



DISTRICT OF COLUMBIA  
*Streetcar Land Use Study*  
PHASE ONE



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January 2012





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**PHASE ONE**

January 2012  
submitted to the  
District of Columbia  
Office of Planning  
by  
Goody Clancy

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Downtown BID

NOMA BID

Capitol Riverfront BID

Washington DC Economic Partnership

River East Emerging Leaders (REEL)

Anacostia Economic Development Council

H Street Main Street

Barracks Row Main Street

Ward 8 Business Council

DC Surface Transit



January 2012

Dear Resident:

The District of Columbia is committed to bringing a streetcar system to the city to improve transit services available to residents and create walkable, vibrant communities. In the spring of 2010, the DC Office of Planning (OP) initiated a land planning study to ensure that the city and its residents gain the greatest possible benefits from the new system, and that the overarching vision and goals for the District are furthered by the new system.

Goals of the DC Streetcar system:

- Link neighborhoods with a modern, convenient and attractive transportation alternative.
- Provide quality service to retain and grow transit ridership.
- Offer a broader range of transit options for District residents.
- Reduce short inner-city auto trips, parking demand, traffic congestion and air pollution.
- Connect people to jobs and services with frequent, affordable, reliable transit service.
- Encourage economic development and affordable housing options along streetcar corridors.

The Streetcar Land Use Study provides an assessment of the citywide benefits of the system in terms of access to jobs and schools, quality of life, transportation costs for

households, job growth, and real estate impacts. The study also considers potential challenges to the introduction of streetcar service such as the impact on historic and cultural resources, housing costs and small business retention. The report examines the benefits and challenges along each proposed corridor and proposes adjustments to phasing and small segments to maximize mobility and economic development benefits of the investment.

In the months ahead, the Streetcar Land Use Study will provide an initial foundation of analysis that OP, DDOT and other involved agencies will use to make recommendations regarding the District's streetcar system. Future elements of the Streetcar Land Use Study will examine specific land use recommendations at the corridor and neighborhood level including zoning, retail and residential uses, streetscape and urban design. The District Department of Transportation (DDOT) will lead the system design, financing, construction and operation of the streetcar, and DDOT is moving forward with the initial phase of the streetcar system with construction of the H Street/Benning Road line. As DDOT completes system planning for each corridor, extensive public outreach to local residents and businesses will take place. The findings supported in this study will further the dialogue between communities and District agencies as we continue planning for future lines.

Harriet Tregoning  
Director, Office of Planning



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# 1. introduction

*The streetcar represents an effective strategy for advancing many of the District's core economic and social goals.*

The District of Columbia's decision to build a streetcar network emerged from a long-term assessment of the city's transportation needs. Integrated with Metrorail and other transit services, the 37-mile system would extend transit to large, underserved portions of the District, and it would expand the benefits of transit for many areas already served by Metrorail.

## 1a Planning for a streetcar system

The District of Columbia Department of Transportation (DDOT) has initiated a program to reestablish streetcar service in the District. The purpose of the DC Streetcar is to provide high-capacity and high-quality transit service to residents and invest in infrastructure that will catalyze economic development. The planned system is the result of 14 years of planning (see Figure 1) and touches every ward in the District. The recommended plan includes a network of streetcar lines operating in eight corridors. The selection criteria for these corridors included 1) ridership potential, 2) demand for additional capacity on existing Metrorail and bus lines, 3) gaps in existing service that connect neighborhoods, employment, and retail centers, and 4) economic development opportunities. Map 3, *Full Streetcar System Phasing*, shows streetcar segments and project phasing.

As the District agency responsible for the system planning, design, financing and construction of the project, DDOT has collaborated with other agencies, including the Office of Planning, to ensure that efforts are coordinated and benefits of the investment are maximized. The Office of Planning led this *Streetcar Land Use Study* to investigate impacts of the proposed system on land uses, as well as job access, quality of life and housing affordability.

To reduce disruption to residents and businesses, DDOT has begun building sections of two streetcar lines as part of previously planned roadway reconstruction along H Street/Benning Road NE and Firth Sterling Road SE. Environmental work has begun on other lines, but decisions still need to be made about many routes and other critical aspects of streetcar planning.

### STUDY PURPOSE AND METHODOLOGY

Commissioned by the District Office of Planning, this *Streetcar Land Use Study* constitutes an integral part of the planning for the new system. Among possible land use impacts of a streetcar system, the study examines jobs, quality of life, and the affordability of housing in the District; potential fiscal benefits to the District; the streetcar's projected effect on real estate development; and

**FIGURE 1 Early Studies**

YEAR	STUDY	SPONSOR	SUMMARY
1997	<i>Vision, Strategy and Action Plan</i>	DDOT	The plan recommended intracity connections between the radial WMATA rail lines, designating ten corridors for transit improvements that would connect District neighborhoods and help support community economic development initiatives.
1999	<i>Transit Service Expansion Plan</i>	WMATA	The plan advanced five corridors for further study.
2001	<i>Core Capacity Study</i>	WMATA	The study identified systemwide Metrorail improvements to accommodate estimated future ridership.
2002	<i>Transit Development Study</i>	WMATA	The study considered each of the previously identified corridors for surface rail transit and recommended four priority corridors for implementation.
2003	<i>Regional Bus Study</i>	WMATA	The study identified bus improvements to serve inside previously designated corridors and to aid in District circulation and Metrorail system-capacity relief.
<b>2004–2010: DC’s Transit Future Alternatives Analysis (DCAA)</b>			
2004–2005	<i>DC’s Transit Future Alternatives Analysis (DCAA)</i>	WMATA, DDOT	The study refined a citywide system plan of enhanced, multimodal surface transit on designated corridors.
2006	<i>Georgia Avenue/7th Street Rapid Bus Service Plan</i>	WMATA, DDOT	The study resulted in the implementation of the Metro Express (Metro Extra at the time) limited-stop bus service, Route 79, in 2007.
2007	<i>30s Line Study</i>	WMATA, DDOT	The study identified a restructuring of five bus routes, resulting in a combination of local, limited-stop and shuttle routes to serve Wisconsin and Pennsylvania avenues. New Metro Express limited-stop bus services, Routes 37 and 39, were initiated in 2008.
2008	<i>16th Street Line Study</i>	WMATA, DDOT	The study resulted in the implementation of the Metro Express limited-stop bus service, Route S9, along 16th Street NW.
2009	<i>Benning Road/H Street Study (Metrobus Routes X1, X2 and X3)</i>	WMATA, DDOT	The study identifies improved bus service levels and a planned Metro Express limited-stop service in the heavily travelled corridor 2009 DC Circulator New Routes DDOT Further expansion of DC Circulator to serve Adams Morgan, Woodley Park, Columbia Heights, Capitol Riverfront, Capitol Hill, and the Nationals Park Stadium area.
CURRENT	<i>DC’s Transit Future System Plan</i>	(DCAA)	Update DDOT. This updates the plan for a system of streetcars and limited stop bus services in the District.

Source: <http://ddot.dc.gov/DC/DDOT/On+Your+Street/Mass+Transit+in+DC/DC+Streetcar/DC+Transit+Future/DC+Transit+Future+System+Plan+-+Planning+Process>

related issues. Its conclusions about all of these impacts will help inform planning for the system.

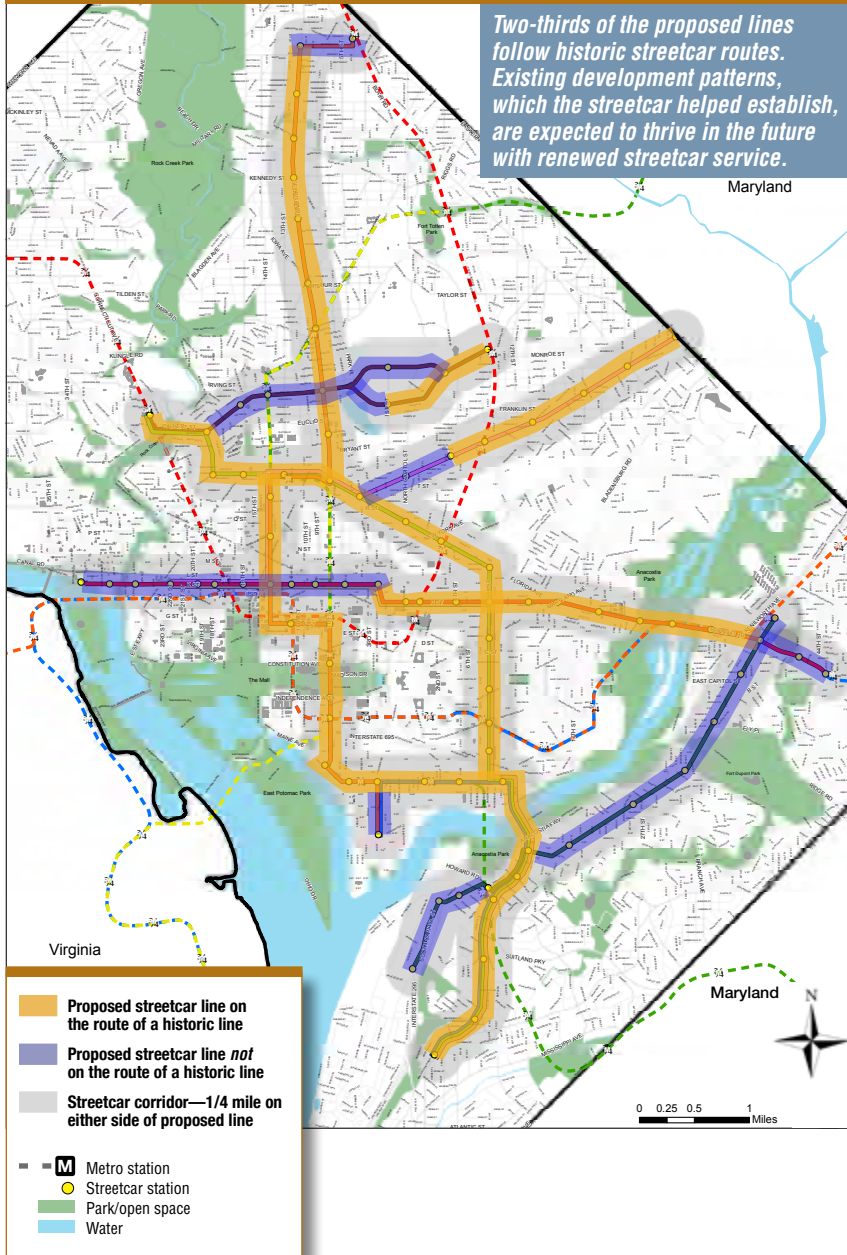
Certain parameters and methodologies for this study were established in order to analyze the impacts to land use and develop future projections. These include study area boundaries, decisions on timing, data sources, and key criteria to be measured. They are highlighted in Figure 2 and described in further detail in the subsequent chapters.

This document represents the first of several study phases and District efforts in planning for the streetcar system. In addition to projecting potential impacts and benefits, it identifies land use opportunities, corridor adjustments, and other actions that can either amplify benefits of building a streetcar system or address challenges its creation might pose. By measuring the economic benefits of the streetcar to the city, this study can help decision makers assess the broad value of the streetcar system and determine whether streetcar-related land use benefits can be tapped to help fund the cost of building the system. DDOT is conducting a comprehensive financing plan that will examine property values and funding of specific projects. Later phases will focus in greater depth on land use issues and will facilitate community engagement in planning for the streetcar.

**FIGURE 2 Methodology Overview**

	STREETCAR LAND USE STUDY PHASE ONE	
Study area	<ul style="list-style-type: none"> <li>All streetcar corridors in the DC Transit Future System Plan (2010)</li> <li>Study area organized into nine corridors that share similar land use characteristics</li> </ul>	Methods of real estate analysis
Projected streetcar impact area	<ul style="list-style-type: none"> <li>¼ mile (1,320 ft.) from streetcar lines, but excluding areas within ¼ mile of existing Metrorail stations where the streetcar's benefit would be largely redundant</li> </ul>	Informed by review of the major types of market benefits evident where streetcar service has been introduced in other cities
Timing	<ul style="list-style-type: none"> <li>Forecasts order-of-magnitude real estate value and market demand increase attributable to the streetcar over a 10-year horizon; analysis assumes entire planned system in operation as of 2010 study</li> </ul>	<p>OFFICE</p> <ul style="list-style-type: none"> <li>Baseline office projection: determined by the Council of Governments Round 7.2 Employment Forecast and District of Columbia, Department of Employment Services' MSA employment projections by industry and occupation</li> <li>Streetcar benefit projection: determined by applying four specific criteria measuring the streetcar's unique office-market benefit in specific corridor areas to office-inclined employment projections combined with Transportation Analysis Zone data from the Council of Governments</li> </ul>
Zoning changes	<ul style="list-style-type: none"> <li>Assumes no zoning changes in this phase</li> </ul>	<p>RESIDENTIAL MARKET POTENTIAL</p> <ul style="list-style-type: none"> <li>Determined by applying six specific criteria measuring the streetcar's unique housing market benefit in specific corridor areas to Zimmerman/Volk Associates' proprietary target market methodology. This methodology establishes market potential based on housing preferences, demographic trends and socio-economic characteristics of households.</li> <li>Includes migration analysis (internal and external), Census data from the American Community Survey, and data from the Nielsen Claritas PRIZM NE market segmentation tool</li> </ul>
Quality-of-life impacts analysis	<ul style="list-style-type: none"> <li>Informed by analysis of demographic data, land use data, and characteristics of urban form (i.e., block size, walkability, neighborhood character)</li> <li>Historic-resources analysis informed by identification of existing and eligible historic structures and districts along streetcar corridors</li> <li>Public health benefits analysis informed by published research on health and safety impacts of transportation by transit, car, foot, and bicycle</li> </ul>	<p>RETAIL MARKET POTENTIAL</p> <ul style="list-style-type: none"> <li>Determined from the additional retail spending potential of new households and workers attracted by the streetcar</li> </ul>
Transportation impact analysis	<p>Considerations for transportation benefits assessment:</p> <ul style="list-style-type: none"> <li>added transit capacity;</li> <li>net new premium transit service;</li> <li>transit service to pedestrian-friendly areas;</li> <li>service to transit-dependent populations; and</li> <li>improved transit access to jobs</li> </ul> <p>Considerations for corridor-constraints assessment:</p> <ul style="list-style-type: none"> <li>roadway congestion;</li> <li>on-street parking impacts;</li> <li>pedestrian barriers;</li> <li>bicycle network overlaps; and</li> <li>priority bus network overlap</li> </ul> <p>Additional analysis addresses how the Streetcar Land Use Plan findings can be used to support future FTA New Starts planning efforts for the DC Streetcar.</p>	<p>Value-capture mechanisms</p> <ul style="list-style-type: none"> <li>Projects the order-of-magnitude increment in the value of existing development and projected new development attributable to the streetcar</li> <li>Discusses strategies for value capture, including tax-increment financing districts, special assessments, business improvement districts, joint development agreements, and property acquisition</li> <li>Discusses potential land use and design guidance tools, including changes in allowable densities, mandatory inclusionary zoning, and development of design guidelines</li> </ul>

**MAP 1 Proposed And Historic Streetcar Routes**



### THE DISTRICT'S SUITABILITY FOR STREETCAR SERVICE

The District had an extensive streetcar network between 1862 and 1962, and many of today's development patterns originally formed around its lines (Map 1, *Proposed and Historic Streetcar Routes*). Since the late 1970s Metrorail has served as the District's signature transit service. The second-busiest subway system in the United States, it provides high-quality service every day to hundreds of thousands of area residents and visitors. Metrorail service, however, is not equally available throughout the District and does not reach certain areas with high demand for premium transit. The proposed streetcar system is planned so that it would reach many of those areas, tying them to each other and to Metro. Unlike Metro, the above-ground nature of the streetcar would increase its visibility and expand opportunity for visitors and others to experience the city visually.

### LESSONS FROM OTHER CITIES

The impact of streetcar systems in other cities has reached well beyond enhanced transportation. While the research and analysis underpinning this study are specific to the District and its neighborhoods, the study also examines the experience of cities that have implemented contemporary streetcar systems, including Portland, San Francisco, and Seattle.

These cities have experienced compelling land-use-related benefits that include increased real estate investment, improved quality of life, and expanded economic

opportunity.<sup>1</sup> This suggests that access to streetcar service can yield a diverse range of positive benefits:

- **Reduced commuting and other transportation costs** for households for whom better transit access meant the opportunity to own fewer cars.

<sup>1</sup> Portland Streetcar Development Oriented Transit, 2008. Prepared by The Office of Transportation and Portland Streetcar, Inc. ([www.portlandstreetcar.org/pdf/development\\_200804\\_report.pdf](http://www.portlandstreetcar.org/pdf/development_200804_report.pdf)). Among other results, Portland has seen \$3.5 billion in new investment within two blocks of its streetcar system since 1997. The Effect of Rail Transit on Property Values: A Summary of Studies, 2001. Prepared by Parsons Brinkerhoff ([www.reconnectingamerica.org/public/show/bestpractice162](http://www.reconnectingamerica.org/public/show/bestpractice162)). Light Rail Systems and Property Values, 2004. Prepared by The Sacramento Regional Transit District ([www.slp2.org/documents/propertyvalfs04.pdf](http://www.slp2.org/documents/propertyvalfs04.pdf)). Cincinnati Streetcar Feasibility Study, 2007. Prepared by HDR and Parsons Brinkerhoff ([www.cincinnati-oh.gov/city/downloads/city\\_pdf17754.pdf](http://www.cincinnati-oh.gov/city/downloads/city_pdf17754.pdf)).

- **Enhanced quality of life** for urban neighborhoods, including increased vitality in local commercial districts, greater walkability, improved access to shopping and services, and similar benefits.
- **Expanded access to economic opportunity**, including employment, training, and education sites and a wider array of services.
- **Increased fiscal returns** for local governments.
- **A rise in real estate values and development potential**, primarily within one-quarter mile of a route and in areas that are relatively underdeveloped.

## Back to the Future: The District's First Streetcar System

Starting in the middle of the 19th century, a growing network of streetcar lines helped shape the city's urban fabric. Electrified streetcars, introduced in the late 1880s, proved faster and better able to handle steep grades than horse-drawn cars, which had served the District from 1862 on. A swift transition to electrified service in the 1890s set the stage for rapid expansion of streetcar lines in the first decades of the 20th century. Real estate developers used the convenience and increasing efficiency of the system to persuade the growing numbers of federal workers to buy moderately priced homes in neighborhoods springing up outside the old city center.

By the second decade of the twentieth century, automobiles had become increasingly common on District thoroughfares, and commercial buses joined them in the 1920s. Streetcars continued as a major mode of

transportation, but their popularity began to decline with widespread suburban development and an explosive growth in car ownership after World War II. Competing lines merged into a single company in the 1930s, but a charter transfer in the mid-1950s imposed a drastic requirement on the new owner: replacement of the streetcar fleet with buses. Although the last trolley ran in January 1962, the system left a lasting imprint on the city's physical form—historic commercial corridors and

neighborhoods that grew up around streetcar routes and stops.



Washingtonians throng sidewalks and streetcar stops at F and 10th streets near Woodward & Lothrop in the 1940s.

Numerous studies have also documented rail transit's impact and importance in attracting housing, jobs, retail, and other amenities to urban areas. The Center for Transit-Oriented Development's 2004 study, *Hidden in Plain Sight*, calculated unmet national demand for transit-oriented housing, and very recent reports by real estate and economic development organizations such as the Urban Land Institute and CEOs for Cities. The development around Metrorail stations over the past three decades provides clear, if anecdotal confirmation of this trend.

In fact, the scale of the District's proposed system and the history of many of the city's main commercial corridors and neighborhoods, which grew up around an earlier streetcar network, may actually help the District realize greater benefits from a streetcar system than some of these counterpart cities. For example, more than 50% of District households and a large majority of the city's jobs would lie within walking distance of the fully built system. The comparable number for Portland is 9% and for Seattle, 6%, although both systems have fewer than 10 miles of tracks. The District's streetcar would be in the same league as San Francisco's, where 65% of households sit within a quarter-mile of a streetcar line—although that system is twice the size of the one proposed for the District.

The study team treated the streetcar experiences elsewhere as helpful guidance, not as substitutes for evaluating the streetcar's impact on the District's unique conditions, such as scale of streets and blocks, patterns



*San Francisco's F Line has been demonstrating the community and economic value of streetcars since the 1980s (above). Seattle's South Lake Union streetcar, funded largely by the private sector, has stimulated substantial development of research, office, housing and retail space (left).*

of workplaces and housing; and existing transit-system configuration. Nevertheless, other cities do hold lessons for the District, particularly the importance of early planning to insure that increased values, expanding markets, and other effects do not hinder some residents and businesses in unanticipated ways. They also highlight the value of taking a comprehensive approach to streetcar planning and of integrating it with land use and broader transportation planning.

### **HOW THE STREETCAR COMPARES TO OTHER TRANSIT OPTIONS**

This study examined the relative costs and benefits of streetcar service as compared to other transit options, including some with potentially lower construction costs. The comparisons indicate that in the District, streetcar service offers a more cost-effective means of achieving community goals than other options.

Bus rapid transit (BRT) and other bus alternatives, like the District’s popular Circulator service, have the advantages of much lower capital costs and much faster implementation. Buses also provide broad flexibility in terms of changing routes and can maneuver more readily in heavy traffic. The primary benefit the streetcar offers, evident in shelters at stops and in the rails themselves, is its visible permanence, which can serve as a powerful attraction to private real estate investment. Although highly visible shelters and stations can raise the profile of bus service, the very flexibility of routes and service levels that represents its biggest advantage also dilutes its ability to spur real estate investment (investment

decisions require predictability over periods of up to 30 years). Although well-designed BRT systems attract some development, their impacts are typically much less than those for rail<sup>2</sup>—and the BRT systems that have generated the strongest development response operate on exclusive rights of way at all times and not in mixed traffic, as the District streetcar would. In cities without the potential to attract much development investment, implementation costs and other factors give buses a clear advantage. In the District, however, streetcar service appears very likely to attract significant real estate investment.

The increases in real estate values and development that the streetcar could spur over a ten-year period—looking only at land within a quarter-mile of new routes—would exceed the projected cost of creating the system by 600%

<sup>2</sup> Further information on transit-oriented development (TOD) associated with BRT systems can be found in TCRP Report 118: Bus Rapid Transit Practitioner’s Guide, 2007. Prepared by the Transportation Research Board of the National Academies ([www.community-wealth.org/\\_pdfs/articles-publications/tools/tod/tool-tcrp-bus-rapid-transit.pdf](http://www.community-wealth.org/_pdfs/articles-publications/tools/tod/tool-tcrp-bus-rapid-transit.pdf))

### **Defining ‘Premium Transit’**

“Premium transit” typically refers to high-quality transit, either rail or bus, that provides reduced travel times, enhances regional/local connectivity, uses improved vehicles and features (such as quality of ride, specific branding, simplified routing) and offers improved amenities (bus stop, platforms, shelters, line supervision) compared to typical local bus service. Premium transit services in the District would include limited-stop bus service, bus rapid transit (BRT), streetcar, light rail and local rail (Metrorail) services.

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to 1,000%. While increased value often precedes the completion of fixed-rail transit, such increases occur along each segment as they connect to Metrorail and do not depend on completion of a full system. Increased real estate investment would translate into stronger fiscal, employment, and population growth for the District.

