DC Neighborhood Circulation Study

Final Report

DISTRICT DEPARTMENT OF TRANSPORTATION

a joint venture of:
- Parsons Transportation Group Inc.
- PB Americas, Inc.
- Delon Hampton & Associates, Chartered

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Contents

GLOSSARY OF ACRONYMS AND TERMS

Accessibility – the ability of transit service to provide access to a destination.

Alignment – the on-street route that a bus line takes in a neighborhood or corridor.

At-grade – operating at street level.

Average numbers of transfers – the average number of times that a transit passenger must alight from one vehicle and board another vehicle on a crossing route when travelling from one origin to a certain set of destinations.

Bus – rubber-tired vehicles operating on fixed routes and schedules on roadways. Buses are powered by diesel, gasoline, battery or alternative fuel engines contained within the vehicle, or by overhead wires.

Capital costs – the expense of procuring new equipment, land or physical improvements necessary to implement a new service.

Choke point – an intersection that experiences excessive delay, which results in an inefficient flow of traffic to and from the intersection.

Connectivity – the ability of transit to provide connections to multiple origins or destinations.

Connectivity Index (Indices) – a measure of how well transit connects people and destinations, based on transit availability, transit travel time, and number of transfers.

Corridor – a narrow band of land, usually surrounding a roadway or other transportation alignment, and linking key origin and destinations.

Cross-town Bus Route – a bus route that connects suburbs or urban neighborhoods but does not pass through the central employment area of the region it serves.

Destination Assessment – a step in the analytical process of this report that involved identification of desired destinations in and near each of the five focus areas.

DDOT – acronym used for the District of Columbia Department of Transportation.

Focus Area – One of the five areas identified to receive in-depth analysis in this report.

Gaps Assessment – a step in the analytical process of this report that involved identification of areas where transit connectivity was lacking within each focus area. The gaps assessment identified barriers preventing efficient travel from one area to another (gaps), including topographical features, and limitations of the road network and transit network.

Land Use — refers to the manner in which portions of land or the structures on them are used, i.e., commercial, residential, retail, industrial, etc.

Level of Service (LOS) – a quantitative measurement of the operational conditions of an intersection measured in seconds of delay. LOS A is free-flow, while LOS F, the worst condition, denotes stop-and-go conditions.

Metrobus – bus service operated by the Washington Metropolitan Area Transit Authority.

Metrorail – rail service operated by the Washington Metropolitan Area Transit Authority.

Mixed-traffic – automobiles and transit vehicles sharing the same roadway.

Mixed-use – a type of development where residences, retail and/or office space are located in the same buildings or area.

Mobility – the ability of transit service to move people rapidly and with minimal transfers or delays. .

Mode – form of transportation, such as automobile, transit, bicycle and walking; a form of transit, such as fixed-route bus, heavy rail or commuter rail.

MWCOG – acronym used for the Metropolitan Washington Council of Governments.

Operating Costs – the expense of operating a transit service running once it is implemented. Sometimes also referred to as operating and maintenance (O&M) costs.

Radial bus route – a bus route that connects one or more suburban or urban neighborhoods to the region's central employment district.

Shuttle Bus Route – a bus route that connects multiple locations within a relatively small area, often arrayed in a loop configuration and anchored on a transfer point to longer-distance transit services.

Traffic Analysis Zone (TAZ) – the basic unit of geography used in conventional transportation planning models. Each TAZ is used to predict the number of transportation trips originating and destined for the zone.

Transit – public transportation, such as buses or trains.

Transit Network – the pattern and connections made by buses and trains.

Transit Assessment – the overall analytical approach of this report, involving examination of the existing neighborhood transit services in the District of Columbia. The identification of focus areas, as well as the gaps assessment and destination assessment in each focus area, were part of the transit assessment.

Transit Modal Share – the percentage of trips made using transit within a certain period of time or between a certain set of origins and destinations.

Transit Travel Speed – the average speed over the duration of trips taken on transit between a particular origin and destination. Transit travel speed is often expressed as an **average** for a set of many different trips.

Transit Travel Times – the amount of time it takes to travel between a particular origin and destination using transit. The measure includes walk access time, waiting time, and the in-vehicle travel time. Transit travel times are often expressed as **averages** for a set of many different trips.

Volume-to-Capacity (V/C) Ratio – a ratio of the traffic volume to capacity of a roadway. A v/c ratio approaching or over 1.0 indicates that the demand for use of a roadway exceed the available capacity of that roadway. This results in traffic congestion.

