
Divvy & Blue Cross Blue Shield of Illinois (Chicago)	\$12.5 million total over 5 years	300 stations
Denver B-cycle (Multiple Partners)	\$20,000 to \$30,000 per agreement for a total of \$603,000 in 2012	82 stations in system. Sponsorship for bicycles
Transit Sponsors		
SEPTA AT&T Station (Philadelphia)	\$5 million over 5 years	Serves the city's three major league stadiums
CTA North/Clybourne Street Station (Chicago)	\$3.9 million over 10 years	Exclusive advertising deal with Apple Inc.
Sports Facility Sponsors		
Criswell Automotive Field at Kelly Park (Gaithersburg, MD)	\$140,000 over 5 years ⁹	

Station sponsorships have been used by a large number of North American bike share programs. They allow organizations to participate in the expansion of bike share by funding the purchase and installation of new stations. A major challenge is to secure operations funding along with capital sponsorship. Over time, operating costs present a greater fundraising need than capital, yet most companies are hesitant to make

⁹ Carignan, Sylvia Criswell Automotive sponsorship deal funds Kelley Park ballfield improvements. Gazette.net <http://www.gazette.net/article/20130614/NEWS/130619387/1080/criswell-automotive-sponsorship-deal-funds-kelley-park-ballfield&template=gazette>

multi-year financial commitment as budgets are re-assessed on an annual basis.

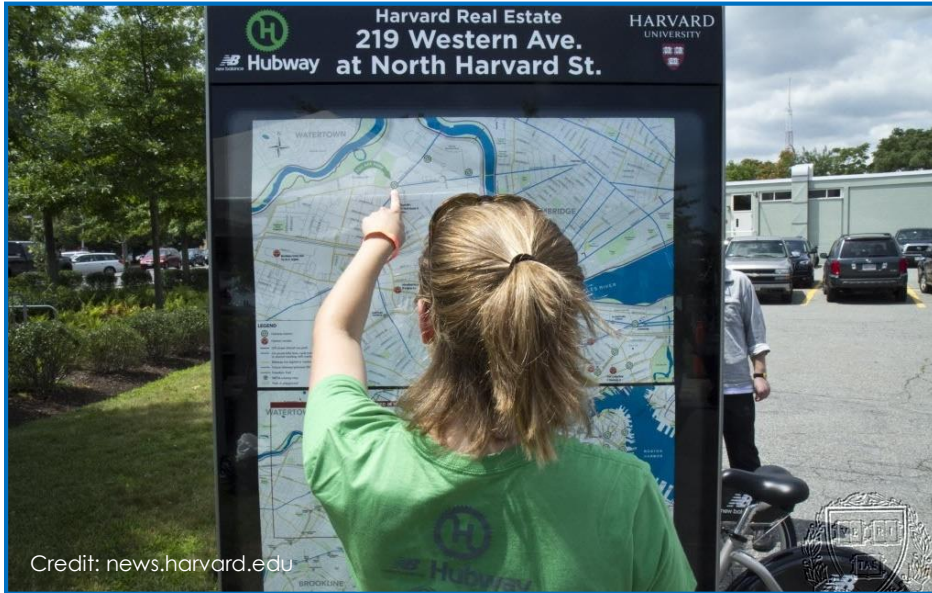


Figure 14 – Station Sponsorship at Harvard University

ADVERTISING

Advertising revenue varies greatly depending on the community. Outdoor advertisers typically price advertising space based on a number of factors such as traffic counts, the visibility of the location, and the demographic profile of the surrounding community. While the most valuable advertising space is on the stations themselves, Howard County

will likely only be able to sell advertising space on bicycles, as station advertising would violate existing signage and off-premise advertising restriction in the county. True on-bicycle advertising is rare, are more often systems sell branding opportunities (bicycle sponsorships) in-lieu of advertising.



Figure 15 – Sponsored Bicycles at B-cycle Austin

6. FINANCIAL AND RIDERSHIP PROJECTIONS

The following section presents detailed financial projections for the Howard County bike share system. These figures are based on assumptions and actual rates may vary depending on a number of factors. Bike share costs can be divided into a capital and operating budget. The capital budget covers any expenses for equipment, parts, site planning, installation, and launch costs. The operating budget includes all day-to-day expenses, including administration, marketing, and operating fees paid to the vendor or vendors. The financial figures here represent year of expenditure dollars with an assumed inflation rate of 3 percent per year.

ASSUMPTIONS

CAPITAL COST ASSUMPTIONS

Equipment Costs: The capital costs in this budget were developed assuming a dock-based bike share system. The capital costs are expected to be approximately \$47,500 per bike share station, including ten bicycles. In addition to these costs, the model allocates money to purchase upfront spare parts for equipment and bicycles.

Installation: Capital costs also assume that every station will incur installation and site planning fees. Ten percent of stations are projected to require the construction of a concrete pad or incur additional siting fees to obtain private easements.

Start-Up: The system will require start-up costs, including the procurement of equipment, vehicles, warehouse space, and other miscellaneous start-up expenses. The plan estimates that start-up expenses will cost \$725 per bicycle and will be incurred in the 12 months preceding a particular phase.

State of Good Repair: Finally, the cash flow model takes into account long-term state of good repair (SGR) costs. It is assumed that bicycles will

need to be replaced every five years while all other equipment will need replacement ten years from its installation. State of Good Repair costs are not incorporated into the annual operating or capital cost projections, and are treated as a stand-alone cost.

OPERATING COST ASSUMPTIONS

Operating costs are based on an assumed cost of \$75 per dock per month. Operating costs tend to vary considerably across peer systems. The team's cost assumptions are based on actual budget or projected operating costs per dock from 8 systems, ranging from \$55 (Nice Ride MN) to \$107 per dock (Boulder B-cycle).¹⁰ In addition to operating costs, the model assumes administrative costs of approximately \$81,750 per year in in Phase 1, and \$108,000 in Phase 2.¹¹

Administrative costs include \$3,000 per year in general supplies, such as printing and assume no additional cost for administrative space or utilities. The financial model includes higher than average assumptions for marketing, with the total budget calculated on a per bicycle basis (\$250/bicycle). This equates approximately to 10-11 percent of the annual marketing budget depending on phase. This higher marketing budget was programmed to support an aggressive equity and outreach strategy.¹²

SYSTEM REVENUE ASSUMPTIONS

Ridership: The ridership and thus user-fee operating revenue is projected by a dynamic model based on estimated ridership rates by phase, time of year, and membership type (24-hour or annual, although other short-term membership options will likely be offered)¹³.

User Revenue: Although it is recommended that Howard County consider other membership and pricing structures, this model has used the standard membership structure to project revenues and ridership. Data

¹⁰ The four peer systems profiled in the feasibility study had an even wider spread of costs, ranging from approximately \$15.50 per dock per month for Spartanburg B-Cycle to over \$117 at Capital Bikeshare. Capital Bikeshare has a higher cost structure because the system overall has ridership and before higher unit costs to operate the system.

¹¹ These costs are in FY2014 dollars. Actual year of expenditure admin costs will be higher because of inflation. The Pilot costs represent 0.75 FTE of labor plus \$3,000 in supplies (assumes \$70,000 cost for salary plus a 50% overhead for benefits). This increases to 1 FTE at the start of Phase 2.

¹² National average is 2.6% (Shaheen et. al. 2014) of program operating budget but most programs rely on a shoestring marketing budget.

¹³ Other membership lengths not included in model because of lack of adequate peer data. Overall these memberships account for only a small share of total ridership and revenue in most systems.

on ridership rates and user split were derived from the four peers examined in detail in this plan.¹⁴ User fee increases will track inflation and occur every three years.

Ridership is projected based on a rate of 0.25 trips/bike/day (the four peer average rounded to the nearest twentieth) and will vary by season and increase over time.¹⁵ For the initial phase 1A, the ridership rate is adjusted up by 50% to account for the concentration of key destination in that phase. The model anticipates an even split between casual and annual membership users. The user-fee model is based on the membership fee structure described earlier, and overage fees assumed in this model are based on the distribution of trips by duration observed in Capital Bikeshare, Hubway, and Nice Ride.¹⁶ The revenue model accounts for the suppressed ridership rate during Year One due to the need to ramp up memberships. An additional year-over-year ridership gain of 5 percent over the first six years of operations is assumed.

Advertising: The system also assumes the sale of on-bicycle advertising/branding revenue. The model assumes 50 percent sale rate at \$168 per bicycle per year.¹⁷ To be conservative, the model assumes that the program will not sell all advertising/sponsorship space available.

CAPITAL COSTS

Implementing the Phase 1 and Phase 2 of the proposed Howard County bike share system is estimated to cost \$2.62 million in year of expenditure dollars (see **Table 10** and **Table 11**). The largest and most expensive phase to implement is Phase 1A, which includes 14 stations.

These costs assume a traditional dock based system. Smart-bike systems generally are lower cost than dock-based systems, however costs vary depending on the technology selected, number of kiosks, number of customized bike racks and final specifications. Smart-bike systems with no fixed station infrastructure are expected to cost less than half the costs of a dock based system. The inclusion of basic station infrastructure and a payment kiosk increases the capital costs to around two thirds the cost of a dock based system.

¹⁴ Capital Bikeshare (Montgomery County only), Greenville B-Cycle, Spartanburg B-Cycle) and Bay Area Bikeshare (Excluding San Francisco)

¹⁵ Year broken into peak (March 1 – October 31) and off peak seasons. Peak ridership set to 0.33 trips/bike/day and off peak to 0.165 trips/bike/day. 5% year on year rider escalation. Year one ridership 80% of base level. 50/50 splits between annual and casual members.

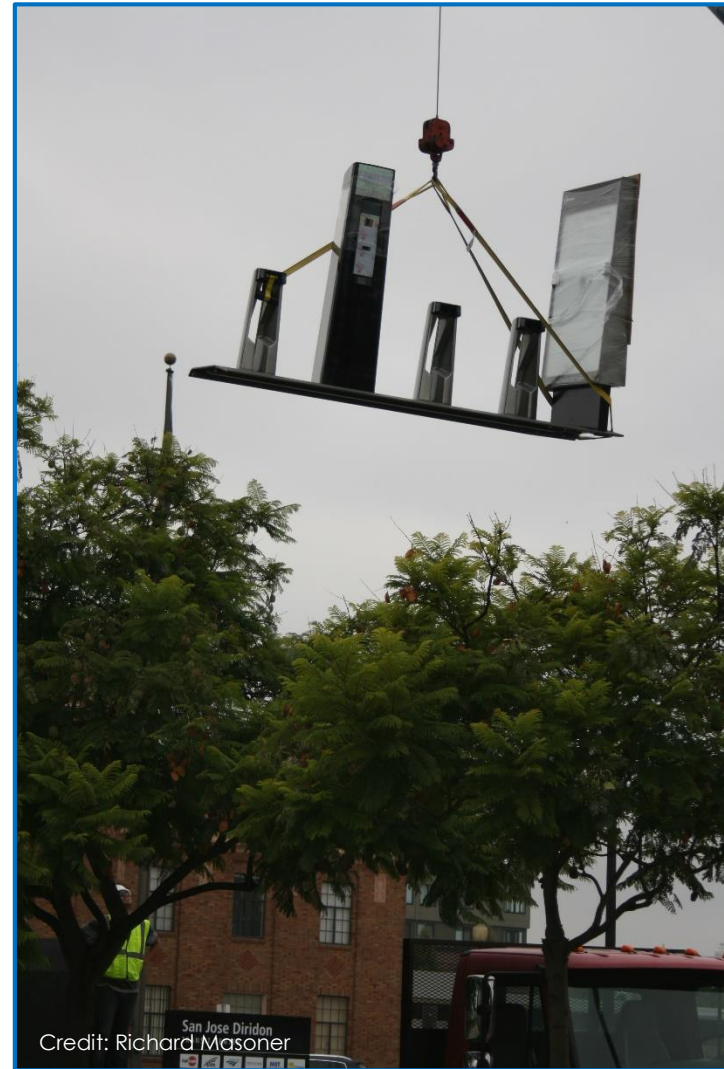


Figure 16 – Station Installation in San Jose

¹⁶ These systems were examined as they provide detailed trip data that can be used to calculate average trip duration by time cohort.

¹⁷ On bicycle advertising space difficult to calculate as most systems sell bicycle branding as part of a sponsorship deal. Costs based on Fort-Worth B-Cycle annual advertising rates.

STATE OF GOOD REPAIR COSTS

In addition to the cost of new capital, the system should prepare for future equipment replacement and state of good repair costs. The model assumes replacement and maintenance costs will fluctuate based on the average fleet age (**Figure 17**). Bicycles are expected to last five years with proper maintenance, leading to a significant increase in replacement capital needs in year six. In addition, payment kiosks and other station infrastructure will need replacement every 10 years.

As bike share is such a new mode, there is limited experience among operators in state of good repair management. Only a handful of systems have equipment that is five years or older. Most systems choose to deal with replacement costs incrementally as they arise. The downside of this strategy is that bike share operators are not actively preparing to keep pace with equipment replacement costs.

On an annualized basis, replacement costs are approximately \$7,600 per station, assuming the funds are invested in an interest bearing account

before being obligated in the year of need¹⁸. Actual state of good repair costs may vary depending on real-world equipment lifespan.

OPERATING COSTS AND RIDERSHIP

Operating costs will start one year prior to the launch to account for the pre-launch administrative costs of setting up the program. In its first year, the program is expected to recover 23 percent of its operating costs from advertising and user revenue; the cost recovery ratio is anticipated to increase by Year Three to 29 percent. By the sixth year of operations, the cost recovery ratio is projected to be 31 percent. This rate puts it slightly below the cost recovery rate of profiled peer bike share systems like Spartanburg B-cycle and Greenville B-cycle. By comparison farebox recovery at Howard Transit is 10 percent.¹⁹

Ridership is projected to grow in conjunction with the expansion of the system, with annual ridership in the first year at approximately 13,400 and increasing over time to 50,400 in FY2022.

See **Table 12** for detailed operating and ridership projections.

Table 10 – Capital Costs by Phase

Phase	1A	1B	1C	1Flex	2: Satellite Laurel	2: Satellite Ellicott	2: Satellite Flex	Total
Year	FY17 (Yr 1)	FY18 (Year 2)	FY18 (Year 2)	FY19 (Year 3)	FY20 (Year 4)	FY20 (Year 4)	FY20 (Year 4)	
New Stations	14	7	3	2	4	4	2	36
New Bicycles	140	70	30	20	40	40	20	360
New Stations and Bicycles Costs	\$662,000	\$341,000	\$146,000	\$100,000	\$207,000	\$207,000	\$103,000	\$1,766,000
Site Planning and Installation Costs	\$59,000	\$30,000	\$13,000	\$9,000	\$18,000	\$18,000	\$9,000	\$156,000
Start Up and Parts Costs	\$127,000	\$66,000	\$28,000	\$19,000	\$40,000	\$40,000	\$20,000	\$340,000
Total	\$848,000	\$437,000	\$187,000	\$128,000	\$265,000	\$265,000	\$132,000	\$2,262,000

¹⁸ This rate is calculated based on the projected state of good repair (SGR) needs over the first 15 years of the plan, and is set so that the SGR balance never falls below \$0. Assumes 2% returns on unused funding balance per year.

¹⁹ National Transit Database, 2012

Table 11 – New Capital Costs by Year

Fiscal Year	Pre-Launch Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
New Stations / Year	0	14	10	2	10	0	0	36
New Bicycles	0	140	100	20	100	0	0	360
New Stations and Bicycles Costs	\$0	\$662,000	\$487,000	\$100,000	\$517,000	\$0	\$0	\$1,766,000
Site Planning and Installation Costs	\$0	\$59,000	\$43,000	\$9,000	\$46,000	\$0	\$0	\$156,000
Start Up and Parts Costs	\$102,000	\$101,000	\$34,000	\$83,000	\$20,000	\$0	\$0	\$340,000
Total	\$102,000	\$822,000	\$564,000	\$192,000	\$583,000	\$0	\$0	\$2,262,000

Figure 17 - Projected State of Good Repair Costs over 15 years

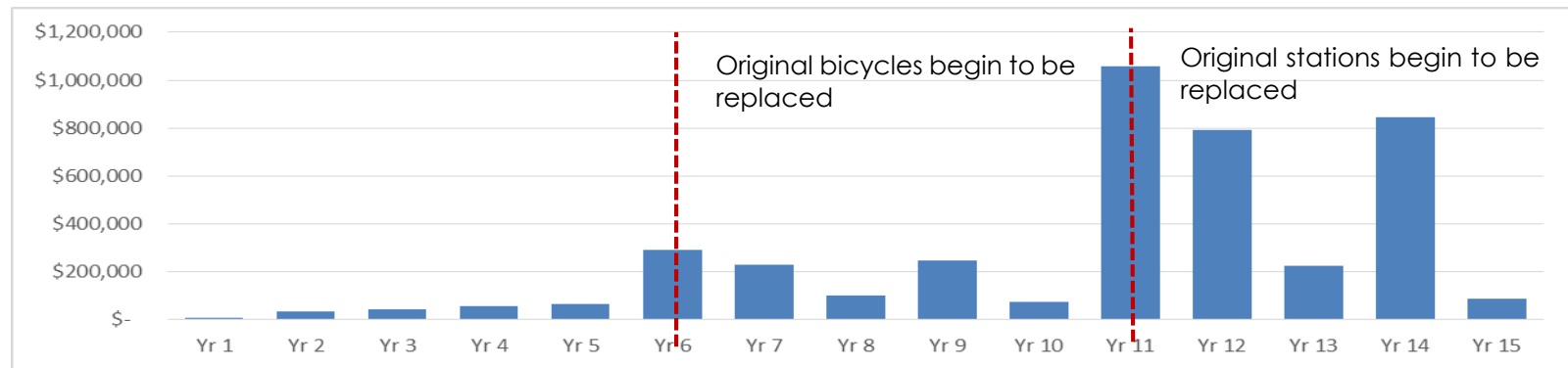


Table 12 – Operating Cost and Ridership Projections

Fiscal Year	Pre-Launch Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Stations	0	14	24	26	36	36	36
Bicycles	0	140	240	260	360	360	360
Ridership							
Registered Users	0	6,700	13,800	17,500	21,200	24,000	25,200
Casual Members	0	6,700	13,800	17,500	21,200	24,000	25,200
Total Ridership	0	13,400	27,600	35,000	42,400	48,000	50,400
Revenue							
Membership Fees							
Registered	\$0	\$34,000	\$69,000	\$94,000	\$116,000	\$131,000	\$138,000
Casual	\$0	\$21,000	\$43,000	\$59,000	\$72,000	\$82,000	\$86,000
Usage Fees							
Registered	\$0	\$1,000	\$1,000	\$2,000	\$2,000	\$3,000	\$3,000
Casual	\$0	\$12,000	\$26,000	\$35,000	\$43,000	\$48,000	\$51,000
Advertising	\$0	\$10,000	\$19,000	\$24,000	\$31,000	\$34,000	\$35,000
Total Revenue	\$0	\$78,000	\$158,000	\$214,000	\$264,000	\$298,000	\$313,000
Operating Costs							
Daily Operations	\$0	\$216,000	\$398,000	\$505,000	\$658,000	\$751,000	\$774,000
Administration	\$82,000	\$84,000	\$87,000	\$118,000	\$122,000	\$125,000	\$129,000
Marketing	\$0	\$36,000	\$64,000	\$71,000	\$101,000	\$104,000	\$107,000
Total Operating Costs	\$82,000	\$337,000	\$548,000	\$694,000	\$881,000	\$981,000	\$1,010,000
Cost Recovery Ratio²⁰	N/A	23%	29%	31%	30%	30%	31%
Operating Deficit/Surplus	-\$82,000	-\$259,000	-\$390,000	-\$480,000	-\$617,000	-\$683,000	-\$697,000

²⁰ Cost recovery of Howard Transit and Maryland Transit Administration is 10 percent and 23 percent respectively.

7. EQUITY AND MARKETING

Bike share systems today are faced with a significant equity gap. Bike share's early adopters have been disproportionately white, young, and well educated. The challenge is to expand the appeal to a more diverse group of users. Programs across the country are making a concerted effort at reaching what this study calls *Low-Participation Populations*, a broad group that can include:

- People over 45 years of age or under 18 years of age
- Minorities
- People with Limited English Proficiency (LEP)
- Low-income households
- Women (all ethnicities)

The challenge of closing the equity gap is two-fold. Bike share systems need to address barriers that exclude certain people from the program, while also focusing on making a more targeted effort to market the program to a broader population.

To meet the objectives set out for this program, Howard County will need to work at closing the equity gap. Fortunately the County can look at examples from other bike share programs and the transit industry at-large, as the challenges of equitably engaging diverse populations is not one unique to bike share.

EQUITY POPULATIONS IN HOWARD COUNTY

The first step in developing a successful equity strategy is to understand the demographics of Howard County and the bike share service area. Howard County is a diverse community. Forty one percent of county residents are minorities (non-White, excluding White Hispanics) and the county has a higher proportion of foreign born residents (18 percent) than the state as a whole (13 percent). Considering the number of foreign born residents, the percentage of the population that reports speaking English "less than well" is low (**Table 14**). No single language dominates among LEP residents. Five languages (Spanish, Chinese, Korean, Urdu, and Vietnamese) account for approximately 70 percent of the population that speaks English less than well.²¹

²¹ All demographic data from US Census, American Community Survey, 2008-2012



Figure 18 – People for Bikes Showing Diversity in Bike Share Marketing

Among the different demographic characteristics related to lower bike share usage, three factors are especially prevalent: minority population, population over 45 years of age, and population under 18 years of age. The demographic breakdown of the County along with the proposed

location of stations, help to define what the focus of Howard County's equity policies should be.

Foremost should be a focus on creating a bike share community that appeals to the County's diverse population. The bike share service area is focused on a part of the County that has above average clusters of low-income, LEP, and minority residents. Strategies should be focused on overcoming cultural and other barriers to bike share use through marketing and outreach. While the community does not feature a high concentration of low-income residents overall, portions of the service area (**Table 13**) have above average concentrations of low-income residents. Moreover, as stations will be located in major regional destinations, it is recommended that the County focus on making the program accessible to people across the region regardless of place of residency.

Age is also another major barrier to bike share usage. The County has nearly twice the percentage of people below 18 years of age, yet an average age that is five years greater than Washington, DC. Addressing age-based equity concerns will require a number of strategies, from making the system more family-friendly, to ensuring the County's bicycle network is perceived as safe by older adults.

Table 13 – Prevalence of Low-Participation Populations by Characteristic²²

	Total	Low-Income	LEP	Minority	Over 45	Under 18
Count	288,676	20,619	21,156	117,823	113,997	74,301
Percent of Total Pop.	(x)	7%	7%	41%	39%	26%

The distribution of low-participation populations in Howard County are displayed in maps (**Figures 19-24**) below. A map displaying the index of combined prevalence of low-participation populations for bike share was also developed for this study. This index combines measures for low-income, LEP, minority, over 45, and under 18 to identify where the highest concentration of low-participation populations are located. As Census data does not cross-tabulate between these categories, each census block was assigned a score of one to four for each demographic

characteristic based on that demographic feature's quintile (e.g. if a census block group is in the 78th percentile for poverty rate countywide, it received a four for that characteristic). The scores were summed across the five attributes for an index that ranges from 4 to 20.

Table 14 – LEP Populations by Language Group²³

	Spanish	Indo-European	Asian-Pacific Islander	Other
Count	5,225	4,976	10,062	893
Percent of Total Pop.	2%	2%	3%	0%
Percent of LEP Pop.	25%	24%	48%	4%

ADDRESSING BARRIERS TO USE

A number of barriers to use may potentially impact bike share ridership in the County. Some of these barriers are directly related to the provision of service, while others relate to the existing cycling environment in the County. In creating a holistic equity strategy, it is recommended that the County work to address the following barriers:

PAYMENT AND COST BARRIERS

One of the primary barriers to bike share use is the requirement that users have a credit or debit card to access the system. Many low-income households account for the largest share of unbanked households, meaning that they do not have access to a bank account, credit cards or debit cards²⁴.

Bike share systems have worked to overcome the barrier presented by credit card requirements. In Washington, DC, Capital Bikeshare partners with BankOnDC, an organization that provides access to financial services for unbanked individuals, in order to get bike share riders a bank account and discounted bike share membership. The City of Philadelphia has proposed waiving the credit card requirement for some users; to ensure that riders will be held responsible for bicycles, the City is working to recruit trusted community partners that have an existing relationship with deposit-free riders.

²² American Community Survey, 2008-2012

²³ American Community Survey, 2008-2012

²⁴ Federal Reserve Bank of St. Louis Reaching the Unbanked and Underbanked.