Residents, visitors, and many commuters tend to prefer streetcars to buses and bus rapid transit for their low noise levels, superior ride quality (steel rails and steadier acceleration/deceleration yield a much smoother ride), lower level of vibration in nearby buildings, and limited emission. Evidence also suggests that streetcar vehicles offer better long-term cost-benefit value than buses.<sup>3</sup>

Both light and heavy rail systems would provide faster, more reliable service than a streetcar because they would operate in exclusive rights of way. Light rail would likely produce somewhat greater real estate investment and related benefits than the streetcar, but a light-rail system would cost two to three times the roughly \$40 million per mile currently projected for the District's streetcar system—and acquiring the necessary rights of way would add to the cost considerably. Metrorail's experience suggests that heavy-rail transit would produce an even larger increase in real estate investment, but heavy rail transit costs several hundred million dollars per mile to build.

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<sup>3</sup> Two recent publications that suggest that maintenance costs can be lower include *Street Smart: Streetcars and Cities in the Twenty-First Century* (Gloria Ohland & Shelley Poticha; 2009, *Reconnecting America*) and *Seven Rules for Sustainable Communities* (Patrick M. Condon; 2010, Island Press).

## 1b Summary of findings

With the completion of the streetcar system and new housing attracted to it, approximately 50% of District households would be located within one-quarter mile of premium transit service (the streetcar or Metrorail; see Map 2, *Net New Premium Transit*). This dramatic increase in access to premium transit would open the door to a set of significant land use benefits, and to a smaller group of challenges, that represent major considerations in evaluating and planning the streetcar system. (Note: In order to develop accurate estimates, the report uses 2010 dollars. Land-use impacts reflect projected growth over ten years, calculated as if the full system began operation in 2010.)

### STREETCAR BENEFITS (CHAPTER 2)

Streetcar service:

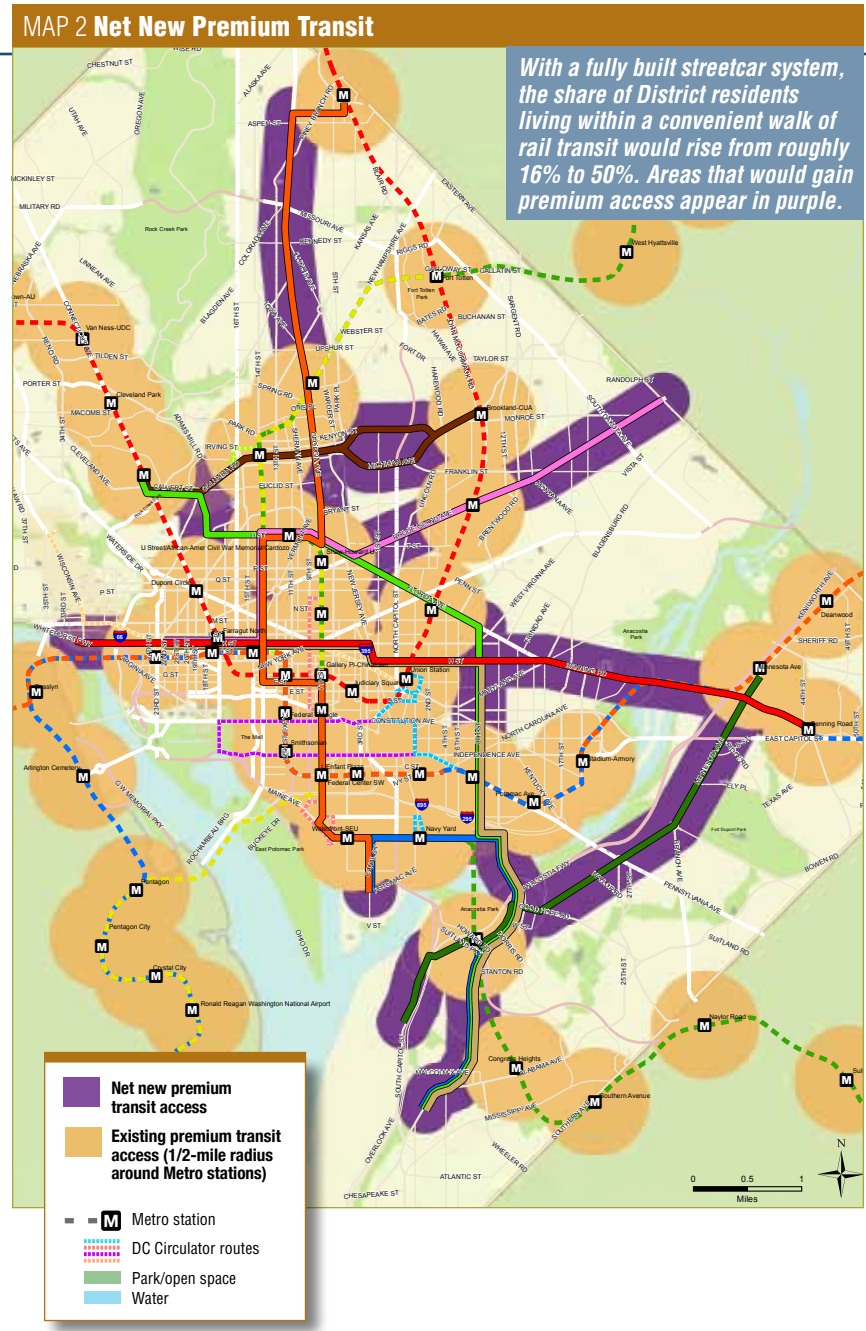
- **Improves access to premium transit** for more than one-third of the District's households, including 100,000 residents along streetcar corridors who do not have access to a car.
- **Reduces transportation costs** by offering households within one-quarter mile of the streetcar a realistic opportunity to be “car light” (that is, own fewer cars) or car-free. Nationally, the average yearly cost of owning a car reached \$8,437 in 2010.<sup>4</sup>

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<sup>4</sup> This is a national average calculated annually by the American Automobile Association (AAA) for a medium-size sedan driven 15,000 miles in a year, with the cost of gas held constant at \$2.60/gallon (for the 2010 calculations; [www.aaaexchange.com/Assets/Files/201048935480.Driving%Costs%202010.pdf](http://www.aaaexchange.com/Assets/Files/201048935480.Driving%Costs%202010.pdf), retrieved 1 March 2011). Taxes and fees would push this total somewhat higher for District drivers, as would the rising price of gasoline. Using a more current average for the District of \$3.47 for a gallon of regular, reported by AAA on 1 March 2011, brings the figure to \$8,902 (<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>, retrieved 1 March 2011).



- **Offers multiple quality-of-life benefits:**
  - › *improves walkability*: new transit trips translate into new walk trips as local residents typically walk to and from transit in urban settings. Higher rates of walking support local businesses and promote a greater sense of safety that will encourage still more residents to walk.
  - › “*extends the walk*” by generating more trips on foot outside of existing commercial districts and other busy areas, thereby supporting expansion of retail and other neighborhood-serving uses.
  - › *fosters the growth of main streets*, as new residents and employees attracted by the streetcar inject more than \$300 million in retail spending annually into local commercial districts.
  - › *broadens access to schools* by more than doubling the number of public and charter schools located within a quarter-mile of rail transit, making it easier for parents to commute with their children to school and work and for families to choose from a wider variety of schools.
  - › *returns premium transit to disinvested historic commercial districts* built around the streetcar in the late 19th and early 20th centuries; the new investment that would follow the streetcar’s introduction would encourage adaptive reuse of more historic properties, contributing to a stronger sense of place.
  - › *Expands housing choices* by supporting development of market-rate and mixed-income housing in areas that have witnessed little or none in recent decades, spurring demand across the District for





developments of ten or more units subject to inclusionary zoning, and expanding the supply of lofts, smaller units, accessory units, and other housing types sought by an increasingly diverse population.

- **Improves access to jobs** by bringing an additional 72,000 households into walkable distance of premium transit, which guarantees them access to more than 85% of the district's office jobs and more than half of all jobs—a benefit to both residents and to employers.
- **Attracts new jobs and residents** by improving accessibility and spurring creation of more amenities. Over a ten-year period, the District could expect to draw new households and retain existing ones at a combined annual rate of roughly 1,400 if the system were complete today. At the same time, the proportion

of District workers who also live in the District, making them subject to its income tax, could increase over 20 years from 31.5% to roughly 34%.

- **Strengthens real estate values** by adding \$5 billion to \$7 billion to the value of existing property and sparking an additional \$5 to \$8 billion in new development in the ten years after completion—in the corridors alone. These benefits extend across housing, commercial, and retail markets and apply in varying degrees to every streetcar corridor.
- **Increases revenue to the District** by strengthening the real estate market, adding new residents, and producing greater sales-tax receipts. Together, these sources would likely generate between \$238 million and \$291 million in annual new revenue within ten years of completion of the system.

*A streetcar loads at the Portland State University campus, above. The Portland streetcar system has sparked more than \$3.5 billion in development, transforming light-industrial districts and railyards into new neighborhoods that mix housing, stores, and commercial uses, like the city's South Waterfront, pictured at right.*

- **Strengthens growth in the creative economy** (generally, arts, media, and communication businesses) by offering the enhanced accessibility and amenities, improved walkability, and support for local Main Streets that employers and their workers in these fields value highly. The creative sector already accounts for 10% of District jobs and adds economic diversity, job growth, and job quality to the District employment market.
- **Improves public health** by offering significantly more people the health benefits of walking, preventing added emissions of unhealthy air pollutants, and providing safer transportation than by automobile.

### CHALLENGES AND MITIGATION STRATEGIES (CHAPTER 3)

Advance planning can mitigate potential challenges, including:

- **Housing affordability**, by addressing early in the planning process the possibility of dislocation posed by a 5% to 12% increase in property values that appears likely to result from improved access to jobs and amenities and by other benefits. These issues are most likely to appear where streetcar corridors pass through neighborhoods with lower household incomes, lower housing prices, and higher proportions of renters. Although residents in these corridors would benefit from reduced transportation costs and greater access to jobs—which could offset increased housing costs for some households—the District should monitor these areas and be prepared to step in with active measures to promote affordability.
- **Potential market shifts within the District** by planning early for alternative redevelopment on parcels without direct streetcar access (offices and other uses

will likely choose accessible sites over non-streetcar sites) and by supporting businesses in the corridors, particularly retailers, concerned about dislocation as new businesses seek to move to the corridors.

- **Routing and right-of-way issues** arising from some potential loss of curbside parking, traffic congestion, and similar issues in specific neighborhoods and commercial districts. Mitigation may involve early identification of route adjustments, alternative parking, or other solutions.

### NEIGHBORHOOD ANALYSIS (CHAPTER 4)

- The study suggests that **all corridors would share in the benefits and challenges** brought by the streetcar (detailed reviews of each corridor appear in Chapter 4), although these impacts would vary considerably among corridors. Impacts would be most dramatic in areas that today have limited current access to Metrorail service.
- In certain locations, **alternative routing or phasing of the streetcar route would unlock greater employment, fiscal, and development benefits** by extending premium transit to land with untapped redevelopment potential. Some of these refinements would mean higher initial costs, but the additional benefits they would trigger seem likely to outweigh the extra cost and deserve study. Other refinements, including earlier construction of particular route segments, would provide better connections to employment centers, resolve right-of-way issues, or provide more convenient service.



*Construction of the H Street/  
Benning Road NE streetcar  
segment, August 2010*

## **STRATEGIES AND TOOLS FOR OPTIMIZING LAND USE BENEFITS** (CHAPTER 5)

The District can maximize land use benefits and minimize implementation challenges in many ways:

- **Make use of existing and new development tools** to augment the streetcar's ability to support neighborhood retail, foster redevelopment of blighted property, attract investment in housing and jobs, and yield similar benefits.
- **Optimize existing and potential land use policies and design guidelines** to ensure that zoning fully supports the District's ability to realize benefits brought by the streetcar and that new development enhances community character and quality.
- **Coordinate with other transportation investments**, including regional and local bus lines, bikeshare, and other modes to facilitate transfers, share operating lanes and stops, and generally take a comprehensive approach to integrating transportation and land use planning.
- **Improve access to the streetcar for pedestrians and bicyclists** by making sure that new development, streets, and sidewalks appeal to pedestrians and cyclists and assure safe and convenient use.
- **Use multiple mechanisms to capture the value of new development drawn to the streetcar corridors to help fund construction and/or operation of the system.** Taxes generated by the rising value of all property could underwrite more than half the system's capital costs through the sale of bonds backed by this revenue. Projects or business improvement districts may see self-interest in contributing to construction costs where a new line would increase the value of their property or business. Determining the timing, extent, and best mechanisms for pursuing such strategies will require significant additional study.

## 2. systemwide benefits

*The streetcar can transform the District's most underdeveloped areas into thriving neighborhoods, enlarge existing commercial districts, and link established neighborhoods to new jobs and amenities.*

The study area for this analysis includes all land within one-quarter mile of the proposed streetcar lines, representing the area within a convenient walking distance (roughly five minutes) of each line. National research indicates that the strongest impacts generated by the introduction of streetcar service occur within one-quarter mile of its routes. Research also indicates that impacts generally extend in a uniform corridor along streetcar routes, owing to the half-mile spacing typically found between stops.

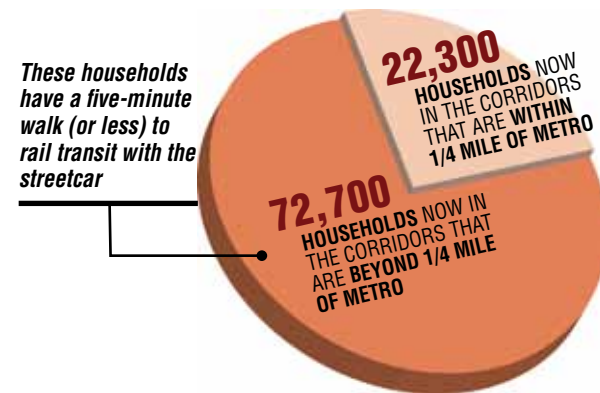
This study area has been organized into nine corridors that share similar land use characteristics to provide a finer-grained and place-specific way of looking at land use changes the streetcar could conceivably bring. Dividing the corridors into smaller subareas enabled the study team to focus on critical sites or other targeted land use issues. Map 4 shows the nine corridors and their sub-areas.

### 2a Improves access to premium transit

“Premium transit” describes transit service that is reliable, predictable, and offers a high-quality ride—in other words, Metrorail or the streetcar. Roughly 72,000 District households now located more than one-quarter mile from a Metro station would be located one-quarter mile

FIGURE 3 **New Access to Premium Transit**

Approximately 95,000 District households are currently located within one-quarter mile of the proposed streetcar corridors.



or less from the proposed streetcar. The streetcar would open significant new transportation choices for these residents, in particular the 44% of the households along the proposed corridors that do not own a car.

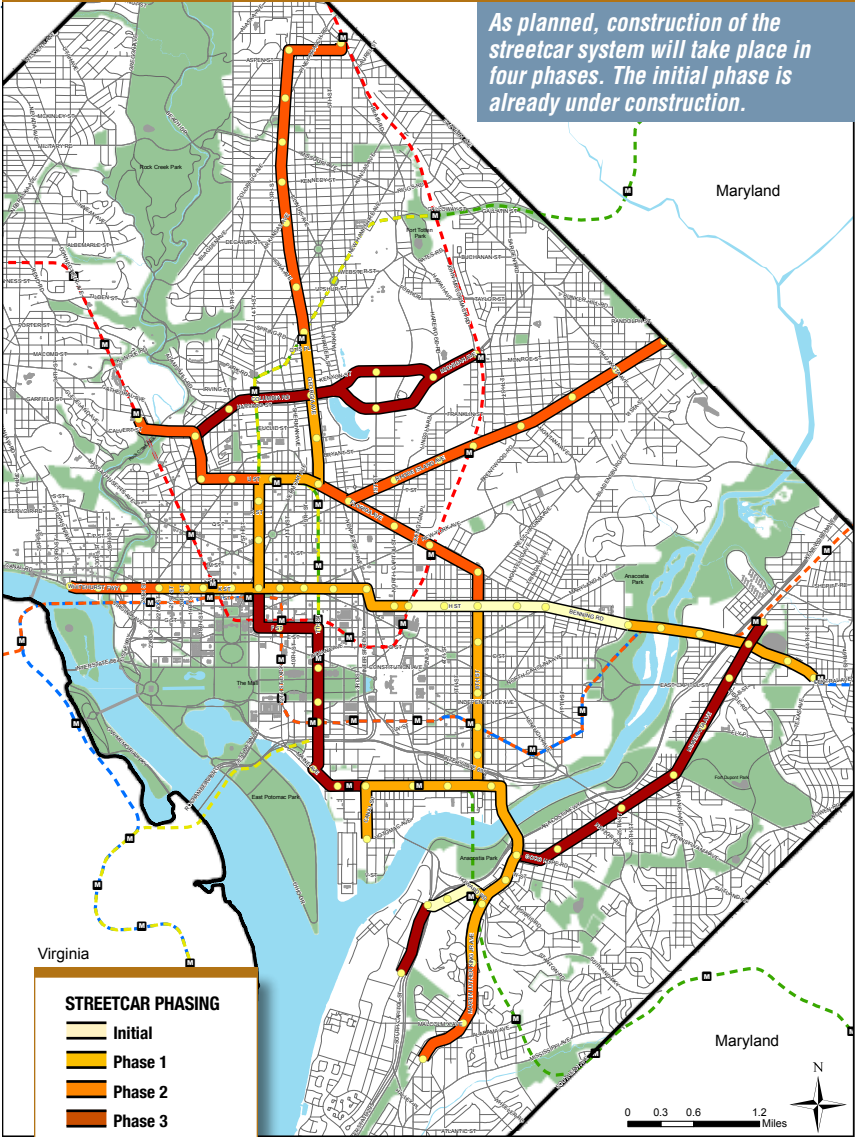
### 2b Reduces transportation costs

The streetcar can enable households to be “car light” (that is, own fewer cars) or car-free. Either option offers the opportunity for considerable saving. In 2010 the average automobile cost \$8,437 to own and operate;<sup>5</sup> most transit commutes cost less than one-third this amount when figured on an annual basis. Avoiding the expense of car ownership has an espe-

<sup>5</sup> See footnote 4 on page 8.

**MAP 3 District Department of Transportation—Full Streetcar System Phasing**

*As planned, construction of the streetcar system will take place in four phases. The initial phase is already under construction.*



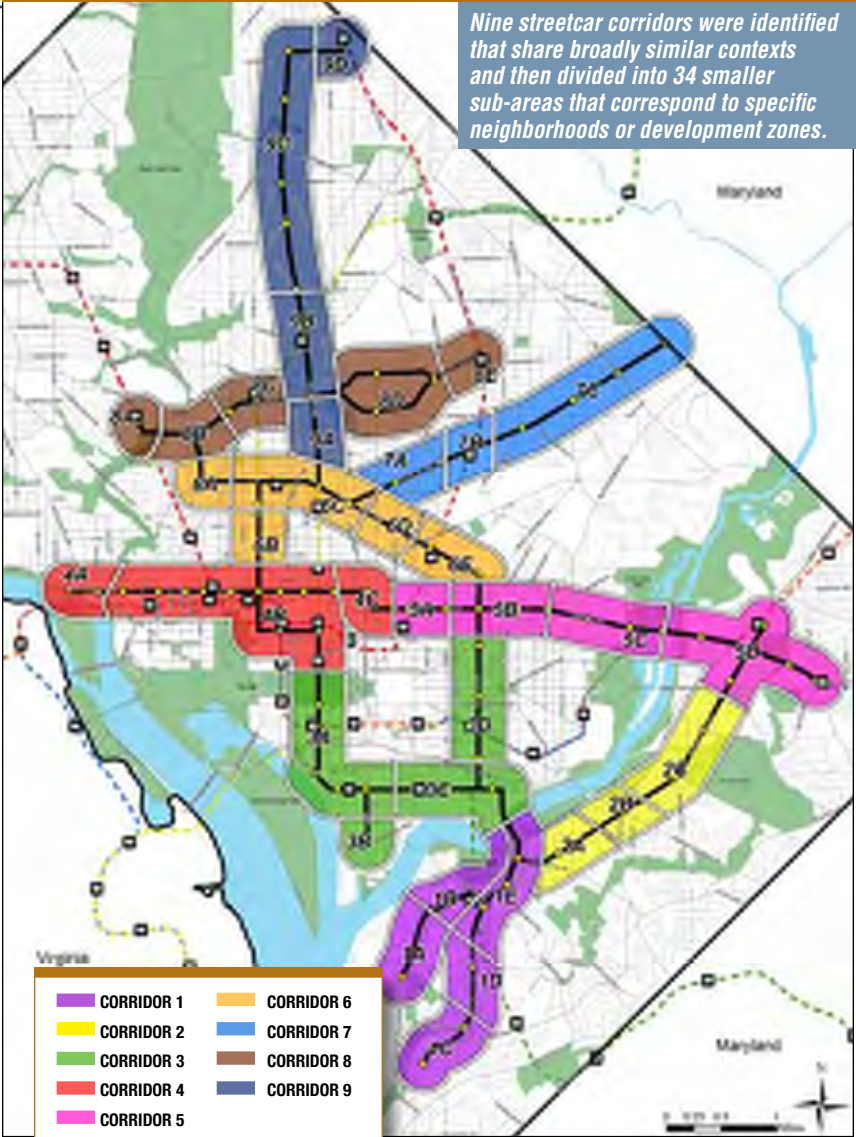
**STREETCAR PHASING**

- Initial
- Phase 1
- Phase 2
- Phase 3

- Metro station
- Streetcar station
- Park/open space
- Water

**MAP 4 Neighborhood Context Corridors**

*Nine streetcar corridors were identified that share broadly similar contexts and then divided into 34 smaller sub-areas that correspond to specific neighborhoods or development zones.*



- CORRIDOR 1
- CORRIDOR 2
- CORRIDOR 3
- CORRIDOR 4
- CORRIDOR 5
- CORRIDOR 6
- CORRIDOR 7
- CORRIDOR 8
- CORRIDOR 9

- Metro station
- Streetcar station
- Park/open space
- Water

cially powerful impact on lower-income households, which spend a higher percentage of their income on transportation than any other group. District households with \$20,000 to \$50,000 in yearly income spend 28% of that income on transportation and another 32% of it on housing (for a total of 60%). By comparison, an average American household spends 20% of income on transportation and 27% on housing (for a total of 47%).<sup>6</sup>

## 2c Offers quality-of-life benefits

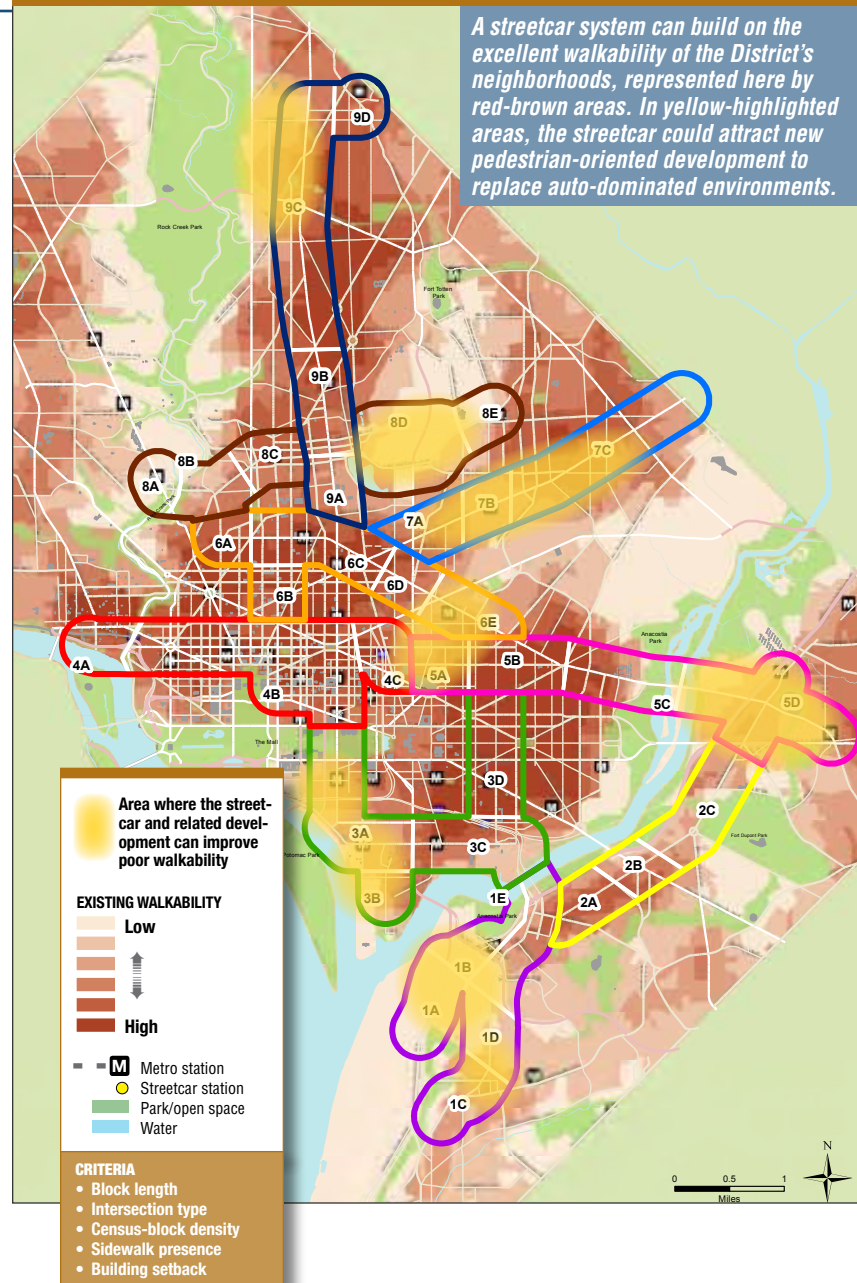
Because the streetcar offers premium transit service to areas with large transit-dependent populations, and because it makes both transit and walking more attractive options for all residents, the system would create significant quality-of-life benefits for people visiting, working, and living in streetcar corridors.