WMATA – acronym for the Washington Metropolitan Area Transit Authority.

Weighted Connectivity Index (Indices) – average transit travel speeds to/from a particular area, weighted by considering demographic factors that are favorable to transit ridership, such as total population, population density, or automobile ownership.

EXECUTIVE SUMMARY

Purpose

The Washington Metropolitan Area Transit Authority (WMATA), in cooperation with the District Department of Transportation (DDOT), conducted the DC Neighborhood Circulation Study (NCS) with the goal of improving the connectivity between neighborhoods, activity centers, and existing transit corridors within the District of Columbia.

The NCS represents an effort to address the issue of transit connectivity within and between neighborhoods in a comprehensive way. All too often, daily commuters are the primary focus of transit planning. The fact that the vast majority of intra-urban trips are for non-work purposes is often lost in the singular focus of moving the rush-hour masses.

In undertaking this study, WMATA and DDOT have shifted some of the focus in the District of Columbia to neighborhood-based transit service, which serves work, shopping, recreation, and other trip purposes. The resulting recommendations, once implemented, are a significant step to ensure that high quality transit services extend to all corners of the nation's capital.

Methodology

The recommendations included in this report are the end result of a process combining detailed analysis of demographic and travel data and public commentary elicited through public meetings as well as a project website and project telephone hotline.

The technical analysis conducted in the study began with a District-wide assessment intended to identify those neighborhoods for which lack of transit connectivity was most acute. This analysis relied upon data from the Metropolitan Washington Council of Governments (MWCOG), which was used to formulate a number of measures of transit connectivity (or lack thereof), including *transit accessibility*, *prevalence of transfers*, and *connectivity indices* (average travel speeds to/from a particular area, both raw and weighted against demographic factors). This analysis resulted in the identification of five focus areas that became the basis of the remainder of the study. The focus areas are small groups of neighborhoods within the District that have issues with transit connectivity, include isolated neighborhoods, and have desired destinations within them.

The second step in the analysis involved identification of desired destinations in and near each of the five focus areas. The results of the destination assessment were then juxtaposed with a gaps assessment. The gaps assessment, in essence, identified difficult transit connections due to gaps in service within each of the focus areas. The gaps assessment included limitations with existing transit service, the District street grid, and physical barriers such as parks, monuments, hospitals, university campuses, or difficult topography.

Analysis and Results

The result of the focus area analysis was a list of potential connections between neighborhoods in each of the focus areas. These potential connections were built on the foundation of the quantitative analysis performed at the focus area-level.

Each potential connection sought to link an isolated neighborhood (or series of neighborhoods) with low transit mode share to desired existing and future destinations. Transit service was proposed in areas where gaps in service had been previously identified.

Preliminary recommendations were then formulated from the list of potential connections within each focus area. These preliminary recommendations were presented to the public in a series of public meetings in order to give residents the opportunity to provide critical reaction and input. The direct knowledge of the neighborhoods' residents allowed the study team to narrow a large set of potential improvements to a smaller set of final recommendations. The final recommendations also take into account comments from members of the public and WMATA and DDOT staff.

Recommendations

These recommendations are broken into neighborhood shuttle recommendations and cross-town routes, and are further divided into near-term (Phase I) and longer-term (Phase II) for purpose of implementation.

All recommendations are designed to provide improvements in connectivity, accessibility, and mobility in the focus areas. With the exception of the recommendations included in the attached Adams Morgan Case Study, the recommendations in this report are conceptual in nature, and would require further analysis and development before implementation.

Shuttle routes are recommended to connect people, neighborhoods, and activity centers inside the focus areas. The shuttle recommendations of the study team are outlined in Table E-1.

Cross-town routes recommended here are meant to improve connections between neighborhoods and activity centers across the District that are not well connected today. The cross-town route recommendations of the study team are outlined in Figure E-2.

The NCS includes a more detailed case study of Focus Area 1, which includes the Adams Morgan/Mount Pleasant neighborhoods. The Adams Morgan/U Street NW/Columbia Heights Case Study (Appendix D of this report) includes more specific changes and recommendations for the implementation of transit service improvements specific to this focus area.