<https://www.stlouisfed.org/publications/cb/articles/?id=2039>

Figure 19 – Proportion of Population Below 150% of the Federal Poverty Line

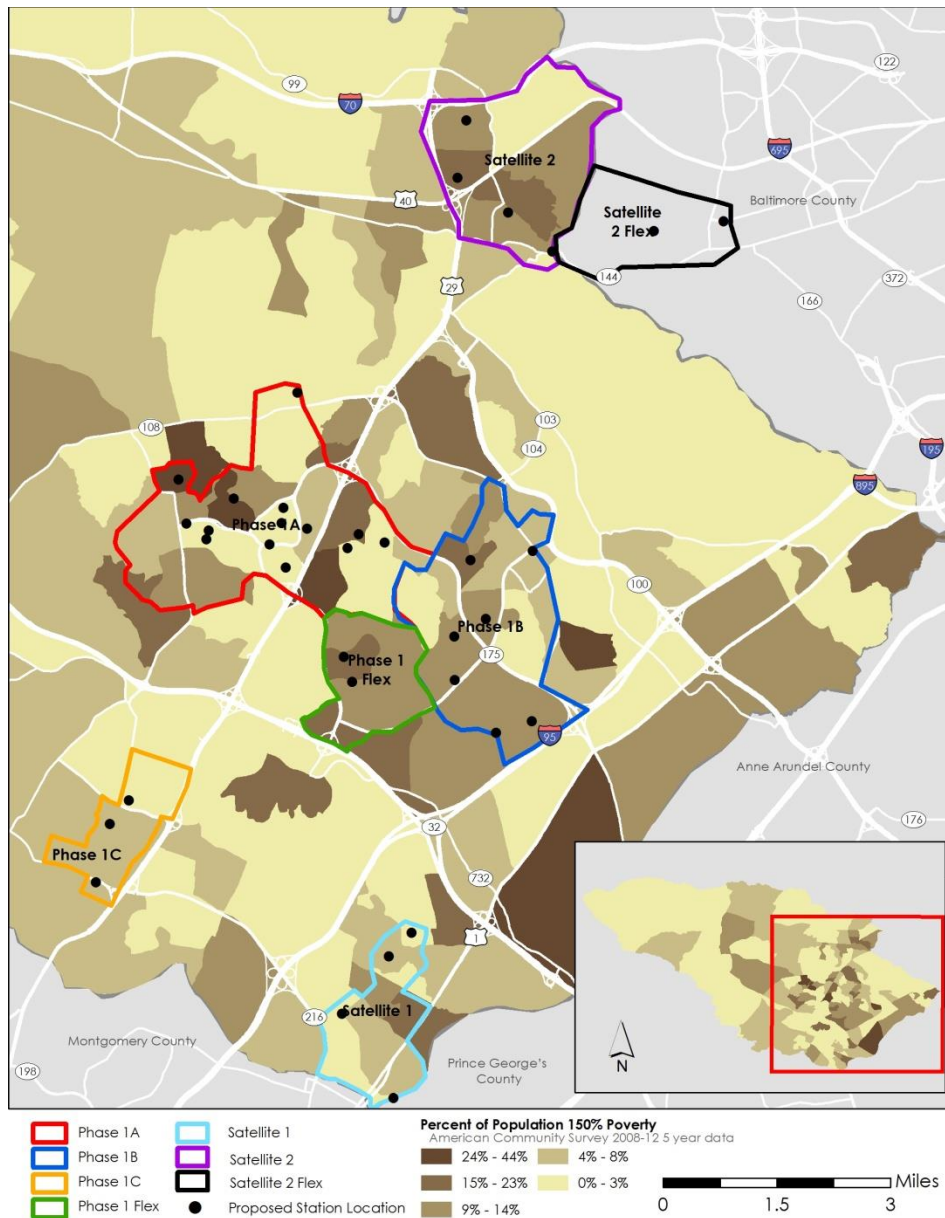


Figure 20 – Proportion of the Population that is Non-White and White Hispanic

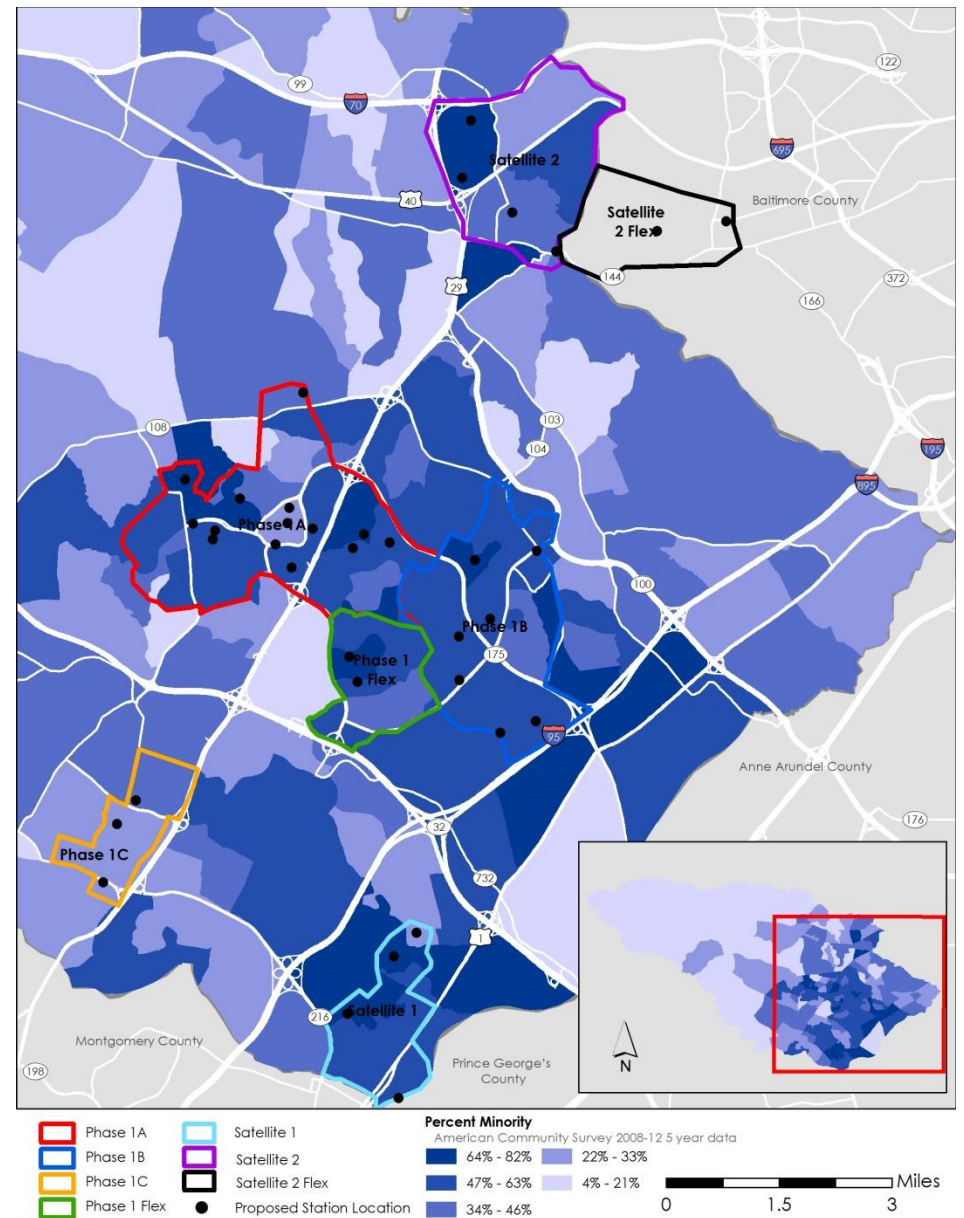


Figure 21 – Proportion of the Population with Low-English Proficiency (LEP)

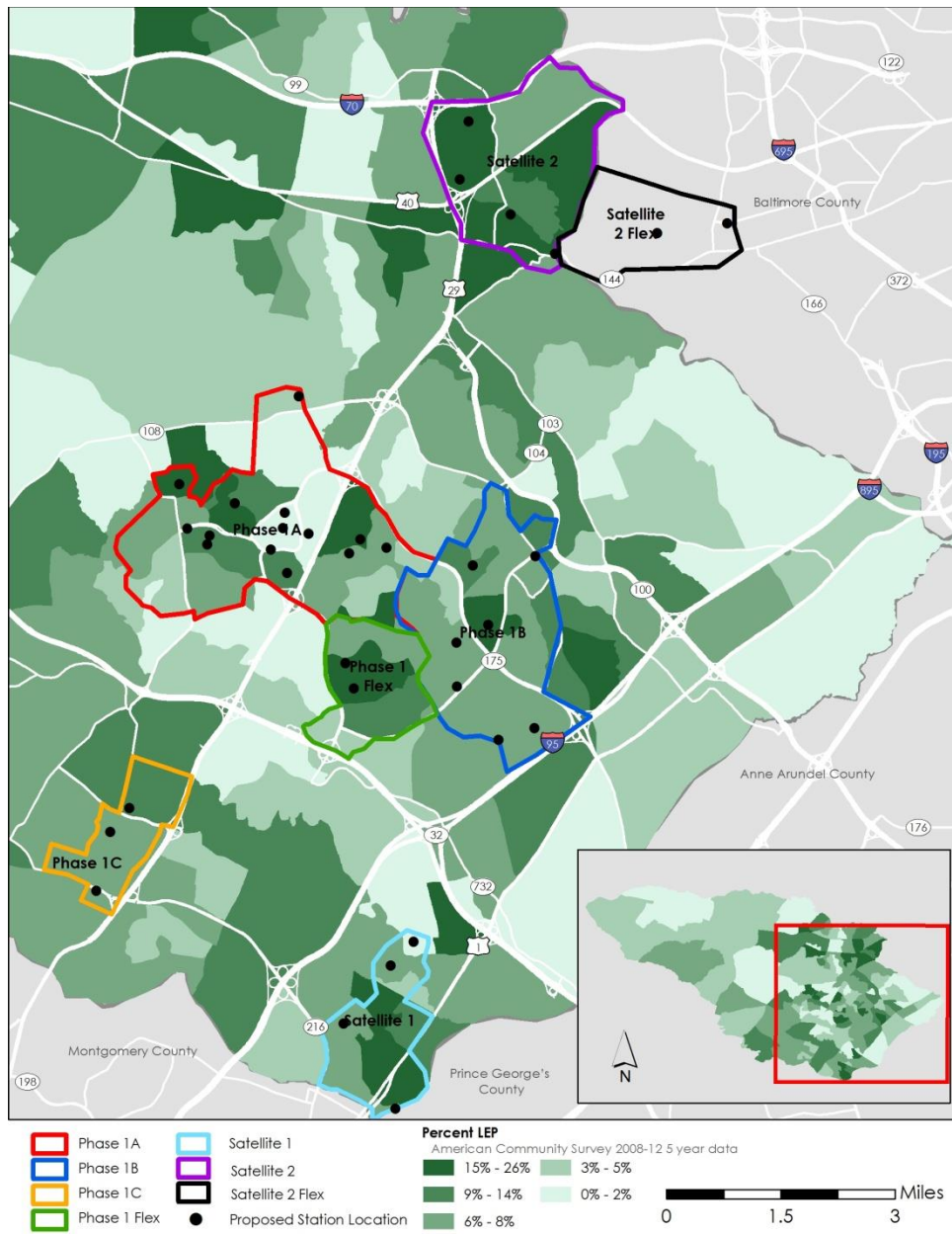


Figure 22 – Proportion of Population Over 45 Years of Age

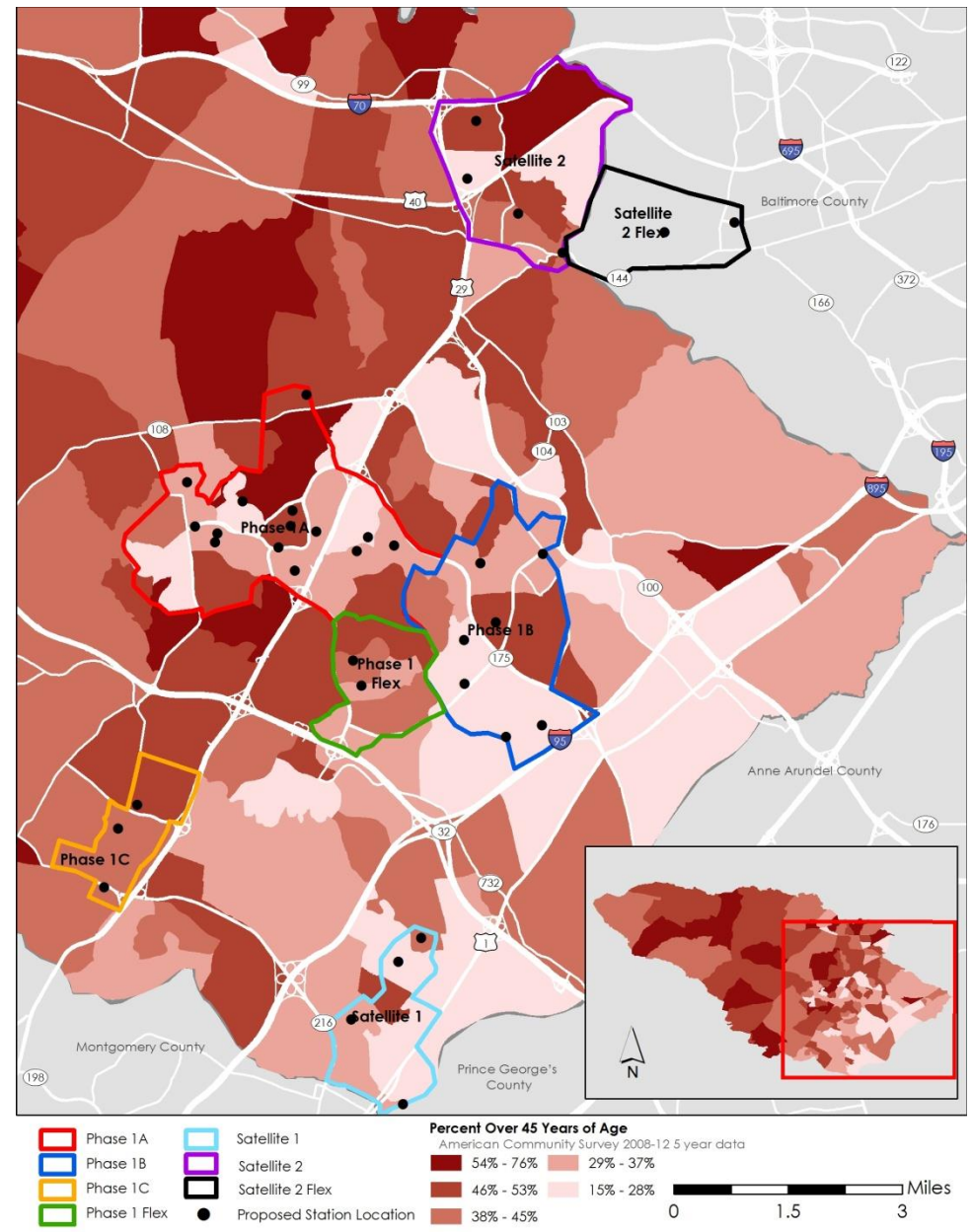


Figure 23 – Proportion of Population Under 18 Years of Age

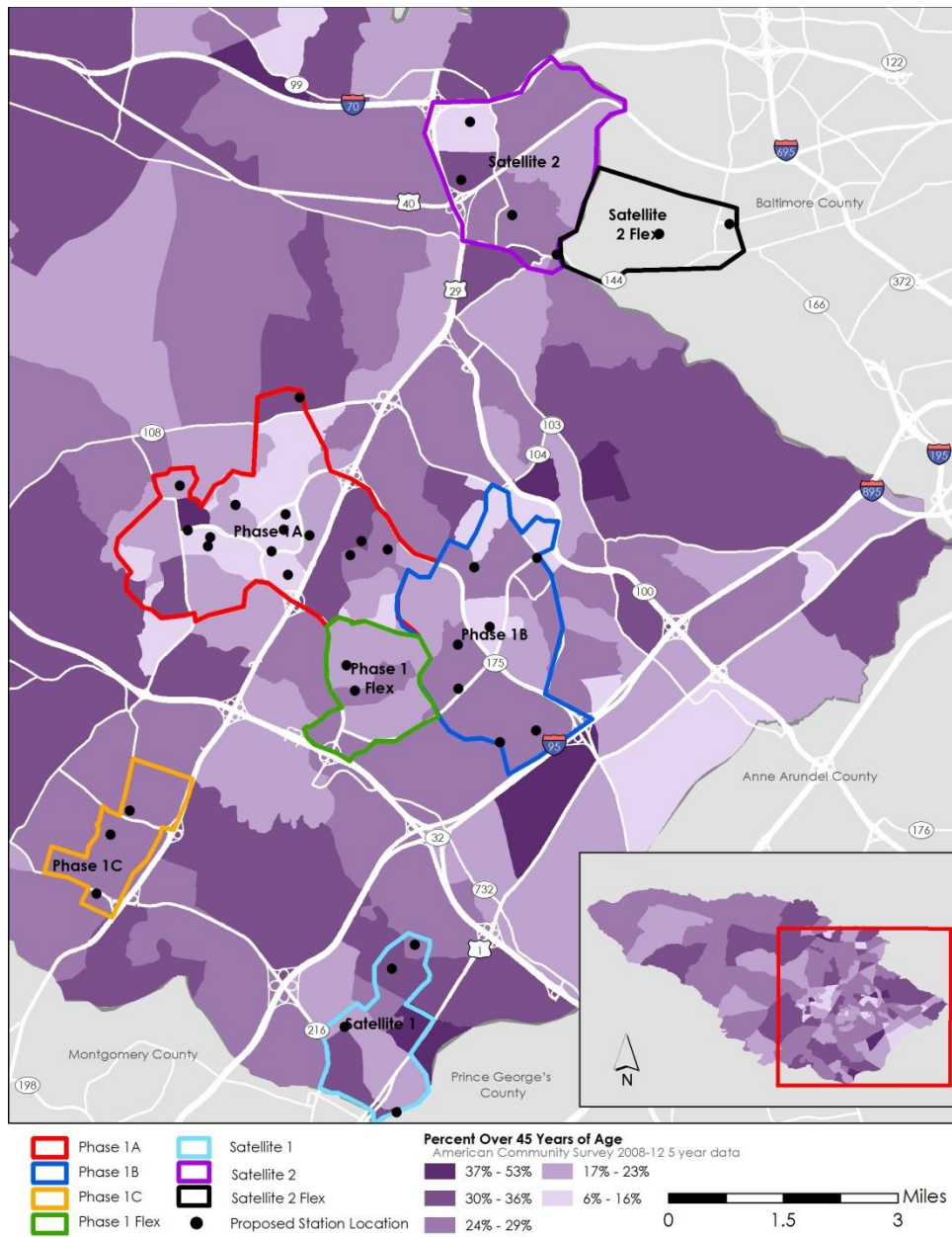
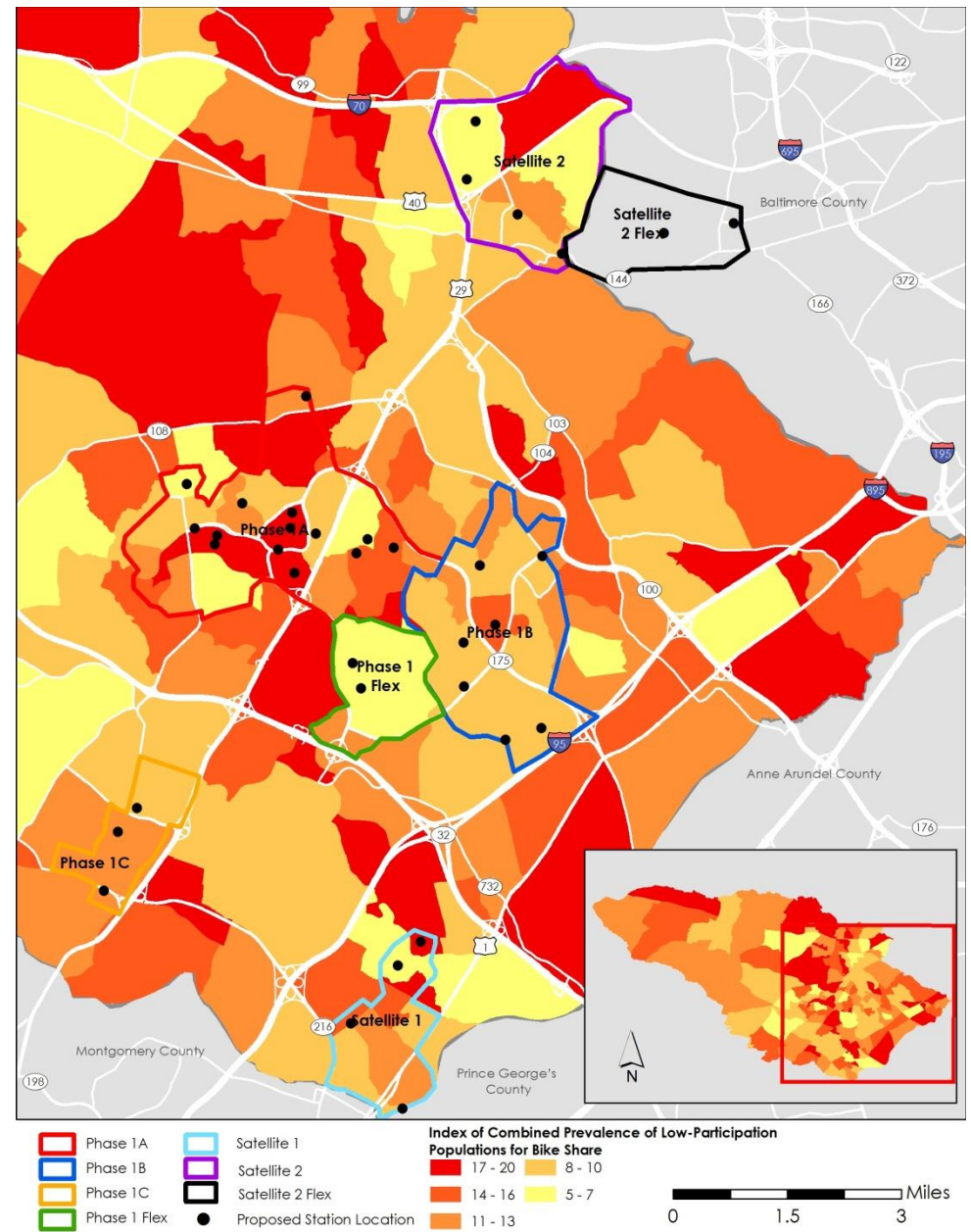


Figure 24 – Combined Index of Low Participation Populations



Howard Community College students may be one target demographic for bike share that might balk at the high deposits required for program membership. The bike share program could partner with the college to insure bicycles in the event of damage or theft of bicycles to reduce the financial burden on students. This partnering strategy could be combined with station sponsorships to provide enhanced bike share access at the community college campus.

Regardless of access to a credit and debit card, cost can also be a major barrier to use for certain populations, notably low-income households and students. Howard County could use a model pioneered in Denver where local partners subsidized the cost of bike share memberships for target populations. There, Live Well Colorado, a non-profit dedicated to reducing obesity, sponsors memberships for certain eligible users.²⁵

AGE RESTRICTION BARRIERS

All North American bike share systems have age restrictions that commonly range from 16 to 18 years of age because of helmet laws and liability concerns. As Howard County has a high prevalence of people under the age of 18, the County may consider making the system accessible to minors. One solution is to allow minors over a certain age to use the system as long as they are wearing a helmet and are accompanied by a responsible adult. Many bicycle rental programs already provide minors bicycles as long as the bicycles are rented by a parent or guardian.

Howard County may also consider emulating a strategy developed by Velib to provide bicycles on a temporary basis to children. In select parks across Paris, bicycles are available for children at staffed locations. The program is intended largely for recreational use and staff are in place to ensure children are properly outfitted with a helmet and following all rules and regulations.

ROAD SAFETY BARRIERS

The prevalence of older cyclists has been used as an indicator statistic for how convenient and safe the general population perceives bicycling.

²⁵ Shaheen, Susan et. al. . Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends & User Impacts. Mineta Transportation Institute. October 2014

²⁶ Pucher, R; Buehler, R Making Cycling Irresistible: Lessons from The Netherlands, Denmark and Germany. Transport Reviews. July 2008. Poulos, R Exploring the experiences and safety concerns of

International examples show that in communities with high level of dedicated bicycle infrastructure, the age distribution of cyclists is more equitable than places where bicycle infrastructure is limited²⁶. Investing in bicycle infrastructure (along with cycling awareness and education) are key to increasing usage by older riders.

MARKETING AND OUTREACH

Marketing and outreach play an equally critical role in addressing the equity gap in bike share. Agencies with limited resources are forced to rely on marketing the system through word of mouth, on-street visibility, and media coverage. The challenge for bike share therefore is to create marketing strategies that break through barriers to reach the people not using bike share. The following are some potential strategies for marketing the proposed bike share program:

TARGETED MARKETING

The County must be savvy in developing marketing strategies that are targeted to the specific demographic groups it hopes to reach. Bike share faces a perception problem in some communities as a service for "others." Marketing materials must therefore be context sensitive and show a diverse range of users in marketing materials.

The messaging for bike share should also be context specific. The County should meet with residents and understand what appeals to them about bike share. For example, for a low-income household where car ownership is something to aspire to, touting bike share as part of a zero-car lifestyle may be an ineffective message. Similarly, there are ingrained cultural barriers to bike ridership that Howard County's marketing should work to address. For example African-Americans have a significantly lower rate of cycling for commute purposes than White Americans, even though the gap has narrowed considerably in the last decade ²⁷

PARTNERSHIPS

A highly effective strategy to build awareness about bike share is to reach potential users through partners. Employers are a natural partner for

older bicyclists in New South Wales, Australia Presentation.
²⁷ Sierra Club New Majority: Pedaling Towards Equity
http://bikeleague.org/sites/default/files/equity_report.pdf

promoting bike share. Information on bike share services may be distributed through employers and retailers to build awareness. As the bike share system will initially focus its service in Columbia, Columbia Association will be a natural partner to help promote the program.

Another key type of partner are community-based organizations (CBOs) such as religious institutions, community groups, associations, and clubs. Here, bike share can learn from the outreach efforts underway at many transit agencies. Transit agencies today are implementing strong partnerships with CBOs as part of their public participation and Title VI (of the Civil Rights Act) compliance strategies. CBOs have existing relationships with targeted populations, such as older adults, non-English speakers, and minority groups. Reaching out to CBOs will allow the bike share system to reach an audience that typically would be difficult to engage through traditional marketing channels.

Finally, the bike share system should partner with local advocacy organizations to help market bike share. Bicycle advocacy groups like Bike Maryland or the Bicycle Advocates of Howard County have extensive expertise in building cycling awareness. The same general advocacy strategies used by these groups could be leveraged to promote bike share.