### IMPROVES WALKABILITY

Because the bulk of streetcar trips begin on foot, streetcar service would increase pedestrian activity within the streetcar corridors. This added activity would in turn support local businesses and contribute to a greater sense of personal safety. Introducing the streetcar along a corridor may reduce motor vehicle speeds and may include facilities for pedestrians, such as improved crossing treatments and sidewalks. Infrastructure and streetscape improvements would also likely take place as part of streetcar line construction. All of these changes would make the walking environment more comfortable, and streetcar service would enable more pedestrians to take advantage of areas where streets and blocks are already well-scaled for walking (for

<sup>6</sup> These numbers are based on research by the Center for Neighborhood Technology. The full report is available at [http://www.cnt.org/repository/heavy\\_load\\_10\\_06.pdf](http://www.cnt.org/repository/heavy_load_10_06.pdf)

MAP 5 Walkability Index



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example, Capitol Hill, downtown, and Petworth). In more auto-oriented areas, such as portions of Georgia Avenue NW, Rhode Island Avenue NE, and Benning Road in Anacostia, it would bridge distances between destinations that are too far apart for comfortable walking and encourage redevelopment that is oriented to pedestrians. In underdeveloped areas like Buzzard Point, a walkable street network can emerge as new destinations and sidewalks are created through development.

### **PROMOTES PUBLIC HEALTH**

Streetcar service can be expected to offer positive public health benefits in three principal ways: by promoting more walking, which leads to associated health benefits; by promoting healthy air quality; and by encouraging travel on transit and on foot as safer alternatives to driving.

People who walk more tend to enjoy better physical fitness, with significantly lower tendency toward obesity or a variety of other serious health problems. On average, transit users get more physical activity than non-transit users, even after accounting for differences in income and other demographic characteristics.<sup>7</sup> This added activity is significant in that transit users are, on average, approximately three times more likely than non-users to meet or exceed the CDC recommendation of a minimum of 22 minutes of exercise daily.<sup>8</sup> Streetcars offer the advantage of attracting more, and more diverse,

riders than does bus transit. Research has further shown that people are willing to walk further to use rail transit than bus transit. The streetcar will offer additional value in places where it stimulates investment in pedestrian-oriented streets and development, as 43% of people with safe places to walk within ten minutes of where they live achieve physical activity targets, compared with just 27% of people living in less-walkable areas.<sup>9</sup>

Motor vehicles produce a major portion of airborne particulate matter, nitrogen oxides, and smog, all of which directly contribute to respiratory health problems. The streetcar's electric propulsion eliminates such air pollutants that would be introduced along streets by automobiles or buses operating in its place.<sup>10</sup>

Travel by transit is also associated with much lower rates of traffic injuries and fatalities than automobile travel, which can be 20 times or more as deadly per passenger mile. Rail transit, further, has only 40% the rate of passenger fatalities of bus transit.<sup>11</sup>

On top of these health benefits, the streetcar can also play an important role providing access to healthy food choices and medical care, particularly for economically and physically disadvantaged populations.<sup>12</sup>

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<sup>7</sup> Ugo Lachapelle and Lawrence D Frank, "Transit and Health: Mode of Transport, Employer-Sponsored Public Transit Pass Programs, and Physical Activity." *Journal of Public Health Policy* (2009) 30, S73–S94. doi:10.1057/jphp.2008.52.  
<sup>8</sup> David Ebner, "For Healthy People, Build a Healthy City." *Toronto Globe & Mail*, [www.theglobeandmail.com/life/health/new-health/health-news/for-healthy-people-build-a-healthy-city/article2251518/page2/](http://www.theglobeandmail.com/life/health/new-health/health-news/for-healthy-people-build-a-healthy-city/article2251518/page2/), accessed 23 December 2011.

<sup>9</sup> Todd Litman, "Evaluating Public Transportation Health Benefits." *Victoria Transport Policy Institute*, June 2010 [http://apta.com/resources/reportsandpublications/Documents/APTA\\_Health\\_Benefits\\_Litman.pdf](http://apta.com/resources/reportsandpublications/Documents/APTA_Health_Benefits_Litman.pdf), accessed 23 December 2011.

<sup>10</sup> Howard Frumkin, Lawrence Frank, Richard Jackson. *Urban Sprawl and Public Health*, p.103. Island Press, 2004.

<sup>11</sup> Litman, *op. cit.*

<sup>12</sup> *ibid.*



### “EXTENDS THE WALK”

As the streetcar generates more trips on foot outside of traditionally busy areas, such as the vicinity of Metro rail stations and existing commercial districts, it expands the area in which intense pedestrian activity helps support retail and other neighborhood-serving uses. Local stores can benefit significantly from this new activity (as the Main Streets discussion below confirms), and as local retail activity grows, the additional amenity and increased number of destinations would promote even more pedestrian activity.

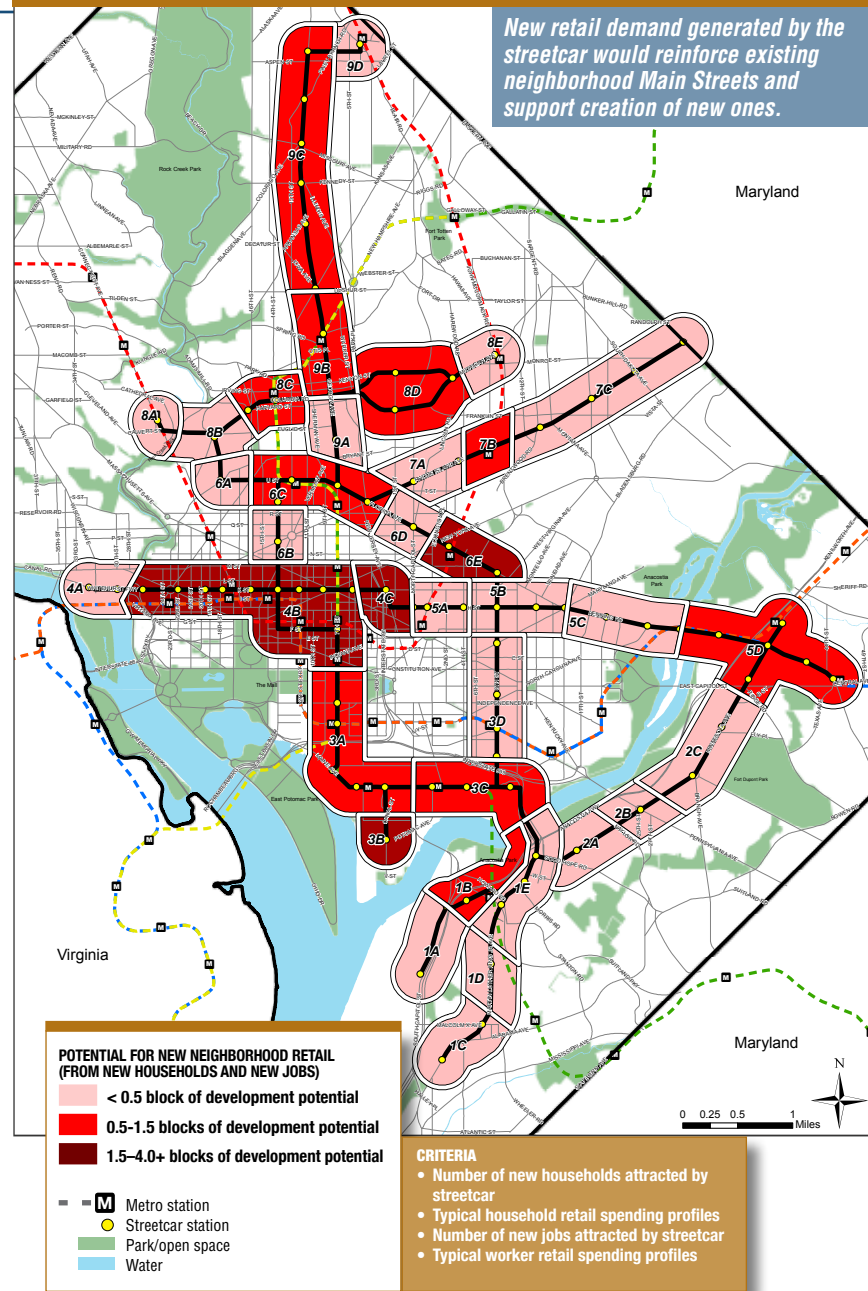
### ENCOURAGES DEVELOPMENT OF MAIN STREETS

As increased development along streetcar corridors attracts new residents and employees, these additional people can drive the establishment of more retail. The analysis indicates that roughly every 1,000 additional households can spur the creation of one new block (30,000-50,000SF) of “main street” retail space. Map 6 shows where this new demand would likely be strongest. Combined with spending by employees of new businesses attracted to the corridors (primarily office workers), these new households could introduce a projected \$305 million to \$370 million in new retail spending into areas along the streetcar system. Such a broad wave of spending would significantly strengthen existing neighborhood retail and support new retail clusters.

Key areas where the streetcar would likely encourage additional pedestrian-oriented retail, a priority for the District and a stated goal of the *Retail Action Roadmap*<sup>13</sup> (2010), include:

<sup>13</sup> <http://planning.dc.gov/DC/Planning/Across+the+City/Other+Citywide+Initiatives/Retail+Action+Strategy/Retail+Action+Roadmap>

MAP 6 New Retail Potential



- Minnesota Avenue SE/NE and Benning Road NE (subareas 2C, 5D)
- Downtown Anacostia (1E)
- Georgia Avenue NW (9C)
- The Atlas District and Florida Avenue NE/NW in NoMa (subsections 5B, 6E)
- Rhode Island Avenue NE at the Rhode Island Avenue Metro (7B)
- Southwest Waterfront (3A)
- U Street NW (6C)

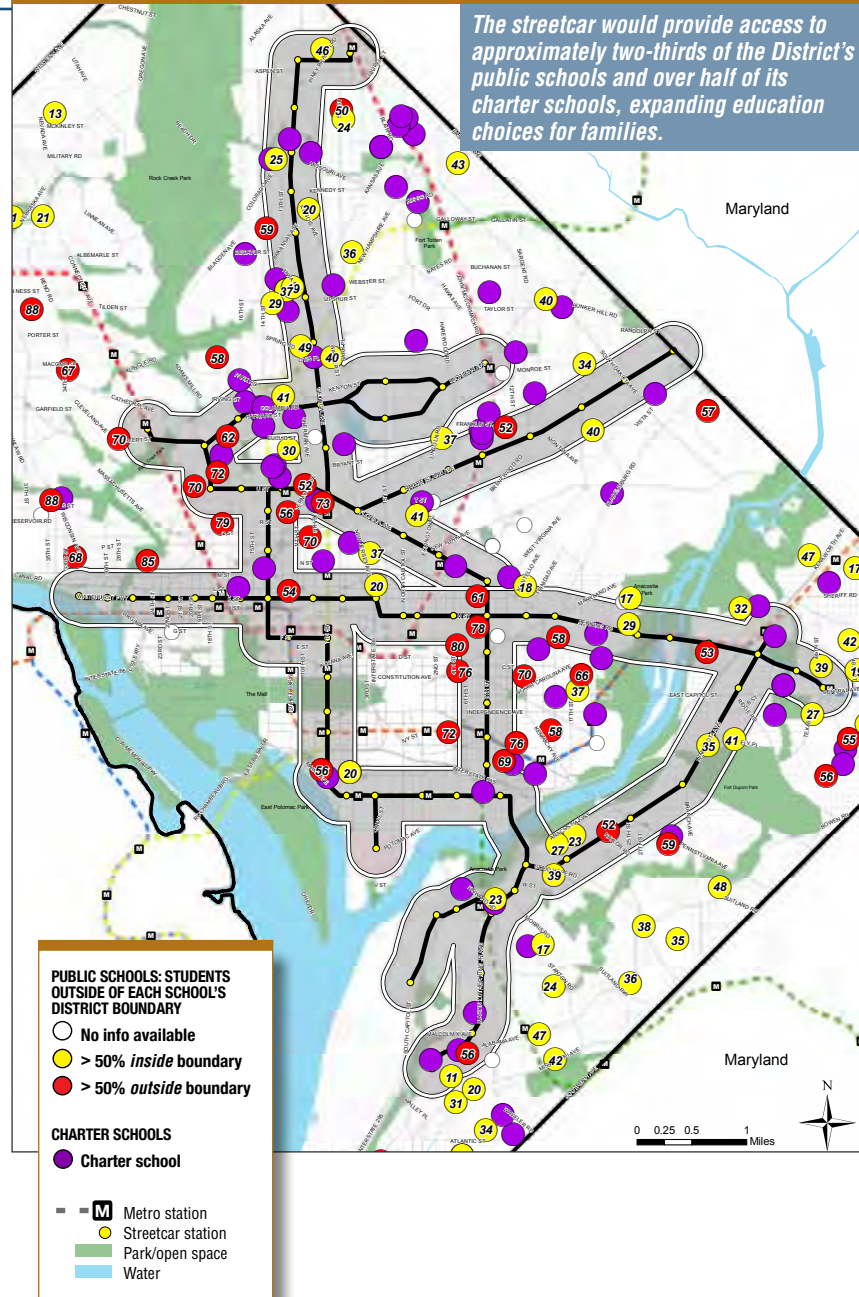
Streetcar service can also rebalance auto-oriented commercial streets such as Georgia Avenue NW and portions of Rhode Island Avenue NE, by increasing foot traffic, better serving bicyclists, and creating a more walkable “Main Street” character.

The streetcar’s support of Main Streets extends to a broader variety of services and job opportunities, strengthening the self-sufficiency of each neighborhood. Residents would enjoy access to a wider range of local shopping, civic services, schools, jobs and other necessities.

### BROADENS ACCESS TO SCHOOLS

The streetcar would increase the share of public and charter schools located within a quarter-mile walk of rail transit from 18% to 39%. Many of these schools are already accessible by bus, but the fact that more than 85% of the District’s office jobs are located along streetcar routes means that many more parents would be able to travel with their school-age children to and from school and work by rail transit. The increased number of schools accessible

MAP 7 Improved Access to Public and Charter Schools



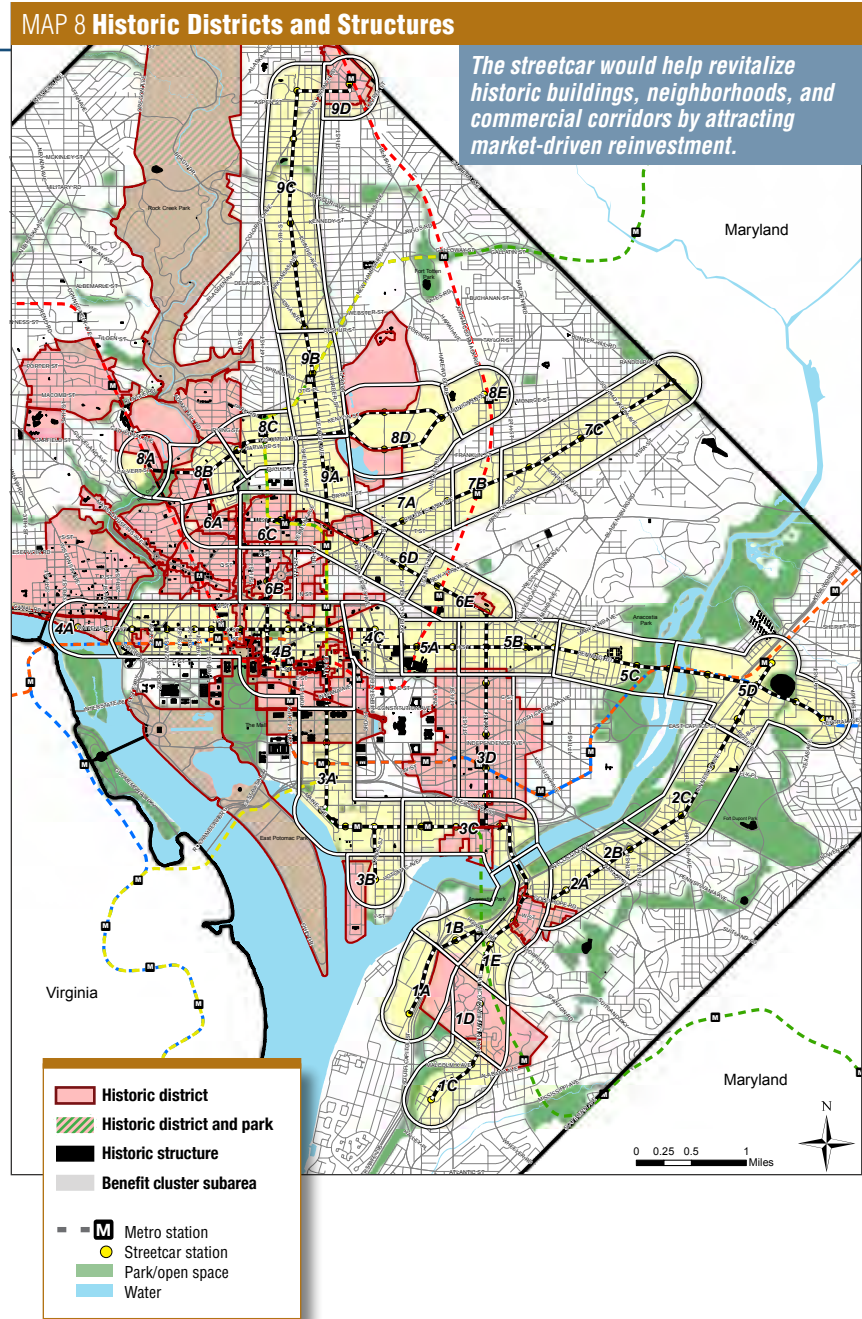
by premium transit will also expand the school choices available to the District’s students. The streetcar would also greatly increase transit capacity during peak hours for students traveling to and from school, a key benefit because so many students depend on transit to reach school.

### PRESERVES HISTORIC RESOURCES

An earlier streetcar system spurred development of many of the District’s commercial corridors and residential neighborhoods. These development patterns remain largely intact and constitute a majority of the city’s historic districts and landmarks (see Map 8; these patterns also include districts and buildings eligible for designation). After streetcar service ended in 1962, some of these areas—such as the corridors along Rhode Island Avenue NE, Georgia Avenue NW, and Martin Luther King Jr. Avenue SE—suffered from a lack of access to efficient transit and other factors that drove subsequent disinvestment. Others, including M Street NW (Georgetown) and 16th Street NW, continued to thrive and have become important contributors to the District’s sense of place.

Implementation of a new streetcar system would trigger reviews by multiple agencies investigating impacts on historic resources. Meeting this obligation would require significant effort.<sup>14</sup> The reviews would address a

<sup>14</sup> *The proposed routes pass through 18 districts protected under the District’s 1978 Historic Landmark and Historic District Protection Act. All local historic districts are also listed on the National Register of Historic Places and are protected under the National Historic Preservation Act of 1966. These protections require local and federal historic-preservation and environmental review processes through the District’s State Historic Preservation Office and its Historic Preservation Review Board. These reviews would be coordinated with other design-review processes conducted by the Commission of Fine Arts and the National Capital Planning Commission, both of which also assess impacts on historic resources.*



## The Question of Overhead Wires

For more than 120 years the District of Columbia has prohibited overhead power and telephone lines in the Old City of Washington (often referred to colloquially as the “L’Enfant City.”) In January 2011 the City Council amended the ban to permit use of overhead wires on the H Street–Benning segment and requiring DDOT to submit a plan for the use of wires on other proposed streetcar routes.

The issue of overhead wires is not unique to the District, and streetcar manufacturers have responded with experimental models that use alternative power

sources. Some of these alternatives are designed solely for short wireless segments of a route and others are designed to operate without an overhead-wire system over longer stretches. The Federal Transit Administration recently awarded DDOT funding to evaluate the advantages and disadvantages of alternative streetcar propulsion systems and provide a recommendation for this and future streetcar lines as part of the Alternative Analysis study of the Union Station-to-Washington Circle extension.

range of issues, including the impact of overhead wires, particularly on historic view sheds; the streetcar’s effect on the character of historic districts and landmarks; introduction of new infrastructure (such as tracks, transformer boxes, streetcar shelters, and medians); and potential changes in the width and general character of historic thoroughfares. The density and significance of resources in some corridors—such as K Street NW, Columbia Road NW, 8th Street SE, and 14th Street NW—would present particular challenges in the review process.

*Examples of potential historic resources include (left to right) 16th Street and Columbia Road NW; Florida Avenue and 3rd Street NW; and Martin Luther King Jr. Avenue SE.*



Alongside these challenges, the streetcar could deliver notable benefits. Roughly two-thirds of the proposed system would retrace earlier routes, restoring the transportation context that shaped many historic areas and areas *eligible* for designation. A new system could build on this inherited urban fabric, particularly in areas that have endured disinvestment, and deliver benefits that include:

- revitalizing historic commercial corridors by making them more accessible, thus attracting reinvestment;
- promoting use of historic-rehabilitation tax credits for both commercial and income-producing residential properties;
- establishing above-ground transit connections to help expand visitor access to and interest in historic and cultural destinations outside the city’s core; and
- bringing communities together around cultural and heritage resources that contribute to a stronger sense of place.

## EXPANDS HOUSING CHOICES

The streetcar would expand mobility to and from a large and diverse mix of housing choices. As noted above, the fully built streetcar system would place an additional 72,000 households within a quarter-mile walk of the streetcar, greatly expanding access to a variety of jobs (see “Office Market” in section 2f). When these are combined with the approximately 40,000 households already within a quarter-mile walk of Metro stations and another 12,000 (approximately) new households that the streetcar could attract to its corridors over 10 years, more than 50% of all District households would sit within a quarter-mile walk of the streetcar or Metro by the time the system is completed.