Table E-1:
Neighborhood Shuttle Recommendations

Focus Area 1	Phase I	**NW DC Circulator**
	Phase II	**Petworth-Adams Morgan Shuttle**
		Woodley Park-Rhode Island Avenue Shuttle
Focus Area 2	Phase I	**Restructure 60-series for better downtown connectivity**
	Phase II	**Petworth-Takoma-Manor Park Shuttle**
Focus Area 3	Phase I	**N8 Extension: GU-AU-UDC Shuttle**
Focus Area 4	Phase I	**Increase the frequency of the X8 route to every ten minutes in the AM and PM peaks, and operate the route at a frequency of every 15 minutes during off peak periods**
	Phase I	**Increase route X3's span of service to 15 hours (6am to 9pm) and frequency to every 20 minutes**
	Phase II	**Trinidad-Lincoln Park-Stadium-Armory Shuttle**
Focus Area 5	Phase I	**Extension of the W8/W6 to include the Pennsylvania Avenue SE Corridor**
	Phase II	**Congress Heights-THEARC-Good Hope Shuttle**

Table E-2:
Cross-town Route Recommendations

Phase I	**Increase service frequencies on the W4 route to 10 minutes during peak periods and to 15 minutes off peak to better connect Focus Areas 4 and 5.**
Phase II	**Cross-town Route Connecting Focus Areas 1, 2, and 3**
	Cross-town Route Connecting Focus Areas 1, 2, 4, and 5
	Cross-town Route Connecting Focus Areas 4 and 5
	Cross-town Route Connecting Focus Areas 1 and 3

1. INTRODUCTION

The Washington Metropolitan Area Transit Authority (WMATA), in cooperation with the District Department of Transportation (DDOT), conducted the DC Neighborhood Circulation Study (NCS) with the goal to improve the connectivity between neighborhoods, activity centers, and existing transit corridors within the District of Columbia.

The District of Columbia Alternatives Analysis (DCAA)[1] and the WMATA 2003 Regional Bus Study (RBS)[2] are the most recent corridor-level studies that identified neighborhood circulation as an area for additional study. The WMATA Regional Bus Study also recommended that neighborhood circulators be considered as improvements to the system. The DCAA took a comprehensive look at the major corridors transit connectivity and provided insight on current gaps in transit, more specifically in many District neighborhoods. The NCS is a follow up to the RBS and DCAA designed to address neighborhood connectivity issues and look at ways of improving transit services to enhance neighborhood circulation. WMATA and DDOT have already begun to improve some service by adding new routes, expanding existing routes, and establishing the DC Circulator in 2005.

The NCS began by conducting a District-wide analysis to determine which neighborhoods had the most problems with connectivity using the local transit network. Based on the results of the District-wide analysis, five focus areas were selected for evaluation in greater detail.

A set of public meetings were held in September 2008 to present some of the preliminary work completed in the District-wide analysis. The primary reason for these meetings was to ask focus area residents about their transit travel habits. The questionnaire distributed to meeting attendees included questions aimed at determining which current services are used, which are not used, and which destinations are not easily accessible using the current transit network.

The study team then completed two types of analysis within each focus area: a service gap analysis to pinpoint where and why there are gaps in the existing transit network, and a destination assessment to determine what destinations residents want to access. The information from residents was used to help assess both desired destinations and locations where service did not provide easy access to these destinations. The results of this focus area-level analysis were a list of "potential connections" that were desired by focus area residents but were not easily accessible using the existing WMATA transit network. Preliminary route recommendations were then made to support these travel patterns.

Preliminary recommendations were presented to the public in a second set of meetings in December 2008. Public comments at the meetings helped to shape the recommendations into the form found in this document. Final recommendations in this document include neighborhood shuttle routes to improve connectivity within the focus areas and cross-town routes to improve travel between each focus area. With the exception of the recommendations included in the attached Adams Morgan Case Study, the recommendations in this report are

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[1] DDOT, *District of Columbia Transit Improvements Alternatives Analysis*, 2007, http://ddot.dc.gov/ddot/frames.asp?doc=/ddot/lib/ddot/masstransit/dcaa/execsumm_2008-03-11.pdf

[2] WMATA, *Regional Bus Study,* 2003, http://www.wmata.com/pdfs/planning/RegBusStudy.pdf

conceptual in nature, and would require further analysis and development before implementation. The Case Study (Appendix D of this report) includes more specific changes and recommendations for the implementation of transit service improvements specific to Focus Area 1.