DIRECT OUTREACH

Direct outreach may be time consuming but is very valuable as it can target the people least likely to seek out information on bike share. The bike share program can organize pop-up events at major shopping centers, transit hubs, and employment sites. During these events, staff will be able to answer questions and show participants how bike share works. Pop-up events are especially effective when tied in with partners like a radio station to attract people to the area. Giveaways, such as a free one-day membership or branded bicycling accessories, are also useful tools.

TRAIN THE TRAINER

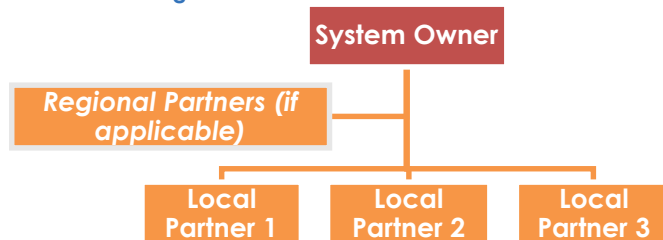
The train-the-trainer model has been successfully used to promote cycling safety across the country. Bike share staff could work with partners such as schools or employers to train a limited number of representatives on how bike share works. These representatives can then go out to train additional users. One of the greatest barriers to bike share use is lack of familiarity. People may be unsure of how the system works or feel reluctant to try out a new mode of transportation. By building a network of trainers in the community, the bike share partners can familiarize potential users with how the system works.

8. IMPLEMENTATION CONSIDERATIONS

PROGRAM GOVERNANCE

The proposed bike share program will require cooperation across multiple public agencies and non-governmental organizations. Leading the program will be the system owner (see **Figure 25**). The system owner will be the final recipient of funding and will be responsible for overseeing contracts with the program's various vendors. In many ways, the term "owner" is a misnomer, as the program relies on the support of partners. Regardless of who the final owner of the system is, the County and non-profit partners should be involved in program oversight.

Figure 25 – General Governance Structure



REGIONAL COOPERATION

The Baltimore-Washington region is already home to a large bike share system, Capital Bikeshare, with a second system planned for the City of Baltimore. Howard County should further explore interoperability with neighboring bike share programs. It is recommended, however, that the County system retain an independent contract and governance structure from these larger nearby systems. From a contracting perspective, Howard County's smaller system will likely have a different cost structure from that of its larger neighboring systems, and would be well served negotiating its own vendor agreements. Economies of scale in jointly procuring bike share services with these larger existing programs are limited due to the geographic distance between Howard County and the existing Capital Bikeshare system.

Opportunities do exist for close cooperation with Baltimore and Anne Arundel County in developing a regional bike share system. The smaller geographic distance and more similar operating characteristics of bike share in those communities could lead to opportunities for greater

integration, including a common system owner and joint contract. In Anne Arundel, Fort Meade is already exploring bike share to enhance employee access to the base.

If Howard County pursues interoperability with neighboring systems, the County should consider having regular communication with partner bike share programs. The system owner and vendor should establish regular monthly meetings with partner jurisdictions.

OVERSIGHT COMMITTEE

Early on in the implementation process, an oversight committee should be established. The exact structure of this oversight committee will depend on the ownership structure chosen. For example, if a new non-profit is formed, the oversight committee will simply be the Board of Directors. Oversight committee members may include private funding partners, partner state agencies, and the County. The committee should be closely involved with major decision making. The operating vendor(s) should be involved with the committee (but may be excluded in instances where their presence poses a conflict of interest), as close coordination with the vendor(s) will be a necessary component for program success. Once operations commence, the committee should meet monthly.

FUNDING AGREEMENT

Local partners and the system owner should develop a funding agreement that defines the financial responsibilities of each partner and the system owner. The agreement should also identify the program's payer of last resort responsible for supporting any budget shortfalls. The exact content of this funding agreement will depend on who is the partner. For example, a large sponsor will have a different funding agreement than a regional partner.

Should Howard County's bike share program be part of a regional system, the County should establish a policy for revenue sharing with partner jurisdictions. Some regional systems like Capital Bikeshare allocate user revenue based on a subscriber's jurisdiction of residency. In this instance, for subscribers residing outside the service area, revenue is split proportionally among jurisdictions. Another model is to establish a reciprocal reimbursement policy with partner jurisdictions. In this model, if

a user of the bike share program utilizes a partner system, the partner is reimbursed based on an agreed upon rate.

SYSTEM EXPANSION AGREEMENT

The proposed program should also establish a protocol for allowing expansion outside of Howard County. System expansion in some cases may be accomplished through a rider clause to the vendor contract which allows other jurisdictions to independently procure bike share under the same vendor contract(s). In other instances, it may make more sense for the existing system owner to locate stations outside of the County.

ADMINISTRATIVE NEEDS FOR PROGRAM

The Howard County bike share system will require a dedicated staff to administer the system. The responsibility of the program staff will depend on the final operating model. The following section outlines the capacity needed to administer a vendor-operated system, currently foreseen as the most feasible operating model for the program (see discussion in the **Operating Structure** section)

Because of the small size of the system, the Howard County bike share system will not require a large dedicated staff. As **Table 15** shows, the system will function with approximately one staff person (40 hours of labor a week). As staff will have a variety of responsibilities, staff hours will likely be spread among a number of individuals.

Table 15 – Total Full-Time Equivalent (FTE) Staff by Phase

Phase	Administrative Staff
Launch	0.75 FTE
Phase 1	0.75 FTE
Satellite Phases and Phase 1	1 FTE

Administrative staff will have to serve a number of functions, including:

Program Launch

- Lead efforts to secure funding
- Oversee procurement of equipment and operating vendor
- Oversee public outreach initiatives
- Lead initial system planning efforts

General Program Management Functions

- Contract management and oversight
- Public relations: serve as spokesperson for the system
- Maintain and report on system performance data
- Develop an Annual Report and other analytical and reporting activities as needed
- Facilitate communication with partners and stakeholders

Budgeting and Grant Management Functions

- Maintain financial records for the system, including the annual budget
- Identify and apply for federal, state, and local grants
- Complete all grant reporting requirements

Private Fundraising

- Develop a donor base for program
- Identify and explore new fundraising opportunities
- Implement advertising contract

Planning

- Plan initial station locations and obtain permits and other necessary approvals for installation of stations, in coordination with the bike share vendor(s)
- Work with the public through a variety of public outreach activities to further define growth areas and identify specific station locations

Marketing

- Work with non-profits and other appropriate agencies to ensure access to bike share by low-income and/or unbanked individuals
- Develop and disseminate materials to help grow awareness and usage of the stations, e.g., working with hotel concierges, employers, retailers, and community associations.

It is not expected that the above functions will be solely the responsibility of program staff. Regardless of who owns Howard County's bike share program, close cooperation will be necessary between public agencies, non-profits, and private-sector partners. Administration of the system will rely on support from a range of partners. For example, a publically-owned system may rely on non-profits for fundraising and donor development

expertise. A non-profit owned system will need public support with siting, permitting and public outreach of the system. A strong governance structure will be necessary to ensure accountability of the program owner and coordination between the organizations involved in the program.

PROGRAM TRANSPARENCY

Maintaining accurate system and financial data will be an integral part of ensuring that the Howard County bike share system functions well and is financially sustainable. Accurate data collection and reporting is needed to inform the system's administrators how the system is performing and to comply with accepted accounting and transit financial planning practices.

PERFORMANCE TRACKING

Tracking performance measures will allow the system to ensure it meets its goals and objectives. Draft performance measures are provided on **Section 2**. Many of the proposed performance measures can be implemented with data provided directly by a vendor, and these are included in the Reporting Requirements section. To fully implement the proposed performance measures, the study team recommends that an annual system ridership survey be considered to capture information such as member demographics and socio-economic profiles, trip purpose, frequency of use, economic impacts of use, and the impact of bike share upon reducing the use of car travel. Geographic Information Systems (GIS) analyses and financial data maintained by the system administrator will also be useful to report on some of the proposed performance measures. All of this analysis helps measure the system's performance and helps determine the most strategic approach for system growth and modification over time.

FINANCIAL DATA

The team recommends the implementation of standardized financial reporting practices for the program. Monthly financial statements on the performance of the bike share system should be prepared for internal use, with a publicly available annual financial performance summary each year. Financial data for the bike share system should be maintained in accordance with **generally accepted accounting principles** (GAAP) as

defined by the American Institute of Certified Public Accountants (AICPA). Annual audits of the bike share system, compliant with the principles of the **generally accepted government auditing standards** (GAGAS).²⁸ By ensuring that the financial elements of the bike share system are transparent and follow sound business practices, the system will be in a better position to obtain future public funds.

The financial data reported will also need to clearly communicate the complete list of expenses and revenues of the bike share system. The operating costs of the system should be broken down to include both the costs incurred by the operator or vendor of the bike share system and administrative costs (such as staff time for contract oversight). Capital expenses incurred can be reported at a summary level, but records maintained need to capture the date and type of expense, and reference the purchase order or receipt documenting the purchase made.

It is recommended that revenue be reported by source, including federal, state, and local grants, private grants, station and/or system sponsorships, advertising, membership fees, usage fee, and other sources. The financial documentation maintained by the Howard County bike share system should allow administrators to quickly understand system expenses funded by each individual revenue source.

In addition to a complete reporting of expenses and revenues, there are several measures of financial performance that should be included in both the monthly and annual financial statements. The **cost recovery ratio**, a typical measure of financial performance used in transit, measures the percentage of operating costs covered by fares, or user fees. In a bike share system the user fees include both the membership (annual and short-term) and usage fees. The financial models in this plan incorporate advertising revenue into the cost recovery ratio as well, however some operators choose to report cost-recovery as purely user recovered revenue. It is important to include the entire operating costs (the system operator's fees and the administrative expenses) when calculating the cost recovery so as not to overstate this measure. The **average cost per trip per user** and the **operating cost per trip** should also both be derived from the data provided on a monthly basis.

²⁸ Government Auditing Standards (December 2011). The Government Auditing Standards are also known as "The Yellow Book," published by the U.S. Government Accountability Office (GAO).

OPERATIONS VENDOR CONTRACTING

In procuring a vendor, the system owner must strike a balance in the request for proposals (RFP) stage between providing lengthy requirements and allowing vendors the flexibility to propose innovations that may ultimately lower costs and streamline operations. The bike share industry today is quickly evolving and as companies continue to innovate, RFP guidelines written today could become out of date in the near future. The following are some guidelines for the procurement process. This list is not intended to be an exhaustive inventory of what an RFP should include but instead highlights some key areas.

VENDOR RESPONSIBILITIES

In procuring vendor services, an RFP must require vendors to propose in detail what services they intend to provide, along with relevant qualifications. Some of the required functions a vendor should offer include:

- All functions associated with daily operations, such as field inspections, rebalancing of bicycles, performance tracking, and crisis management
- Maintenance and support for all equipment
- Management of back-end systems such as IT and payment platform
- Development and maintenance of a website
- Customer support call-center
- Liability insurance coverage for program
- Equipment installation
- Design and printing of maps, brochures, and marketing material
- The owner may request that the vendor include on its team someone with sponsorship development capability

The RFP should permit vendors to suggest additional services beyond the ones listed above. Vendors should also be free to subcontract specific functions. Peer bike share systems recommend using the RFP process to push the technical envelope and explore unique solutions for the County; once a vendor is selected, the owner will have less leverage to negotiate new technical solutions or features.²⁹

CONTRACT LENGTH

Peer systems prefer short-term contracts with vendor, usually lasting 12 months, with options for renewal. Short-term contract are preferred because they encourage vendors to be responsive to the owner's needs. If the contracting structure turns out to be ineffective, the owner has the ability to rewrite the contract with additional requirements after the initial contract expires. Many contracts feature limits on year-over-year cost increases if renewal options are executed³⁰.

SERVICE METRICS

Vendor contracts should include service metrics that contractors are responsible for maintaining. Metrics allow the bike share administrator to ensure vendors are providing the necessary level of service. Common service guidelines include:

- **Rebalancing requirements:** Rebalancing of bicycles to ensure no station is full or empty is one of the largest day to day operating expenses for a bike share system. For example, Capital Bikeshare sets a service standard that no station may remain full or empty for more than 3 hours between 6am and midnight. Staff may fill or empty stations late at night in anticipation of rush hour demand. Other systems set less strict standards such as 12 hours. Less stringent rebalancing standards may lower the cost of operations.
- **Fleet Deployment:** A percentage of the system's fleet will be out of service at any one time. Deployment standards provide guidelines for what proportion of the fleet must be in active operations. Requirements may be reduced in the winter due to lower demand and fleet management strategies.
- **Inspection and Maintenance:** Contracts should stipulate how often bicycles are inspected. Operators should have standards for how often a station is visited each month by field inspectors, as well as how often bicycles are inspected and maintained. Capital Bikeshare requires that bicycles be inspected and maintained at least every 30 days. Maintenance schedules may vary depending on the intensity of use in the program.
- **Customer Service Standards:** Contracts should stipulate quality of service standards including call center wait times and customer service satisfaction ratings. Standards may stipulate that telephone operators are available in more than one language.

²⁹ Discussion from the Planning for New and Expanding Bike Share Systems APA Workshop, June 2014

³⁰ *ibid*

RECOMMENDED REPORTING REQUIREMENTS

A contract with the system operator will stipulate what data will be provided to the bike share system management on a monthly basis. It is recommended that contracts stipulate that a vendor provide the data both in a raw format as a database and in a formatted report that includes graphs and tables showing both monthly and annual (when applicable) performance. The program owner can require the vendor to provide more detailed reports on a quarterly and/or annual basis. Common measures provided by program operators include:

- **Membership**
 - Annual Members (New, Expired, and Renewed)
 - Casual Members
 - Member residency information
- **Ridership and Usage**
 - Daily ridership (by member type)
 - System-wide or total ridership (by member type)
 - Station-level ridership (origin and termination) (by member type)
 - Ridership by day (preferably with average daily temperatures reported)
 - Trips per bicycle
- **Operations and Maintenance**
 - Rebalancing activity
 - Instances (and length of time) of full and empty stations
 - Any service disruptions or suspensions
 - Number of bicycles in fleet and in service
 - Crash summary
 - Bicycle and station repairs
 - Theft and vandalism

Within these data topics, the vendor may propose or the bike share administrative staff can dictate a number of more specific desired measures. This raw data can be used by the system's administrative staff

to run a number of more complex analyses to be included in a system evaluation or similar analysis to help inform future decision making. Some of this data may also be made available to the public for their use through the use of an online dashboard.

BIKE SHARE EQUIPMENT CONTRACTING

Today most bike share systems are closed proprietary systems that provide little flexibility to incorporate bicycles, IT systems, or other equipment from third-party vendors. While proprietary systems are unavoidable to some degree in the bike share marketplace, Howard County should encourage in the RFP process bike share technology that allows for future compatibility with third-party equipment. For example, the docking systems could be designed to be potentially compatible with another company's bicycles. Furthermore, the County could consider encouraging the vendor to offer IT systems that are flexible enough to allow a replacement back-end software to be installed. The fewer equipment restrictions and proprietary systems used, the less reliance Howard County will have on a single vendor. It is unlikely that such compatibility will be immediately available, but may be on a company's longer-term development plan.

The County should also consider decoupling vendor operations from bike share equipment vendors. While equipment and vendor services may be procured together under one contract, the program owner should carefully consider the implications of entering into a contract that stipulates that the equipment vendor has an exclusive agreement with a particular operator. In the case, should an operating vendor prove to be performing unsatisfactory, the program owner will have the maximum flexibility to select a new company to operate the system without impacting equipment procurement, maintenance, or operations. Such a structure that decouples equipment and operations can introduce additional complexities and more administrative management.

9. PROGRAM IMPACTS

BIKE SHARE'S IMPACT ON THE COMMUNITY

Bike share systems can have transformative impacts on the communities they serve, from expanding transportation accessibility, to strengthening a culture of cycling. The performance measurement plan proposed for Howard County tracks many of these impacts such as the public health, air quality, congestion, and transportation accessibility improvements. Estimating these effects at the feasibility study stage can be a challenge however. Like ridership and revenue projections, the community impacts of bike share are derived from peer data, and many of the documented impacts are for systems with different operating characteristics from that of Howard County. In this section, the study estimates potential community impacts and notes where program impacts cannot be quantified with the data available.

PUBLIC HEALTH BENEFITS

Possibly the greatest benefit of a health and recreation focused bike share system are its impacts on public health and physical activity. In a survey of three major bike share programs, over 60 percent of respondents said they received more physical activity since joining bike share³¹. At the typical length of a bike share trip (1.5 miles), a user will burn on average 57 calories³². System-wide by year six of the program, 2.6 million calories are to be projected to be burned by users per year.

CONGESTION AND AIR QUALITY

The congestion and air quality impacts of Howard County bike share are more challenging to estimate than the public health benefits. Other systems see varying rates of trip diversion from car to bicycle. Only 3.5 percent of surveyed bike share users in Boston reported that they would drive if bike share was not available for their most recent trip. A similar survey (yet with a much smaller sample size) conducted in San Antonio found that 21 percent of bike share trips substituted car trips. Generally

communities with a robust transit system and low car usage saw lower rates of car trip substitution than auto-centric communities.³³

For Howard County estimating trip diversion from other modes is further complicated by the fact that users are expected to primarily use the system for leisure and recreation, at least initially. Capital Bikeshare's 2013 survey results showed that 9.1 percent of recreation and leisure riders would have driven for their last trip if bike share was not available; this sample size was small and a large margin of error applies.³⁴ The diversion rate in Howard County from car trips to bike share trips will likely fall toward the high end observed among peers due to the high car modal split.

The ridership projected by year six in this plan is equivalent to 75,500 trip miles; if all those trips were otherwise taken by car, that would equal approximately 51,000 pounds of CO₂ per year.³⁵ Most likely the majority of trips in the Howard County bike share program would not be substituting car trips. Assuming the 21 percent diversion rate observed by users of San Antonio, the Howard County bike share program by year six would reduce vehicle miles traveled by 15,867 miles and reduce greenhouse gas emissions by 10,710 pounds of CO₂. For comparison purposes, in 2007 there were 3.9 billion vehicle miles traveled in the Howard County.³⁶ Bike share is expected to negligibly contribute to reducing overall VMT or vehicle emissions in the county.

The program could have localized traffic and congestion impacts. One of focuses on Phase 1 is to provide stations that connect Howard County General Hospital and the Community College to Downtown Columbia. These destinations are within bicycling distance and bike share could serve to connect employees and students to retail and entertainment opportunities. Over 30,000 students are enrolled at Howard Community College, the majority of who live within five miles of campus³⁷.

31 Shaheen, Susan et. al. . Public Bikesharing in North America During a Period of Rapid Expansion: Understanding Business Models, Industry Trends & User Impacts. Mineta Transportation Institute. October 2014

32 Trip length: Arlington Capital Bikeshare TDP Executive Summary, 2012. Calories burn rate: Livestrong.com for cycling trips at easy/moderate effort for users averaging 150 pounds.

33 Ibid

34 2013 Capital Bikeshare User Survey

35 Estimated rate of 0.675 pounds of CO₂ per mile. Figure based on CO₂ savings rates used by Capital Bikeshare to calculate user CO₂ equivalents.

36 Howard County Climate Action Plan

37 Interview with Bob Marietta of Howard County Community College, May 2014

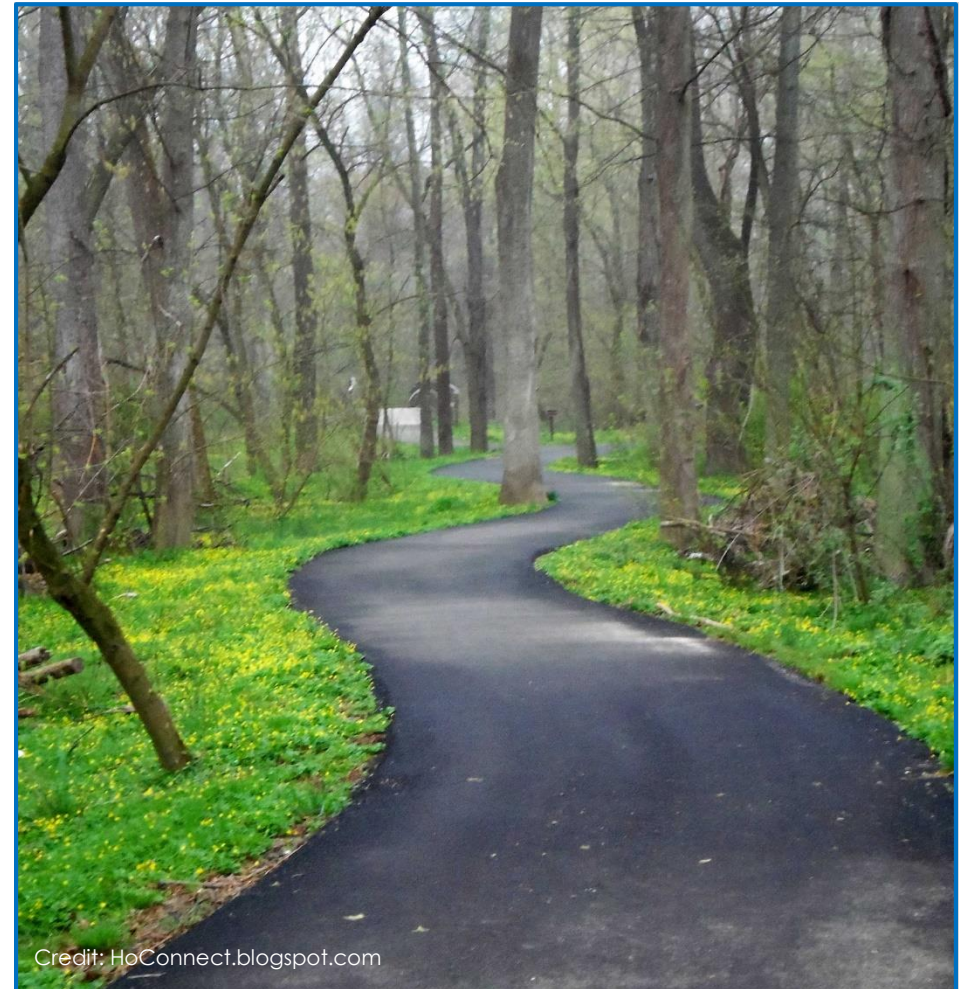
ACCESSIBILITY IMPROVEMENTS

The final impact of Howard County bike share would be its overall ability to improve transportation accessibility in the county. Compared to most communities with bike share, the County is highly auto-dependent and has a less-robust public transportation system. Bike share would complement public transit by providing a last mile connection to destinations, especially at Downtown Columbia, a major transit hub in the County. In a survey of three early bike share systems, 95 percent of respondents saw bike share as enhancing their community's public transportation network³⁸. Data on whether bike share increases usage of other transit modes such as bus or rail are mixed and depend on the community. Communities like Washington DC and Montreal with high level of existing transit ridership saw bike share as a *substitute* for other transit modes, while Minneapolis, a city with lower transit ridership, saw bike share users ride transit at a higher rate since joining the program³⁹. The results of peer surveys in aggregate are too inconclusive to quantify the transit ridership impacts of bike share in the County.

Table 16 – Select Projected Annual Health and Environmental Indicators for Bike Share

Year	Bike Share Miles	Calories Burned	Vehicle Miles Diverted	Greenhouse Gas Reductions (LB. of CO ₂)
Year 1	20,208	767,899	4,244	2,864
Year 2	41,363	1,571,777	8,686	5,863
Year 3	52,423	1,992,083	11,009	7,431
Year 4	63,684	2,419,981	13,374	9,027
Year 5	71,959	2,734,430	15,111	10,200
Year 6	75,557	2,871,152	15,867	10,710

Figure 26 - Bicycle Trail in Columbia, MD



Credit: HoConnect.blogspot.com

³⁸ Ibid

³⁹ Jeff, Eric The Most Persuasive Evidence Yet that Bike-Share Serves as Public Transit

10. CONCLUSION

If implemented, Howard County Bike Share would be a pioneer in expanding bike share to more suburban settings. The demand analysis and system projections anticipate a program focused primarily on health and recreation, while also improving accessibility at key County activity centers. This study envisions a relatively small program that at full build-out will serve 50,400 trips a year with 36 stations.

Following the conclusion of this study, the County will face a number of steps to make bike share a reality. As the business plan outlines, Howard County will need to select an ownership and operating model, develop its fundraising strategy, and procure equipment for the program. Creating a bike share system takes time, and even in ideal conditions it would likely take between one to two years to go from concept to program launch in Howard County.

For many communities, a bike share program's feasibility is largely driven by whether funding can be identified for operations and capital. Most bike share systems require subsidies and Howard County is no different. Howard County's bike share program is expected to cover less than 30 percent of its costs through user revenue and advertising.

The program could serve an important public purpose in the County, by encouraging more physical activity and making cycling more accessible to the public. The demand analysis for the program found strong potential for a health and recreation focused system that connects key destination together in the county.

One of the impetuses for this study was to understand not only the public health potential of bike share, but also the congestion and air quality impacts of a bike share program. The availability of data to estimate congestion and air quality benefits of bike share is limited, but based on the data available, the study anticipates a small impact on overall miles driven or greenhouse gas emissions in the county. The program could have localized impacts by reducing demand for driving and parking around Downtown Columbia and the Howard Community College.

Howard County has long strived to provide its residents with world-class amenities and a high quality of life. Today the county is a leader in many

ways, from providing residents an extensive park and trail system, to being awarded the best library system in America. Bike share fits within this tradition of innovations and provides the county a new opportunity to promote further public health and livability in the community.