In areas that have seen little or no development of market-rate and mixed-income housing in recent decades, the streetcar would support development within roughly a five-minute walk of each new line. As demonstrated in other cities, streetcar service also tends to spur development of new housing that responds to current market needs and preferences. This newer development often takes the form of lofts, smaller units, and accessory dwelling units that expand the diversity of housing choices and enable people to find the kind of housing they want within a given neighborhood. Young professionals, for instance, can more easily find affordable starter housing close to employment, family or friends, and empty nesters can more easily shift to smaller units without leaving their community.

Although the streetcar is projected to raise housing values and rents in neighborhoods along each line, the size of the increase—roughly 5% to 12%—appears unlikely

MAP 9 Improved Household Access to Jobs via Transit



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to cause widespread displacement or in other ways dramatically transform neighborhood character. (Chapter 3 includes a more detailed discussion of this point.) The streetcar should indirectly spur creation of affordable housing in higher-income areas in developments subject to mandatory inclusionary zoning, which is discussed further in Chapter 3.

## **2d Improves job access**

As noted above, more than 50% of all District households would sit within a quarter-mile walk of the streetcar or Metro by the time the system is completed. More than two-thirds of new housing units and 85% to 95% of all new office employment over the next ten years are projected to be located in the corridors (section 2e, below, examines these figures in more detail), underscoring the streetcar's value in connecting jobs and housing. Map 9, *Improved Household Access to Jobs via Transit*, shows how access increases within corridor subareas. The map reflects both the level of new accessibility that streetcar service adds and the proportion of residents who would gain strong benefit from it.

Map 9 shows that the proposed streetcar corridors cross neighborhoods that today lack access to premium transit yet whose residents rely heavily on transit. As noted earlier, roughly 44% of households now in the corridors do not own a car. The streetcar would improve transit service in these areas, particularly along Martin Luther King Jr. Avenue SE, Minnesota Avenue SE/NE, Benning Road NE, M Street SE, Florida Avenue NE/NW, and the northern stretches of Georgia Avenue NW (dark purple).

Adding streetcar service in corridors with a high demand for additional transit service will provide residents in those areas with better links to downtown, other employment centers, and higher education that can improve workforce readiness. These include Howard University, Washington Hospital Center, the St. Elizabeth's hospital site, Walter Reed Medical Center, and Georgetown University, all of which currently lack premium transit service. Additionally, the proposed network will improve connections to Metrorail stations, allowing resident access to job centers throughout the region.

## **2e Attracts new jobs and residents to the District**

While this area requires further study, initial figures suggest that the added accessibility and amenity of the streetcar appear likely to attract new jobs and residents to the District. Preliminary projections suggest that as the system grows, it would draw an additional 6,300 to 7,700 jobs and 4,000 to 12,000 households to the District over a ten-year period, compared to a scenario with no streetcar. Figures 4 and 5 compare the two scenarios for residential growth and job growth, respectively. Better access and amenities would also help the District retain some households that might otherwise move. Taken together, these two trends could translate into a projected increase of more than 1,400 households annually once the system is complete. This would increase the proportion of the District workforce that also lives in the District from 31.5% today to approximately 32.5% over 10 years and roughly 34% over 20 years (Figure 5).

**FIGURE 4 Projected Residential Growth Over Ten Years**

	<b>BASE</b> (WITHOUT STREETCAR)	<b>PROJECTED STREETCAR IMPACT</b> <i>Figures in parentheses show percentage increase over base condition. Assumes full implementation of streetcar network.*</i>	<b>COMBINED</b> (BASE + STREETCAR IMPACT)
<b>POPULATION</b>			
Net new District residents	34,340	15,500–18,900 (45–55%)	49,800–53,200
<b>HOUSEHOLDS</b>			
Net new District households	22,000	10,800–13,200 (49–60%)	32,800–35,200
Of net new households, those located along streetcar corridors	16,360	7,400–9,000 (45–55%)	23,800–25,400
<i>Existing</i> households within 1/4 mile of rail transit	39,500 (16% of 248,300 households)	72,400 more existing households (29%)	About 112,000 (45% of 248,300 households)
<i>Existing and new</i> households within 1/4 mile of rail transit	43,500 to 48,500 (16–18% of 270,300 new)	96,200 to 97,800 (34–35% of 278,300)	139,700 to 146,300 (50–52% of 278,300 households)

\* See “Residential Market” on page 24 for explanation of the streetcar’s potential to attract and retain households.

**FIGURE 5 Projected Job Growth Over Ten Years (Office and Retail)**

	<b>BASE</b> (WITHOUT STREETCAR)	<b>PROJECTED STREETCAR IMPACT</b> <i>Figures in parentheses show percentage increase over base condition. Assumes full implementation of streetcar network.</i>	<b>COMBINED</b> (BASE + STREETCAR IMPACT)
Net new jobs*	78,133	6,300–7,700 (8–10%)**	85,096
Net new workforce	22,900	10,300–12,600 (45–50%)**	33,200–35,500
Number of jobs in District held by residents—2010	248,220 (31.5% of 788,160 jobs)	N/A	N/A
Number of jobs in District held by residents—2020	271,116 (31.5% of 860,760 jobs)*	10,300–12,600 more workforce; 6,300–7,700 more office and retail jobs	281,400 to 283,700 (32.4–32.7% of 866,293 DC jobs)*
Number of jobs in District held by residents—2030	294,013 (31.9% of 922,259 jobs)	10,300–12,600 more workforce; 6,300–7,700 more office and retail jobs	314,600 to 319,200 (33.4–34% of 941,558 DC jobs)

\* These projections are preliminary and reflect conservative assumptions. Further study of the streetcar’s impact on the District’s regional competitiveness appears likely to identify greater opportunities for job growth.

\*\* See “Office Market” on page 26 for explanation of the streetcar’s potential to attract and retain tenants and associated jobs.

\*\*\* Based on residential market benefits.

## 2f Provides real estate market benefits

This initial assessment of the streetcar’s impact on real estate markets conservatively projects that if the system were in place today it would add \$5 billion to \$7 billion to the value of existing property and attract an additional \$5 billion to \$8 billion in new investment in the study corridors over ten years (Figures 5 and 6). These projections align with studies of real estate impacts from new streetcar lines completed in Portland and Seattle and projections of the impact of a proposed line in Los Angeles.<sup>15</sup> The study team believes that more detailed assessment in Phase II of the streetcar’s impact on real estate values and investment would likely show that the streetcar can make the District more competitive for a range of real estate investments. Further assessment will also look at the extent to which the streetcar would make the District more competitive for jobs within the region.

<sup>15</sup> Estimated real estate investment in Portland from the time the city identified its 7.3 miles of streetcar routes to 2008 was \$3.5 billion ([http://www.portlandstreetcar.org/pdf/development\\_200804\\_report.pdf](http://www.portlandstreetcar.org/pdf/development_200804_report.pdf)). In Seattle, approximately \$2.4 billion in investment, including 2,500 housing units and 12,500 jobs, has taken place in the last eight years along the 2.6-mile streetcar line that connects the South Lake Union neighborhood and downtown. The line was financed and built within three years, with one-half of the \$52.9 million cost coming from adjacent property owners (South Lake Union Investment Analysis, Seattle Department of Transportation, 2008). A 2011 study for the city redevelopment agency and Los Angeles Streetcar, Inc., L.A. Streetcar Economic Analysis, found \$1.1 billion in economic impact for a proposed 5.0-mile streetcar route in downtown Los Angeles. That figure includes the value of new commercial and residential construction (respectively, 2,600 units and 675,000 square feet) and 2,100 new non-construction jobs ([www.lastreetcar.org/wp-content/uploads/2011/02/Downtown.L.A.Streetcar.Economic.Impact.Report\\_Feb.08.2011.pdf](http://www.lastreetcar.org/wp-content/uploads/2011/02/Downtown.L.A.Streetcar.Economic.Impact.Report_Feb.08.2011.pdf)).

FIGURE 6 Property Value Increases Along Streetcar Corridor (approximate)

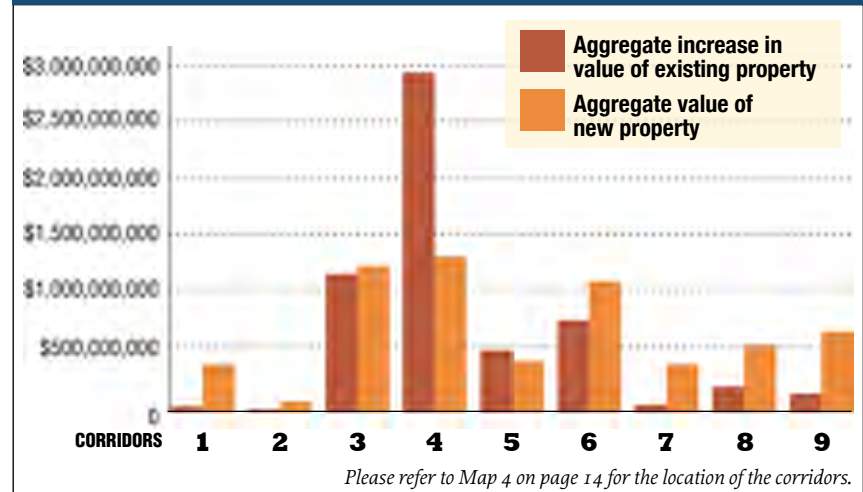
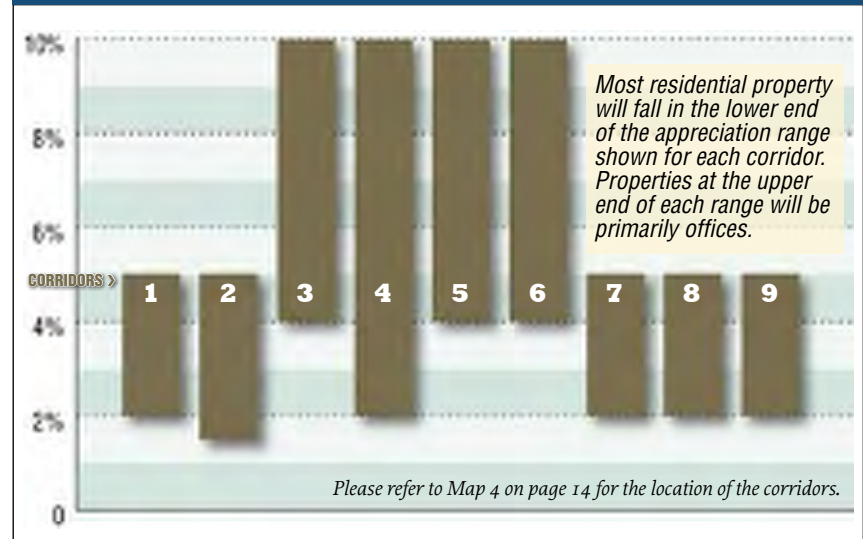


FIGURE 7 Expected Ranges for Existing Property Appreciation (typical)





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The streetcar’s impact on property values and new investment is particularly pronounced in three situations:

1. **Where it improves access to underdeveloped areas.** Most real estate investment in the District over the past three decades has visibly clustered within a half mile of a Metro station. The premium transit offered by the streetcar would expand market interest in areas such as Buzzard Point and the Washington Hospital Center, which have extensive underdeveloped land but lack convenient transit service today.
2. **Where it encourages further expansion of existing commercial districts and intensively developed transit nodes by “extending the walk.”** In areas such as New York Avenue NE (particularly east of the rail underpass), 14th and U streets NW, portions of Anacostia, and Eastern Market, the streetcar supports growth of existing lively commercial districts along streetcar corridors, in part by making them more readily accessible to nearby neighborhoods.
3. **Where it increases accessibility to areas with existing amenities.** Established markets, such as K Street NW, and growing areas like NoMa would realize increased property and business value from more convenient access to restaurants and other amenities in places like the H Street corridor. They would also benefit from the addition of premium accessibility for a larger pool of employees. Similarly, residential markets would benefit, particularly in areas with expanded access to jobs, amenities, schools, and services

## RESIDENTIAL MARKET

This study measures opportunities for new housing development in each corridor subarea by identifying undeveloped or underdeveloped sites large enough to accommodate significant multifamily housing, and evaluating the development capacity those sites have under current or anticipated zoning.

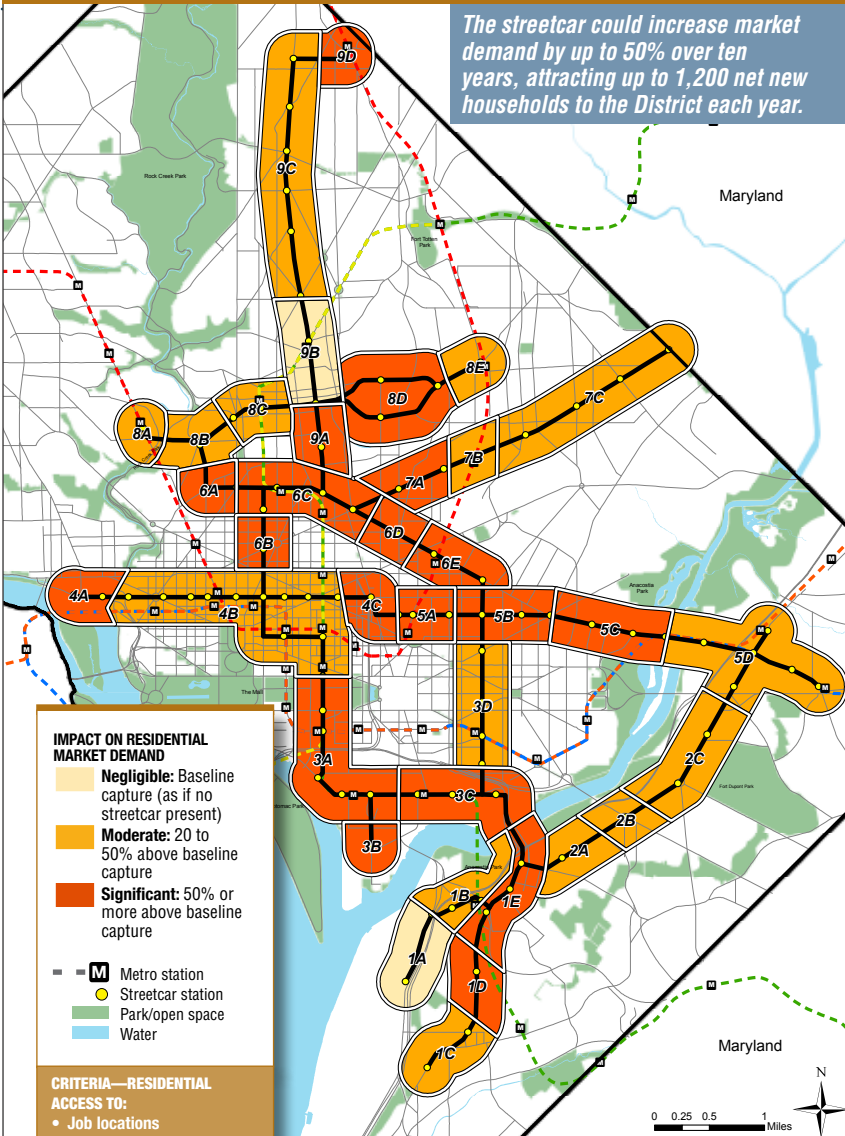
The streetcar would stimulate residential market demand, translating into increases in values for existing housing and investment in housing construction and rehabilitation.<sup>16</sup> Map 10, *Impact on New Residential Market Demand*, highlights areas where the streetcar system appears likely to intensify market demand for new housing.

The streetcar system would increase existing residential property value by \$1.0 billion to \$1.6 billion, and the increases would be especially pronounced near the District’s core, in locations that are currently less well served by Metrorail. Most property values would increase 5% to 12%, with values likely to rise even higher in areas that have many prime redevelopment sites.<sup>17</sup> The

<sup>16</sup> *The yardstick used to assess the streetcar’s impact on housing markets in each corridor was how well it increased accessibility to six destinations that affect housing values and demand for development: workplaces, Metro stations, shopping and services, entertainment, eating and drinking establishments, and green space/parks/recreation. In addition, the study team evaluated the extent of publicly owned, vacant, and underdeveloped sites in each corridor that would be readily available for redevelopment.*

<sup>17</sup> *While individual property values could increase 5% to 12%, the study utilized more conservative estimates in calculating corridor-wide totals: between 2.5% and*

**MAP 10 Impact on New Residential Market Demand**



strongest growth in demand for both existing and new development would occur adjacent to downtown:

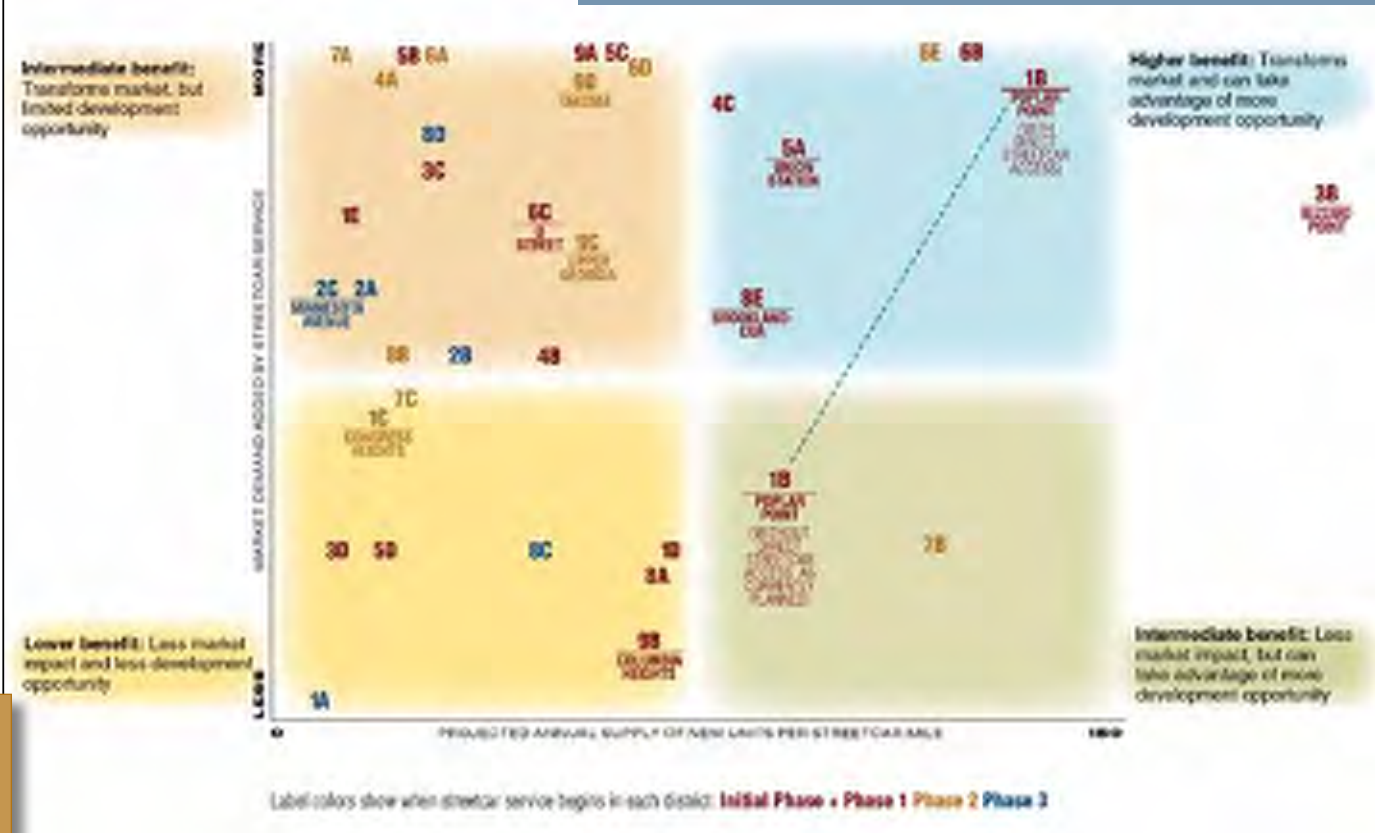
- U Street/Logan Circle/Florida Avenue/NoMa/Howard University/western Rhode Island Avenue (subareas 6A–6E, 7H, 9A)
- H Street/Benning Road (4C, 5A–5C)
- Buzzard Point (3B)
- Capitol Riverfront (3C)
- Other significant increases in demand would occur in Downtown Anacostia (1E), Washington Hospital Center (8D), Takoma Park (9D), and Georgetown (4A).

Figure 8 suggests how the streetcar’s impact on new housing development would vary in different settings. It reflects both the degree to which streetcar service heightens market demand and the availability of land that could support development to meet that demand. The chart highlights where the greatest value and strongest potential for new residential development would occur once the streetcar system is in place. The chart’s vertical axis shows the relative increase in market demand for housing that the streetcar would add in each subarea. The horizontal axis shows the potential number of new housing units developed annually, taking into account site availability. For instance, subarea 6C (U Street) would experience a greater increase in market demand than subarea 8E (Brookland/CUA), but more new units could be

*5% for residential values and between 5% and 10% for commercial values.*

FIGURE 8 Variations in Streetcar's Impact on Housing Development

The streetcar's impact on housing development would vary by subarea based not only on market impact, but also on availability and character of development sites.



- CRITERIA FOR AVAILABILITY OF DEVELOPMENT SITES**
- Sufficient site size to accommodate mixed-use development
  - Scale and character of context
  - Site proximity to streetcar corridors

produced in 8E because it has more underdeveloped sites. Subarea 1B (Poplar Point) appears twice to illustrate the difference between developing a large site with no direct streetcar access (the current plan) and developing it with direct access, which would significantly increase market demand.