2. TRANSIT ASSESSMENT

Introduction

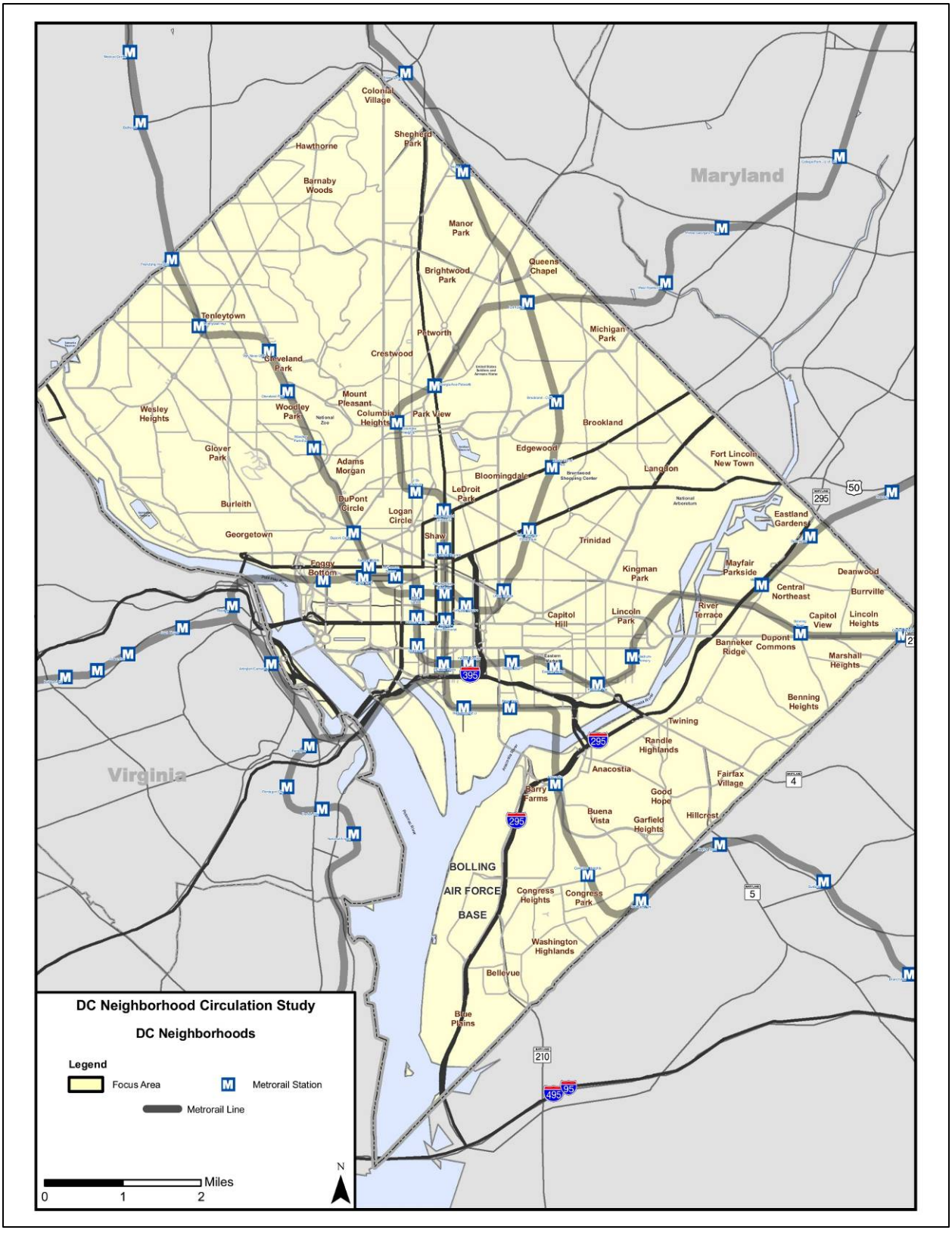
The NCS identified five focus areas within the District where transit connectivity is challenging for some transit riders. It is at this level that analysis and recommendations were primarily conducted. This section documents the analysis involved with initial identification of each of the focus areas, and then the analysis that occurred within each focus area.

The identification of focus areas and the transit assessment within each focus area were conducted using both quantitative and qualitative evidence. Quantitative evidence is from year 2000 census population, demographic, and travel data used in the Metropolitan Washington Council of Governments (MWCOG) travel forecasting model. This data has not been updated based on more recent estimated data, and will not be updated until after the release of 2010 census data. The data from the model allowed the study team to assess measures of connectivity within and between traffic analysis zones (TAZs), including the average transit travel speed, the transit mode share, and the average number of transfers required to complete inter-zonal trips.