Figure 27 – Bike Share User in Suburban Whippany, NJ

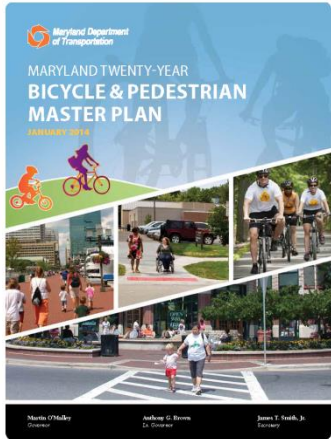


Credit: Wall Street Journal

APPENDICES

APPENDIX 1 – LOCAL AND REGIONAL PLANS AND POLICIES

MARYLAND BICYCLE AND PEDESTRIAN PLAN 2014



In 2013 the Maryland Department of Transportation revised its 2003 Statewide Pedestrian and Bicycle Master Plan. This revision serves as a guide for decision making and prioritization of bicycle and pedestrian infrastructure, particularly to advance the transportation element of the state's Economic Growth, Resources Protection and Planning Policy. Furthermore, the Plan outlines objectives and strategies to evaluate and propose improvements for the pedestrian and bicycling environment in jurisdictions across the state. The Plan identifies locations in Downtown Columbia as an area with a higher potential for short

trips – trips that could be served by active transportation. This Plan specifically recommends bike share implementation as a 2013-2018 strategy to integrate active transportation and transit:

- Support installation of bike share stations at transit hubs and other high demand locations, and incorporate siting guidelines into appropriate guidance documents¹

Finally, the Plan identifies potential funding sources to implement bicycle and pedestrian projects that ostensibly could contribute to implementing a bike share system in Howard County:

- MDOT dedicated funding, Consolidated Transportation Program
- Maryland Heritage Areas Authority
- Community Legacy Program
- Program Open Space

PLANHOWARD 2030

Howard County's general Master Plan strives to establish a sustainable economic, environmental, and community focused future for the County. The Plan recognizes the difficulties in creating a well-connected bicycle and pedestrian network due to past land use and transportation decisions.² To this end, the Plan aims to emphasize the promotion of transit, bicycle and pedestrian transportation.³ Although the Plan does not discuss bike share significantly, it recommends the promotion of "rideshare and bike share systems, HOV programs, and expanded park and ride lots"⁴ to help reduce traffic congestion, energy consumption, and greenhouse gases.

PlanHoward also recommends amending the exiting Countywide design manual to include Complete Streets as an approach to building new and upgrade existing bicycle and pedestrian facilities. Furthermore, the Plan discusses the existing Transportation Demand Management (TDM) efforts to maximize the efficiency and sustainability of the complete transportation network.⁵

2009 HOWARD COUNTY SHORT-RANGE TRANSPORTATION DEVELOPMENT PLAN

This Plan is Howard County's short-term plan, approximately five years, to guide transit development in the County. The Plan examines and ranks the transit dependent areas and densities in the county.⁶ The highest ranked transit dependent populations are located in the central and eastern parts of the county. The Plan also recommends the implementation of new transit service and expanded public transportation coverage throughout these areas. Although the Plan does not mention bike share, bike share station locations could complement transit by providing first-mile and last-mile connections to-and-from bus corridors.

¹ Maryland Twenty-Year Bicycle and Pedestrian Master Plan. January 2014. Page 29.

² Plan Howard 2030, Executive Summary. February 2013. Page 7.

³ Plan Howard 2030. February 2013. Page 95.

⁴ Plan Howard 2030. February 2013. Page 175.

⁵ Plan Howard 2030. February 2013. Page 97.

⁶ Howard County Short-Range Transportation Development Plan, February 2009. Page 1-10 – 1-18.

BIKE HOWARD – THE HOWARD COUNTY BICYCLE MASTER PLAN 2014 (DRAFT)

This draft Bicycle Master Plan provides a framework to guide policy and investments to improve the County's bicycle infrastructure and to promote bicycling as a safe and convenient travel option. Although bike share is only briefly mentioned as a possible recommendation for Howard County, achieving the Plan's goals could greatly benefit a bike share system. For instance, three of the Plan's goals which may be able to be achieved through the implementation of a bike share program include:⁷

- Create a safe and seamless network
- Increase participation and safety
- Promote active living

The document details the inventory of bicycle facilities and recommends further improvements based on facility type in order to create a complete bicycling network. The Plan also provides recommendations related to the bicycle network and active living programming, which could benefit the implementation of a bike share system, including:

- Integration of bicycle transportation with transit.⁸
- Development of "Complete Streets" design guidelines that incorporate bicycle facilities.⁹
- Expansion of the bicycling elements of the County's Transportation Demand Management program.¹⁰

By providing Howard County residents increased access to bicycling, a bike share system may be able to help achieve the Bicycle Master Plan's goals, particularly recommendations related to the encouragement of bicycling and healthier lifestyles, establishment of an active living partnership, and continuation of the Cycle2Health program, which is a non-competitive, peer-led, bicycling club for adults of all ages and riding abilities, coordinated by the Health & Wellness Division of the Howard County Office on Aging.

Finally, the Bicycle Master Plan could have a significant and beneficial impact on a bike share implementation in Howard County. This plan will

guide bicycle infrastructure investments and consequentially influence possible implementation and expansion of a bike share system throughout the County. The Plan may also help improve the bicycling environment and in turn make bicycling an easier and more convenient form of transportation throughout Howard County.

DOWNTOWN COLUMBIA PLAN

The Downtown Columbia Plan is an amendment to the Plan Howard 2030 Comprehensive Plan. Although this Plan does not explicitly mention bike share, it does promote the development of a multi-modal transportation system through transit, bicycle, and pedestrian improvements.¹¹ Moreover, the Plan recommends a "Complete Streets" approach to street design within the downtown grid. These recommendations may help create a better environment for bicycling, and consequentially a better environment for bike share.

This Plan also recommends that the County develop a Transportation Demand Management plan, to further improve the utility of the transportation network. Bike share can play an important role in such a transportation demand management program, especially promoting the use of the bicycle for short trips, and for first/last mile legs of a longer trip. Finally, the Plan provides a bicycle and pedestrian circulation plan to help guide where bicycle and pedestrian facilities should be located to help bicyclists and pedestrian travel throughout Downtown.¹² The Circulation Plan should be consulted by County Staff to help with the placement of potential station locations so as to be easily accessible from multiple directions.

CONNECTING COLUMBIA: ACTIVE TRANSPORTATION ACTION AGENDA

Connecting Columbia is Columbia Association's Plan to provide recommendations to create a more interconnected and comprehensive bicycling and pedestrian circulation system throughout Columbia. This in turn will help achieve CA's health, recreation, and transportation

7 Bike Howard, The Howard County Bicycle Master Plan, draft. February 2014. Page 1.

8 Bike Howard, The Howard County Bicycle Master Plan, draft. February 2014. Page 48.

9 Bike Howard, The Howard County Bicycle Master Plan, draft. February 2014. Page 11.

10 Bike Howard, The Howard County Bicycle Master Plan, draft. February 2014. Page 54.

11 Downtown Columbia Plan: A General Plan Amendment. February 2010. Page 35.

12 Downtown Columbia Plan: A General Plan Amendment. February 2010. Page 45.

goals.¹³ *Connecting Columbia* recommends studying the feasibility of implementing a bike share program and it notes that interest in bike share has grown among residents and community leaders throughout the last few years.¹⁴

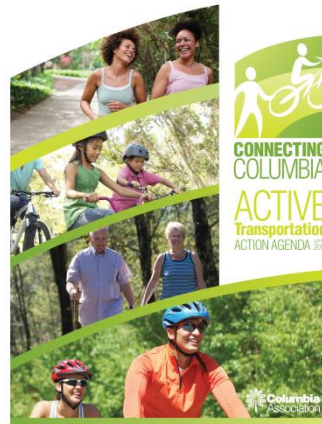
Many of *Connecting Columbia*'s recommendations relate to the implementation of a bike share program as they provide for improving the quality of existing bicycle lanes and shared-use pathways, implementation of new pathway connections to link neighborhoods and commercial centers, and for increasing the comfort, security and safety of path users. *Connecting Columbia* also discusses potential funding sources for active transportation projects, such as:

- Federal Transportation Enhancements¹⁵
- Congestion Mitigation Air Quality Program
- Cycle Maryland
- Horizon Foundation

Implementation of *Connecting Columbia* may directly influence bike share implementation by increasing the connectivity between and within Columbia's communities and in turn make bicycling (and bike share) a more convenient option for transportation.

POLICIES AND COUNTY ORDINANCES

As bike share programs are relatively new, the form of equipment, installation, and operations are not typically codified into existing zoning, permitting, and other ordinances. Howard County must therefore consider what policies and ordinances will require some updates or modifications to allow for the implementation and promotion of bike share. Furthermore, the County will need to understand the process under which potential bike share stations will



be permitted and installed and will also need to understand whether the current regulations surrounding advertising and sponsorship will allow for such revenue generating avenues to help implementation of the program.

The following is a review of several regulations within Howard County's Zoning Ordinance that could have an impact on the potential implementation of a bike share system. There are several regulations within the Howard County Zoning Ordinance that could have an impact on the potential implementation of a bike share system.

Mixed Use Districts

Mixed use districts are established to permit flexible and efficient use of large parcels at key locations by combining housing, employment, local commercial and open space uses in accordance with a unified design.¹⁶ Setback requirements in Mixed Use Districts range from 30 to 75 feet, potentially providing enough space to install a bike share station, with cooperation of the building owner. Additionally, in these districts, minor additions and modifications to site development plans, such as minor accessory structures or parking lot additions, do not require Planning Board Approval.¹⁷

Transit Oriented Development (TOD) Districts

A Transit Oriented Development (TOD) District is intended to encourage development of residential and commercial centers with safe and convenient access to public transit.¹⁸ In each TOD District, setback requirements for buildings adjacent public right-of-ways range from 10 to 30 feet, which may allow enough space for installing a bike share station in some areas, but not all.¹⁹ Bike share, which has been promoted as an additional transit mode, could be a natural component of a TOD District.

Traditional Neighborhood Center (TNC) Overlay District

The Traditional Neighborhood Center (TNC) Overlay District is intended to provide pedestrian-oriented areas with a mix of retail, service, office,

¹³ Connecting Columbia: Active Transportation Action Agenda. September 2012. Page 3.

¹⁴ Connecting Columbia: Active Transportation Action Agenda. September 2012. Page 5.

¹⁵ Since publication of Connecting Columbia, Federal Transportation Enhancements have been replaced with the Transportation Alternatives Program

¹⁶ Howard County Zoning Ordinance. Section 127.0.A.

¹⁷ Howard County Zoning Ordinance. Section 127.0.F.3.

¹⁸ Howard County Zoning Ordinance. Section 127.4.A.

¹⁹ Howard County Zoning Ordinance. Section 127.4.E.3.

and residential use.²⁰ Setback requirements in this type of district range from 0 to 100 feet, which will allow enough space to install a bike share station in some, but not all areas.²¹

Community Enhancement Floating (CEF) District

The Community Enhancement Floating (CEF) District is intended to encourage creative development and redevelopment to enhance surrounding uses and create a coherent, connected development.²² Property developers apply to the County to designate an area as a CEF District, by including amenities that could benefit the community. When a district is designated as a CEF District, developers are able to change the existing zoning district to another which may be more amenable to the surrounding areas. Under this ordinance, bicycle, pedestrian and/or transit improvements which provide connections to off-site destinations or other bicycle pedestrian or transit facilities are considered enhancements beneficial to the community and can be used to apply for a CEF District. The County may be able to codify bike share stations as improvements allowed under CEF District status.

Signage

Signs are a key component of a bike share operation, as they provide information and maps of the system and directions to nearby bike share locations. In Howard County commercial districts, directional signs are permitted by a variance in all areas except in Downtown Columbia, assuming the sign or signs are necessary for the public convenience and are consistent with the intent of the ordinance. These signs must be located at intersections with a maximum allowable area of 12 square feet and there may not be more than four signs for any single business.²³ These signs may be located in the public right-of-way with approval from the Department of Inspections, Licenses and Permits.²⁴

In Downtown Columbia, commercial directional signs are allowed and must conform to the Downtown Neighborhood Design Guidelines.²⁵ Pedestrian directional signs can be placed on private land or in the public right-of-way and must conform to design standards that direct

and inform pedestrians.²⁶ Public signs, or signs in a non-commercial nature in the public interest, are exempt from the provisions set forth for other signs. These signs include directional, regulatory, and information signs.²⁷ In all commercial districts and in all areas within Downtown Columbia, signs used to advertise a product or service at the site and location of the sign are permitted as “accessory to the building or use.”²⁸

The code limits the size of informational signs to two square feet for each linear foot of building frontage,²⁹ suggesting that this section would need to be revisited for relevance to bike share signage. The code also limits signs from encroaching in the public right of way. Given the County Code of Ordinances, it is the consultants opinion that signs on a bike share station that provide the name or other information about bike share would be permitted by the code, pending additional interpretation of the Code.

Advertising

Howard County's municipal code identifies outdoor advertising as billboards or poster panels which advertise products or businesses not connected with the site or building on which they are located.³⁰ Furthermore, the code limits outdoor advertising to be temporary in nature and located on unimproved property in industrial or manufacturing districts. This extends to any outdoor advertising, for example advertising on bus shelters.

General advertising (e.g., for commercial products or businesses) on a bicycle station would be considered outdoor advertising and would not be allowed by the current code. Also, in Downtown Columbia, advertising signs that are three square feet or larger and on vehicles are also prohibited by the code.³¹ Unless revised, these policies will limit the County's ability to use advertising as an additional revenue source for implementing bike share.

20 Howard County Zoning Ordinance. Section 127.6.A.

21 Howard County Zoning Ordinance. Section 127.6.E.5-12.

22 Howard County Zoning Ordinance. Section 121.0.A.

23 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8.

24 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.505A (b)3.

25 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8.

26 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c)8c.

27 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.503 (a).

28 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.500 (b).

29 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.501 (c) (1).

30 Howard County Code of Ordinances. Title 3-Buildings, Subtitle 5. Sec. 3.500 (d).

31 Howard County Code of Ordinance. Title 3-Buildings, Subtitle 5. Sec. 3.505 (a)10.

Please note that interpretation of all zoning and advertising regulations were based on a preliminary review. It is recommended that all County regulations and ordinances be reviewed with the County attorney prior to system implementation. Additionally, Howard County engineering, planning and permitting staff should consider creating a general blanket permit to help regulate and expedite the placement of bike share facilities. Finally, it is recommended that Howard County staff work with local officials to establish a specific set of guidelines to allow for the use of bike share sponsorship and advertising.

APPENDIX 2 – STAKEHOLDER AND PUBLIC ENGAGEMENT SUMMARY

On May 1st, 2014, the study team sat down with community stakeholders and members of the public to discuss the benefits of bike share, provide an overview of the planning efforts underway, and solicit feedback on the feasibility of bike share in Howard County. The day began with four stakeholder meetings targeted at the following groups:

- Public-sector partners
- Local non-governmental organizations (NGOs)
- Representatives from Howard County's economic development and tourism offices
- Howard County Community College

Following these meetings, an open house was held in the evening with the general public. The meeting provided an overview of the plan underway and concluded with an open discussion session.

Throughout the day a number of common themes emerged that helped frame the discussion of the feasibility of bike share in Howard County. Participants voiced what they saw as the opportunities and challenges faced by bike share in the county. The discussion also brought up a number of goals participants felt bike share should strive to achieve. Finally the discussion touched on how a bike share system in Howard County would integrate with existing and planned systems in the region.

Opportunities for Bike Share

Howard County is an active community, with many people cycling already for recreational purposes. The county, especially in Columbia, has an extensive trail network that connects to recreational facilities, village centers, and parks. Participants saw bike share as a means to further promote active living, allowing residents to explore local parks, lakes and trails.

Bike share also could serve a mobility need in Howard County. Bike share could provide a last-mile connection to transit, connecting commuters from the MARC train to their homes and places of work, including the National Security Agency (NSA) in Ann Arundel County. Columbia features a number of large employers, the Mall in Columbia, and Howard County Community College, all within biking distance to

residential areas. Residents could use bike share for non-work trips as well. Stations could provide improved access to the county's extensive library system, local recreation centers, and retail destinations.

Finally, participants saw economic benefits to bike share. Howard County's economy depends on attracting a well-educated, mobile, and highly-competitive workforce. Bike share provides an additional amenity that sets the community apart from its peers. The county attracts hundreds of thousands of visitors a year to its festivals and concerts; bike share would encourage people to explore the county more when they visit. Although Howard County is one of the wealthiest counties in the nation, not all residents are so well-off. Bike share could provide additional mobility options for low-income households without car-access and connect residents to jobs, services, and retail they otherwise could not reach.

Participants suggested a number of locations for bike share in the county. Generally the discussion focused on Columbia. Stakeholders and the public saw opportunities for bike share along the corridor that includes downtown Columbia, Howard County Community College, and Howard County General Hospital. These areas are experiencing a great deal of development, and especially at the community college, there are parking constraints.

Columbia's lakes were another potential location for bike share. Providing bicycles at places like Lake Elkhorn and Centennial Lake could facilitate "lake-to-lake" trips. Outside Columbia, participants saw opportunities for bike share along the Route 1 corridor, in Maple Lawn, and between MARC stations and the NSA.

Challenges to Bike Share

In many ways Howard County is an untested market for bike sharing in the United States. Some participants questioned how bike share could function in such a low-density, suburban area. How would bike share function in Columbia's villages, where residents are dispersed across a large area? One participant pointed out that bike share stations in the suburban areas of Montgomery County, MD are attracting little ridership. As driving is the most convenient way to get around in Howard

County, there is less incentive to adopt bike share as a means of travel than in places like Washington DC.

Cycling infrastructure is another challenge. Howard County has few bike lanes or other on-street cycling facilities. The wide streets encourage fast driving and are a hostile environment for biking. While Columbia has an extensive trail system, the lack of wayfinding makes it hard to navigate even for longtime residents. The county's hilly topography is another barrier to biking. Some participants questioned whether bike share bikes without electronic assistance would be practical.

Finally, bike share faces regulatory hurdles to implementation in Howard County. The county's zoning code would prohibit selling ad space on bike share stations, a potential source of operating revenue. In Columbia, strict sign regulation governed by each of the community's village covenants, would make it impossible to create one unified station design that conforms to each village's sign restrictions. Changing the sign regulations would be a time-consuming process as it would require separate special exemptions for each village.

Goals for Bike Share

Participants identified the following goals for bike share:

- Improve public health by encouraging physical activity
- Reduce parking demands in places like the Howard County Community College and downtown Columbia
- Promote a cycling culture in the county
- Ensure a system that is fiscally sustainable
- Provide a transportation alternative to driving
- Enhance the mobility of residents and visitors
- Encourage visitors to explore the county more, especially tourists attending local concerts or fairs
- Provide a last-mile connection to transit
- Make Howard County more economically competitive

Integration with Other Systems

As an equal share of residents work in Baltimore and Washington DC, participants generally did not show a preference for integrating with the system in one city over the other. One participant stated that integration with Capital Bikeshare should be a priority, simply because

the system is so extensive. Participants recognized that bike share may take a different form in Howard County and that integration concerns should not limit the options considered during this study.

Private-Sector Funding Opportunities

An important component of determining bike share feasibility is identifying funding sources for capital and operations. Participants felt that there were a number of potential funding partners in the community that could help support bike share. Major institutions like Howard County Community College and the General Hospital would make excellent partners as they have existing transportation needs that bike share could support. The county has a strong employer base that might be interested in sponsoring in bike share. Developers may be interested in funding bike share as a way to reduce parking requirements. Finally, there are existing non-profits and foundations that are active in investing in Howard County.

STAKEHOLDER MEETINGS

PUBLIC SECTOR GROUP

Participants

- David Cookson, Howard County Department of Planning
- Scott Templin, Columbia Association
- Allison Calkins, Office of Transportation
- Bob Frances, Department of Licensing and Permits
- John Byrd, Department of Parks and Recreation

Facilitators

- Mauricio Hernandez, Toole Design Group
- Andrew Zalewski, Foursquare Integrated Transportation Planning

Summary

The purpose of this meeting was to brief public sector stakeholders on the bike share feasibility study underway, discuss the potential for bike share within the county, and better understand the challenges to implementing bike share. The meeting began with a discussion of how bike share works. Participants were interested in how much memberships typically cost, how large the stations are, and who would operate a system. Stakeholders provided valuable information on the

regulatory challenges bike share faces in the community and discussed their goals for a potential system.

Background

Howard County features world class public amenities, including an extensive trail system and park network. The Department of Parks and Recreation (DPR) is already studying the feasibility of increasing private sector involvement in funding parks and recreation facilities. DPR sees potential in private firms sponsoring public facilities.

Financially, operating funds in the county are likely to be more challenging to identify than capital funding. The stakeholders felt that bike share could receive a public funding commitment from the county if strong public support is demonstrated. None of the government agencies present had the financial resources available to fund bike share in their current budgets.

Challenges to Bike Share

There are existing advertising and signage restrictions that pose potential barriers to implementing bike share. The county has a ban on off-premise advertising which would forbid the selling of advertising space on bike share stations.

Existing signage regulations, notably in Columbia, are another regulatory barrier to implementing bike share. The covenants of each village in Columbia separately govern the appearance of signage. These regulations are some of the most restrictive in the country and, as stands, would make it impossible to design a bike share stations that conforms to each village's signage code. While there have been multiple attempts at reforming the code since the 1970's, signage regulations remain largely unchanged. Any change to the code would have to be enacted by each village council.

Opportunities for Bike Share

The group saw a number of opportunities for bike share in the county. There are a number of organizations that could be key partners in supporting bike share, including the Horizon Foundation and the county's major employers, such as Applied Physics Laboratory (APL) and the National Security Agency (NSA).

From a health and recreation standpoint, bike share would provide residents new opportunities for physical activity. Users could ride bike share to county parks, reducing the pressure on parking, or access community resources such as recreation centers and libraries. Participants saw bike share as benefiting a diverse population in the county, including the county's growing senior population.

Finally, bike share could improve mobility for county residents. Stakeholders saw opportunity for bike share to provide last-mile connections to transit. Bike share could make communities like Columbia and Maple Lawn less car dependent. Bike share would fit within existing transportation demand management (TDM) policies aimed at reducing single-occupancy auto use. Finally bike share could expand transportation options for low-income residents, most notably along the Route 1 corridor.

Goals for Bike Share

Participants identified the following goals for bike share:

- Fiscal sustainability
- Promote environmental sustainability
- Support active living and improve public health
- Reduce driving to county parks
- Provide a last mile connection to transit
- Facilitate short trips by means other than driving
- Expand mobility options for low income residents

NON-PROFIT STAKEHOLDERS

Participants

- Jane Dembner, Columbia Association
- Sean Harbaugh, Columbia Association
- Alex Obrecht, Bike Maryland
- Chris Tsien, Bicycling Advocates of Howard County
- Larry Schoen, Transportation Advocates

Facilitators

- David Cookson, Howard County Department of Planning
- Alison Cohen, Toole Design Group
- Mauricio Hernandez, Toole Design Group
- Andrew Zalewski, Foursquare Integrated Transportation Planning

Summary

This session brought together stakeholders from non-governmental organizations, including Columbia Association, Transportation Advocates, Bike Maryland, and Bicycling Advocates of Howard County. Participants all were familiar with bike share and most had used bike share in other cities, most notably Capital Bikeshare in Washington DC. A number of stakeholders had questions about bike share, including about technology, ways feasibility is determined, and whether being unbanked is a barrier to bike share use. The group helped define a number of opportunities and challenges bike share faces in the County.

Challenges to Bike Share

The group was concerned whether Howard County's suburban land uses and auto-oriented road network provide conditions conducive to making bike share successful. Participants saw bike share as supporting strategic objectives like improving cycling infrastructure but were not sure if bike sharing could succeed without more bike-friendly streets. Stakeholders wondered how bike share can serve low-density residential neighborhoods, such as Columbia's villages. One participant stated: "When I think of Columbia and who lives here, I wonder how bike share can work". Major employment centers near Columbia such as Gateway are challenging to reach by bike.

There are other barriers to bike share usage. The group saw Columbia's restrictive signage covenants as a challenge for bike share. As each of Columbia's villages has separate covenants in place, creating a uniform exemption for bike share would be a complicated effort.

Columbia's extensive trail network is an asset, but the lack of wayfinding across the network makes it hard to navigate the trails. Bike share is expected to draw in inexperienced riders who would not be familiar with the trail network.

Opportunities for Bike Share

Overall the group felt that bike share could benefit Howard County. Howard County is already a very active community. Columbia features an extensive trail network that bike share could build off from. One participant saw an opportunity to create a "lake to lake" bike share system that connects Columbia's multiple lakes and parks such as Centennial Park, Lake Kittamaqundi, and Lake Elkhorn.

Downtown Columbia, Howard County General Hospital and the Howard County Community College were mentioned as promising locations for bikes share. The college features a large student body and too little parking to accommodate demand. The completion of the trail between the Community College, the hospital and downtown will establish a corridor of destinations that bike share could serve.

Bike share could connect users to Columbia's recreation facilities and libraries as well. The community features one of the most extensive library systems in the country. Recreation centers operated by Columbia Association see hundreds of thousands of visits each year.

Howard County has existing mobility needs that bike share could help address. The system would improve connection to the MARC stations, especially along the Route 1 corridor. The NSA, located just across the county line in Ann Arundel County, is Howard County's largest employer. Bike share could provide an alternate mode for county residents commuting to jobs at the NSA.

Integration with Neighboring Communities

When asked whether integration with Baltimore's future bike share system or Capital Bikeshare is more important, participants saw integration with Capital Bikeshare as more appealing as it has a large existing network of stations. Since an equal number of residents work in Baltimore and Washington DC, integration with one system over another does not yield greater benefits to county commuters. One participant voiced concern that striving to integrate bike share with a system like Capital Bikeshare may "price us out of the market".