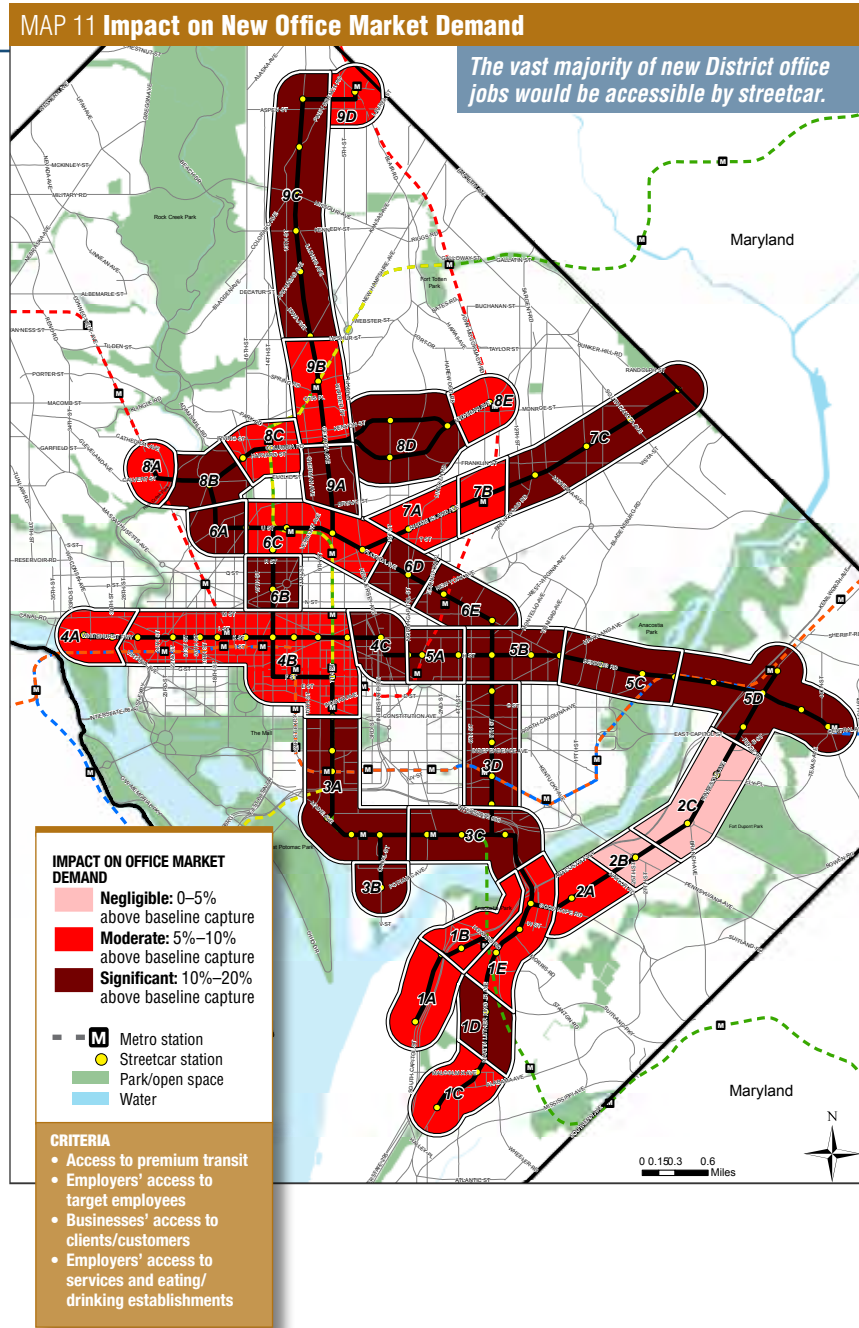
**OFFICE MARKET**

The streetcar would bring similar benefits to the markets for existing and new office development along the proposed streetcar corridors. The value of existing office space would increase most in locations without convenient Metrorail access. Map 11, *Impact on New Office Market Demand*, shows how streetcar service would increase market demand for new office development

around the core of the District as well as along radial corridors. Roughly \$1 billion to \$1.3 billion in office development would occur in streetcar corridors within the next ten years (the figure combines new construction and rehabilitation). The streetcar corridors were designed to pass through existing concentrations of jobs and areas of greatest anticipated growth in office development, which they will reinforce. In some underdeveloped areas, introduction of streetcar service will likely play a more transformative role, putting these locations “on the map” for office development.

Specifically,

- The streetcar would increase **demand for office development** within streetcar corridors by 2.5 million to 3.0 million square feet or roughly 15%. The streetcar would make nearly all locations within the streetcar corridors moderately to significantly more competitive for office development than they are today. The streetcar would increase the market share of new office development for these corridors from roughly 85% to more than 90% of new office investment in the District.
- More than 80% of this **demand would occur in parts of the streetcar corridors that today have substantial underdeveloped land and poor transit access**. These include Buzzard Point (subarea 3B); portions of the Southwest Waterfront (3A); the eastern part of the Navy Yard (3C); parts of NoMa near New Jersey Avenue NW (4C) and New York Avenue NE east of the train tracks (6E); the Washington Hospital Center (8D); and the eastern reaches of Rhode Island



Avenue NE (7C). Improving access to Poplar Point, as described on page 57, could give development prospects a significant boost, increasing demand by more than 20%.

- The streetcar could **increase existing office property values by roughly \$3.7 to \$5.8 billion**. Office property values would increase between roughly 2% and 10% along individual corridors. In areas that are already substantially built out, 2% represents the likely upper limit, while in underdeveloped areas with significant capacity for new development, property values could rise by 20% or more.<sup>18</sup>
- **Adjusting the proposed system routing** in a limited number of areas, particularly Buzzard Point and Poplar Point, could significantly increase office-development opportunity in those locations.

## RETAIL MARKET

Increased residential and office market activity along streetcar corridors would benefit retail values and raise demand for retail space nearby. As shown in Figure 9, the streetcar would add a projected \$305 million to \$373 million to the District’s retail spending potential, which in turn would generate approximately 1.1 to 1.3 million square feet of new retail space after 10 years. New households would provide the most significant support: preliminary analysis determined that each 1,000 new households could

<sup>18</sup> Some cities have seen commercial property values rise substantially as a result of building a streetcar system. Portland, Oregon, experienced a 400% property-value increase after completing its system, but much of the land in question began as railyards and vacant industrial sites. The District’s streetcar corridors would not see such dramatic rises, because real estate values typically start at much higher levels.

**FIGURE 9 Potential new retail spending\***

CORRIDOR	SALES	SQUARE FEET
1	\$22,800,000–\$27,900,000	80,600–98,000
2	\$4,800,000–\$5,800,000	17,000–21,000
3	\$54,300,000–\$66,400,000	192,000–235,000
4	\$60,200,000–\$73,500,000	213,000–260,000
5	\$22,900,000–\$28,000,000	81,000–99,000
6	\$53,000,000–\$64,900,000	188,000–229,000
7	\$21,300,000–\$26,100,000	75,000–92,000
8	\$29,200,000–\$35,700,000	103,000–126,000
9	\$36,500,000–\$44,600,000	129,000–158,000
<b>TOTAL FISCAL BENEFIT</b>	<b>\$305,000,000–\$373,000,000</b>	<b>1,100,000–1,300,000</b>

\* Projections assume a 10-year time frame and that all corridors receive similar spending potential for each new household or job.

Sources: Claritas Inc., Retail Market Power; International Council of Shopping Centers, Office Worker Retail Spending Patterns (2003); W-ZHA

spur development of roughly 30,000–50,000 square feet of additional retail space within a five- to ten-minute walk (a quarter- to a half-mile).

This new demand would take different forms in different places. Areas that see substantial new housing and/or jobs, such as Buzzard Point, could support one or more blocks of new retail space. In areas with substantial existing development, new market demand would both increase business for existing retailers and attract new infill retail where space permits it. Because retailers prefer to locate near other retailers, these new businesses would likely attract additional stores that serve broader markets.

## 2g Increases tax revenues

Existing real estate within the proposed corridors represents roughly \$100 billion in property value (Figure 10). As noted above in the discussion of real estate market benefits, the streetcar would likely add roughly 10% to 15% to this aggregate figure, increasing District real estate tax revenues by a corresponding amount.

Figure 6, as noted earlier, shows the impact the streetcar would likely have on values of both existing and new properties. Most noticeably, increases vary broadly across the streetcar system: some areas would gain value mostly from appreciation of existing properties, other from new development, and still others from both (also see Figure

7). The difference owes largely to the density of existing properties and the availability of land for development. For example, increased value from new property would significantly outweigh increases in existing properties' value in Anacostia because of large planned projects, such as mixed-use redevelopment of the eastern portion of the St. Elizabeth's hospital site (subarea 1D) and Poplar Point (1B). By contrast, heavily built-out areas such as downtown (4B) would see minimal gains from new properties but substantial gains in the value of existing property. For parts of the city with both significant new development opportunities and larger volumes of high-value property, such as Capitol Riverfront and NoMa, major value increases would come from both sources.

**FIGURE 10 Projected Fiscal Benefit of Streetcar Over Ten Years**

	BASE (WITHOUT STREETCAR)	PROJECTED STREETCAR IMPACT	COMBINED (BASE + STREETCAR IMPACT)
<b>COMMERCIAL</b>			
Existing commercial property tax	\$1,260,000,000–\$1,540,000,000	\$79,200,000–\$96,800,000	\$1,339,200,000–\$1,636,800,000
New commercial development property tax	\$135,000,000–\$165,000,000	\$5,700,000–\$6,900,000	\$140,700,000–\$171,900,000
<b>RESIDENTIAL</b>			
Existing residential property tax	\$244,800,000–\$299,200,000	\$9,000,000–\$11,000,000	\$253,800,000–\$310,200,000
New residential development property tax	\$136,800,000–\$167,200,000	\$68,400,000–\$83,600,000	\$205,200,000–\$250,800,000
Income tax (new residents due to streetcar)	\$117,900,000–\$144,100,000	\$64,300,000–\$78,600,000	\$182,200,000–\$222,700,000
Retail sales tax (additional sales tax due to streetcar)	\$21,600,000–\$26,400,000	\$11,900,000–\$14,500,000	\$33,500,000–\$40,900,000
<b>TOTAL FISCAL BENEFIT</b>	<b>\$1,916,100,000–\$2,341,900,000</b>	<b>\$238,400,000–\$291,400,000</b>	<b>\$2,154,500,000–\$2,633,300,000</b>

The District would also benefit from additional income taxes paid by new residents attracted by the streetcar (Figure 10), projected at \$65 million to \$80 million annually after full system buildout.<sup>19</sup> Additional retail spending by new residents and employees after full buildout is projected to generate roughly \$14 million in new annual tax revenue.

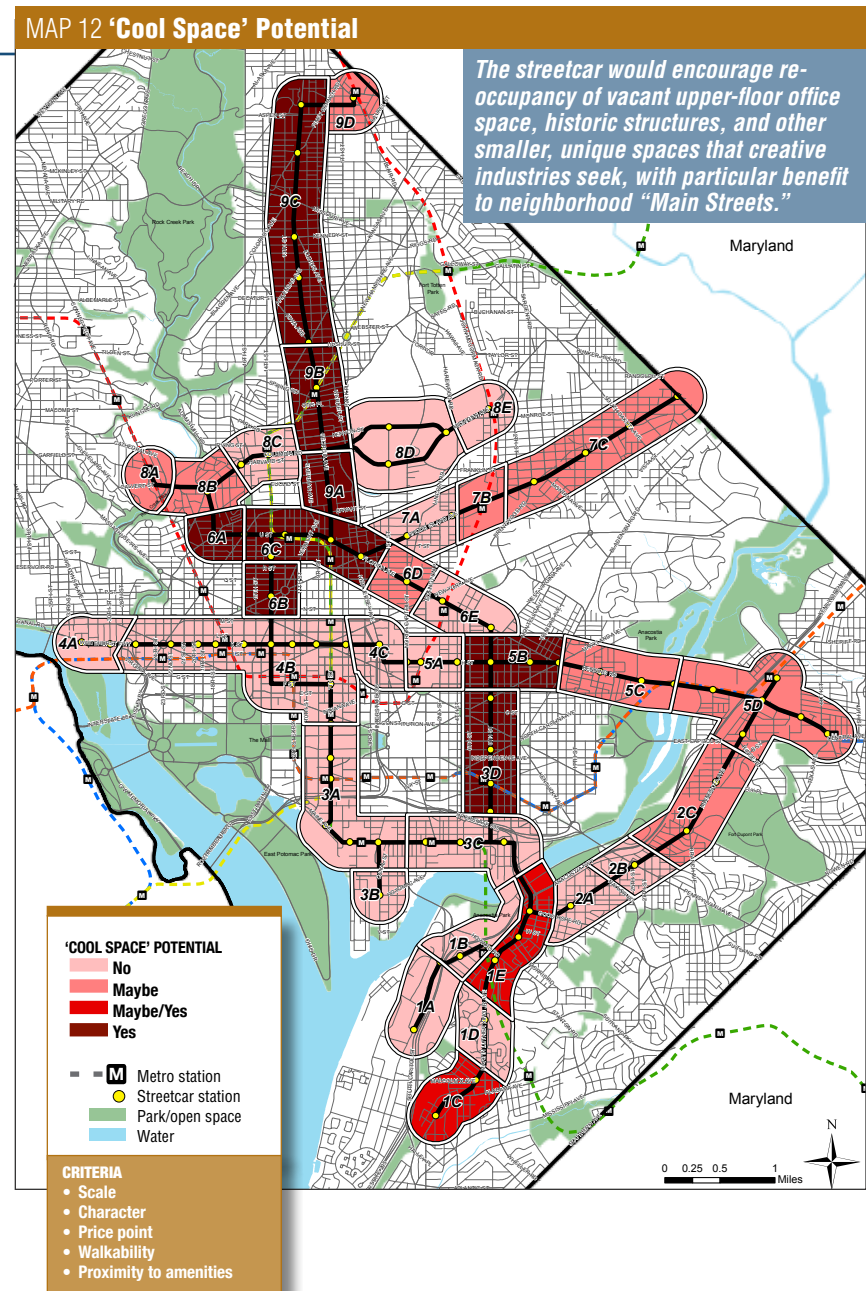
## 2h Expands the creative economy

*Creative Capital: The Creative DC Action Agenda*, released in 2010 by the District’s Office of Planning and The Washington Economic Partnership, stresses the importance of the “creative economy” to the city’s economic diversity, job growth, and job quality. The District defines the creative economy, which already accounts for 10% of District jobs,<sup>20</sup> as economic activity related to museums and heritage, building arts, culinary arts, performing arts, media and communications, and visual arts and crafts. The enhanced accessibility to jobs and amenities and the improved walkability the streetcar system would create represent critical strategic advantages in the District’s effort to retain existing creative-industry businesses and attract new ones.

Studies prepared for CEOs for Cities include two key findings particularly relevant to the District: that the U.S. faces a long-term shortage of the kinds of skilled

<sup>19</sup> An estimated 1,200 net new households would move into the District annually as a result of the full streetcar system buildout, generating \$65 million to \$80 million annually in new income tax revenue, assuming an average taxable household income (after deductions) of \$70,000.

<sup>20</sup> Creative Capital: The Creative DC Action Agenda, 2010 (<http://newsroom.dc.gov/show.aspx/aency/planning/section/2/release/20010>, retrieved 1 March 2011)



and educated workers that are essential to creative industries and that creative-industry employers understand the necessity of locating in areas preferred by their workforce.<sup>21</sup> CEOs for Cities surveys indicate that these workers are roughly 50% more likely than the general population to prefer living and working in urban neighborhoods with lively commercial districts; they also are far more likely to value short commutes by transit and convenient transit access to a wide range of shopping, entertainment, and other urban amenities.<sup>22</sup> The streetcar appeals directly to these preferences.

Seeking distinctive character but sensitive to cost, creative-economy employers tend to search for “cool space”—rehabilitated industrial or commercial buildings, upper floors above retail, and similar nontraditional spaces. Often found in older commercial districts and

other neighborhood locations that offer restaurants, unique shopping, and similar amenities, such spaces become more competitive as locations for these businesses once they are accessible by streetcar. Map 12, *Cool Space Potential*, shows each subarea’s potential to attract creative-economy businesses.<sup>23</sup> Areas well supplied with “cool space” that would likely see strong interest by creative-economy businesses, include:

- Capitol Hill along 8th Street NE/SE (subarea 3D)
- Georgia Avenue NW (9A–9C)
- Logan Circle, U Street NW (6B,6C)
- Atlas District/H Street NE (5B)
- Downtown Anacostia (1E)
- Adams Morgan (6A, 8B)

<sup>23</sup> Calculations to determine subareas’ cool space potential appear in Appendix E.

### Wanted: ‘Cool Space’

Common characteristics:

- interesting/historic buildings
- ample natural light
- easy walking distance to restaurants
- sidewalks in front of buildings
- not necessarily inexpensive
- convenient size for emerging and growing businesses

Industries that frequently

locate in “cool space” include:

- fine arts/artists
- communications/advertising/marketing
- media
- information technology
- entertainment
- health services



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# 3. systemwide challenges and mitigation strategies

From right-of-way constraints to housing affordability, building a successful streetcar system raises an array of issues that require early and close coordination of planning for both land use and transportation. This chapter identifies challenges facing the proposed District system and potential strategies for mitigating them across the system. Chapter 4 examines how these challenges and strategies could play out in each of the nine corridors.

Strategies are available to help mitigate challenges that would come with streetcar implementation.

## Addressing challenges

### HOUSING AFFORDABILITY

The accessibility and amenity benefits that the streetcar would bring could create affordability issues in multiple locations along the streetcar corridors. To pinpoint where these issues might appear, the study team devised an index that combines five indicators of the potential for increased housing costs:

- Projected rise in the value of existing housing (as calculated for this study)
- Median household income (existing)
- Proportion of rental to ownership housing in any area (existing rental housing is more susceptible to short-term cost increases)



M Street SE

- Median home values (existing)
- Proximity to existing Metrorail

Map 13, *Housing Affordability Pressures*, shows how each streetcar corridor subarea fared when measured against the index. The analysis found that nearly a third of subareas stand a relatively higher chance of experiencing strong upward pressure on housing prices. Another group of subareas, roughly half, would likely face more moderate upward price pressures. Together, these indicate the advisability of applying city policy to preserve and

expand affordability in a substantial portion of the streetcar corridors for District residents.

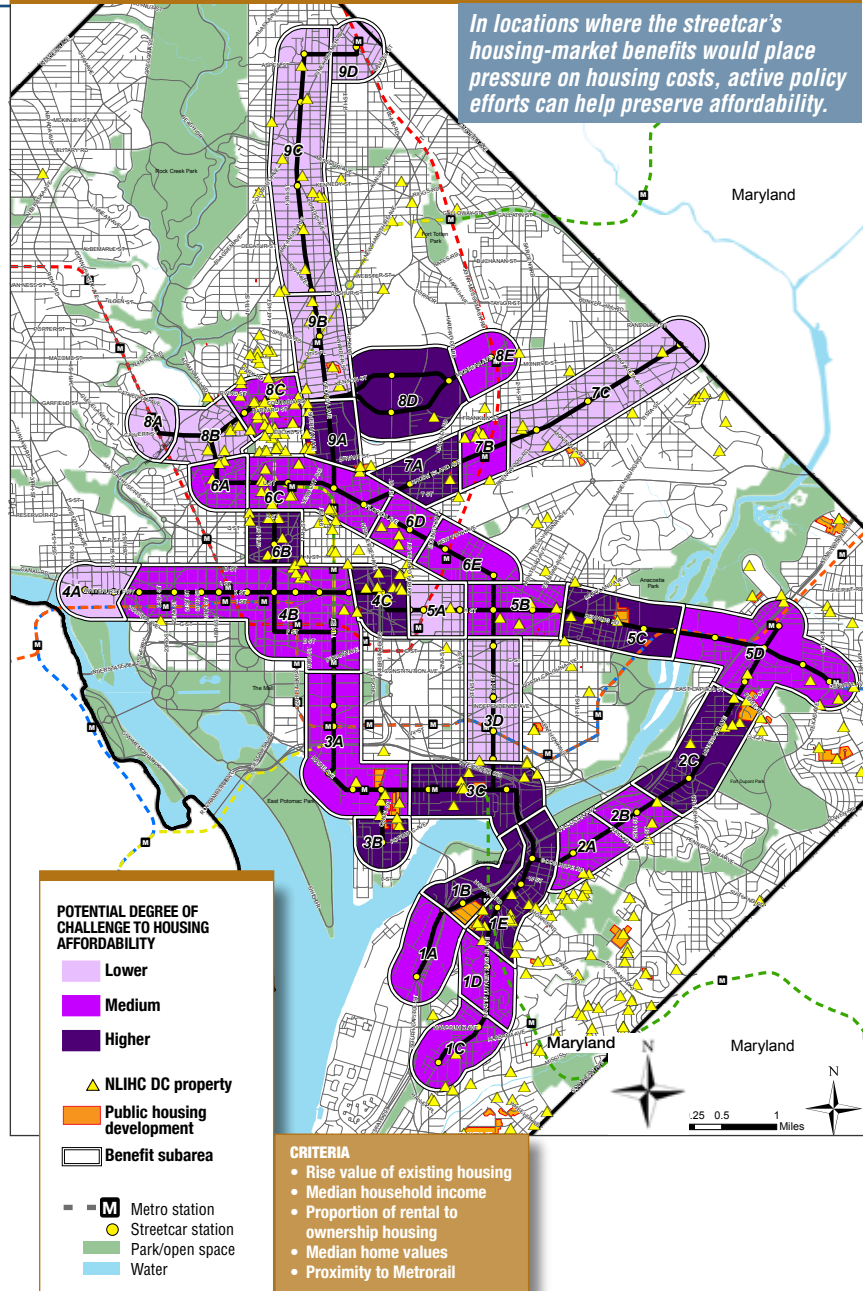
Financial benefits generated by streetcar service could help some of these same households offset potential increases in housing costs. Introduction of premium rail transit would create an opportunity for households to reduce the number of cars owned (or to become car-free). These households would pocket much of the cost of owning and operating a car—as noted earlier, more than \$8,000 annually for a mid-sized sedan. That would constitute a particularly significant saving for households earning between \$20,000 and \$50,000 per year, which, on average, spend nearly as much on transportation as they do on housing. Many of these households would also benefit from improved access to jobs as a result of the streetcar’s introduction.

The District could adopt several strategies to promote preservation and construction of affordable housing:

- **Mandatory inclusionary zoning**—the District’s 2009 ordinance will apply to most new housing development with more than 10 units in streetcar corridors. The ordinance would make more than 8% of new units affordable, and these units could offset a small portion of affordable units lost in areas where displacement appears most likely to occur.<sup>24</sup> The bulk of new housing construction, however, would take place in areas where strong housing demand has already increased values. While that outcome would expand affordable options

<sup>24</sup> Assumptions: 80% of new units are in developments of 10 or more units; 60% of eligible units are of wood-frame construction; 40% of concrete- or steel-frame construction; and no density bonuses are used.

### MAP 13 Housing Affordability Pressures



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in more affluent neighborhoods, it could not address all potential lost affordability, and additional measures may be needed to assure that affected households can remain in their communities.

- **Use of public land**—either vacant or in need of redevelopment—for mixed-income housing with specified affordability targets could yield a significant number of units. Roughly 100 acres of publicly owned land (about 40 of them at the former McMillan sand filtration site) lie within the corridor subareas identified on Map 13 as places where the streetcar would likely have the strongest effect on housing costs. Approximately 140 more acres of public land lie in the remaining portions of the corridors; more than half of that total represents the District’s portion of the former St. Elizabeth’s Hospital campus.
- **Targeted use of tax-credit and other affordable housing funds** could encourage additional mixed-income housing on sites within the streetcar corridors.
- **Preserving existing public, subsidized, and/or other affordable housing** in or near the streetcar corridors, also shown on Map 13, represents one of the most cost-effective ways of maintaining affordable-housing choices.
- **Encouraging creation of accessory dwelling units** within existing properties, by converting basements or garages to apartments, could generate units to meet additional demand in well-established neighborhoods.

## MARKET SHIFTS

While the streetcar would likely attract new development into the District, it would also draw some commercial development to the streetcar corridors from other areas of the District. This is particularly true of office space. Of the roughly 19 million square feet of additional office space the streetcar corridors are projected to receive over ten years, 1.9 million square feet (about 10%) would likely be attracted by the streetcar from elsewhere in the District. Planning should examine redevelopment strategies for places where:

- **Market interest may diminish.** *Identify other market-based uses that do not seek locations close to premium transit, like light industry, and determine the best strategy for directing investment in those uses to neighborhoods outside the streetcar corridors.*
- **Market interest will likely intensify.** *Review the District’s zoning and development policy to ensure promotion of mixed-use, transit-oriented development where it has not historically occurred.* Examples include the Washington Hospital Center, Buzzard Point, and portions of auto-oriented street corridors, such as portions of Rhode Island NE and Minnesota Avenue NE.

Focusing development along streetcar corridors also has a variety of positive impacts. It would:

- Make more efficient use of District infrastructure (transit, utilities, streets, sewers) and service delivery.
- Better support environmental sustainability and cut energy and time costs for residents and businesses by reducing auto-oriented development and dependence.

- Protect large parcels further from the core, preserving long-term development capacity to accommodate unanticipated uses that may emerge as future priorities.
- Retain more space for service and light-industrial businesses that support core economic sectors and help diversify the District’s job base with more blue-collar jobs.
- Reduce development pressure in neighborhoods where it is inappropriate.

### **SMALL BUSINESS PRESERVATION**

Owners and residents have expressed concern that streetcar service, by inducing higher rents and heavier competition, poses a threat to small businesses in Anacostia and possibly other areas. Other cities’ experience with streetcar systems suggests that many existing retailers, including smaller “mom and pop” businesses, would benefit from the new streetcar-related spending described in Chapter 2, in part because a large part of such spending would flow to existing commercial areas. The District maintains several programs designed to support commercial areas and individual businesses.<sup>25</sup> Although program funding remains limited, streetcar planning offers an opportunity to determine strategic ways to use these programs to help existing and future small businesses benefit from streetcar service, reinforcing the

<sup>25</sup> “Tools and Resources” in Section Four of the Office of Planning’s report, Retail Action Roadmap: The Future of the District of Columbia’s Retail Markets (2010) describes a number of these programs in more detail (<http://planning.dc.gov/DC/Planning/Across+the+City/Other+Citywide+Initiatives/Retail+Action+Strategy/Retail+Action+Roadmap>).

diversity and unique character of individual commercial areas. Such planning may also involve addressing parking and traffic concerns, discussed below.

### **CONSTRAINED RIGHT OF WAY ON CITY STREETS**

As in any highly urbanized area, there are many demands for the existing roadway space in the District. Vehicles traveling on the road (private cars, buses, trucks, bicycles), in addition to users parking, loading, and walking along the road all compete for limited space. While adding streetcar provides a desirable and sustainable transportation choice for residents, in some cases it will require tradeoffs with other modes and users. For example, it may require allowing parking on only one side of the street, dedicating sidewalk space for shelters, or reducing travel lanes for motor vehicles. In locations that experience particularly severe congestion, the addition of streetcar service poses a design challenge: balancing the needs of each mode of travel as well as the needs of local residents and businesses, and designing a right of way that is efficient and effective. Other cities have shown that a streetcar system can be successfully integrated into this type of congested urban environment with appropriate design and mitigation.

Mitigation strategies include giving transit vehicles priority over other vehicles by changing signs, lane configuration, and/or signalization. The most effective form of mitigation may be the streetcar itself, since its availability can reduce the use of private automobiles, which require more roadway space and parking per

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person than public transit. Through DDOT's system planning, each proposed corridor will undergo detailed design to address the impacts of streetcar on other modes.

### **PARKING**

For streetcars to run safely and efficiently, on-street parking needs a permanent, dedicated lane or must be removed. Streetcars cannot operate on roadways with peak-hour on-street parking restrictions, which occur along roughly 40% of the proposed corridors. Eliminating on-street parking or limiting on-street loading may restrict vehicular access to nearby businesses or residences, but that may prove acceptable when comparing the new riders and street-level activity that streetcar service is expected to generate. The question of how to handle on-street parking and loading zones will be addressed case by case at the planning stage, will involve all key community stakeholders, and will reflect the needs of affected properties, traffic requirements, transit users, and pedestrians.

### **CONGESTION**

As in any highly urbanized area, many District streets experience daily vehicular congestion. This study evaluated daily traffic volume per peak-hour travel lane, and Figure 8 shows the areas of potential concern it identified. The analysis found the highest levels of congestion within the proposed streetcar network along K Street NW, Columbia Road NW, Florida Avenue NW/NE, Benning Road SE, and Georgia Avenue NW. This chapter outlines potential alter-

native routings for the limited number of locations where congestion may reach levels too high to accommodate the streetcar.

Other cities have successfully shown that a streetcar system can be designed to operate efficiently under such conditions. Mitigation strategies include giving transit vehicles priority over other vehicles by changing signs, lane configuration, and/or signalization. The most potent form of mitigation, however, may well be the streetcar itself, since its availability lessens the need to use automobiles. Devising specific strategies for addressing congestion will require further, more localized study.

### **BICYCLES**

Attention to detail in the design phase will be essential to ensuring that bicyclists and streetcars can share the road safely. Bicyclists and transit vehicles often leap-frog each other at transit stops creating a weaving pattern that can slow transit operations and increase hazards for all roadway users. Streetcar tracks can also pose a hazard to cyclists, as bike tires can get caught in the rails.

Several options are available to mitigate potential conflict. One-way streets can accommodate bicycle lanes on one side of the street and streetcar tracks on the other. Alternately, bike routes can be designated on streets parallel to streetcar routes. In addition, several cities have developed coordinated lane markings for bikes and streetcars that could serve as models for the District.



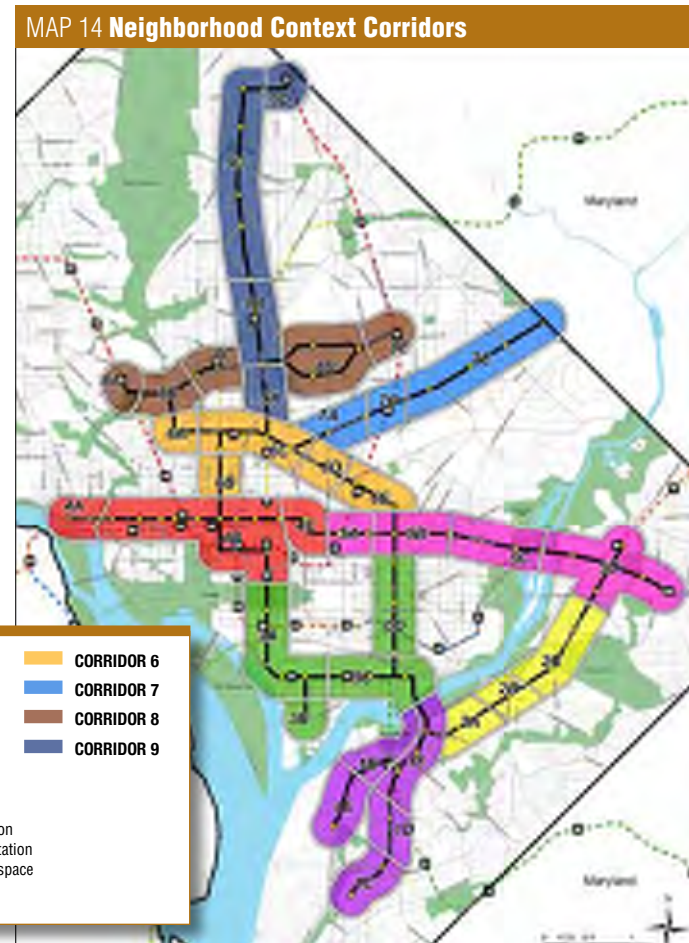
# 4. corridor/neighborhood analysis

*This chapter examines the specific opportunities and challenges the streetcar could bring to the neighborhoods along its corridors.*

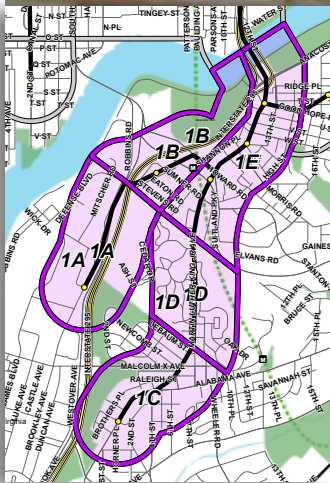
## 4a. Assessing benefits, opportunities, and challenges in each corridor

To clearly describe how the streetcar system will influence particular neighborhoods, this study divides the proposed network into nine corridors (with additional subareas) that reflect similar land use characteristics (see Map 14, *Neighborhood Context Corridors*). As stated earlier, the full streetcar system would create different opportunities and challenges in different neighborhoods. Generally, the most dramatic benefits will occur in neighborhoods that currently lack access to fixed-route transit and have underdeveloped land and commercial districts. All areas, however, will experience some level of benefits. Section 4b, “Capturing opportunity through alternative routing or phasing” describes changes in proposed routes that may deliver further benefits.

This chapter describes the location or other key local benefits of streetcar service, as distinct from the discussion in Chapter 2 of benefits that would accrue across the system and the District itself. Similarly, while this chapter identifies locations where challenges such as housing affordability and right-of-way constraints might arise, Chapter 3 describes in a more general way strategies for addressing these challenges.



# Martin Luther King Jr. Avenue, Firth Sterling Avenue, and South Capital Street



*Downtown Anacostia (MLK Jr. Avenue SE)*

## CORRIDOR 1

The portion of this corridor along Martin Luther King, Jr. Avenue SE had streetcar service for much of the 20th century. The corridor begins in downtown Anacostia, an area of significant cultural importance that also contains opportunities for reinvestment in properties and businesses. The corridor passes south through the former St. Elizabeth’s Hospital campus, currently being redeveloped west of MLK as headquarters for the U.S. Department of Homeland Security (DHS), which will ultimately employ approximately 14,000 people here. The campus east of MLK will likely host mixed-use redevelopment. The corridor ends south of a cluster of neighborhood retail and schools in Capitol Heights. A spur from the Anacostia Metro station serves the Barry Farm public housing development and the U.S. Naval Annex.<sup>1</sup>

**Benefits:** The streetcar would bolster the area’s access to premium transit and strengthen its connections to both neighborhood and citywide amenities. It would link Anacostia, Barry Farm, Congress Heights, and surrounding neighborhoods to employment opportunities at the future DHS headquarters and other development planned on the St. Elizabeth’s site. Equally beneficial, streetcar service would connect new employees at these sites to Anacostia’s commercial districts, broadening the market for existing and new businesses and housing.

<sup>1</sup> This spur is under construction as a pilot segment of the streetcar system.



### NOTABLE INDICATORS

- **Job growth** projections suggest this area will add 25,000 jobs by 2030. That includes the 14,000 DHS jobs as well as others in downtown Anacostia, Poplar Point, and Congress Heights.
- One of the largest public housing developments in any streetcar corridor, Barry Farm, gives this corridor a substantial concentration of low-income

households (80% earning less than \$35,000) and households without cars (75%). **Median household incomes** are significantly higher elsewhere in the corridor.

- The corridor has one of the largest inventories of **public land** available for redevelopment among the corridors.

The streetcar would further support mixed-use development planned or anticipated along MLK SE between Chicago and U streets, at Barry Farm, and at the Anacostia Metro station. Existing and new development in these areas and Congress Heights would benefit from improved access to and from District and regional destinations via Metrorail Green Line connections and direct streetcar connections to areas west of the river.



*Solomon G. Brown Corps Community Center on Martin Luther King Jr. Avenue SE*

Certain routes in Anacostia could increase the economic benefits that streetcar service brings. Running the streetcar under I-295 for direct access to Poplar Point would expand redevelopment possibilities for the large parcels of land there and improve public access to the Anacostia waterfront. A second alternative would extend service from Congress Heights east along Alabama Avenue to the Congress Heights Metro station, creating stronger connections for Congress Heights, St. Elizabeth's, and Metrorail's Green Line. (See section 4b for more detailed discussion of these routings.)

**Challenges:** The proposed MLK Avenue corridor could present a design challenge if the right of way proves too narrow to accommodate the streetcar, customer and delivery parking, traffic, and existing transit services simultaneously. However, DDOT is working with the Federal Transit Administration to conduct a NEPA analysis to refine and improve the plan for proposed streetcar service in this area.

## Good Hope Road and Minnesota Avenue



Minnesota Avenue at 16th Street NE



### CORRIDOR 2

As proposed, this corridor passes mostly through established residential development with clusters of neighborhood retail at Good Hope Road SE and Pennsylvania Avenue SE. The plan proposes extending streetcar service to the Minnesota Avenue Metro station, with its large municipal office building.

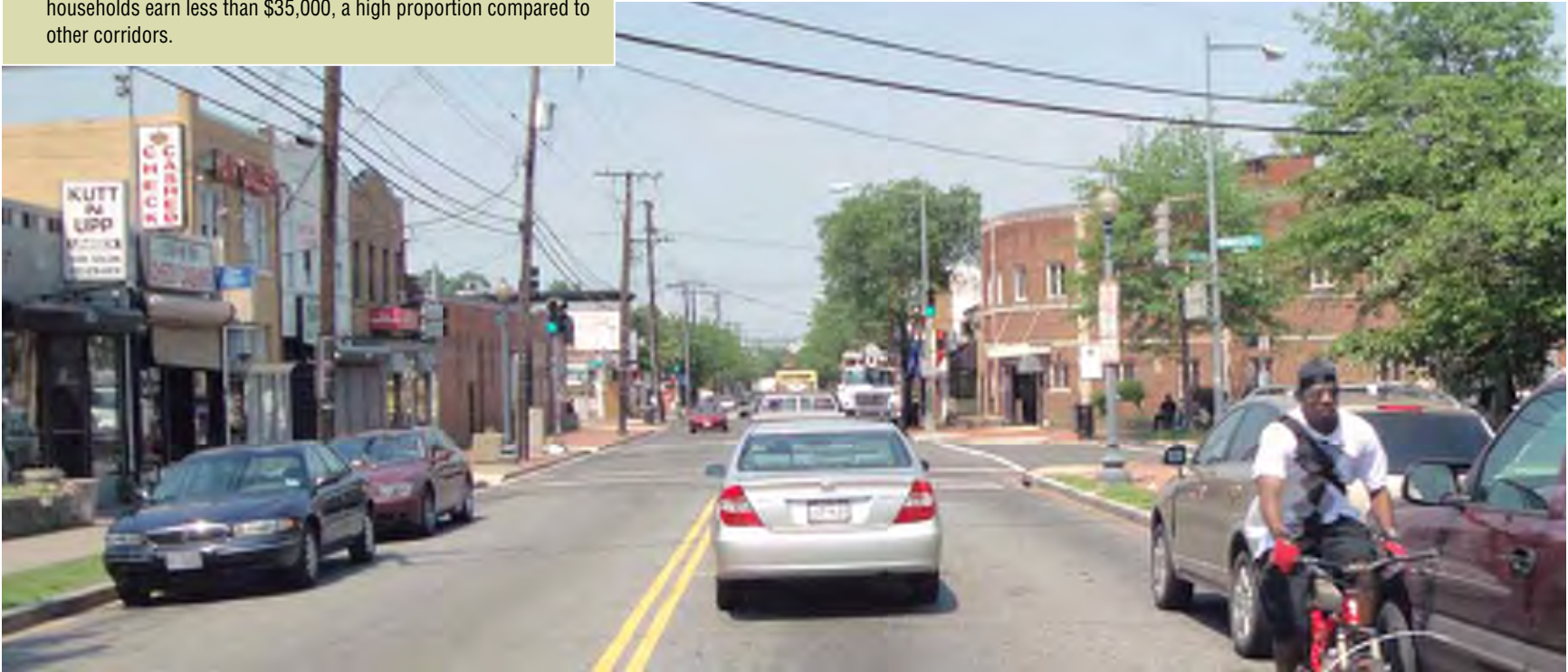
The corridor runs next to Fort Dupont Park, one of the District's largest, and runs within a half mile of Anacostia Park. Redevelopment opportunities exist on several sizable commercial parcels north of East Capitol and where Pennsylvania Avenue SE crosses the corridor. Note: Corridor 5 describes the Minnesota Avenue corridor north of East Capitol Street NE.

**Benefits:** Streetcar service would better connect the corridor's neighborhoods —Fairlawn, Randle Highlands, Twining, Greenway, and Fort Dupont—to local retail, jobs, and Metrorail and streetcar lines in downtown Anacostia and at the Minnesota Avenue Metro station. The streetcar has the potential to intensify retail/commercial activity, particularly at Pennsylvania Avenue SE and along Minnesota Avenue NE between East Capitol Street and Benning Road, if stops are located close to commercial properties.

**Challenges:** Implementation of the streetcar may affect on-street parking.

#### NOTABLE INDICATORS

- **Median household incomes** and **home values** are solidly in the middle range of streetcar corridors. However, 40% to 50% of households earn less than \$35,000, a high proportion compared to other corridors.



*The intersection of Good Hope Road and Minnesota Avenue SE*

## Capitol Riverfront, Buzzard Point, Capitol Hill, and 7th Street



*Redevelopment of the Arthur Capper/Carrollsborg public housing site to create a new mixed-income community*



*Buzzard Point*

### CORRIDOR 3

Most of this corridor once enjoyed streetcar service. The Capitol Riverfront has seen some of the District's most intensive recent development, including new federal offices, the Arthur Capper/Carrollsborg mixed-income housing redevelopment, and Nationals Park.

Significant redevelopment opportunities remain at the Southwest Waterfront, Buzzard Point, and several other underdeveloped sites. The north-south legs of the corridor pass through Capitol Hill, L'Enfant Plaza, and the National Mall, areas already largely developed and/or under historic protections. They contain a variety of important travel destinations and Metro connections and connect areas separated by the Southwest and Southeast freeways.

**Benefits:** Streetcar service would enhance connectivity in this area and generate additional economic benefits by offering an additional premium transit option to these neighborhoods. This is particularly true in Buzzard Point and the Southwest Waterfront, both of which have large supplies of underdeveloped land that could greatly increase in value and development potential once a streetcar connection exists.

The routing of the spur to Buzzard Point has flexibility and could respond to proposed mixed-use development. (Section 4b, "Capturing opportunity through alternative routing or phasing" describes alternative route options.) A



Barracks Row on 8th Street SE

route that provides convenient service to both downtown and Anacostia’s St. Elizabeth’s Hospital site would be especially beneficial. A route could also serve Nationals Park, strengthening its connection to the region.

The mixed-income community that will emerge near M Street SE from redevelopment of the Arthur Capper/Carrollsborg public housing could take significant advantage of the streetcar. The project will attract public housing residents as well as higher-income professionals—groups that typically have higher rates of transit ridership. Public housing sites near the Waterfront SEU Metro station could present further opportunities for mixed-income redevelopment. Both they and the mixed-use development envisioned on Maine Avenue at the Southwest Waterfront would benefit from streetcar service. A more direct streetcar connection to the

Southwest Waterfront would make its planned hotel, stores, and restaurants more accessible to visitors at the National Mall or downtown, as well as to residents and jobs elsewhere in the Capitol Riverfront.

The 7th Street NW/SW leg of the streetcar route would establish a critical connection among the Capitol Riverfront and Anacostia, downtown, multiple Metro and commuter rail lines, and visitor destinations to the north. This service would create important workplace-to-housing and business-to-business connections and would open new options for visitors beyond the National Mall. It could also support walkability enhancements needed around L’Enfant Plaza.

Capitol Hill would benefit from improved connections to Metrorail stations and direct streetcar routes to a other District neighborhoods. Among other benefits, this would make businesses at Barracks Row, Eastern Market, and Massachusetts Avenue more accessible destinations. While streetcar will not markedly increase the magnitude of mixed-use development already completed or planned along M Street SE from South Capitol to the Navy Yard, it will expand access between this significant development and other centers of jobs and housing.

**Challenges:** 8th Street NE/SE offers only a single travel lane in each direction, but it could function as a streetcar corridor with an appropriate redesign to manage traffic and parking-related issues.

#### NOTABLE INDICATORS

- **Median household income** varies within the corridor. Capitol Hill is tied for the second-highest median income among streetcar corridors, but south of the freeway income drops substantially. A concentration of public and other affordable housing means that as many as two-thirds of households earn less than \$35,000—one of the largest concentrations of low-income households in any streetcar corridor. Household incomes rise markedly from east to west along M Street, which has a large supply of market-rate housing built during the urban-renewal era. Major projects recently completed or under way—including redevelopment of the Arthur Capper/Carrollsborg public housing as a mixed-income community that will retain its current count of 900 public units—will produce more varied household-income levels. Nevertheless, wide disparities will almost certainly persist.
- South of the freeway, as few as 20% of households own cars, one of the lowest **car-ownership rates** among streetcar corridors.
- The M Street corridor contains 80,000 **jobs** today—second among streetcar corridors—and, together with Buzzard Point, is projected to add about 25,000 new jobs by 2030, more than any other corridor.
- A significant expanses of **redevelopable land** has drawn strong development interest. About 16 million square feet of new development has been proposed for completion by 2015, including major housing and office projects.

## K and H streets to Union Station; F, 14th, and 7th streets downtown



*NoMa (K and I streets, NE)*

### CORRIDOR 4

K Street NW from Georgetown to Mount Vernon Square includes some of the District's densest and highest-value development—mostly office space, but with housing as well. Between Mount Vernon Square and Union Station the corridor takes on a different character, with much less development and large parcels cleared for urban renewal, construction of I-395, or industrial uses near Union Station. This area has attracted intense redevelopment activity in recent years, particularly east of North Capitol Street in NoMa. Overall, approximately 10 million square feet of development, split about equally between offices and housing, has been proposed to be built by 2015. The corridor crosses three business improvement districts: Georgetown, Downtown, and NoMa. Although the downtown portion of the corridor has several Metro stations, Georgetown and New Jersey Avenue lack rail transit. Streetcar service along this corridor would also enhance east-west connectivity in the downtown core.

**Benefits:** By filling the gaps between the Metro stations at Mount Vernon Square, Gallery Place, Judiciary Square, Union Station, and New York Avenue, the streetcar system would reduce barriers that now make it hard for pedestrians to reach Metro stations and would add new transit connections. These improvements would reinforce favorable conditions for new development and raise the value of existing properties. On a systemwide basis, the streetcar's added transit capacity would also help address

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capacity challenges on Metro lines in the downtown core. Section 4b discusses alternative routing intended to strengthen redevelopment sites east of North Capitol Street in NoMa.

Areas of the corridor that are mostly built out would also gain from the streetcar. The streetcar’s visibility and sense of permanence would enhance K Street as an address and thus tend to bolster property values. Because K Street property is already quite valuable, even an increase as small as 2% would yield a major boost in tax revenues to the District. The streetcar would also benefit the convention center by offering visitors simpler, more direct connections to hotels, Metrorail, and Union Station.

The streetcar would create a stronger east-west connection to Georgetown, enhancing existing premium bus service. In a built-out neighborhood like Georgetown, most streetcar benefits would accrue to existing properties and residents. The proposed corridor extension beyond Phase 3—

extending the line north to M Street, Georgetown University, and/or further north along Wisconsin Avenue—would bring rail transit’s benefits to important destinations; section 4b includes a more detailed discussion of this option.

The 7th, F, and 14th Street NW routings downtown also add important connections to the extensive jobs, Metro stations, and amenities that already exist here. Additionally, streetcar service would encourage more residents to use transit and could reduce levels of car ownership.

**Challenges:** Building the streetcar line will require a major redesign and reconstruction of K Street. The corridor’s intense economic activity and traffic volume demand special attention in order to mitigate construction impacts. 7th, F, and 14th streets NW in downtown present challenges, including street widths, intersection geometry, and traffic levels; see section 4b, “Capturing opportunity through new connections or phasing” for routing alternatives that avoid these potential problems.

#### NOTABLE INDICATORS

- This corridor contains the most significant concentration of **jobs** in the streetcar system—more than one third of all jobs in the District. Projections show it attracting nearly 20,000 more by 2030.
- The corridor is one of the most important centers of planned **development** activity in the streetcar system. Substantial office and housing development are planned or under way, particularly on sizeable parcels east of Mount Vernon Square.
- At nearly \$120,000, **median household income** at the Georgetown end of the corridor leads all streetcar corridors by a wide margin. Elsewhere, the corridor matches most other corridors with a median income of about \$50,000.
- Outside of Georgetown, the corridor contains some of the lowest **household rates of car ownership** within the streetcar system, averaging about 40%.

## H Street/Benning Road



*H Street NE*

### CORRIDOR 5

The H Street NE commercial corridor along H Street NE, an historic streetcar route, has endured a decades-long decline that ended only when the revival of cultural facilities like the historic Atlas Theater and construction of the first modern streetcar segment in 2009 began to spur reinvestment. High-density mixed-use development has occurred close to Union Station on former industrial parcels at the edge NoMa.