Goals for Bike Share

Participants identified the following goals for bike share:

- Promote public health and physical activity
- Get more people to ride bicycles
- Improve local mobility
- Increase the visibility of alternative modes such as biking
- Shift trips away from automobiles
- Promote complete streets and cycling-friendly policies

ECONOMIC DEVELOPMENT STAKEHOLDERS

Participants

- Rachelina Bonacci, Howard County Tourism
- Terry Owens, Howard County Economic Development Agency
- Scott Templin, Columbia Association

Facilitators

- David Cookson, Howard County Department of Planning
- Alison Cohen, Toole Design Group
- Mauricio Hernandez, Toole Design Group
- Andrew Zalewski, Foursquare Integrated Transportation Planning

Summary

The study team met with representatives from Howard County Tourism and Howard County Economic Development Agency (EDA) to learn more about Howard County and the potential of bike share to support economic development and tourism locally. While neither representative was a regular bike share user, they were familiar with the concept of bike share and its impact in other communities, notably Capital Bikeshare in Washington DC.

County Economy

Howard County features a dynamic local economy supported by one of the most highly educated work-forces in the country. The county ranks as the third wealthiest per capita in the United States, with a median household income of over \$100,000. About an even proportion of residents work in the Washington DC region, Baltimore region, and in Howard County. The county's economy features a high concentration of knowledge industry jobs, with employment focused around technology, defense, and professional services. The local economy depends on attracting a highly educated workforce. Howard County sees itself as competing with other major suburban communities nationwide that provide a similar high quality of life such as Cherry Hill, NJ and Reston, VA.

Tourism

Howard County's tourism strategy is focused around both attracting visitors to the county and retaining tourism dollars from local residents. The county's most popular tourist attraction is Merriweather Post Pavilion, an outdoor concert venue in Columbia that attracts a number

of major music festivals. Approximately 350,000 people attend concerts at the venue every year, many of them from out of county.

Other major attractions include:

- Historic downtown Ellicott City, a major draw for residents in the region
- Agri-tourism, including the county's 23 farmers markets
- Local festivals, including Maryland's largest wine festival
- Outdoor recreation opportunities; Howard County has over 100 miles of trails and is a major mountain-biking destination
- Adventure destination along Route 1 such as a BMX park and laser tag

In addition to leisure visitors, the county is competitive at attracting business travelers and benefits from its position between Washington DC and Baltimore that provides "two cities for the price of one".

The county competes with other exurban local markets such as Loudon County, VA in attracting visitors. One of the greatest challenges is to encourage visitors coming to Howard County for events to spend more time in the area.

Opportunities for Bike Share

The group felt very positive about bike share in Howard County. From an economic-development perspective it will provide an additional amenity to attract the educated and highly mobile workforce its economy depends on. Howard County's major employers could be attracted to sponsoring the program. While the type of industries based in Howard County (defense and professional services) may not be particularly interested in sponsorships as a means to build brand awareness, they have a history of actively investing in the community.

For tourism, bicycling is also increasingly important. The Sheraton hotel in Columbia already has bicycles available for guests. Proximity to bike share has become a selling point for businesses and hotels in Washington DC. Bike share could be a means to help tourists explore the county, especially drawing visitors from Merriweather Post Pavilion to downtown Columbia.

Parts of Howard County, such as downtown Columbia, are increasingly becoming more dense and developed. Bike share could help serve this growing area. Other opportunities for bike share include at the community college and at the trails to Catonsville and BWI airport.

The group was not discouraged by the limited examples of bike share in a suburban setting. Howard County has a history of “firsts” and they saw an opportunity for the county to be a pioneer in bringing bike share to a new setting.

Goals for Bike Share

The group saw bike share as supporting the following goals:

- Public health
- Providing an alternative to driving and reduce the impact of future development on traffic congestion and parking
- Tourist amenity; brand Howard County as a bicycle destination
- Economic development tool

MAJOR INSTITUTIONS GROUP

Participants

- Bob Marietta, Howard County Community College
- Scott Templin, Columbia Association

Facilitators

- Alison Cohen, Toole Design Group
- David Cookson, Howard County Department of Planning
- Mauricio Hernandez, Toole Design Group
- Andrew Zalewski, Foursquare Integrated Transportation Planning

Summary

This meeting was conceived as an opportunity to talk with major employers about bike share in Howard County. Only Howard County Community College was able to attend but the Community College was interested in the plan and will likely be a key stakeholder if bike share moves forward.

Overview of Community College

The Howard County Community College is a major anchor institution in Howard County, with over 30,000 enrolled students (13,000 full-time

equivalents) and approximately 2,000 employees. The majority of students attend classes at the main campus in Columbia, however satellite campuses are located in Laurel, Mount Airy, and Gateway.

The Community College continues to expand and a new master plan is currently under development. The northern end of campus, home today to the campus's core, is nearly entirely built-out and future development will likely occur to the south.

The growth of the campus has placed strains on the existing parking supply. The main campus features only 3,000 parking spaces on its main campus, with additional parking available off-site. There is nearly not enough parking to allow every student and employee to drive to campus. Many students are dropped off at campus, walk, or take transit. The majority of the students live within five miles of campus. A trail is currently under construction that will provide direct access from the Community College to downtown Columbia.

As classes are spread across the 120 acre campus, some students drive from one location on campus to another, farther exasperated parking constraints and auto-congestion on campus. As the campus continues to grow to the south, the need to encourage non-motorized circulation through campus will grow.

Opportunities for Bike share

Howard County Community College seems very interested in bike share, both as a means to connect students and employees to campus, but also as a way to provide improved campus mobility. The construction of the trail link to campus will make cycling to campus much more appealing. The link will also provide an alternative for students traveling to shops and food in downtown Columbia.

The Community College is interested in helping support a bike share system in Howard County. It sees a lot of potential in bike share and may explore implementing a system even if no countywide system is established. The college does not see itself as operating the system but would be willing to discuss helping financially support the system in some way.

Goals for Bike Share:

Participants identified the following goals for bike share:

- Provide an alternative to driving and reduce the demand on parking
- Promote sustainability on campus
- Promote improved health and wellness of faculty and students

PUBLIC MEETING

Overview

The following are highlights of the feedback provided at the public meeting on May 1st:

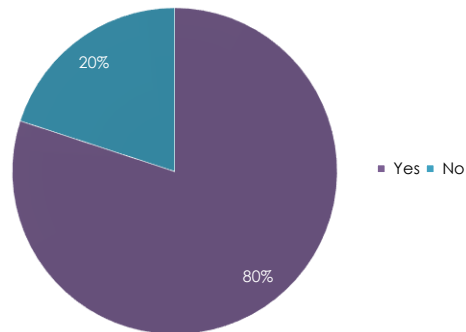
- "I live in Oakland Mills and the thought of picking up a bicycle in the village center and biking to the mall is appealing. I hate going to the mall because of parking"
- Bike share has very low ridership at many suburban Capital Bikeshare stations, including stations in Rockville, Maryland. How can bike share succeed in Howard County when it is poorly utilized in nearby peer communities?
- Columbia has very different conditions from cities where bike share is successful. The lack and cost of parking make bike share appealing for short trips in Washington DC. In Columbia there are few barriers to driving so residents have little incentive to use bike share.
- The steep grades in Howard County can be a barrier to bicycle usage. Some participants voiced interest in E-bikes. One person present expressed that E-bikes present an infrastructure challenge as most bike share stations are solar powered and existing solar systems do not provide the kind of power necessary to charge bicycles.
- Wayfinding for cyclists is a challenge in Howard County. While Columbia has an extensive path network, the lack of signage makes it hard to navigate around.
- Bike share may have to serve a different market here than it does in urban areas. Howard County was designed for the

automobile. Parking is plentiful and easy to find. A bike share system may serve more of a recreation purpose than it would in Downtown DC or Baltimore.

APPENDIX 3 - ONLINE SURVEY RESULTS

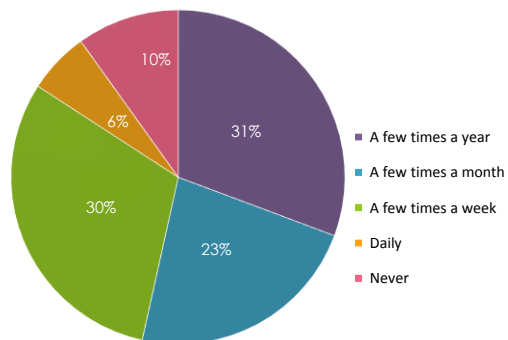
The following is a summary of input received through the online survey that was linked to the Howard County Bike Share Feasibility Study website www.howardcountybikeshare.com. The survey was open for general comment from April 3 through June 13, 2014.

1. Do you currently have access to a working bicycle?



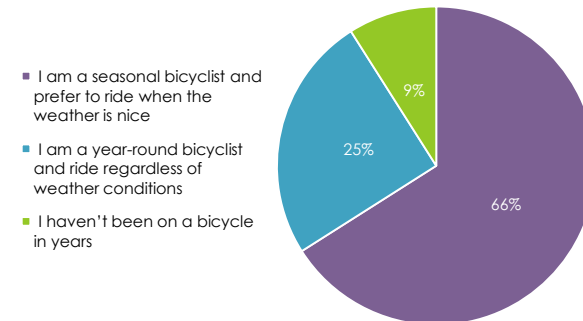
Total responses: 152

2. How often do you ride a bicycle?



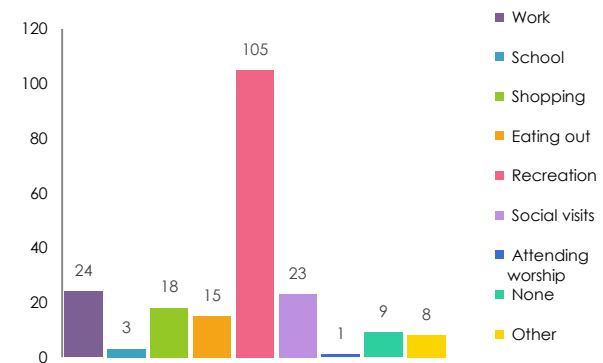
Total responses: 121

3. Which of the following best characterizes your bicycling behavior?



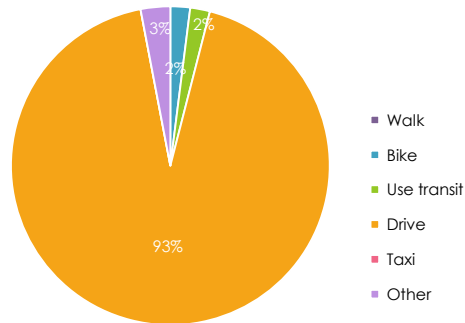
Total Responses: 120

4. What types of trips do you currently use a bicycle for?



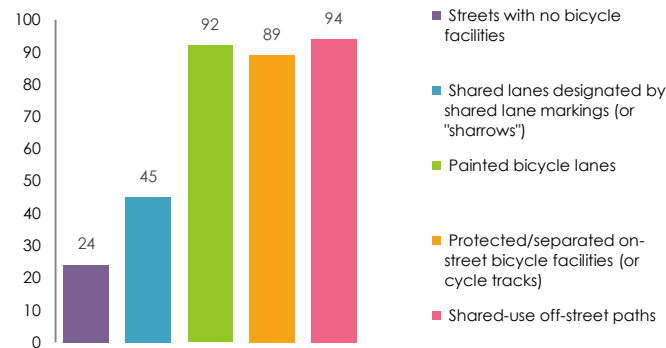
Total responses: 121

5. What is your primary mode of transportation for destinations in Howard County?



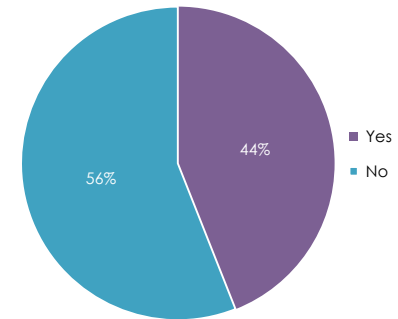
Total responses: 152

6. Which of these bicycle facilities would you feel comfortable riding bike share on:



Total responses 143

7. Do you think the existing trails, paths and bicycle lanes in Howard County will be sufficient to encourage you to utilize a bike share system?



Total responses: 147

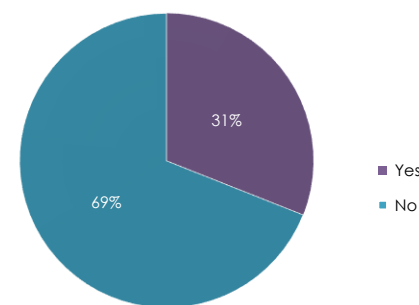
8. Why not?

Count	Response
1	Bicycle lanes when taken from existing roadways are dangerous and should be banned.
1	Could not safely get to work if I decided to bike.
1	Don't go directly and safely to shopping areas.
1	Don't like them
1	Existing trails don't seem to go anywhere. The villages need to be inter-connected better.
1	I don't need a bike, I need better infrastructure.
1	I have my own bike
1	I so not like riding bicycles
1	I want a bike when I want it, not if it is available.
1	If I were to go somewhere by bike, I would use my own, not bike share.
1	It's fine for a ride i the park, but not to commute.
1	Need better access
1	Not marked well at all as to rules of behavior for safety and directions to various destinations
1	Not safe. Not near where I would need them. Lack of directional signs
1	Some paths are cut off and do not make it easy to get around all the time
1	Some streets are too dangerous!
1	The paths are designed for recreational use and neighborhood to neighborhood access.
1	There are no trails near my residence
1	They are too narrow
1	They don't get me where I need to go, if they do it certainly isn't the fastest route there.
1	They don't go the entire route I wan to take.
1	Too crowded
1	Too crowded. Too dangerous (criminals).
1	Too far to effectively bike anywhere.
1	Too large of an area
1	Too many areas shared with vehicles
1	Too much opportunity for robbery and stolen bikes.
1	Trails don't go everywhere
1	WAY TOO MUCH TRAFFIC CALMING
1	can be dangerous
1	communities are separated too far for nothing other than recreational riding
1	folks don't ride enough to warrant spending money to support.
1	need more roadway facilities so get to destinations.
1	not enough lanes !
1	not enough quick and safe access.
1	way too crowded as it is.

1	I would think the bike share bikes would be cumbersome to ride on the hilly, uneven paved columbia pathways, and are not really suited for sidewalks. I believe that the population of people that you might get to use the bike share (i.e. people with not too much bike safety experience) would not feel comfortable riding in a lane with cars.
1	I do not agree with riding on ANY ROADWAY in Howard County. Many of the streets are narrow and heavily traveled. Too dangerous for the rider and driver!!
1	The major roads like Cedar Lane and Broken Land, Snowden River, Little Patuxent do not have shoulders and I never feel safe riding a bike on those major road ways. Until something is done to address this issue, I don't think biking is safe. I work 5 miles from my home and would love to be able to ride my bike to work but I never consider that option because it involves roads with no shoulders.
1	The bike paths are good for walking and awful for biking. Main roads have no bike lanes and are dangerous to ride on. Columbia is not bike friendly at all.
1	Missing bike facilities between major sections of Howard County (fast suburban roads with little or no shoulder).
1	Trails are already very crowded with joggers, pedestrians, etc. Commuting in many places requires crossing busy streets (e.g. between lake kittamaquundi and the mall). A decent used bike can be bought at Race Pace for under \$150. People in columbia already live on or near a trail most places. The issue is crossing busy streets like 175, 108, patuxent parkway, and 29, etc.
1	Too much bicycle/jogger/pedestrian traffic already on the existing trails. More infrastructure is needed.
1	Most of my Howard County trips are home to destination. If I am traveling from home, I am going to want to take my own bike. Bike Share seems to work best in places that have a mode of transit between home and destination. Example: Home --> Metro --> Destination.
1	Many trails aren't big enough for both pedestrians and bicyclists. And to get to a destination on the other side of the mall or rt 29 requires me to go quite a distance out of the way to find a safe route. I ride slowly, so I try and avoid all but the quietest neighborhood roads.
1	To narrow of shoulders in some locations that don't offer necessary protections between drivers and cyclists. Often, riders are forced into the lanes of on-coming vehicles.
1	The existing system is confusing unless you already know where the trails lead. Additionally, the trails do not necessarily lead to many commercial locations safely.
1	I don't feel that existing roads throughout Howard County are overall very bike friendly. I live in the Emerson community and Gorman Road & Murray Hill Road have absolutely no shoulder or designated bike lane.
1	There are way too few and they have insufficient interconnectivity. If I'm riding a bike to get from A to B (as opposed to recreational) I don't want to be on shared paths maneuvering around walkers and runners and children on bikes and skateboards.
1	No designated and painted bike lanes on main arteries. Paths are nice but not good for road bikes and too inefficient for commuting or running errands by bike. Share the road signs are not enough to convince drivers that bikes belong on the road. There are also a lack of secure bike racks in key places.
1	Howard County needs more bike friendly trails. Road sharing by creating separate lanes would be great. Like they do in Holland.
1	i live in Scaggsville and we are not connected to the rest of columbia, so riding my bike to somewhere is dangerous at the moment. I wish there were more bike lanes and sidewalks in my area. it is too dangerous for the kids to walk or ride anywhere from my house, and it is sad because there are restraints and shops that COULD be in walking distance.
1	There aren't many separated bike lanes. I wouldn't feel safe riding around. If there was a bike share at Centennial Park or something, that could be cool so people wouldn't have to bring their bikes.
1	Don't feel that the trails are a safe place to ride especially alone. There are always news clips in the Flier of the thugs assaulting someone, stealing phones, wallets and such.
1	Still have to cross some busy streets and motorists, in my experience, are not likely to share road with bikes
1	People speed on most roads, and although they are not supposed to, I regularly see people texting or talking on their phones while driving. Unless there is a wide shoulder or a dedicated bike lane, I am always nervous that I will be hit by someone who is distracted.
1	If there was a market for a bike share system, someone would start a privately owned one. The fact that government is attempting to subsidize it means it will fail.
1	I live in Elkridge and I do not feel like it is safe for bicyclists to be on the road there because of lots of traffic, and narrow lanes and lack of paths/bike lanes.
1	Most trails do not go to places of interest. They are for recreation. If transportation is desired, better facilities are needed.
1	I would like to bike to work but there are no trails or lanes that would bring me to Ridge Rd. in Ellicott City.
1	I don't think there are enough bike lanes in HoCo. Also roads are narrow surrounding Columbia and throughout HoCo. Many roads/streets do not have shoulders or are wide enough to allow a bike to travel safely when there's significant traffic.

1	The county is too geographically dispersed for bike share to be feasible. There are miles of separation between our largest suburban centers with multiple physical and logistical obstacles for a feasible path selection. Bike shares tend to be done in increments of 30 minutes. This works in places like the City of San Francisco, but does not work in rural/suburban counties.
1	There are many areas in Howard County where I would hesitate to ride my bike or a bike share bike due to the lack of bike lanes and heavy traffic. And I would think that the most logical places for stations would be in these very busy areas, such as Columbia Town Center and shopping centers.
1	The paths are not wide enough and there are no streets I can think of where I would feel safe riding. For example, if I wanted to go from my home near Cradlerock South to the E. Col. Library I would have to ride on Cradlerock, where I would be in traffic, or go straight across through land where muggings have occurred.
1	There are no maps to show how they are connected or where the trails go... at least I'm not familiar with any maps that do exist. Also, would they go where I need them to go?
1	Land use is too sprawling, destinations are too far apart and high speed stroads create major barriers.
1	Not enough safe riding area continuity. Snowden is a nightmare to ride on. Consider an off-street path the length of Snowden.
1	The trails are wonderful, but often you must go on major streets to connect the trails. A sign that says "Share the Road" isn't good enough, really scary w/ the drivers around here. Dedicated painted bike lanes would be great in the streets that connect the paths.
1	I love to bike and I own a bike now but I never ride because I believe that I would be putting my life in jeopardy because of the crazy drivers. There would have to be many more bike lanes made before it would be safe to ride in Howard County!!!
1	Paths bring criminal element preying on helpless yuppies on expensive bikes waiting to get mugged.
1	there's not enough and it's not safe to ride a bike on most streets in howard county. there is not enough education to drivers to respect other forms of transportation on the road. it' extremely dangerous. there needs to be better education for drivers and cyclists and clearly marked bike lanes with signs and painted roads. Barriers would also prevent motorists from entering the bike lanes for any reason which would also increase safety.
1	I've tried to commute to work on existing trails and paths, and it is way too convoluted and in complete. I end up on the roads half the time. Now I just bike the roads---much quicker, and no pedestrians with dogs to worry about---only cars, buses, trucks!
1	Because biking is not a good mode of transportation is a county as spread out as Howard. This is not New York City.
1	Bike system is currently designed for recreational cycling in CA region, not commuting or casual errands as bikeshare is often utilized for. Also, bikes will need to be designed for longer distance rides since HoCo point-point distances are longer than urban cycling systems.
1	Most trails are narrow and I feel that cycling on them is dangerous to the walkers. Bicycle lanes are good and I feel safe, but there are very few of them.

9. Have you had an opportunity to use an existing bike share system before?

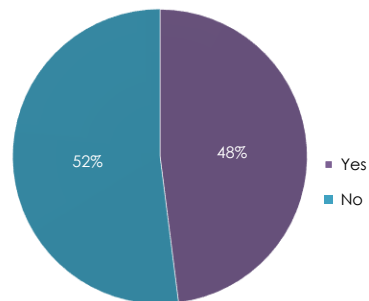


Total responses: 131

10. Where?

Count	Response
1	Chicago
10	DC
1	DC and Arlington.
1	DC, Boulder, Chattanooga, Oklahoma City
1	DC, Chicago
1	DC, Montreal
1	DC, NYC
1	DC; NYC
1	DC; Paris, France
1	Dc
1	Holland
1	Holland and D.C.
1	In Netherlands
1	Miami
1	MoCo, DC
1	NYC
1	New York City
1	New york. Charlotte
1	Paris
1	Paris but I used my roller blades back then
1	Portland
1	Quebec City
1	San Francisco, CA
1	Silver Spring, District
5	Washington DC
1	amsterdam
1	washington DC
1	washington, DC
1	I've walked to every village center, savage park, ellicott city. Keep bike paths away from cars and keep them in park like settings.

11. Do you think bike share is a good idea for Howard County?



Total responses: 131

12. Please tell us why you think bike share is a good idea for Howard County.

Count	Response
1	An alternative to cars and no need to own/maintain/store a personal bike.
1	Bike riding is better for our physical fitness and for the environment.
1	Biking in general is a much healthier way of traveling short distances.
1	Biking is better than driving for health and for the environment.
1	Get cars off the road, get people exercising and moving, more use of the paths already available
1	Howard County is a young fit county. Lets support it!
1	It could cut down on traffic and get people active.
1	It will provide a transportation and recreation option that people want.
1	It would be nice to borrow a bike to ride in our many parks.
1	It would be wonderful and would open up Howard County to its residents
1	It would prove beneficial for those who cannot afford a vehicle
1	Less cars on the road!
1	Less driving is always a good thing
1	More Urban areas need options.
1	More bikes = better living.
1	More people on bikes is always a good thing
1	NICE FOR FOLKS TO HASVE ACCESS
1	Reduce auto traffic, increase business revenue, increase mobility, attract young people.
1	The more bikes present the better.
1	Traffic control and health.
1	We already have tons of trails to get you where you need to go.
1	better for health and environment
1	exercise
1	the bus system is available but not always convenient
1	the county is easily accessible by bike ;
1	So many trips are short, to pick up something quickly. It's not necessary to drive because the shop is close by, and the items purchased can be placed in a bike basket.
1	Mixed feelings. Good way to get from center to center, but I would most likely leave from home, so wouldn't use the bike share.
1	It will generate traffic in the Village Centers and reduce vehicle emissions. Also, citizens will get to exercise.
1	It would give the opportunity to have a cleaner environment, provide extreme health benefits to residents and be cost efficient alternative transportation as well.
1	Encouraging more people to bike would reduce the number of cars on the road, making it even safer to bicycle around town. Plus there would be less road noise and cleaner air, so I'd be more comfortable in public places.
1	County has existing trails that could be shared with bikers; sidewalks are not heavily used by pedestrians (e.g. not as bad as DC) and could be shared with bikers; Howard County is a health-conscious county; bikeshare has been rolled out regional, so individuals may be familiar with it; many stores are within biking distances of one another, thus providing a high "bike-ability" factor
1	What a great way to continue to develop a "green" environment. I also believe with the existing path system the idea is just another great alternative for healthier living.
1	The existing network of bike trails seems well-suited to allowing Columbia residents use bikes for shopping, socializing, or possibly going to work.
1	The bike network is growing and more people want to get around by bike for some of their trips. Bikeshare will be good for the local economy because it encourages people to shop locally. More vibrant street activity with people walking, biking and taking transit makes Howard County a better place to live.
1	There are a lack of viable public transit options here. For example, if I want to arrive to work (HCGH) at 7am in the morning, I would need to get a bus from my house at about 5am in order to make a 6am transfer at the mall, however the buses do not run this early, so I really must drive. However, if I could ride a bike to the mall and then catch a bus, that would be another story.
1	Good way to get around without having worries about risk of having my bike damaged or stolen. Great for one way trips or when there is alternate transport for other leg of trip. Efficient way for commuters to get to job or school. Fun way to get to pools, gym.
1	There are a lot of nice paved paths hidden in Columbia, at least. It would be fun to bike these, but I do not own a bike.
1	I don't use a bike often and enjoy walking. But, the bike paths in the park settings are essential to the character of Columbia. We need more beautiful paths. More thought should have been put in the design of the Dobbin/Snowden area. I hope it's not too late to add paths there as development continues.