Other portions of H Street and Benning Road NE generally contain small commercial or mixed-use parcels with well-established residential development on flanking streets, most commonly two- and three-story townhouses and single-family houses. Only the Hechinger Mall and several vacant parcels near the “starburst” intersection of H Street and Benning Road break this pattern. Two sizeable multifamily developments are planned northwest of the mall, and the rest of the vacant sites offer significant redevelopment potential.

East of the Anacostia River walkability remains poor and most development is light industrial or commercial in nature. The Benning Road and Minnesota Avenue Metro stations have attracted little redevelopment compared to other stations in the District, and most new development has relied on District financing or subsidy. The area’s poor walkability, a legacy of auto-oriented development, is one factor discouraging development in the area.



## NOTABLE INDICATORS

- **Median household income** at the east end of this corridor ranks behind other corridors, with 50% or more of households reporting less than \$35,000. Toward the west, however, median incomes rise significantly, with more than 80% of households near Union Station reporting income of more than \$35,000, high compared to other corridors.
- **Car-ownership rates** tend to reflect income patterns. In the lower-earning east, 30% to 50% or more of households do not own cars (relatively high compared to other corridors); this rate shrinks to nearly 20% in the west.
- **Median home values** and densities tend to be somewhat below other corridors.

**Benefits:** Under construction since 2009 as part of the Great Streets Streetscape project, the H Street/Benning Road streetcar route represents a pilot segment for the full system. It will bring premium rail transit access to more than two miles of H Street and Benning Road and introduce a variety of new development opportunities.

Connecting to Union Station would increase access to jobs and many other transportation modes for residents of the corridor's many neighborhoods—the Atlas District, Trinidad, Carver Langston, Kingman Park, Mayfair, River Terrace, Mahaning Heights, and Benning.

Redevelopment opportunities along H Street NE are limited because of established development patterns, with numerous historic buildings, relatively few larger

parcels, and lower-density residential zoning on adjacent blocks. However, significant potential exists on several underdeveloped parcels, including the shopping center at 8th Street NE, the proposed housing redevelopment north of Hechinger Mall, and in the long term, potentially the Hechinger site itself. Medium-size sites assembled from smaller parcels might be able to support mixed-use redevelopment that, if pedestrian-friendly, could help knit together the four neighborhoods that meet there.

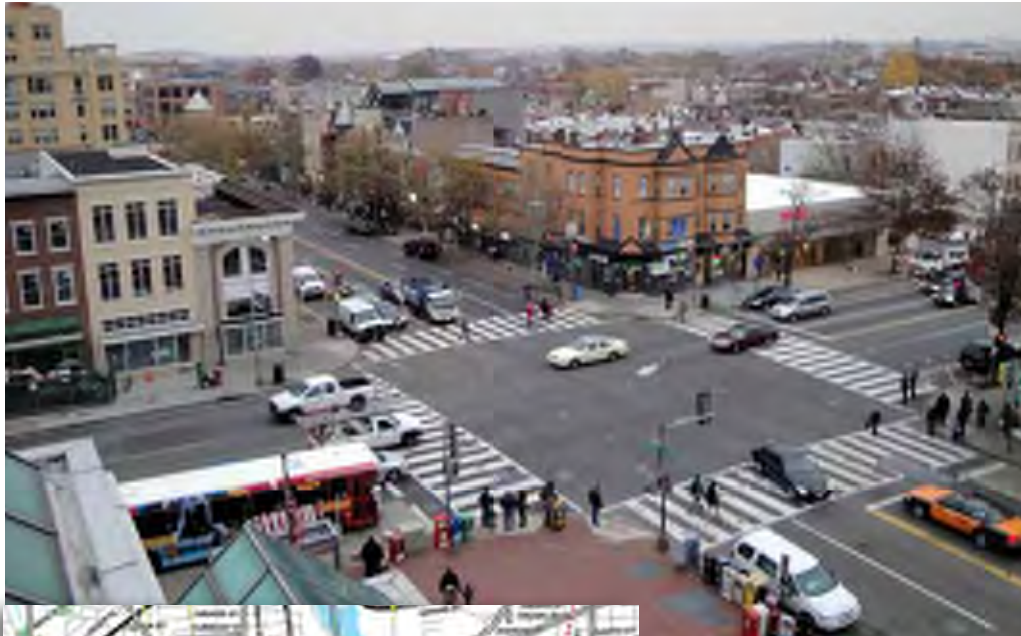
Existing properties would see moderate to significant increases in values with the streetcar. Mixed-income redevelopment on public housing sites in the corridor, potentially coordinated with Hechinger Mall redevelopment, could offer a good opportunity to expand affordable and market-rate housing choices. Areas with auto-oriented uses and heavier traffic, particularly around the Hechinger Mall and east of the Anacostia River, will need updated pedestrian facilities to meet current standards for sidewalks, crossings, pedestrian-oriented land uses, and street-level activity—all key to deriving full advantage from the streetcar's presence.

**Challenges:** New street infrastructure with smaller blocks and better pedestrian accommodations must complement development in this area to help it take full advantage of the streetcar. Restoring the street grid across the shopping center at the corner of Benning Road and Minnesota Avenue NE could improve both walkability and traffic flow, making Benning more attractive as a retail destination and residential neighborhood.



*Minnesota Avenue at Dix Street NE*

## 14th Street, 18th Street (Adams Morgan), U Street, Florida Avenue and 8th Street



*U and 14th streets NW*

### CORRIDOR 6

These former streetcar corridors just north of downtown suffered decades of decline prior to 2000, when reinvestment began to transform the blocks around the Metro stations at U Street-Cardozo, Shaw-Howard University and New York Avenue. Much more development is planned near the New York Avenue station. Existing development, some of it historic, limits the corridor's potential for new development, yet opportunities remain in NoMa, at Howard University, and on a handful of larger commercial parcels. High ridership and demand for the streetcar will likely come from Howard and Gallaudet universities (student and staff populations) as well as restaurant and entertainment destinations in the Adams Morgan/U Street area.

**Benefits:** The streetcar's significance in this corridor stems from its ability to extend the walkable area from existing Metro stations along five streetcar corridors that will radiate from the area. Nearly all of this corridor would experience greater market interest for existing and new residential and commercial space, amplifying the revitalization already spurred by Metrorail.

Development potential varies along the corridor. Much of U Street NW in Shaw is built out or subject to historic-preservation restrictions, yet several commercial parcels could be redeveloped. Several large parcels also stand out in blocks adjoining 14th Street NW, which otherwise is also mostly developed.

Along Florida Avenue in LeDroit Park, Bloomingdale, Eckington, and Truxton Circle, the streetcar would complement existing bus service, which is relatively light compared to demand. Streetcar service would particularly improve access to the New York Avenue Metro station, where conditions present barriers to walkability: roadway width and traffic volume on New York Avenue, the railroad embankment, and the auto-oriented character of most existing development. These challenges have severely limited the benefits of the station. Streetcar service would improve access by attracting pedestrian-oriented development that can gradually make New York and Florida avenues more walkable. By improving access here, the streetcar would enhance some of the District's most important redevelopment opportunities in NoMa and the Florida Avenue Market.

New streetcar service would provide valuable support in Adams Morgan, where stakeholders say that limited parking and auto capacity have constrained growth of the restaurant/retail district along 18th Street NW (see “Challenges” section below). streetcar corridor also connects to Metrorail’s Red Line at Woodley Park,



*Gallaudet University at Florida Avenue and 8th Street NE*

#### NOTABLE INDICATORS

- The corridor contains one of the highest **residential populations** among the streetcar corridors, and strong household growth is projected through 2030.
- The area contains the third largest **concentration of jobs** in the corridors. Taken together, NoMa and The Florida Avenue Market area will add a projected 13,000 jobs by 2030.
- By 2014 the area around the New York Avenue Metro station will likely add about 6 million square feet of **development**, almost evenly balanced between offices and housing. The rest of the corridor has relatively little land suitable for redevelopment.
- The 14th Street and Adams Morgan portions of the corridor have the highest **housing-unit densities** of all streetcar corridors. Densities in NoMa and the area near Gallaudet University rank at the bottom of the corridors.
- **Median household income** just surpasses the middle range of values among all the corridors.
- **Median home values** drop by about 50% from west to east along the corridor.

an important link that helps local destinations and adds mobility for residents and workers across the full Metro/streetcar network.

**Challenges:** Streetscape conditions for pedestrians need improvement, particularly along Florida Avenue. Demand for on-street parking and traffic congestion in the area are high. Construction of the streetcar line would require refinement of existing on-street parking. Neighborhood-scale approaches to parking and congestion management can offer appropriate ways to address these challenges.

## Rhode Island Avenue



*Rhode Island Avenue at 2nd Street NE*



Once served by streetcars east of 3rd Street NE, this corridor divides neatly into three segments. From Florida Avenue NW to 4th St NE, Rhode Island Avenue contains a median with landscaping and shade trees and runs through well-established residential neighborhoods. A half-mile from the Rhode Island Avenue-Brentwood

Metro station the avenue's character shifts to automobile-oriented commercial uses—although a new mixed-use project may signal the arrival of a new development model in this section. East of the station lower-density residential neighborhoods line the corridor, with clusters of underdeveloped, auto-oriented commercial parcels near Montana Avenue NE and at the Maryland border.

**Benefits:** The streetcar would provide much of the corridor with its first premium transit service in decades and would strengthen the connection between Brookland, Langdon, Woodbridge, Brentwood, and other neighborhoods and the city's core. A relatively broad right of way and moderate traffic volumes on Rhode Island mean that the streetcar could travel at higher speeds, a distinct benefit for residents and workers.

As in other corridors, isolated walkable areas would be extended along the corridor. Important opportunities for higher-value pedestrian- and transit-oriented redevelopment would be created, particularly around the station, near the commercial node at Montana Avenue NE, in the Woodbridge commercial district, and at Brentwood Shopping Center.

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Adding a future spur to or an alternative terminus at Fort Lincoln and the Gateway neighborhood along South Dakota Avenue NE would open additional opportunities for development and connectivity. Section 4b examines these ideas in more detail.

**Challenges:** Areas dominated by auto-oriented development today will need pedestrian and streetscape improvements; updated zoning and design guidelines and implementation procedures could help achieve these goals. Due to the corridor's relatively small number of jobs, ridership seems likely to be dominated by one-way peak travel compared to other corridors.

#### NOTABLE INDICATORS

- The corridor contains considerable **redevelopable land** in both public and private hands, primarily east of the Metro station.
- The concentration of **public housing** near the Rhode Island Avenue Metro station corresponds to relatively high numbers of corridor households earning less than \$35,000 (more than 50%) and lacking a car (more than 60%). An additional group of public housing units sits just outside the corridor on Montana Avenue NE.
- Overall, **median household incomes** and **home values** fall within the middle range of values for all streetcar corridors.



*Auto-oriented commercial properties with transit-oriented redevelopment potential near Rhode Island and Montana avenues NE*

# Woodley Park, Columbia Heights, Washington Hospital Center and Brookland



*The McMillan Sand Filtration site—a development opportunity*



Streetcars formerly ran on Calvert Street NW in Woodley Park/Adams Morgan and on Michigan Avenue NE in Brookland. The west end of the corridor links to Metrorail's Red Line at Woodley Park. The corridor's intermediate section passes through Columbia Heights, where high-density mixed-use development has recently taken root around the Metro station, and through the Washington Hospital Center, a major employment center. The hospitals, the McMillan Sand Filtration site, and the Armed Forces Retirement Home possess great near- and long-term development potential for residential, biomedical and other uses. The eastern end of the corridor contains Catholic University, Trinity University, other religious and educational institutions, housing, and a light industrial area near the Brookland Metro station that has drawn redevelopment interest.

**Benefits:** This route ties together neighborhoods and districts that have long been separated by Rock Creek, large institutional uses, and a rail corridor. It would also relieve capacity constraints on core Metrorail lines by shortening interline connections among Woodley Park, Columbia Heights and Brookland-CUA stations.

While Woodley Park offers limited development opportunities, a streetcar connection to the Metro station would play a key role in expanding access options for residents and easing capacity constraints across the full Metrorail/



*New Columbia Heights development within the one-quarter -mile streetcar corridor*

streetcar network. It can also serve the area's many hotels. The streetcar would give Columbia Heights' dense population and burgeoning retail destinations important east-west connections on premium transit, and it would improve access to the thousands of jobs at the Washington Hospital Center. That area also holds strong potential for additional jobs in the biomedical and other sectors.

The streetcar would expand development potential at the McMillan Sand Filtration and Armed Forces Retirement Home sites —two of the District's largest neighborhood development opportunities. Further east, Catholic University and other institutions would gain better connections to destinations and Metrorail lines to the

west, and the Brookland/CUA Metro station could emerge as a mixed-use center offering a greater range of amenities to the corridor.

An alternate corridor could consolidate the planned track configuration into a single route through the hospital campus. See section 4b for a more detailed discussion.

**Challenges:** Columbia Road NW presents one of the most stringent right-of-way constraints in the entire streetcar network, with just one travel lane each way and substantial traffic. Due to congestion east of 16th Street NW, additional routes merit consideration for streetcar operation, such as Harvard Road NW. Near the hospital campus and the Brookland-CUA Metro station, auto-oriented development dominates the corridor, which might benefit from new zoning and design guidelines to encourage more walkable development and streetscapes.

#### NOTABLE INDICATORS

- Already important as a jobs destination, the Washington Hospital Center is expected to see significant **job growth** in coming decades.
- The Adams Morgan and Columbia Heights portions of the corridor have some of the highest **population and housing-unit densities** per acre among all streetcar corridors.
- There are significant opportunities for higher-value **redevelopment** around the Washington Hospital Center and Brookland-CUE Metro station, though relatively little development is planned for the near term.
- Woodley Park has one of the highest **median household incomes** of any portion of the corridors in the streetcar system. The remainder of the corridor contains a range of median household incomes and **property values**, including a public housing component.

## Georgia Avenue and Takoma



*Georgia Avenue near Jefferson Street NW*



### CORRIDOR 9

Streetcars formerly served the four-mile stretch of Georgia Avenue NW that forms the heart of this corridor. Howard University's campus dominates the corridor's southern end, and extensive mixed-use development has arisen around the Georgia Avenue-Petworth Metro station, but neighborhood and auto-oriented retail backed by low-density residential neighborhoods define much of the rest of the corridor. At Butternut Street NW the corridor reaches Walter Reed Army Medical Center, slated to add significant mixed-use redevelopment, then turns east toward the Takoma Metro station, which offers only modest opportunities for multifamily housing or other transit-oriented development on infill sites.

**Benefits:** The streetcar can transform auto-oriented portions of Georgia Avenue NW into more transit-oriented areas with higher-value development and improved access options. Streetcar service would expand the walkable area now concentrated at the Georgia Avenue-Petworth Metro station. Similarly, it would make the northern part of the Howard campus, an important employer, more accessible to the Shaw-Howard University Metro station. The streetcar would also amplify Georgia Avenue's appeal as an office location for creative-economy industries. As households and jobs increase along the corridor in response to the streetcar, thousands of square feet of new neighborhood-oriented retail could be created. These



### NOTABLE INDICATORS

- **Median household income** rises along Georgia Avenue from about \$35,000 at the corridor's southern end to about \$70,000 at the north, placing it in the upper-middle range of streetcar corridors
- At the southern end of the corridor, with many **public housing** residents and university students, more than 50% of households earn less than \$35,000, and nearly 60% lack a car.
- The corridor is expected to add a large number of **households** by 2030.



*New development on Georgia Avenue NW*

changes would make Georgia Avenue's neighborhoods more self-sufficient in terms of jobs and services.

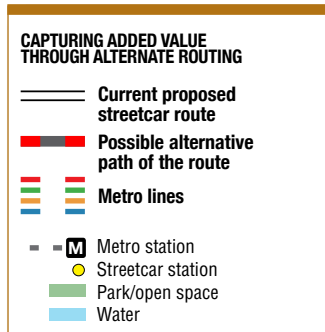
Many commercial parcels hold strong potential for infill redevelopment, like the former Curtis Chevrolet dealership at Peabody Street NW. Such sites could reinforce neighborhood commercial nodes and attract employers to locations along Georgia Avenue in Brightwood, Manor Park, 16th Street Heights, and Petworth. The corridor's marquee opportunity, however, is the Walter Reed campus, where planning has begun to introduce major redevelopment that combines commercial, government, and housing uses over a decade.

Extending the streetcar line north on Georgia Avenue to Silver Spring, instead of ending it at Takoma as now planned, would open opportunities in this part of the District. The District's northern neighborhoods would gain much better transit access to regional job centers and housing. This could, in turn, significantly raise land value and neighborhood connections along Georgia Avenue. Shifting the route would not markedly affect Takoma, because it already has Metro service. Section 4b contains a more detailed explanation of this alternative routing.

**Challenges:** The biggest design challenge involves integrating the streetcar into the right of way along Georgia Avenue, a thoroughfare that currently experiences high volumes of bus, motor vehicle, and pedestrian traffic. Areas now dominated by auto-oriented development will need pedestrian and streetscape improvements.

#### 4b. Capturing opportunity through new connections or phasing

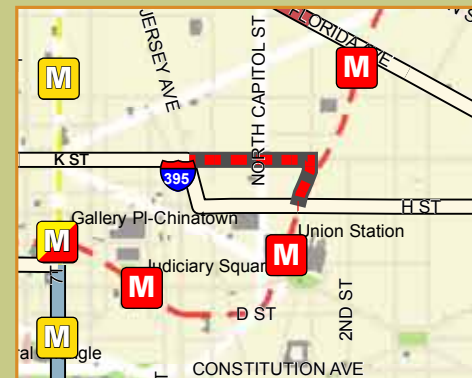
The Office of Planning evaluated each streetcar line proposed in the *DC Transit Future Plan* to determine whether minor adjustments along the 37-mile system could, in areas close to the corridors, capture even more value or benefit from existing and future development. This evaluation—which entailed an analysis of each line’s route, construction phasing, and “service profile” (trip frequency, projected ridership, and capacity)—identified several possible opportunities that could yield significant dividends in the future as the result of these minor adjustments. The Office of Planning, alongside the District Department of Transportation, will continue to study the potential for capturing this extra value.



#### K, 1st, and H Streets at Union Station

##### Capturing added value through alternate routing:






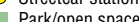
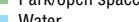
Connecting the H and K Street NW/NE segments along 1st Street NE instead of New Jersey Avenue NW would extend transit access to more underdeveloped land along K Street NE in NoMa while preserving access to the Union Station Metro station for un-



derdeveloped sites along the planned New Jersey Avenue route. This

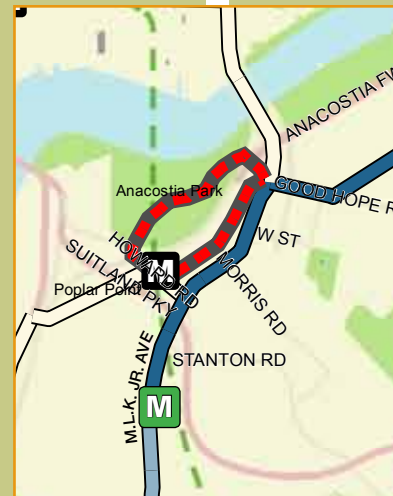
alternative eliminates a need to rebuild tracks and the Union Station streetcar stop as part of extending the line to the west.

**CAPTURING ADDED VALUE THROUGH ALTERNATE ROUTING**

-  Current proposed streetcar route
-  Possible alternative path of the route
-  Metro lines
-  Metro station
-  Streetcar station
-  Park/open space
-  Water

## Poplar Point








**Added opportunity through alternate routing:** Poplar Point is one of the District’s largest planned-development and waterfront park sites, yet conditions strongly discourage walking to it from the nearest Metro station, Anacostia. A future spur or loop directly serving Poplar Point would dramatically improve access to the site by public transit and make I-295 a less-daunting barrier. By shifting development from auto-oriented to transit-oriented form, the spur or loop option would also provide powerful support for Poplar Point to succeed as a major mixed-use development and a park/recreation destination for the entire District. New development value created by streetcar service would likely justify the cost of the modest route extension.



## Downtown Anacostia

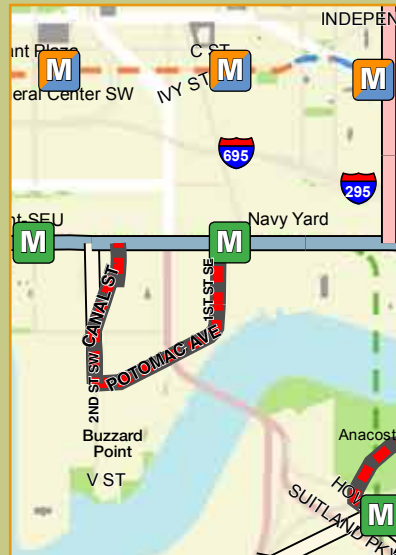
**Added opportunity through alternate routing:** Several strategies could help fit streetcar service into the constrained MLK right-of-way in downtown Anacostia in ways that benefit businesses and institutions there. These strategies include creating alternate traffic routes, such as Shannon Place SE or Poplar Point; creating a one-way couplet for the streetcar using Shannon Place SE and limited development-parcel area together with MLK; and/or routing streetcars through Poplar Point between Good Hope and Howard roads instead of on MLK. Applying one or more of these strategies would avoid removing on-street parking and loading spaces on MLK—vital to Anacostia’s principal commercial district— to create streetcar stops.

**CAPTURING ADDED VALUE THROUGH ALTERNATE ROUTING**

-  Current proposed streetcar route
-  Possible alternative path of the route
-  Metro lines
-  Metro station
-  Streetcar station
-  Park/open space
-  Water

## Buzzard Point

**Added opportunity through alternate routing:** Adding Buzzard Point access along 1st Street SE and Potomac Avenue SE/SW would expand streetcar access to Nationals Park and to development planned along Half and 1st streets SE. It would also connect future development in Buzzard Point to the stores and restaurants near the stadium. This route could serve as the sole



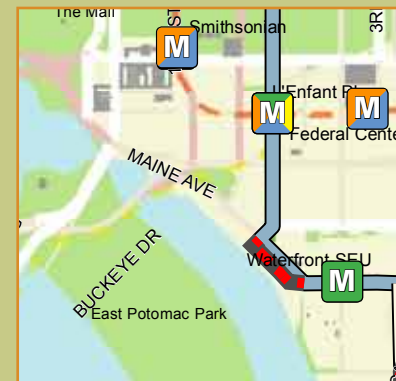
conveniently connect Buzzard Point to both downtown and the former St. Elizabeth's site.

access to Buzzard Point or it could supplement a second route along 1st, Canal, and 2nd streets SW, if justified by Buzzard Point development value. In either case, routes and operations should

## Southwest Waterfront

**Capturing added value through alternate routing:** Relocating the streetcar from Maine Avenue SW to Water Street SW would improve access to the large mixed-use development proposed for Water Street, as well as to public waterfront areas, with negligible impact on route length.

**Capturing added value through alternate phasing:** The Southwest Waterfront development project appears likely to start before Phase 3 streetcar construction begins for this segment. The project would benefit from coordinated inauguration of streetcar service east to Nationals Stadium-Navy

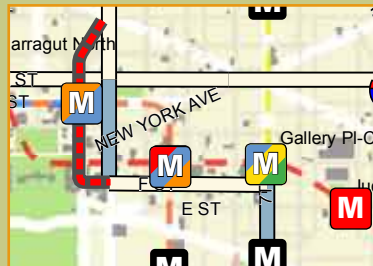


particularly for visitors, an important target market for planned hotel, retail, and entertainment uses.

Yard Metro and north to L'Enfant Plaza or, preferably, to the National Mall and downtown. These connections would improve access,

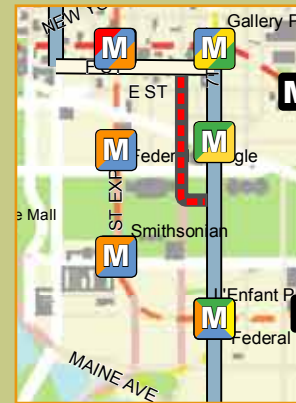
## 14th Street/F Street NW

**Added opportunity through alternate routing:** Tight turning geometry and traffic congestion at 14th and F streets NW both make persuasive arguments for identifying an alternate route, such as 15th Street and Vermont Avenue to Thomas Circle.



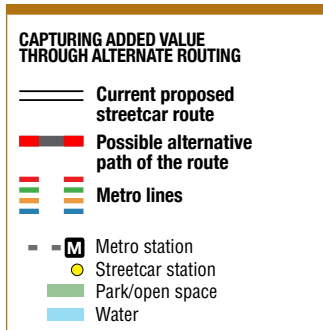
This alternate would also improve rail transit access for blocks located further from Metrorail stations.

**Added opportunity through alternate routing:** Introducing a one-way couplet can avoid impacts on the constrained right of way along 7th Street NW and expand streetcar access to a broader corridor.

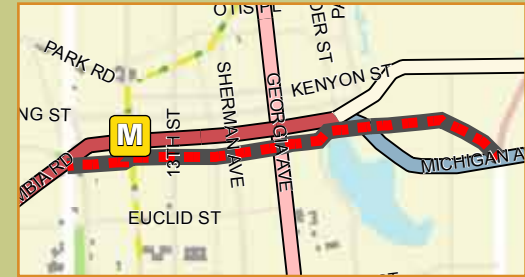


A couplet could follow 9th St and Constitution Avenue NW between F and 7th for southbound streetcars, with northbound service using 7th to F streets NW.

## Washington Hospital Center

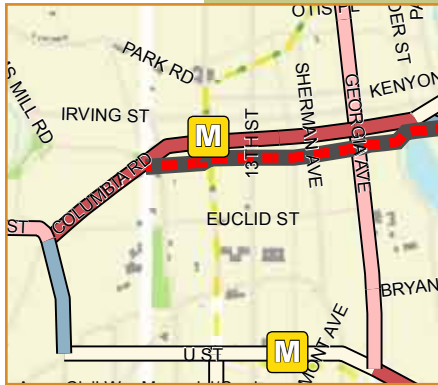


**Added opportunity through alternate routing:** Eliminating the route split planned on Irving Street/Michigan Avenue NW/NE in favor of a single route through or along the south side of the hospital campus would provide convenient access for employees and visitors while eliminating the need for about one mile of double track, a savings of \$25–\$40 million. The consolidated routing would remain sufficiently close to the McMillan Sand Filtration site to encourage development there. Less convenient access to the streetcar from the Armed Forces Retirement Home campus may be acceptable, given the modest quantity and long-term nature of potential development there.



**Added opportunity through alternate phasing:** Building this segment earlier than Phase 3 could offer multiple benefits. Providing earlier streetcar access to the hospital center, a major employment destination, could translate into earlier demand elsewhere in the District for housing. It would further benefit Columbia Heights and Adams Morgan, high-density neighborhoods that would see significant benefit from the new service. Accelerated construction would also help free up critical capacity in Metro’s core by allowing inter-line connections among Woodley Park, Columbia Heights, and Brookland-CUA stations. The segment also offers the chance to add a streetcar-maintenance facility on Metrorail’s Red Line near Brookland-CUA, which could serve Phase 1 and 2 segments along Georgia Avenue, U Street, Florida Avenue and/or 14th Street NW.

## Columbia Road NW

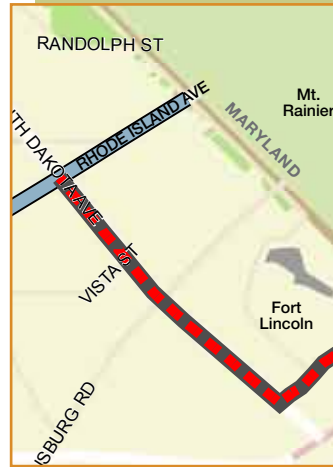


**Added opportunity through alternate routing:** Due to congestion and one-way travel on Columbia Road east of 16th Street NW, additional routes in the area, such as Harvard Street, should be considered for streetcar operation. This could also reduce impacts on neighborhood parking, and spread streetcar benefits across a broader corridor.

**CAPTURING ADDED VALUE THROUGH ALTERNATE ROUTING**

- Current proposed streetcar route
- Possible alternative path of the route
- Metro lines
- Metro station
- Streetcar station
- Park/open space
- Water

## Fort Lincoln

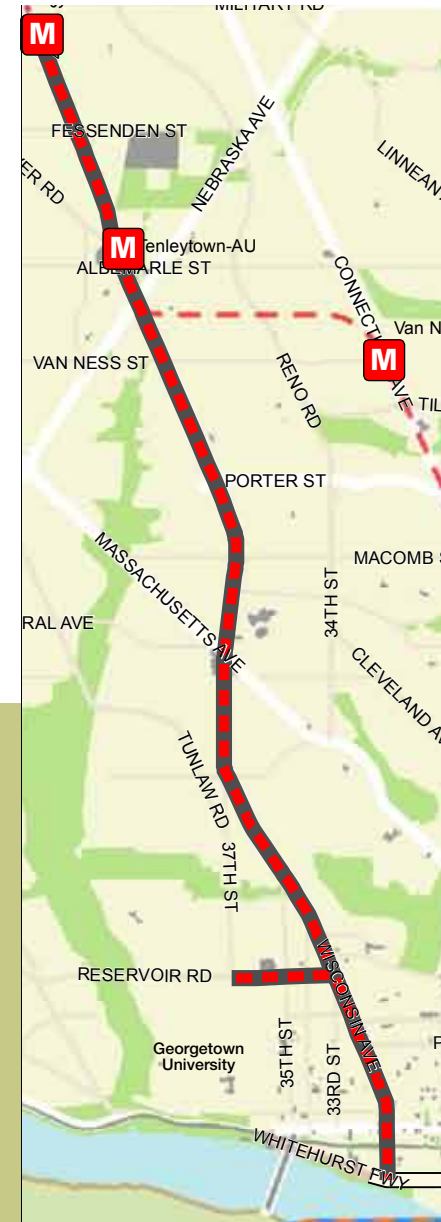


**Capturing added value through alternate routing:** This route along South Dakota Avenue NE to a terminus at Fort Lincoln would reach large parcels of underdeveloped land that the District's Comprehensive Plan has designated for high-density housing and large-scale retail. Fort Lincoln could provide a more compelling terminus for the Rhode Island Avenue segment than Mount Rainier. Given its lower-density development patterns and significant grades, Fort Lincoln itself offers only modest opportunity for streetcar-related redevelopment, but industrial parcels along South Dakota Avenue hold very

strong potential. This alternative also offers the opportunity to create a streetcar-service facility.

## Silver Spring

**Capturing added value through alternate routing:** A major employment and residential center, Silver Spring makes a more compelling origin and destination for streetcar trips than Takoma Park. Terminating the Georgia Avenue NW segment at Takoma requires riders to transfer to the Metrorail's Red Line to travel on to Silver Spring. Adding Silver Spring expands opportunities to increase housing and commercial values and attract neighborhood-oriented infill development along Georgia Avenue. The route also creates synergies between Silver Spring and the mixed-use redevelopment planned at Walter Reed Medical Center. Finally, the streetcar could make a direct connection to MARC's Brunswick Line at Silver Spring, linking Walter Reed and the rest of the Georgia Avenue corridor to counties northwest of the District. These benefits could well justify the costs of the 1.5- to 2-mile extension, which would require funding from the State of Maryland.



### CAPTURING ADDED VALUE THROUGH ALTERNATE ROUTING

- Current proposed streetcar route
- Possible alternative path of the route
- Metro lines
- Metro station
- Streetcar station
- Park/open space
- Water

## Wisconsin Avenue NW

**Capturing added value through alternate routing:** This proposed route would run from K Street NW to the Friendship Heights Metro station, with a potential spur along Reservoir Road NW to Georgetown University and its hospital. The strongest case for streetcar service along this corridor is the connection it would provide to existing jobs and the addition of Georgetown University to the city's transit network. Job growth will not match the system's top corridors but projected job growth and population density are comparable to Rhode Island Avenue. Benefits do not now appear as strong as those in some other corridors and alternate routes.



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# 5. strategies and tools for optimizing land use impacts

**M**aximizing the cost-effectiveness of the streetcar depends on pursuing policies that reap the greatest benefit from new streetcar-related investments in development and infrastructure, and on funding strategies that make implementation possible. This is a preliminary assessment; further analysis of specific conditions and locations along the streetcar corridor is needed. DDOT is developing a thorough funding plan to determine the most effective funding tools for the District.

*Thoughtful District development policy, infrastructure planning and funding strategies are vital to achieving the streetcar's potential benefits.*

## **5a Maximizing land use benefits, minimizing implementation costs**

The District already employs several potentially effective development tools, in some cases as a partner with other entities, that could effectively enhance the development benefits from streetcar service. Further planning should address the ability of the streetcar to reinforce the effectiveness of each of these tools—particularly for areas in which the District seeks to encourage and shape investment.

To identify areas where anticipated development pressures might most merit updated development tools, the study team performed a development-capacity analysis for all the streetcar corridors. Available development capacity under current zoning was determined for all parcels within a quarter mile of the proposed streetcars lines and then compared against ten years of potential residential and commercial development attracted by the streetcar. Map 15 highlights the areas where development capacity is low compared to predicted demand.

### **POTENTIAL DEVELOPMENT TOOLS**

The District can create or call on several entities to encourage development along the streetcar corridors:

- **Tax-increment financing districts, special assessment districts**

These tools can help finance street infrastructure and/or other public investments that support development by increasing development capacity, providing better pedestrian connections to existing neighborhoods and development, and encouraging greater investment by developers.

- **Local/business improvement districts (BIDs)**

Expanding existing BIDs or encouraging formation of new ones along the streetcar corridors bolsters private-sector resources that can assist with marketing, tenanting, managing local services, and/or other functions that support existing and new development—magnifying the streetcar’s ability to attract new investment and vitality.

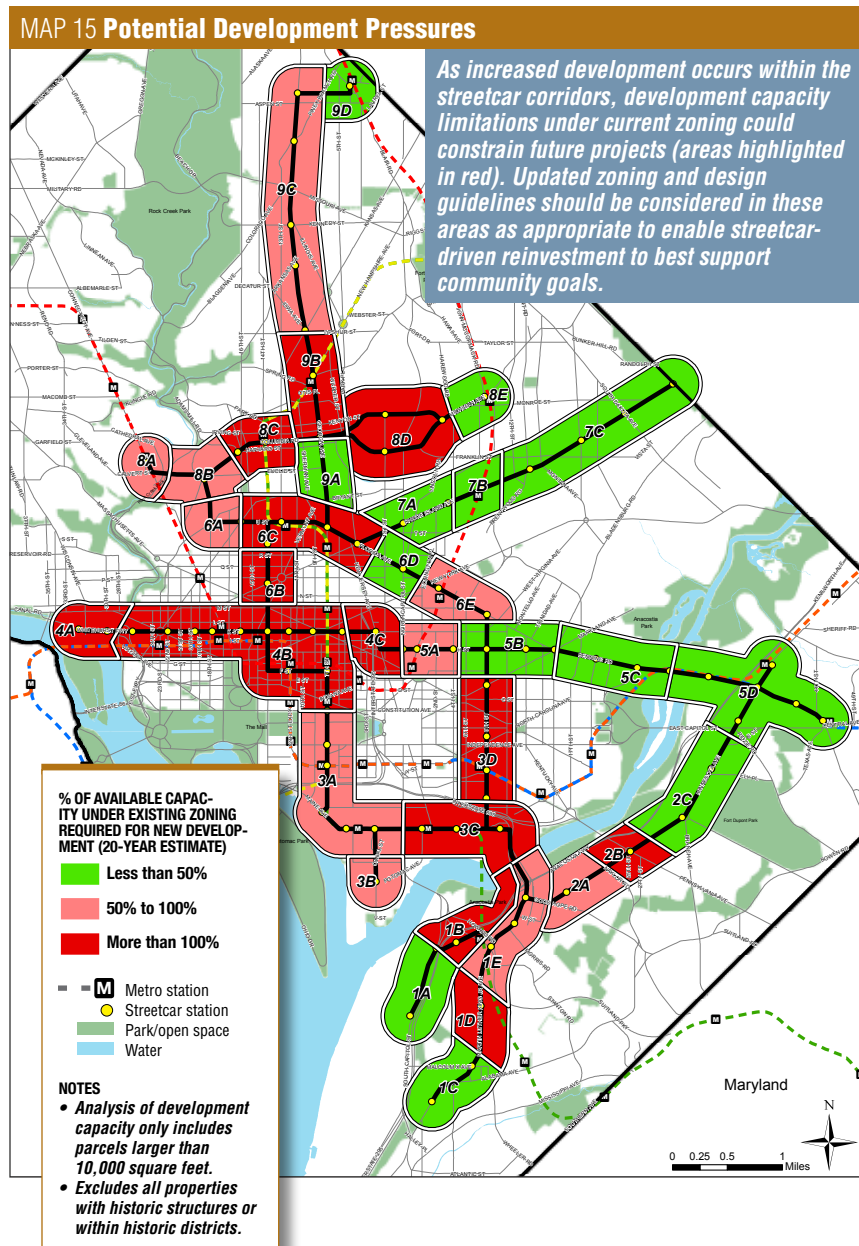
- **Joint development agreements, public-private partnerships**

Cooperative agreements among property owners, developers, and/or government agencies can spell out approaches to complex development projects, improving the District’s ability to influence the mix of uses, scale, character, and other qualities in new development.

- **The Property Acquisition and Disposition Division and other agencies**

This District entity can aggregate, land bank, and offer for redevelopment strategic parcels that advance planning goals—an especially effective way to insure that the streetcar’s potential to attract investment translates into projects that benefit particular neighborhoods and commercial districts.

The effectiveness of these entities as tools for promoting development can vary widely, depending on context. Phase II of this study will examine which combinations of these and other tools make the most sense for each streetcar corridor and its unique redevelopment opportunities.



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## POTENTIAL LAND USE AND DESIGN-GUIDANCE TOOLS

Streetcar planning presents an opportunity to refine zoning and other tools the District already employs to manage development and promote design quality. As with the potential development tools, reviewing and fine-tuning can help insure that streetcar-related development reinforces the quality and character of neighborhoods and commercial districts, takes full advantage of increased development potential, and moves the District toward its employment and fiscal goals.

- **Changes in allowable densities** to allow well-designed, potentially higher-density developments in streetcar corridors where appropriate (see Map 15).
- **Recommendations for changes in land use mix** to make the most of new transit service and add flexibility in responding to market demand.
- **Mandatory inclusionary zoning (MIZ)** to specify a share of new construction that is affordable to households with low to moderate incomes. The District adopted an inclusionary zoning ordinance in 2009.
- **Development of design guidelines** to ensure high design quality throughout all streetcar corridors.

## COORDINATION WITH OTHER INFRASTRUCTURE INVESTMENTS

Coordinated planning of transportation and infrastructure investments will make the streetcar more cost-effective. Phase II of this study will address this coordination in more detail.

## STREET INFRASTRUCTURE

DDOT achieved major cost savings by including two streetcar segments—H Street/Benning Road NE and Firth Sterling Road—as part of already planned street improvements. Any potential changes in the phasing of other segments should follow this model, taking into account and aligning with future plans for infrastructure investment.

## WALKABILITY

Because the streetcar will be useful only if people can safely walk to its stops, implementation plans must take full account of the convenience and safety of pedestrian networks. Specifically, many locations will require upgraded sidewalks, improved crossing treatments, and pedestrian-friendly development. According to the District's 2009 *Pedestrian Master Plan*, pedestrians worry most about the safety of crossing streets, and the plan recommends crossing improvements near transit stops.

## BUSES

WMATA recently introduced a Priority Corridor Network (PCN) for its highest-performing local bus routes, which many of the streetcar corridors overlap. The PCN program aims to improve bus travel times, reliability, capacity,

and system access.<sup>1</sup> Developing the streetcar system to complement rather than compete with the PCN program will ensure that streetcars increase overall transit service along each corridor. In particular, many Metrobus lines extend to destinations outside the District, and it will be important to maintain these transit connections.



*Streetcar service will complement Washington's growing range of transportation choices.*

The design of streetcar and PCN bus facilities should be coordinated to allow for seamless transfers between the two networks and to take maximum advantage of infrastructure investments. This includes designing stops that both buses and streetcars can share; coordinating other transit-priority treatments, such as signal priority and transit-only lanes; and integrating fare structures and ticketing.

### **BICYCLING**

Transit and bicycling complement each other in two important ways: bicycling can serve as an extension of the transit trip and transit can provide an alternative to the bicycle trip. Many existing or proposed bicycle routes in the District follow proposed streetcar corridors, highlighting the need for careful coordination of both systems. This includes addressing the bicycle/streetcar

<sup>1</sup> The PCN program includes a significant investment by WMATA in methods to help buses travel more efficiently and cross intersections with minimal delay, including queue-jump signals, transit-signal priority, and bus-only lanes

challenges identified in section 3a. To make bicycling a convenient extension of streetcar trips for more people, the proposed streetcar system should provide secure bike storage and bike-share facilities at every stop.

### **CAR SHARING**

It will also be important to build connections between the streetcar system and car-sharing programs. Integrating these programs will not only improve mobility and options for residents, but will also reinforce the District's goal of fostering sustainable transportation.

## **5b Funding**

### **DEVELOPMENT-DRIVEN FUNDING MECHANISMS**

Federal funds, which can cover up to 50% of a system's cost, are a common funding source for large-scale transit projects. Some communities prefer to find other sources to avoid the expense, delay, or uncertainty a federal application can introduce. Benefits from real estate investment spurred by the streetcar could fund roughly 40% to 60% (and possibly more) of the streetcar system's projected \$1.5 billion completion cost. Of a variety of local private- and public-sector funding tools that systems across the country have used, three appear particularly promising for the District based on this study's analysis of the streetcar's potential land use benefits.

- **Municipal funds repaid through increased property tax revenue.** This approach capitalizes on the growth in property taxes (and/or related revenues from

fees) that occurs as a result of streetcar investment: over time existing property appreciates in value and development adds new properties to the tax rolls. Tax-increment financing (TIF) is a common form of this approach, although other models exist. Under TIF, a municipality obtains near-term capital funding by floating bonds that are repaid over time from the increased revenues.

As an example, a 5% to 7% appreciation of the roughly \$100 billion in aggregate property value that exists today along the streetcar corridors would add \$5 to \$7 billion in value. If half of the tax revenue produced by this new value were dedicated to streetcar-bond repayment, approximately \$300 to \$400 million worth of bonds could be sold. An equally reasonable scenario projects the addition of \$5 to \$8 billion worth of new development attributable to the streetcar over a ten-year period. Half of the added tax revenue this development generated would support the sale of another \$300 to \$500 million worth of bonds. Together, these two sources could generate roughly \$600 to \$900 million of

bond-backed funding to help pay for construction of the system.

- **Direct payments from developers or property owners who stand to see a return on their investment.** This approach recognizes that individuals with large land holdings may see a business advantage in funding streetcar segments that connect their property to the larger transit network and thereby substantially increase development potential on their parcels. Buzzard Point, Poplar Point, and NoMa are areas where such an approach could make a measurable difference in property value.

As Figure 11 shows, a reasonable scenario in Buzzard Point would involve streetcar service’s doubling the value of certain parcels from \$20 to \$40 per developable square foot. At the same time, by making the area more accessible and reducing parking requirements, the streetcar would increase feasible development from over 1.5 to nearly 1.9 million square feet. Together, these two changes would create additional value worth nearly \$45 million. The possibility of realizing significant new value from the new transit system would represent a compelling incentive for some developers to contribute to the cost of building it.

- **Payments from business improvement districts (BIDs) or other local organizations that stand to see a return on their investment.** Business and property owners within organized areas may find their interests served by directing a portion of their BID contributions toward streetcar implementation costs. Such contributions could extend streetcar service to their area sooner than scheduled, delivering

**FIGURE 11 Buzzard Point: 2010–2020**

	FAIR SHARE OF DEVELOPMENT	STREETCAR IMPACT	REALIZED VALUE
Office square feet	1,534,000	1,882,650	
FAR foot value	\$20	\$40	
Value	\$30,680,000	\$75,306,000	\$44,626,000
Cost to develop the streetcar segment			\$12,050,000
Internal rate of return			14%

Source: W-ZHA, Inc.

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earlier financial returns that justify the investment. This funding approach would prove effective, for instance, on K Street through contributions from the Downtown, Georgetown, and/or NoMa BIDs.

### **IMPROVED ELIGIBILITY FOR FEDERAL FUNDING**

The Federal Transit Administration (FTA) announced in early 2010 that it plans to revise its funding guidelines by expanding the primary criteria—cost and time saved—to include consideration of land-use-related contributions to livability, such as expansion of economic development opportunities and environmental benefits. U.S. Transportation Secretary Ray LaHood pledged that a more expansive approach to project proposals “will work to promote livability rather than hinder it.” Details of the change are not available at the time of this writing, but it appears likely that it will improve chances for streetcar projects to receive funding. The impacts of streetcars are often more evident in livability issues than in traditional transit-evaluation criteria.

The streetcar’s ability to generate value that can be tapped to help fund the system is important because the FTA’s discretionary Section 5309 Capital Investment Program, the primary source of federal funding in support of rail transit investment, can provide only a portion of the system’s development costs:

- **New Starts**—provides up to a 50% federal match for rail transit projects.
- **Small Starts**—provides up to \$75 million of federal funding for projects with total capital costs of \$250 million or less.
- **Very Small Starts**—provides federal funding for projects with a total capital cost of \$50 million or less.

A full description of the process and criteria for seeking FTA funding appears in the Transportation Analysis appendix, which also evaluates how well the District’s streetcar project aligns with the current FTA selection criteria.

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# 6. next steps

*Community dialogue and targeted technical analysis are critical next steps toward unlocking the opportunities of the streetcar.*

The Office of Planning commissioned this study to gauge the nature and extent of land use impacts associated with reintroducing streetcar service into the District. The study's fundamental finding is that the streetcar represents an effective strategy for advancing many of the District's core economic and social goals. The streetcar's benefits would extend, to varying degrees, to each of the streetcar corridors. Increased real estate values and other financial benefits associated with the system can be tapped to help fund the system's construction. At the same time, the findings also indicate that the streetcar will pose manageable challenges.

Integrating land use considerations into the next stages of planning will play a critical role in achieving the streetcar's full potential. The study provides a clear outline of benefits and challenges, and in the process establishes the value of additional analysis. Further work can more clearly define the metrics associated with each of the findings, including the extent to which real estate and other financial benefits could help fund system construction. Further study can also more precisely project the impacts on each corridor and on other parts of the District. An assessment of regional economic

development trends would more fully establish the extent to which the streetcar would make the District a more competitive place to live, work, and invest. The District can also explore the kinds of policies and initiatives that would maximize benefits and mitigate and manage challenges that arrive with the streetcar.

This study and the work that follows create an essential foundation for broad and informed community dialogue. This dialogue is critical to compete for federal funding and to meet the requirements of the National Environmental Policy Act (NEPA). More important, the dialogue that this study supports will enable the community to participate in tailoring the streetcar to the unique characteristics and aspirations of every District neighborhood.



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