1	Anytime you can encourage people to get out of their cars, it's a good thing. Downtown Columbia needs more off-street pathways connecting shopping and points of interest. More bike stands are a must as well.
1	I've always marveled at the bike share programs in DC and think providing people an opportunity to do the same in HOCO would make sense
1	Howard County already has a tremendous system of walkways and trails, which might experience different types of usage if there were a bikeshare program.
1	If the system guaranteed safety (separate bike lanes) and reduced my fear of my bike being stolen while at work, I would be definitely open to this idea or new way of city life.
1	Makes it easier (more accessible) to ride instead of drive. Good for the health, and good for the environment.
1	Get more people using bikes instead of cars. Better for health, better for environment, better for community.
1	Lots of people have bikes, but only a few actually ride them (probably b/c their bikes have flat tires and need maintenance). If the bike shares are placed well, people will probably ride. An app to find the bike shares would be a good idea.
1	Only if the existing roads are expanded to include a sufficient shoulder or dedicated biking lane.
1	It encourages people to bike, less driving and traffic, more active life style. We are european, so we love bikes and would love to have that implemented here.
1	I think the extensive pathways that Columbia already has in place would be ideal for bike sharing in my area. I would LOVE to get in my car less, and this could be an incentive. Plus, would be great for my kids to get around.
1	In the central district, there seems to be enough slow roads (residential streets) that could easily be utilized in addition to the current bike path system. Though the current bike path system is a bit too narrow for mainstream commuters.
1	HoCo has a large population of cyclists and an even larger population of eco-enthusiasts. HoCo already has a large number of off-road paths for cycles and a growing number of neighborhoods encouraging non-vehicular mobility.
1	It gets the community to exercise more and gets people to drive less. Re: question 8 & 9, if people take public transit, it would be very helpful to have bike shares integrated between Baltimore and Washington.
1	There needs to be better options moving forward. there should have been bike lanes already on the roads. encouraging bicycle riding would necessitate making the roads more bike friendly and expand greatly the quality of life in Howard County. Enabling people to utilize the outdoors much more and cutting dow on parking and road congestion problems and pollution, not to mention saving people money in the long run. i see it as a big draw for the younger generation to move to the area. Move forward Howard County, don't get left behind. we have much going for us.
1	It will promote health, ease congestion, and increase transportation options for people who do not own a car.
1	Would make it possible for those who can not afford a bike or want to go biking once in a while to enjoy the weather and get some exercise
1	As the population grows, especially near Town Center, there needs to be alternative methods of transportation.
1	Any increase in bicycle ridership in howard county makes it easier for cyclists to coexist on the county roads with cars. I would like to envision our community in the near future as one in which it is safe enough for even our kids to ride to school without fear of being hit by a car.
1	If there was a bike share I would bike more places than drive. My current bikes are road/racing bikes that are not as good on trails.

13. Please tell us why you don't think bike share is a good idea for the County.

Count	Response
1	Access to inexpensive bikes is not a problem in HoCo. Roads and trail capacity are the problem.
1	Because there are no safe places to ride.
1	Bikes are inexpensive and I prefer to own my own.
1	County can't afford any new expenses.
1	Does not have the density to support bike share
1	Don't use county funds.
1	Encourages dangerous bike use in heavily trafficked areas.
1	HoCo is too spread out and the bike infrastructure is lacking.
1	How much would it cost to expand and maintain? I am already taxed too much by the county.
1	I do not see the purpose for it outside of a city!
1	I don't believe this is a wise use of tax money at this time.
1	Impractical and dangerous. Overwhelming number of vehicles and grid-lock traffic.

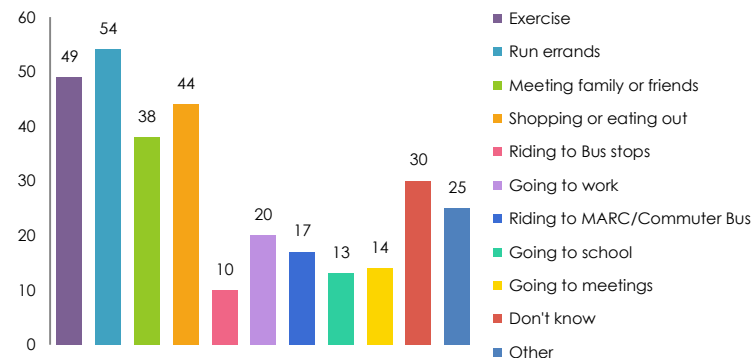
1	Lack of biking safety infrastructure such as designated and painted bike lanes on main arteries.
1	No helmets. No good facilities. People should buy their own bikes and helmets.
1	No part of the county, including downtown Columbia, is dense enough to support it.
1	There are more important problems to worry about.
1	Too rural.
1	Traffic
1	You have too many bikers as it is and the ride on the worst roads i.e. college ave etc.
1	it's too dangerous and ties up traffic
1	not convenient
1	stop wasting my tax dollars!
1	HoCo isn't connected to anything besides itself. Despite Rouses' visions, there is a lot of progress needed to revitalize the neighborhood centers to create the destination. I know the chicken/egg because I work in the profession, but most use these for short trips, not recreational ventures, as they are bulky.
1	I don't think the roads /paths are appropriate for running errands, etc. I road my bike to my CSA once this year and it was a horrible experience. First work on improving/increasing the bike lanes and connecting major shopping centers to the Columbia Trail system before investing in something like a bike share system. If people don't feel safe, they will not use it. I am a very experienced biker and wish I could take my children - by bike - to the shops/restaurants at Dobbin Center but there is not even a sidewalk for them to ride on once the CA trail ends.
1	I am not sure. Like I said before...make the major roadways safer for bikers (bike lanes/shoulders) and then I think it would be a great idea.
1	Bikeshare is best implemented to augment an existing multi-modal transit infrastructure where cycling infrastructure is already in place or vehicle speeds are slow enough to accomodate casual cycling. HoCo cycling infrastructure is in its infancy, point-point distances for destinations are often too far for casual cycling, and the bikeshare infrastructure is not backed up with a high frequency (very long headway) transit system especially at night.
1	Almost everyone would have to DRIVE to get to where a bike was..so what would be the point? Howard County is too spread out for it to be workable. AND there is not a good system of paths, and the roads are barely safe for bikes.
1	(1) It's unnecessary for transportation needs. The County is still primarily a bedroom community for DC, Washington Business Park, Fort Meade, etc.; (2) if someone wants to ride a bike, they can buy a bike for \$100 (which would pay for several months of rental/share); and (3) the resources should be better spent on hard transportation/civil projects or unfinished parks/recreation projects (Blandair Park).
1	If people want a bike, they should buy a bike. If it were a good idea, there would be an independent non-government company doing it.
1	Perhaps on Main St. Ellicott City and Savage/Laurel where people go from store to store/restaurant. Parking is plentiful everywhere else.
1	Priorities. I would rather see sidewalks built for pedestrian traffic. This would eliminate virtually ALL available right of ways for bikes.
1	I would qualify my answer with "at this time." I like the concept. If the idea is to get infrastructure in place before increased urbanization, I'd be in favor of that. But reality is that many of us who have bikes already would use them for all kinds of trips if there were enough safe places to ride but there aren't. Also, I fail to see a demographic that would use the facility in sufficient numbers. Columbia in particular doesn't have enough young people given no large universities and not a lot of affordable housing. As for commuting, it seems most people who live in Columbia don't work there and vice versa. And the public transit seems so lightly used that it would hardly supply enough who wanted to finish their commute on a bike.
1	It is a waste of tax dollars. People would only ride bike when the weather is good, which is almost never.
1	I think most of the people who would ride bikes in Howard Co are residents - and they more than likely already have bikes. Long term bike ownership is more cost effective than renting. There are not locations to draw people to bike from place to place as in a big city.
1	It is a car dominated area, better to use resources for more busing. Most non riders will only ride during nice days.
1	The roads are already crowded. The distances are too great for bikes to be practical or useful. If there was a market for a bike share, a privately owned business would spontaneously form to address this market.
1	It's Howard County not DC. People have room for bikes. The roads are just not safe for bike travel.
1	I want to say maybe. It is a good idea because it allows Howard County to present itself as a sustainability leader. Maybe in the denser parts of the county, but I live in Ellicott City. A reason I don't think bike share is a good idea is because I don't think it will have high enough demand. I see a lot of bicyclists out, but they tend to be the strong and confident cyclists in lycra who don't carry locks because they aren't going to stop anywhere on their ride. When I ride to the grocery store it is usually only my bike locked outside, and very few stores are accessible by bike for people who are nervous about traveling on or over Rt 40. The lycra clad bike rider does not ride for utility purposes, despite their

	physical ability and confidence. Howard County needs the infrastructure to encourage casual cyclists before we invest in Bike Share.
1	See my previous comment block for details. Economic subsidization of private industry by government interests is a waste of money and lacks sound fiscal discipline. This state is wasting money left and right and the infrastructure required for this type of project does not exist.
1	While I support the concept of bike sharing I don't believe Howard County and Columbia have the population density to support this program.
1	Howard County is too spread out and this is the last thing on earth the county needs to get involved in. The county can't even respond to snow removal effectively and efficiently as evidenced by this last winter, why on earth are you hand-wringing about silly projects like this? How about you pay attention to and service the infrastructure you already have? If the county wants to get involved in ANY sort of new transit endeavors, pitching access to either MARC or WMATA's Metro in Howard County should be the focus.
1	People are going to get mugged and its going to cost a lot of money to replace all the stolen bikes.
1	Most people in Howard Co that want to ride a bike already have one. I think the people that will rent one will not know how to follow the rules of the road ... will cause accidents for themselves or others.
1	Not many people ride bikes to work. On my drive I see 1 person biking to work seasonally. Most avid cyclists will ride regardless of whether or not there are designated lanes and they own their own bikes.
1	We are a suburban community not a major city. Don't have enough people without cars or places to park as in DC.
1	I think most people who would ride already own a bike. The money could be better spent creating real bike lanes.
1	You do not have bike lanes or even shoulders on a lot of our roads. Sometimes it's unsafe riding down roads like Homewood let alone busier streets.
1	People who want to ride a bike have one of their own. This idea is only good for tourist areas and maybe students at a large university. If you don't have a bike, it would be dangerous to just pick one up and try to ride.
1	This model works well in Cities... it may work well if limited only to downtown Columbia. I don't see it working well throughout Columbia, it won't get enough use to justify the cost.
1	Anticipated fees and costs will prevent so many people from using the system much. People in cars cost the county much more money. Make bikes low cost and subsidize them to get autos reduced in numbers just as in Copenhagen and many places in Europe
1	It's a silly idea and a waste of money. It's the suburbs; people drive most places (and expensive bike rental will not change that). The people who do want to bike can already buy one and keep in their house for a few days worth of rental. This is not New York where people don't have room for bikes.
1	To do so the right way will be very costly, and the tax payers already pay waaaaay too much for the limited service we get in return. This will (sadly) end up costing way more than it should due to who will be implementing / running it.
1	More bicycles on public streets will lead to more accidents, people in cars getting stuck behind bicycles, etc.
1	Back to earlier comment. If on one of the bike trails, near the mall, anywhere on Stevens Forest. It is not a safe place to be especially alone with the resident Ho. Co. thugs
1	There are only a handful of locations where I can envision sufficient activity to warrant a station. A very limited system would be extremely inefficient and costly to operate for the likely amount of usage.
1	Bike share is about supplementing existing convenient mass transit, which Columbia doesn't really have. This is because you need an alternate means of transportation if 1. No Bikes Available 2. It starts to rain/snow or you just don't want to ride back. One of the main issues I have with DC's bikeshare (before it broke me) was that when I came in to Union Station in the morning, all the bike were gone as they were in use by people who got there before I did. And even worse is the reverse. When I would be returning to Union Station, all the slots were full and I had to go to an alternate and would end up missing my train. Columbia is hilly and too spread out for these types of bikes which aren't designed for long distance and only have three speeds.
1	Nothing is centralized in the county...I don't see the purpose. I see buses driving up and down my street and no one ever uses that public transportation, why would they use a bike? Additionally, when monitoring the daily police blotter, bikes are the most commonly stolen item. If the bike share is targeting those individuals who have limited means of transportation, why would they give the bike back?
1	Currently too many peckerheads riding around HOCO being a nuisance on roads they have no business being on. If the road does not have a shoulder there should be no bicycle traffic on it. Like 108, Old Frederick, Burntwoods, Florence, Jennings Chapel or even Rt 32 where I FREQUENTLY get stuck behind a pack of these pests. Narrow windy roads are not the place to be leisurely cycling around. Yet HOCO sponsors rides several times a year.
1	If it is feasible let a private company do it. Not where I need my tax dollars in a state running a 1/2 billion deficit.

1

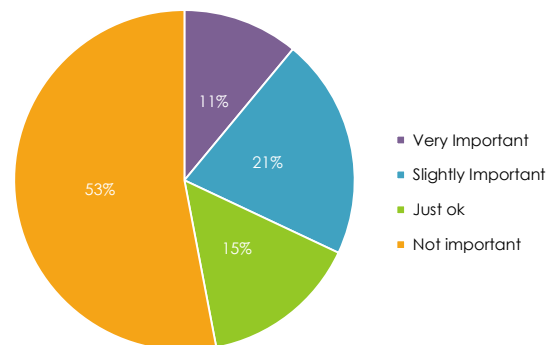
I believe that our county relies heavily on cars and buses for transportation. I also believe that these new riders will not obey the laws of the road and use the sidewalks.

14. If bike share were available, throughout the County what types of trips do you think you would use the bikes for?



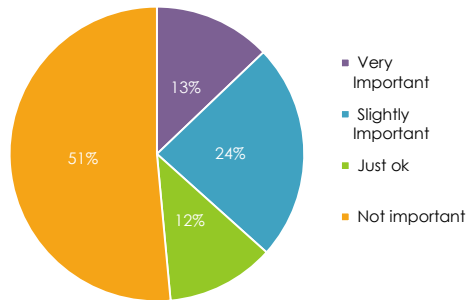
Total responses: 122

15. How important would it be to integrate a potential bike share system in Howard County with the proposed bike share system in Baltimore?



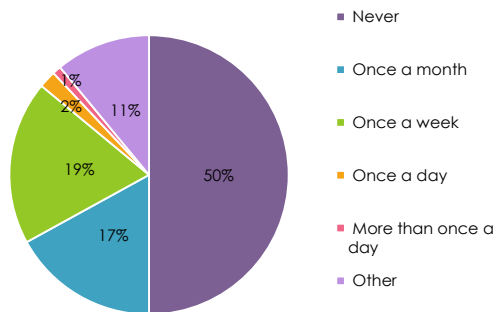
Total responses: 128

16. How important would it be for any potential system in Howard County to integrate with the existing bike share system in Washington, DC?



Total responses: 127

17. About how often do you think you would use bike share?



Total responses: 129

18. How much are you willing to spend on an annual bike share membership?

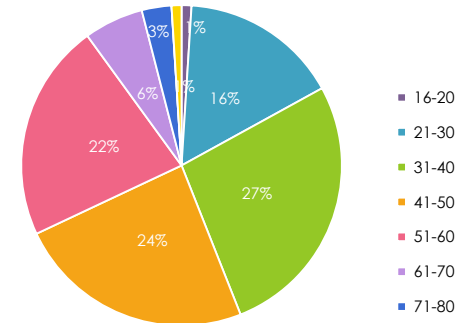
	Average	Min	Max	StdDev	Responses
Annual membership fee:	58.14	0	200	58.79	85
Weekly membership fee:	11.66	0	200	24.8	67
Daily or casual membership fee:	12.02	0	200	31.01	81

19. Please let us know which of the following objectives are the most important for the County to focus on for implementing its bike share program.

Objective	Score	Overall Rank
Expand the on-road bicycle facility network to accommodate more bicycle trips around priority station locations.	548	1
Promote a culture of safety among bike share users.	488	2
Integrate bike share as an extension of transit.	482	3
Educate the public about safe biking practices and rules of the road.	457	4
Optimize the number of origins and destinations that can be served by a bike share system serving as many neighborhoods and destinations as possible.	451	5

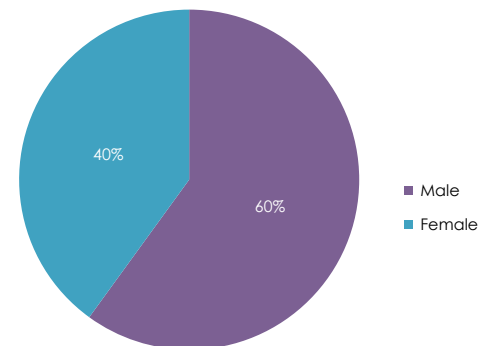
Develop a system that engages and serves users in minority and low-income communities and improves their access to key destinations, such as jobs, educational centers and recreational centers	383	6
Plan for and ensure sustainable capital funding for system growth and ongoing equipment replacement.	368	7
Provide station locations not only in the denser parts of the County but also in neighboring residential areas and eventually expand the geographic coverage across the County.	349	8
Cover all capital and operating expenses without public assistance.	349	9
Focus the system only in the denser County core.	299	10

20. Age



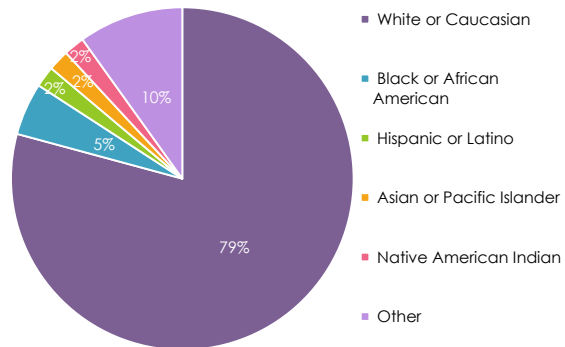
Total responses: 127

21. Sex



Total responses: 123

22. Ethnicity

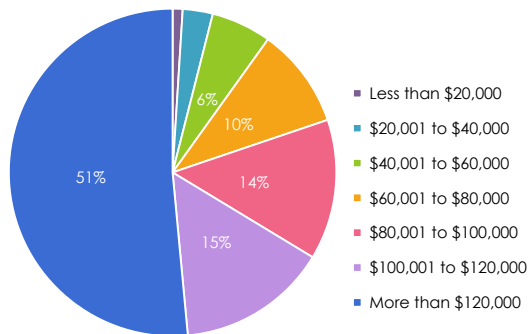


Total responses: 123

23. How many people reside in your household?

Count	Response
1	0
7	1
47	2
1	21
25	3
25	4
10	5
3	6
1	7

24. What is your annual household income?

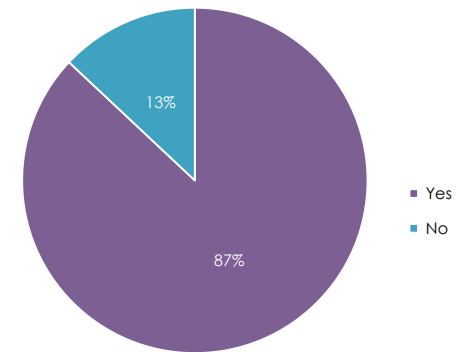


Total Responses: 116

25. 5-digit zip code for your home address

Count	Response
7	20723
8	20759
1	20763
1	20777
1	20794
1	20814
1	20902
1	21029
12	21042
4	21043
30	21044
30	21045
12	21046
1	21048
1	21060
7	21075
1	21737
1	21738
1	21794
1	21797

26. Are you currently employed?

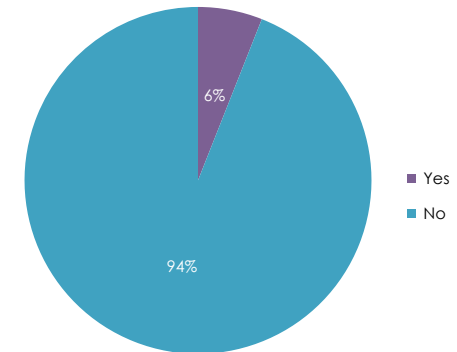


Total responses: 125

27. What is the zip code of your place of employment?

Count	Response
2	20001
1	20002
2	20006
1	20009
1	20024
1	20173
1	20506
1	20706
2	20707
8	20723
1	20740
1	20742
3	20755
3	20759
1	20777
1	20783
1	20794
1	20892
2	20910
1	20993
1	21031
1	21042
2	21043
11	21044
7	21045
10	21046
1	21048
3	21075
2	21076
1	21077
2	21090
1	21093
1	21117
1	21201
2	21202
1	21204
1	21217
1	21218
1	21226
1	21235
1	21287
1	21401
1	21784
1	22033
1	22102
2	22202
1	22204
1	22209
1	22314

28. Are you currently enrolled in school?



29. What is the zip code of the school you attend?

Count	Response
1	20742
2	21044
1	21205
1	21218
1	36561

30. Please provide any additional comments here:

Count	Response
1	Bad idea
1	Columbia is not this place for such a program. Save our money for better uses.
1	Don't spend my tax payer money on this. If you get private money for it going ahead.
1	Howard county doesn't have a bike problem, we have a biking environment problem.
1	I really hope this goes through, I would love to be able to bike through Wilde Lake.
1	I think it is silly and idiotic. I think someone is looking for votes.
1	I would like the see a bike share location in Maple Lawn.
1	If it feasible let private business do it.
1	Keep the bike paths in park like settings. Focus on beauty and culture.
1	Love the idea!
1	Make dedicated bike lanes a priority
1	Thank you for your hard work in bicycle advocacy in howard county!
1	This is a waste of tax dollars and/or CA dues.
1	This is exciting, I think bikeshare would be a great option for travel in Howard County!
1	Until the streets are made safer for bicyclists, this program will be under utilized
1	none
1	I think I bike share system would be great - but only after making significant road improvements that make it safer to bike. All of the people involved in planning this program should get on their bicycles and ride to major shopping destinations around HoCo or even just Columbia and see how safe they feel. While you can get to the village centers easily on the paths (yea!) you can't get to HCC, to/around Dobbin Center, to/around Columbia Crossing, to Wegmans/Apple Ford area, etc. I would routinely bike to these places if it were safer - a bike share system alone will not make it any more likely for people to bike.
1	It seems that bike share can be a part of transit options in the most dense parts of Columbia, but it also can be seen as a recreational opportunity to make use of the trail systems. Maybe bikeshare can be placed at the big trail entry points, such as near the lakes and off Patuxent Branch Trail.
1	I think Bike share would be most effective if all the roads were equipped to handle bikes first. that should be the number one priority. if there is still funding after that for a bike share program then that is great! I hope it comes soon.Best of luck!

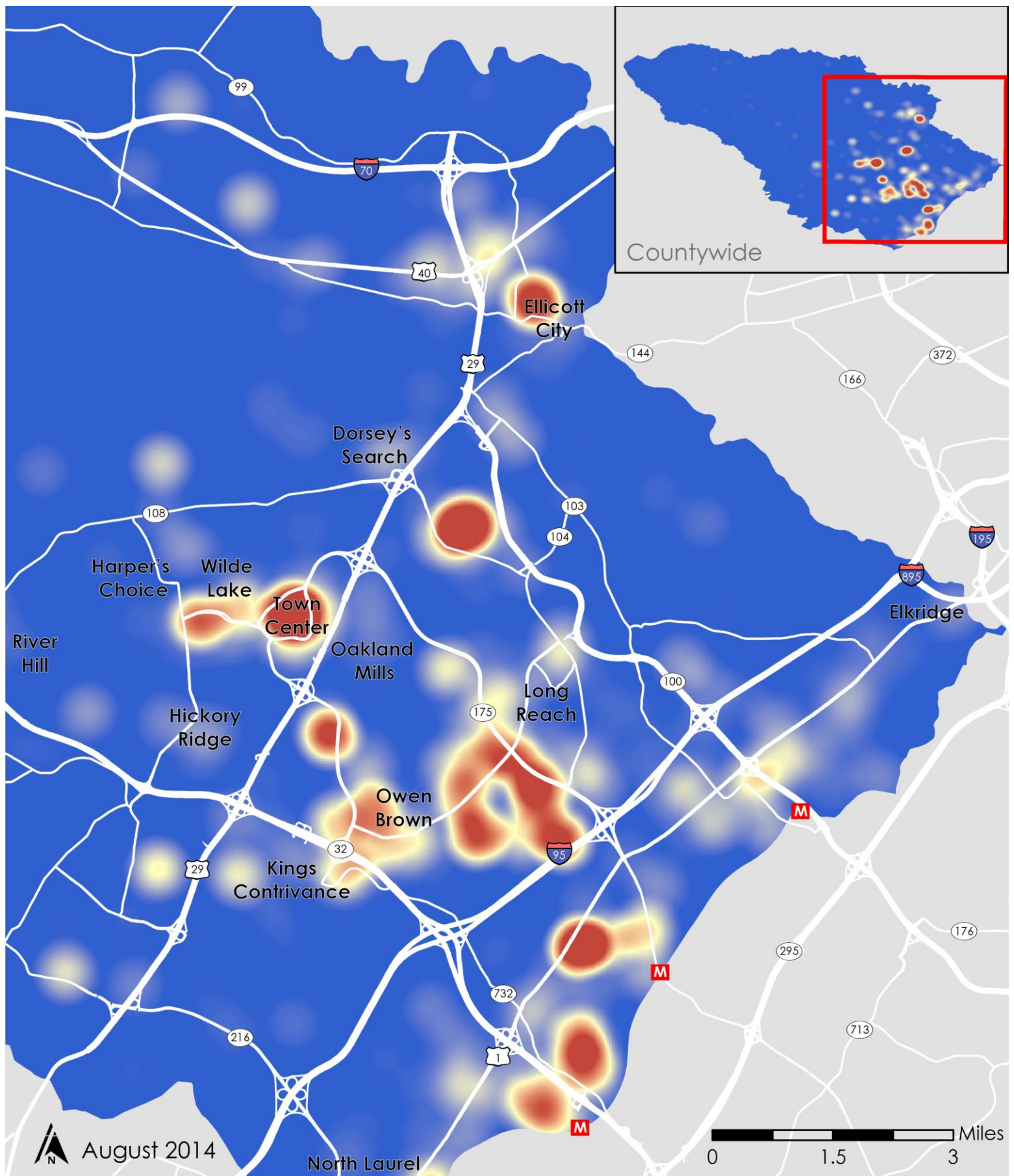
1	I would support a bike share program, even though I would be unlikely to use it because I already ride my own bikes throughout Howard County.
1	Columbia was built on the idea of walking to village centers. The idea has failed - just witness that entire Columbia area is wall-to-wall with cars on the week-ends. Only a very few people will use existing or new bike facilities and infrastructure.
1	Although I would probably not use bike share much I would love to see it implemented as an environmentally friendly means of transport, a healthy form of exercise and a means of reducing traffic, noise, pollution, etc ...
1	Instead of bike share, use funds to put in designated and painted bike lanes on all main arteries.
1	I believe this is a wonderful initiative for the future. I prefer to know my children can ride bikes rather than grow up car-dependent. I would ultimately use a bike too to go to work and go with kids to school, but a sense of bike safety is a major issue for me right now today.
1	You really need to substantiate the need for this. It can be very expensive and then end up not being used much. Makes sense in an urban area like DC or Baltimore, but Howard County is not urban.
1	My answers may be skewed because I own and actively use a bike. Not likely to use the bikeshare bikes but I would benefit from the increased focus on bikes and especially MORE BIKE RACKS AROUND THE COUNTY!
1	In parts of Germany the bike lanes adjoin the sidewalks, and walkers had better not intrude on the bike lanes! Our bike/walk paths are not safe for walkers because the majority of bikers do not give warning as they approach walkers from the rear.
1	Improving the infrastructure for a bike share program would help people be able to use their personal bikes too. Wouldn't even need to add bikeshare-specific stations all over, even just adding regular secured bike racks would help.
1	If you start a Bike Share, you should start one in the Villages Centers. This helps reach the county's overall goal to increase traffic to the Village Centers. Also, Columbia Gateway. Lots of Bikers are there on the weekends.
1	For pity's sake....before investing in a lot of new bikes out there, could we possibly concentrate on making it safer for bikes first?!? WHY oh WHY can't there at least be a SHOULDER to ride on 108?!? There are so many more bikers who would commute if there was something that looked like a dedicated bike lane on the major routes...175, 108, Snowden River, 29. I like my 30 minute bike commute, but it sure has increased my PRAYER LIFE!
1	Bike sharing works best in areas with high population density and many users of public transportation. I am a lifelong resident of Ho Co and friend of the environment and don't see where I ever would use bike sharing. The only place where I would use it would be to transfer from a bus or metro stop to my work or shopping. Otherwise, like most county residents I know, I would use my own bike or use a car. The county should talk to the bus riders as this would be a benefit to them. In the areas with the lakes the renting of bikes for recreational purposes might break even, otherwise this is a bad decision for our area.
1	Bike Share does not need to come to Howard County unless private companies find it feasible, and based on the fact that they don't already exist I would assume that it is a money-loser. There's no reason Howard County needs to get involved, especially given the poor level of service Howard County gives to its existing infrastructure.
1	Please expand roads throughout the county that are bicycling friendly. Too many roads that are dangerous with no shoulder or dedicated bicycling lane!
1	What are the results of other feasibility studies from communities most similar to Columbia and not a large city?
1	If the county moves forward with this program, I hope they will also be committed to improvements to make HoCo more bike friendly.
1	Getting from point a to b takes time in a spread out community like ours. Weather is a big factor for an occasional rider. Functional riding to a store or restaurant means you need storage for the bike and proper safety equipment. We have great trails for recreation. more bikes and pedestrian are asking for trouble on trails. Added lanes would be great.
1	Bike Share program planning needs to be integrated with planning for improved pathways, new bridge over Route 29 in Oakland Mills, and improved transit services.
1	I see bike riders run stop signs and red lights. They ride the wrong way on roads. They ride on sidewalks and almost knock people down. Bike riders must be made to ride on roads or bike lanes and obey all traffic laws. They should have to have a bike license and a license plate for their bike.
1	I love the idea of the bike share, however, the roads are not safe for bikers. Without shoulders or bike lanes I don't see this happening. People don't mind riding through the back paths some of the time, but some of those paths have big hills and do not connect. I don't see how you can do this safely.
1	Your survey seems to ignore the issue of almost no safe place to ride a bike. My answers might have been different if there had been some clarity about the road/path conditions under which bike share would be implemented.
1	I think it is more important to add a set of trails to directly inter connect the different villages.

1	I think that it is a great idea for Columbia in particular, given the existing trail system and the proposed trail improvements.
1	While I am a fan of broadening services and opportunities, I don't think that a Bike Share really should be a priority for the County or the CA. The County has enough major capital projects or issues with major transportation (29 expansion), civil (flooding in Ellicott City), parks (Blandair & Merriweather) to stay busy without adding another unnecessary project. The CA is in the middle of several projects as well (Haven on the Lake, new member services, and Inner Arbor) and should address aging facilities (Supreme Gym and Swim Center have continuous issues and need to shutdown frequently). In short, there are many more important issues to tackle than the creation of a Bike Share in a sprawling suburb.
1	You need to simplify membership and participation. There may be a danger of bureaucratic demands upon persons interested
1	Nice to know all other problems in the County have been addressed and we can focus on somebodies feel good pipe dream planned community utopia concept. Really this is a concern a bike share?
1	Maybe a very limited system in TC/HCC would be used. Apartment dwellers near the mall and HCC students may bike from home or school to the mall or whole foods. But I don't think such a limited system could possibly be economic to operate.
1	This is a terrible idea and an example of something that government should not be doing. Let the free market decide whether there is a market for a bike share or not. If Howard County has to subsidize it, there is no market and no point in wasting tax revenue.
1	I do not support spending my tax money on this effort. Please use our tax money for education or to ease road congestion.

APPENDIX 4 - CHALLENGES AND OPPORTUNITIES

Item	Challenges	Opportunities
Geography, Climate and Land Use	<ul style="list-style-type: none"> Difficult topography makes bicycling challenging in some parts of the County. Street connectivity is impacted by existing development practices in some areas of the County. 	<ul style="list-style-type: none"> Relatively well connected network of pathways and trails throughout eastern parts of the County. Older communities have a more interconnected street grid. Temperate weather throughout the year.
Demographics and Employment	<ul style="list-style-type: none"> Lower population and employment densities in Western areas of the County. Population and employment densities in central and eastern parts of the County remain low in comparison to denser peer jurisdictions with existing bike share programs. 	<ul style="list-style-type: none"> Areas in southeastern parts of the County (i.e. Downtown Columbia along Little Patuxent Parkway, Ellicott City and North Laurel) exhibit higher population and employment densities than those areas in the west. Development patterns in some areas of the County (ex., Downtown Columbia and Route 1 Corridor) are expected to encourage increased density of employment and population.
Transportation Mode share	<ul style="list-style-type: none"> High dependency on single occupancy vehicles Low parking rates and availability of free on-street parking Infrequent bus transit service and limited number of routes throughout the County. MARC commuter rail stations are relatively far from higher density areas 	<ul style="list-style-type: none"> Downtown Columbia is the central node of many of the bus services in the County, opening the opportunity for first- and last-mile connections to and from this location. County residents without access to a vehicle, represent an important demographic for bike share implementation, as it could help serve as a convenient and flexible complement to existing public transit services.
Bicycle Infrastructure	<ul style="list-style-type: none"> Existing major highways act as barriers to connectivity. Incomplete way-finding and signage program. Street design encourages high speed of motorists. Difficult connectivity to key destinations around Downtown Columbia. 	<ul style="list-style-type: none"> Limited but ever increasing bicycle friendly facilities network. Existing and approved active transportation plans calling for the expansion of bicycle and pedestrian facilities throughout the County.
Tourism	<ul style="list-style-type: none"> Reaching the visitor population may require targeted marketing via strategic partnerships with local groups and tourist destinations. 	<ul style="list-style-type: none"> Existing significant destinations and events that attract a steady number of tourists who may be potential users of a bike share program. Well-organized Tourism and Promotions office which may provide some in-kind marketing and promotion services Existing trail and pathway network provides a strong recreational opportunity for visitors. Existing regional destinations in the vicinity of Downtown Columbia (ex., Columbia Mall, Merriweather Post Pavilion, Howard Community College)
Local and Regional Plans and Policies	<ul style="list-style-type: none"> Current zoning ordinances do not allow for bike share station installation. Existing signage ordinances may do not allow for the use of advertising, sponsorship. 	<ul style="list-style-type: none"> Comprehensive transportation plans aim to achieve multi-modal and active transportation goals, which will benefit implementation of a bike share system State and local plans address a need to improve the bicycle network Howard County recommends further expansion of its ride share and transportation demand management programs, which can include a bike share element
Public Input and Stakeholder Engagement	<ul style="list-style-type: none"> Public remains skeptic about implementation of bike share program in a suburban setting Public recognized that as driving is the most convenient way to get around in Howard County, there is less incentive to adopt bike share as a means of travel Public Stakeholders recognized the existing cycling infrastructure is incomplete and not connected. Public stakeholders agreed that bike share faces regulatory hurdles to implementation in Howard County in the form of its existing Zoning Code. 	<ul style="list-style-type: none"> Strong interest in remaining an active and healthy community. Strong interest in implementing a system that supports recreational activities Strong support for using bike share as a catalyst for increased bicycle friendly infrastructure. Strong interest in increasing mobility options and access to various areas of the County for residents. Support for bike share as a way to attract a well-educated, mobile, and highly-competitive workforce.

APPENDIX 5 – INDIVIDUAL VARIABLE MAPS



Employment Density

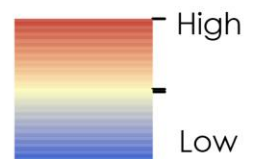
BIKE HOWARD

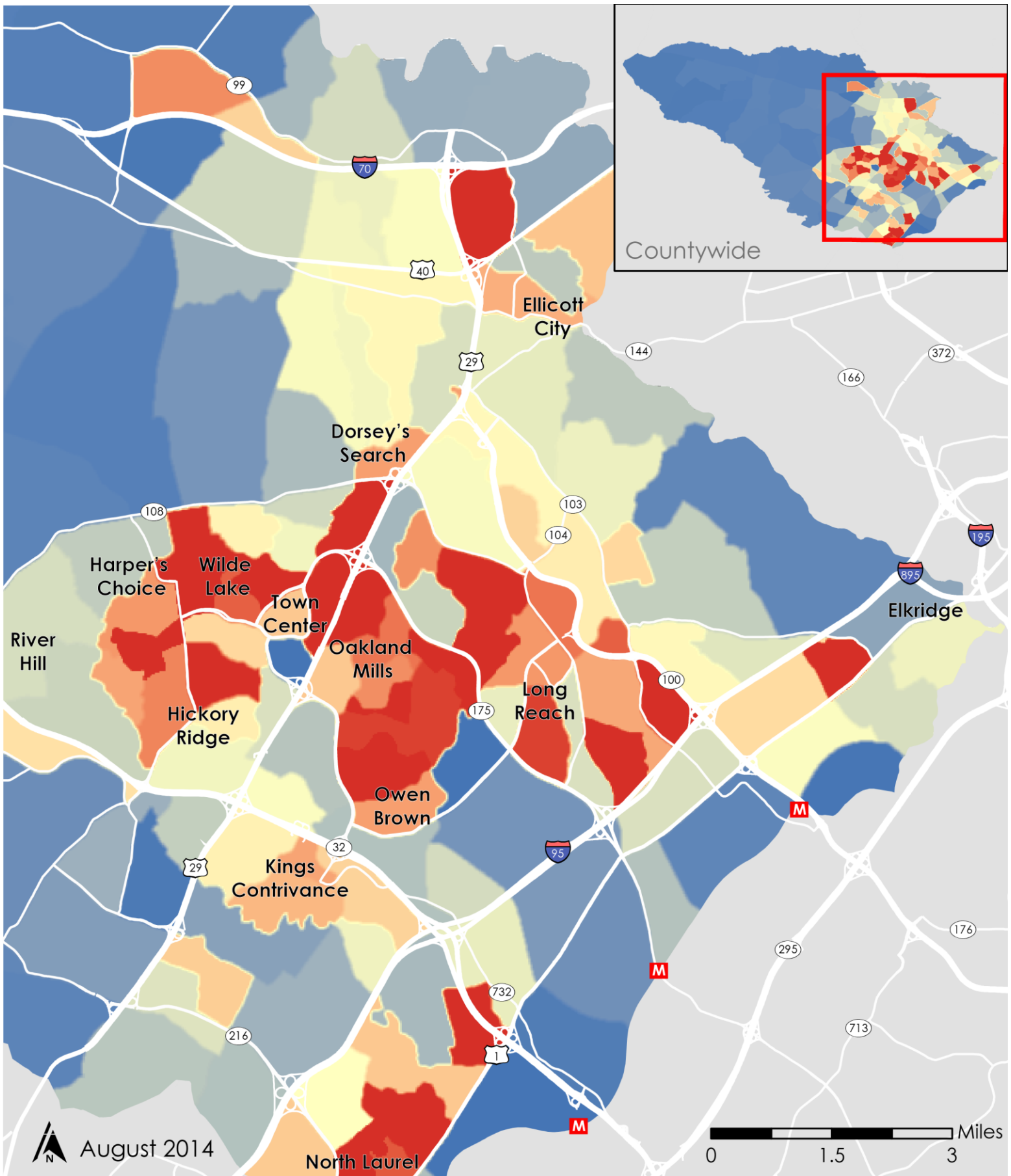
Bike Share Feasibility Study



M MARC train

Source: US Census Bureau. Longitudinal Employer-Household Dynamics. Area Profile Analysis in 2011 by Primary Jobs





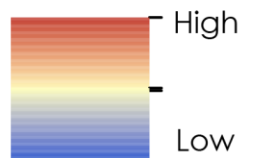
Population Density

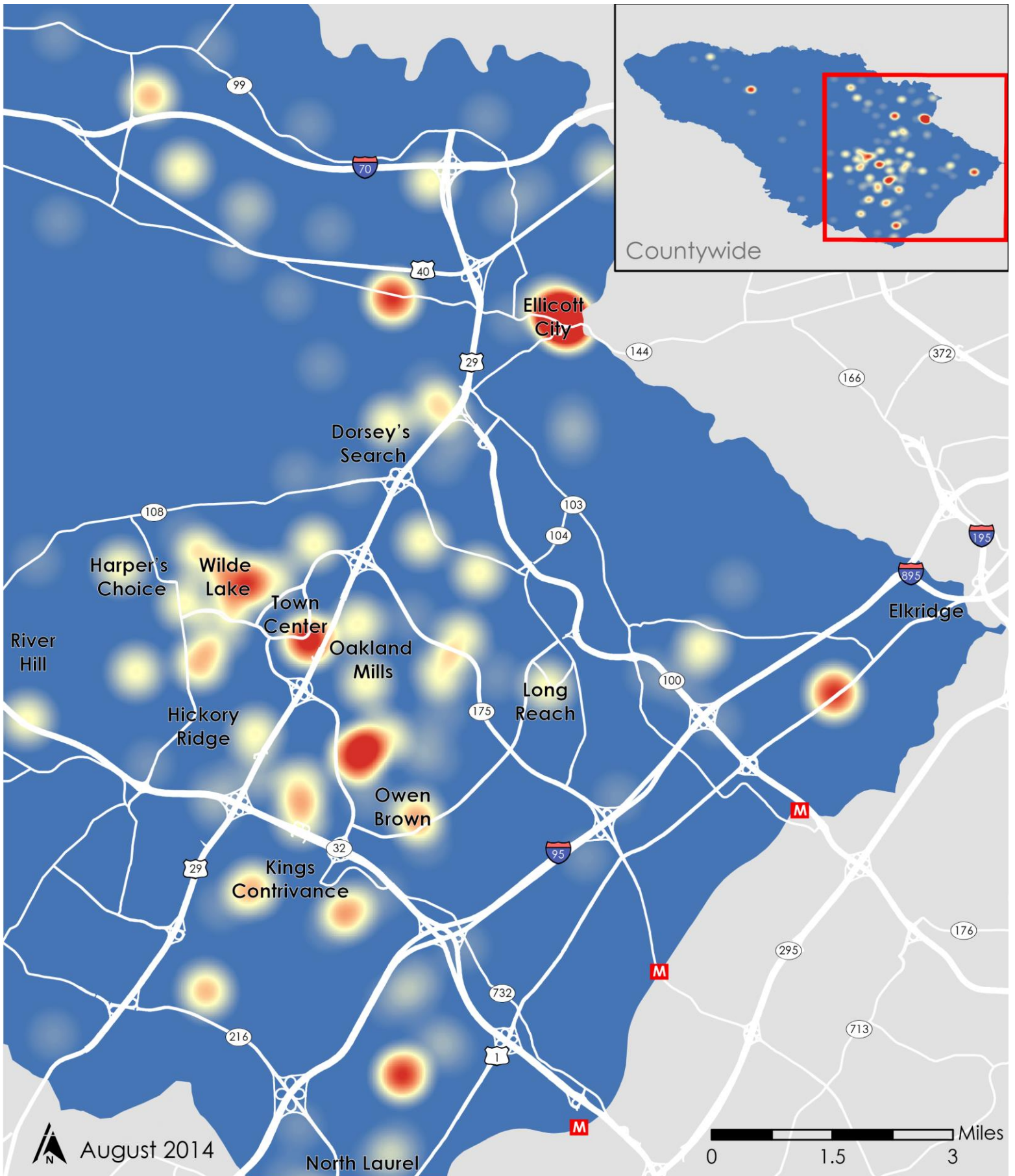
BIKE HOWARD

Bike Share Feasibility Study 

Source: 2008-2012 American Community Survey 5-Year Estimates.
File S0101 Age and Sex. U.S. Census Bureau.

 MARC train



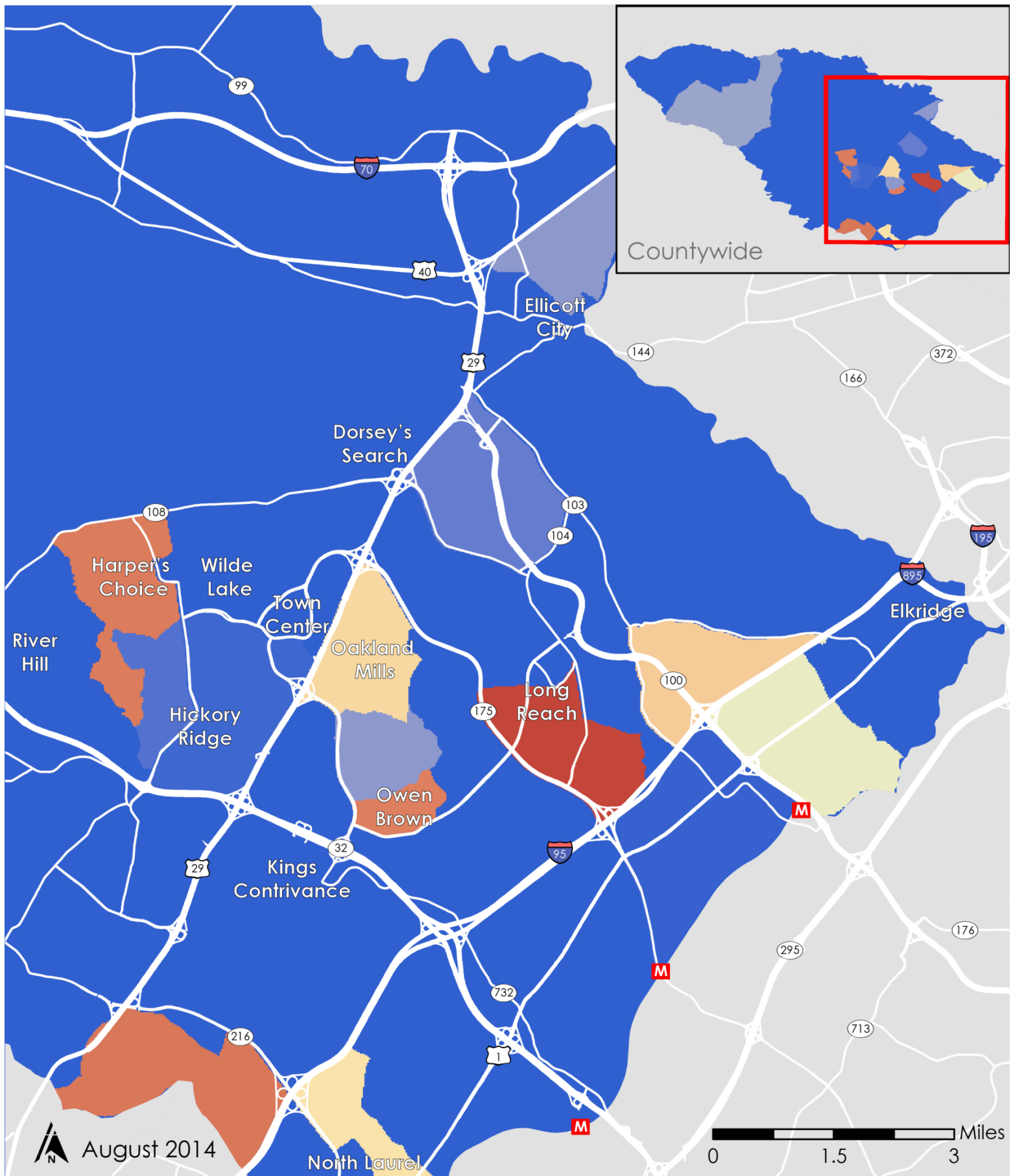


Destinations BIKE HOWARD

Bike Share Feasibility Study



Source: Howard County DPZ Staff. File: Core Places



Bicycle Modeshare

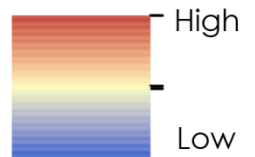
BIKE HOWARD

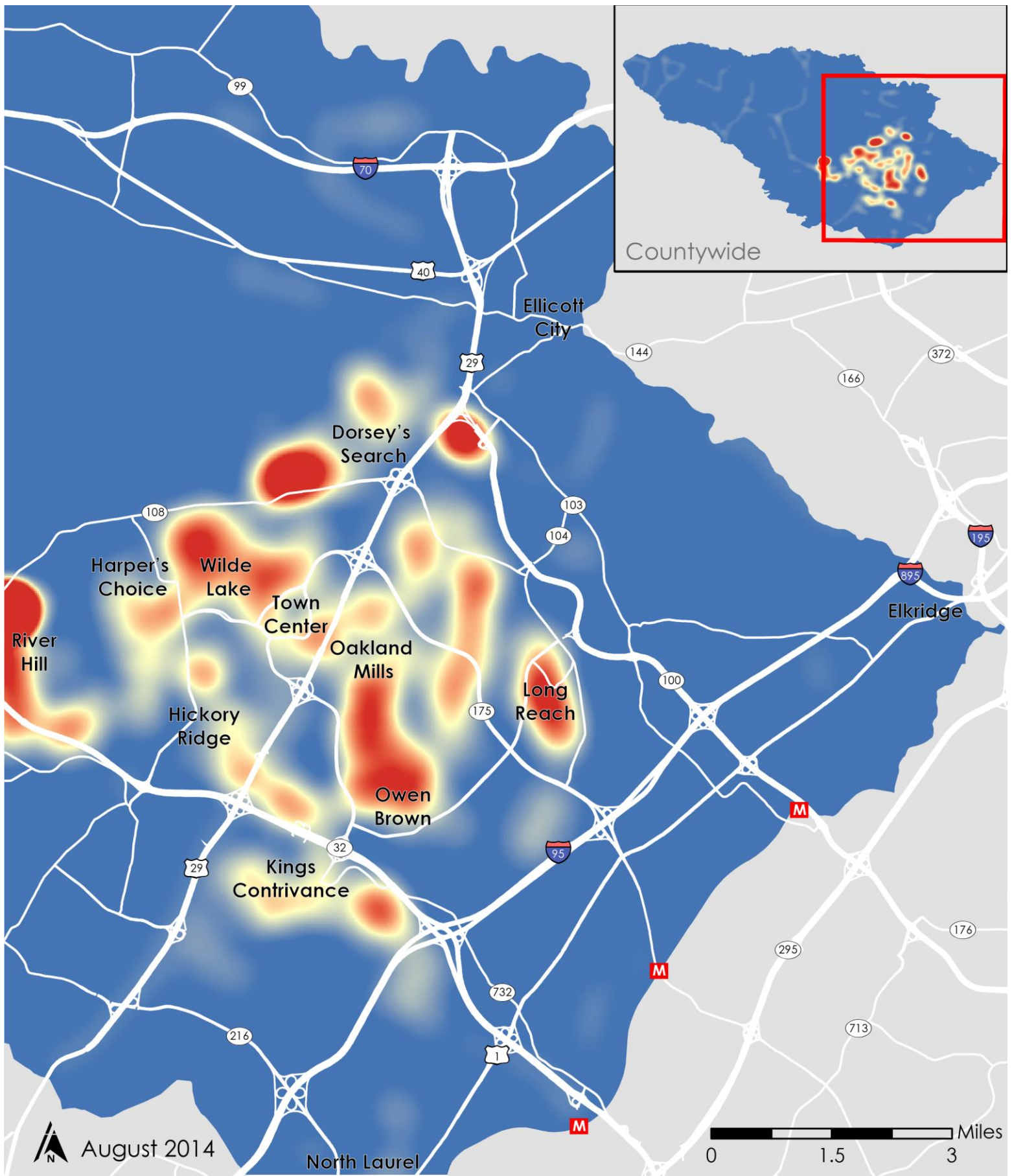
Bike Share Feasibility Study



M MARC train

Source: 2006-2010 American Community Survey 5-Year Estimates. File B08101 Means of Transportation to work by age. U.S. Census Bureau and 2010 Transportation Analysis Zones provided by Howard County DPZ Staff.





Proximity to Existing Bicycle Infrastructure

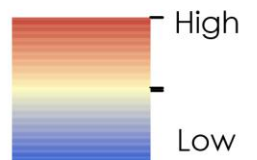
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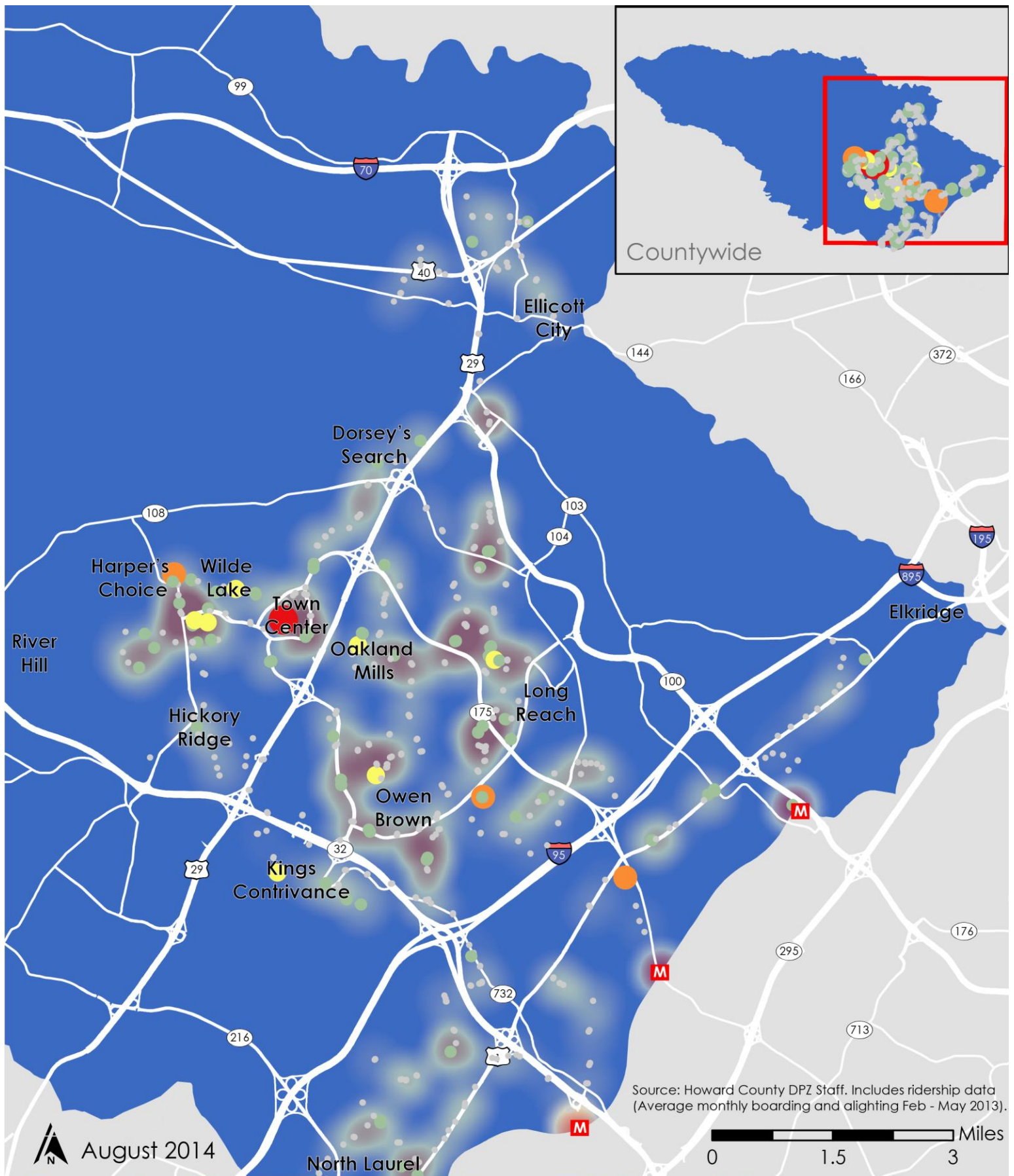
Bike Share Feasibility Study



M MARC train

Source: Howard County Bicycle Master Plan and
Howard County DPZ Staff





Proximity to Transit vs Ridership

BIKE HOWARD

Bike Share Feasibility Study

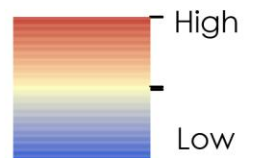


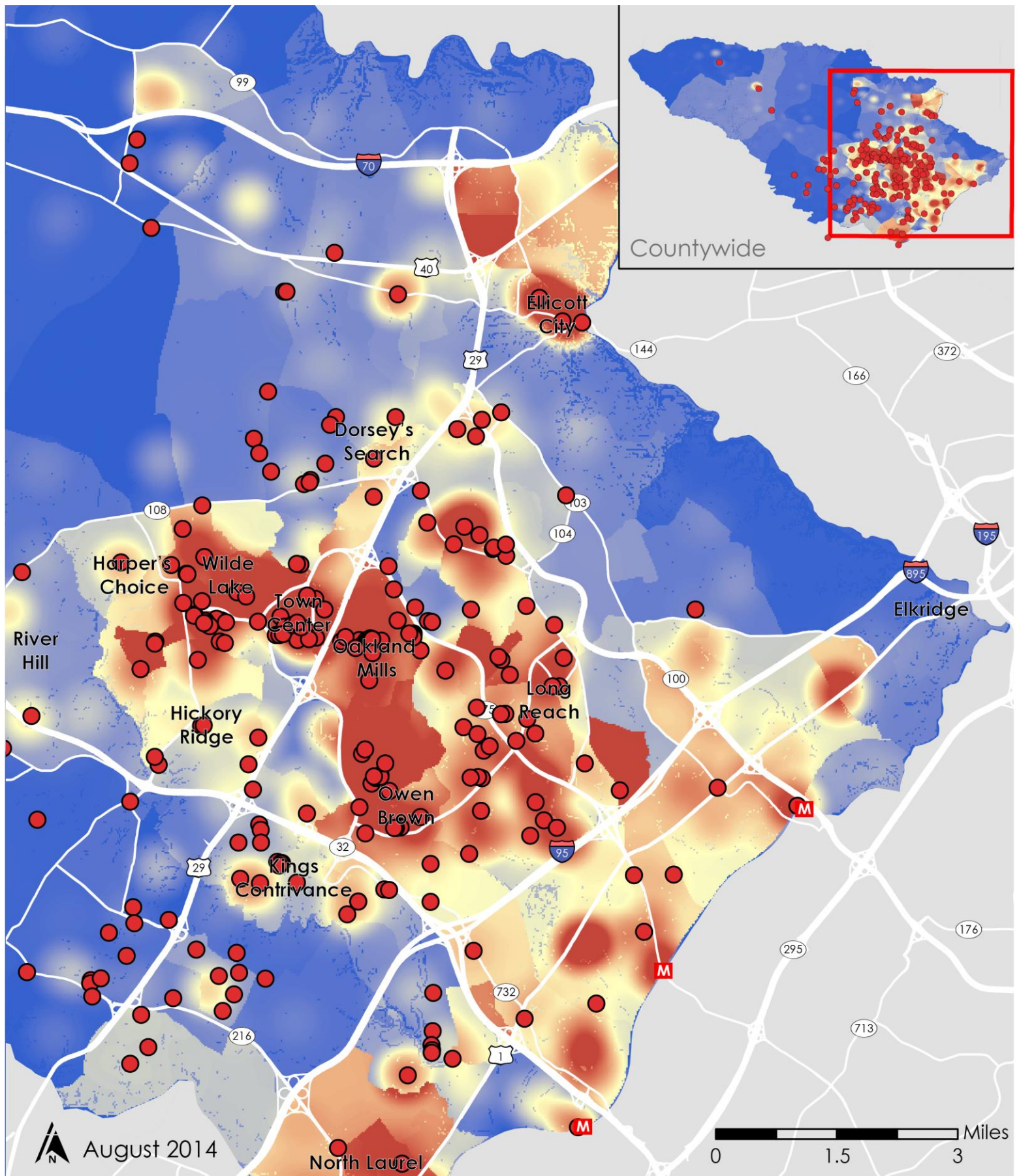
Bus Boarding and Alighting

0 - 1,122
1,123 - 4,506

4,507 - 11,298
11,299 - 27,728
27,729 - 21,3012

MARC train





Publicly Suggested Locations

BIKE HOWARD

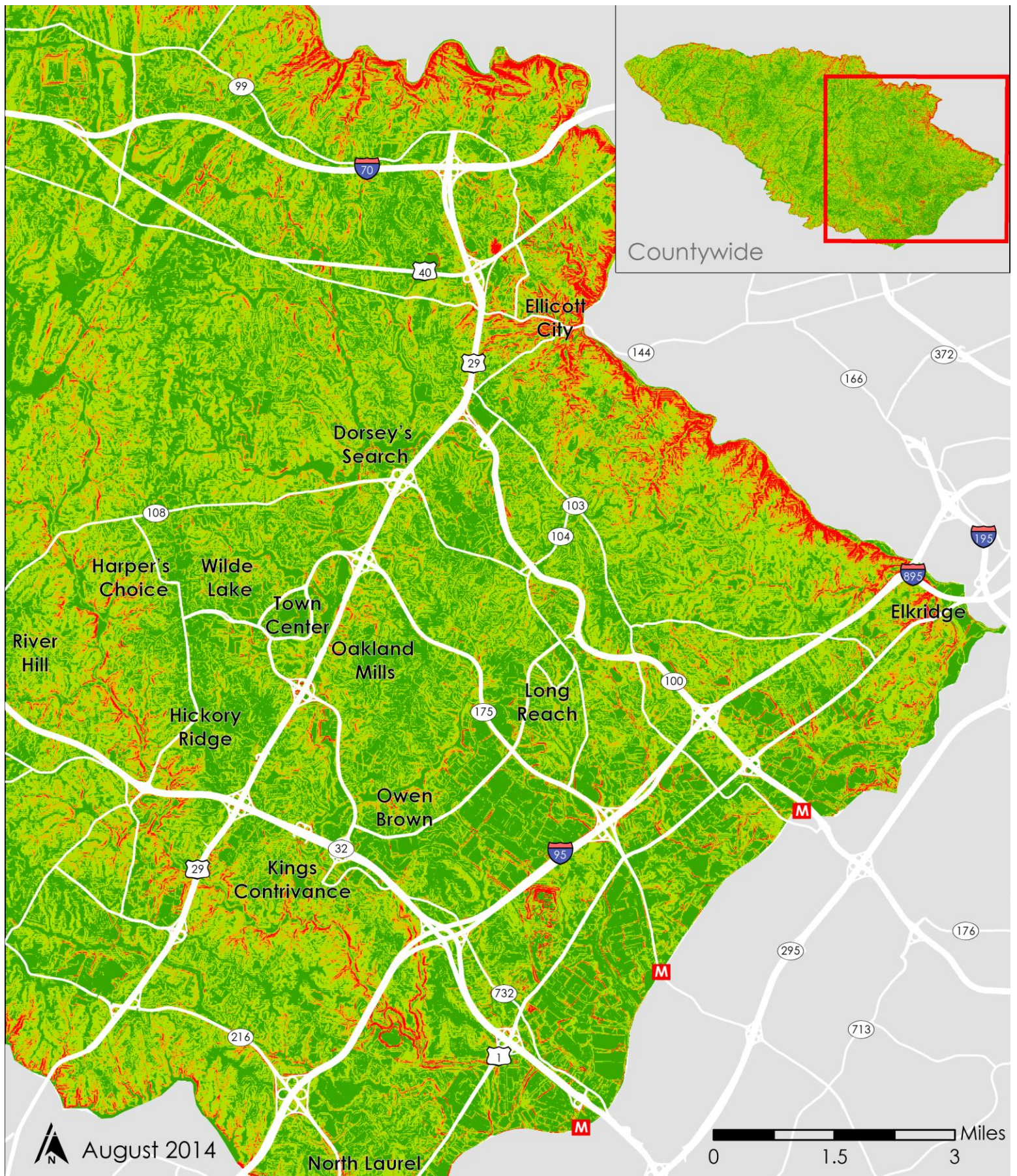
Bike Share Feasibility Study

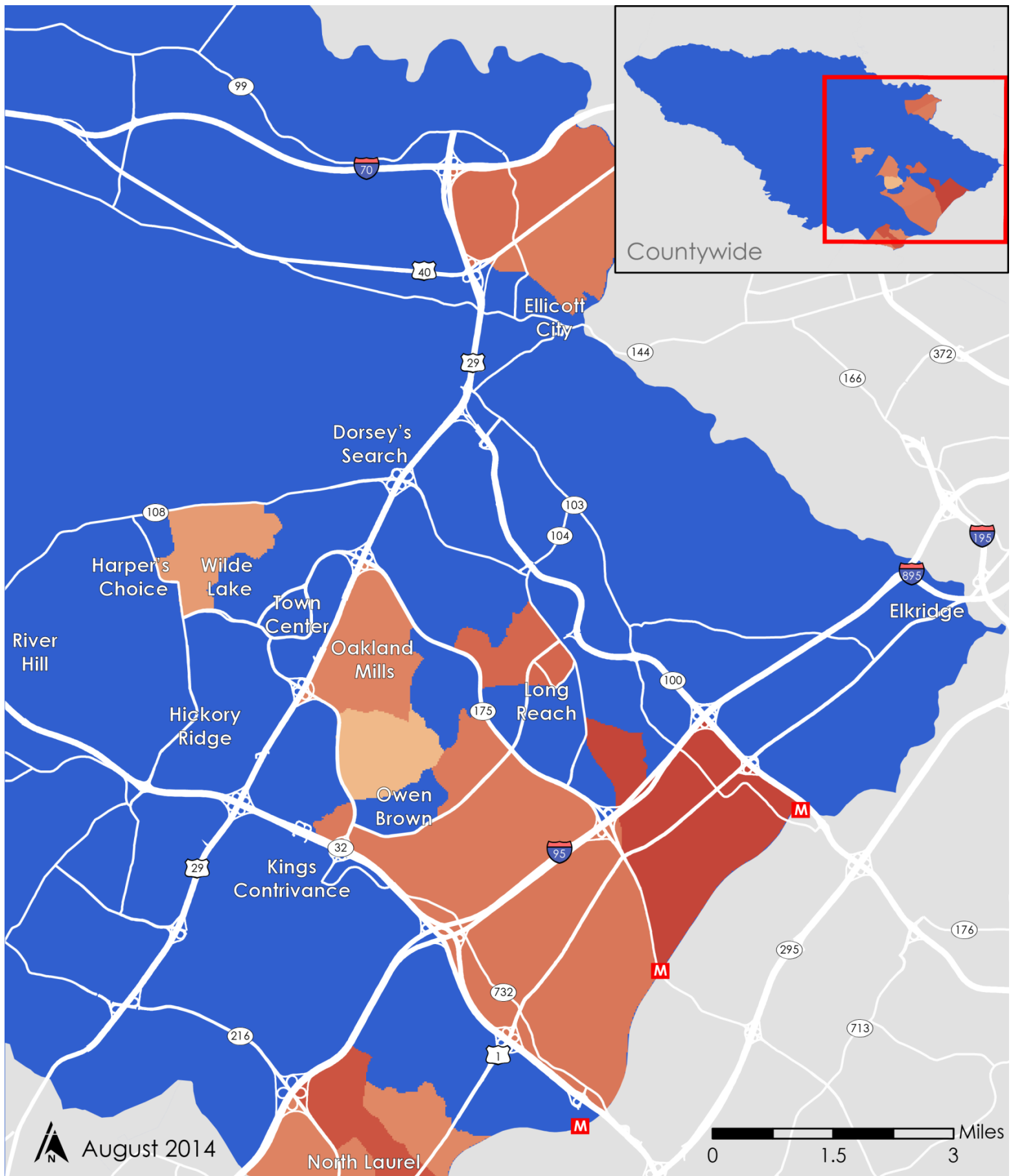


M MARC train

● Public Suggestions

Source: Publicly suggested station locations
via www.howardcountybikeshare.com





APPENDIX 6 – PILOT PROGRAM

Should funding be unavailable for launching bike share as the full Phase 1A, a smaller pilot program could be created that focuses bike share in Downtown Columbia, the Community College, and Howard County General Hospital. The eight station pilot could then be expanded at a later date to encompass the entire Phase 1A. Developing a smaller pilot is not necessarily ideal as there is a strong network effect that impacts bike share; larger systems can accommodate a more diverse range of trips due to the larger number of origins and destinations available. However, by pursuing a pilot phase first it will allow the County to test bike share's feasibility in the local market, and make any necessary strategy changes before committing to a larger scale program. The pilot will also allow the program owner to build institutional capacity to eventually manage a larger program.

SERVICE AREA AND PHASING

Based on the recommendations contained in the Business Plan, a smaller area of the County is proposed as the staging area for a bike share pilot program. The proposed phasing area and generalized station locations are presented in the map below.

This proposed Pilot Program is expected to provide a resource for transportation and recreation travel, connecting various activity centers in the core of the County including the Villages of Harpers Choice, Oakland Mills and Wilde Lake. The project would also provide service to Howard Community College, Howard General Hospital, Downtown Columbia, Blandair Park and Lake Kittamaqundi.

The pilot would provide effective service between a mix of recreational trip origins and destinations and increase transportation options between existing activity centers. However, because of the existing land use patterns and bicycle infrastructure, the predominant types of bike share trips expected for the program's outset will be recreational in their nature (ex. a resident living close to Oakland Mills Village Center wanting to go for a recreational ride around Blandair Park) even as there might be opportunities for each trip to have transportation related purposes.

The proposed pilot program as defined includes eight stations in an area of 2.1 square miles for a total station density of around 3.9 stations per square mile, double the density of stations of the overall proposed program. Based on this proposed density and phasing, the Pilot is expected to serve around eight percent of the County's total jobs and just over five percent of the County's residents based on place of residence and place of employment. The system is also expected to serve County visitors who go to Downtown Columbia for its shopping, restaurants, parks, etc. Finally, the proposed pilot program has the potential to serve 30,000 students who are enrolled at Howard Community College, with the majority of them living within five miles of campus.³²

PROPOSED STATION LOCATIONS

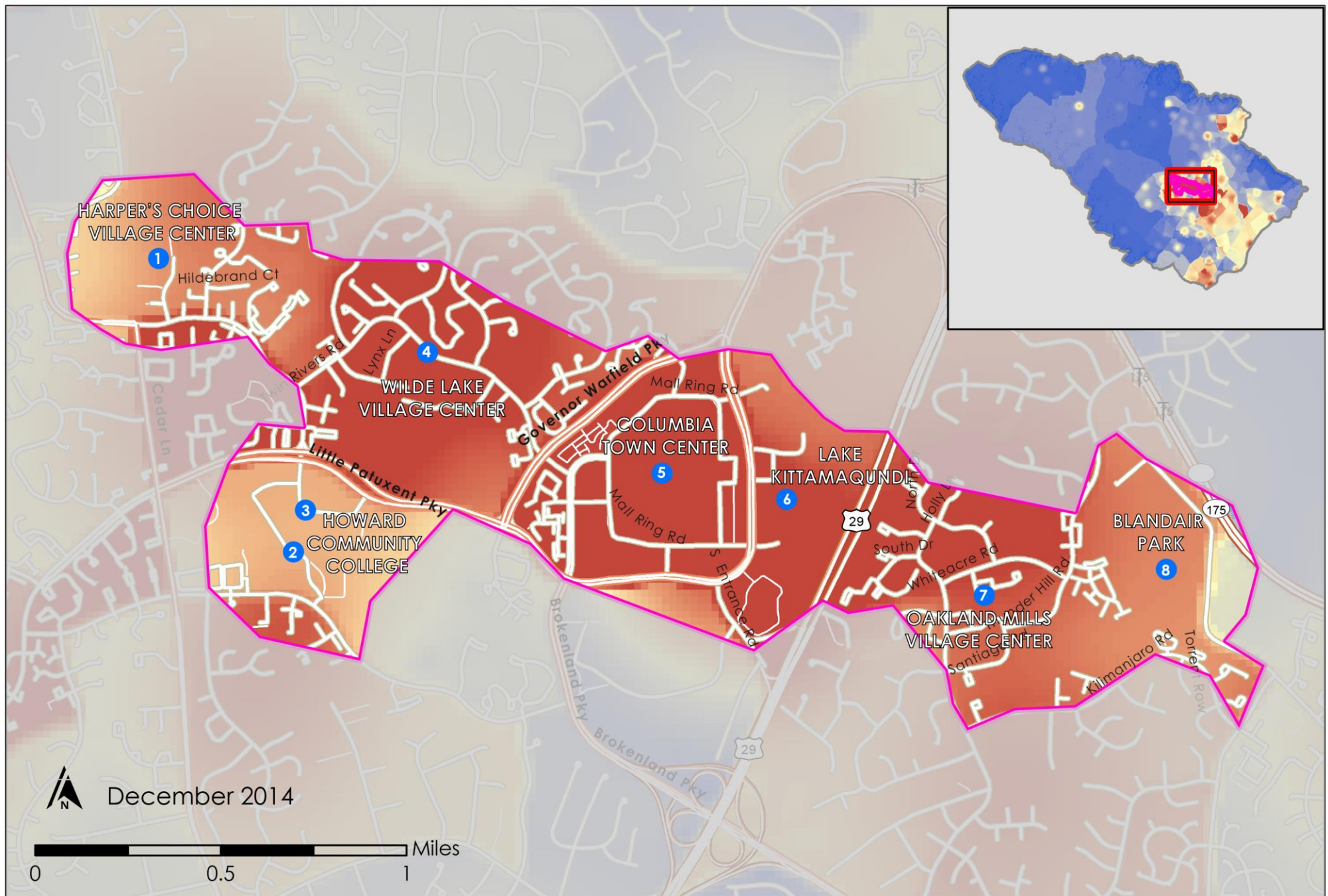
General station locations were determined based on public and stakeholder input, as well as heat map analysis performed as part of the Feasibility Analysis. The proposed locations were further refined with the feedback from County and Columbia Association representatives. The proposed station locations are included in the table and map below:

Proposed Station Locations

Station Location	Station Number
Harpers Choice Village Center	1
Howard Community College	2
Howard Community College/Howard General Hospital	3
Wilde Lake Village Center	4
Columbia Town Center	5
Lake Kittamaqundi/Whole Foods	6
Oakland Mills Village Center	7
Blandair Park	8

Please note that the final station placements will require additional public outreach and field work to determine and confirm availability of space, and right of way ownership among others. The proposed locations for bike share stations contained in this report are to be used only as a general guide.

³² Interview with Bob Marietta of Howard County Community College, May 2014



FINANCIALS

PROGRAM COSTS AND RIDERSHIP

Two cost and ridership assumptions differ for a pilot phase from those used for the entire system. A higher ridership rate is used for the pilot than assumed for the whole system at 0.5 trips/bike/day. A pilot would also require only 0.5 full-time equivalents (FTE) of administrative support, as opposed to 0.75 FTEs for Phase 1A. The program is expected to serve just over 10,000 trips in its first fiscal year, and nearly 15,800 in its second fiscal year, the first full year of operations. Cost recovery will follow the same trajectory as projected for the whole program, with the recovery ratio growing from 29 percent to 46 percent in six years. The pilot's capital costs are projected to be just under half a million dollars.

Projected Operating Costs and Ridership for Pilot (\$000s)

Fiscal Year	Pre-Launch	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6
System Size							
Stations	0	8	8	8	8	8	8
Bicycles	0	80	80	80	80	80	80
Docks	0	160	160	160	160	160	160
Ridership							
Registered Users		5,100	7,900	8,600	9,000	9,500	9,900
Casual Members		5,100	7,900	8,600	9,000	9,500	9,900
Total Ridership		10,200	15,800	17,200	18,000	19,000	19,800
Revenue							
Memberships							
Registered		\$26k	\$39k	\$46k	\$49k	\$52k	\$54k
Casual		\$16k	\$25k	\$29k	\$31k	\$32k	\$34k
Usage Fees							
Registered		\$1k	\$1k	\$1k	\$1k	\$1k	\$1k
Casual		\$9k	\$15k	\$17k	\$18k	\$19k	\$20k
Advertising		\$6k	\$7k	\$7k	\$8k	\$8k	\$8k
Total Revenue		\$58k	\$87k	\$100k	\$107k	\$112k	\$117k
Operating Costs							
Daily Operations	\$0k	\$124k	\$153k	\$157k	\$162k	\$167k	\$172k
Administration	\$52k	\$53k	\$55k	\$56k	\$58k	\$60k	\$61k
Marketing	\$0k	\$21k	\$21k	\$22k	\$23k	\$23k	\$24k
Total Operating Costs	\$52k	\$197k	\$229k	\$235k	\$243k	\$250k	\$257k
Funding Gap							
Cost Recovery Ratio	N/A	29%	38%	43%	44%	45%	46%
Operating Deficit/Surplus	-\$52k	-\$139k	-\$142k	-\$135k	-\$136k	-\$138k	-\$140k

Estimated Capital Costs for Pilot Phase

	Pilot
New Stations	8
New Bicycles	80
New Stations and Bicycles	\$378,000
Site Planning and Installation Costs	\$34,000
Start Up and Parts	\$73,000
Total	\$485,000

PROGRAM IMPACTS

Estimates of Select Health, Emissions, and Congestion Indicators

Year	Trips	Trip Miles	Calories Burned	Vehicle Miles Diverted	GHD Reduction (LB of CO2)
Year 1	10,264	15,396	585,066	3,233	2,182
Year 2	15,700	23,551	894,921	4,946	3,338
Year 3	17,152	25,728	977,661	5,403	3,647
Year 4	18,010	27,014	1,026,544	5,673	3,829
Year 5	18,910	28,365	1,077,871	5,957	4,021
Year 6	19,856	29,783	1,131,764	6,254	4,222

The health, mobility, air quality, and congestion impacts of the program pilot mirror those of the full system, but on a smaller scale. Like with the full system, the largest benefit will be to public health. The program is estimated to result in over a million combined calories burned per year by its fourth year in operation. Congestion, air quality, and transit impacts are more challenging to quantify. The impact on total vehicle miles traveled and greenhouse gas emissions is expected to be negligible. The program could improve mobility in its service area, especially for trips between key destinations such as Downtown Columbia, Howard Community College, and Howard County General Hospital. Finally, while a pilot would provide improved accessibility to the transit hub in Downtown Columbia, the data from peer systems is inconclusive to quantify its impact on overall transit ridership. Bike share could also reduce trip and parking demand at the Howard Community College, especially for intra-campus car trips.