Qualitative data about the area was used to confirm the numbers from the model and also uncover things that the model does not reflect. This was as important, as the data in the model was eight years old at the time of study and did not show recent changes in residential or commercial development within the District. Qualitative data was important in identifying new destinations that are not reflected in the model numbers. DDOT, WMATA, and the study team were especially observant during public meeting discussions and rider questionnaire analysis in order to understand what current destinations riders want to access.

This section of the report shows the primary findings of the analysis. The full findings, including numerous maps and figures, are located in Appendix A of this document. Please note that this section refers to the names of various neighborhoods throughout the District. In many places, maps include neighborhood names. Figure 2-1 shows some of the main neighborhood names for the District.

Figure 2-1 District Neighborhood Names



Identification of Focus Areas

Gaps analysis

The study team examined transportation and demographic data from the Metropolitan Washington Council of Governments (MWCOG) to identify gaps in connectivity within and between District neighborhoods. Data from MWCOG provided a broad overview of existing travel patterns within the District and forecasts of future increases in both work and shopping trips. This data, as well as examination of connections in the roadway network, the existing transit network, and the locations of barriers, allowed the study team to identify gaps in the transit network that could potentially be addressed by changes to existing transit service, or by the addition of new service.

Population and employment growth

Existing and forecasted population and employment densities help identify those areas where slow transit trip speeds affect the largest number of travelers. The population within the District is expected to grow between now and 2030, with the highest growth in the areas surrounding the following communities:

- Mount Pleasant and Adams Morgan
- LeDroit Park and Howard University
- Shaw and Logan Circle
- Trinidad, Union Station, and Stanton Park
- SW/Waterfront and Lincoln Park
- Bellevue, Sheridan, and Barry Farm
- Wesley Heights

The MWCOG data also revealed several important findings:

- Households earning less than $30,000 are found all over the city, but are most concentrated in southeast, specifically around Capitol View, Garfield Heights, and east Capitol Hill. Typically, a high proportion of such households are transit dependent, and, therefore, are affected to a larger degree by slow transit travel speeds and gaps in connectivity.
- Employment is most concentrated in Northwest, particularly around the downtown core, but there are other significant employment densities in near Southeast and near Northeast. The areas that will gain the most employees by 2030 include the northeast section of the downtown core from Mt. Vernon to Union Station as well as the Navy Yard area in near Southeast.

By 2030, the largest change in work trips will occur slightly north of the downtown core around Dupont Circle, Logan Circle, Shaw and U Street NW. Work trips in several other areas will significantly change as well, including the former Walter Reed Medical Center site, Bolling Air Force Base, and the Columbia Heights/Mount Pleasant area.

As congestion grows, transit service reliability deteriorates unless the root causes of the congestion are addressed. The deterioration in service will be most rapid in areas where the increase in traffic congestion is greatest. It will be felt most acutely in areas where transit

demand outstrips capacity. In the absence of congestion relief, adding additional resources can allow for the maintenance of existing transit service levels. For example, if a bus route requires four buses operating simultaneously to provide 15-minute headways today, delays and slower travel speeds caused by traffic congestion might mean that, in the future, the same bus route could require five or six buses running simultaneously to produce the same 15-minute headways.

Accessibility

To test for accessibility, a one-fourth mile and one-eighth-mile buffer was created around each existing bus stop and rail station. The typical transit planning standard is one-fourth of a mile,[3] so this standard was used to test for initial accessibility. However, a stricter standard of one-eighth of a mile was also used in order to test for accessibility for persons with disabilities, since they may find it difficult to travel the typical one-fourth-mile distance.

The one-fourth of a mile buffer indicates the majority of District residents and businesses are located within one-fourth-mile of a transit stop or station. The following areas have transit accessibility issues because they are farther than one-fourth of a mile from a bus stop or rail station:

- Wesley Heights
- North Cleveland Park/Forest Hills
- Anacostia Naval Station/Bolling AFB

At the one-eighth mile standard there are more pockets with transit accessibility issues, including:

- Colonial Village
- Chevy Chase
- Forest Hills
- Tenleytown
- Spring Valley
- Palisades
- Southeast of Ft. Totten
- Trinidad
- Langdon
- Lincoln Park
- Central NE
- Penn Branch
- Congress Heights

In these areas, relocating existing bus lines or implementing new service may be warranted to provide better access to transit.

[3] The Transit Cooperative Research Program (TCRP), *TCRP Report 100, Transit Capacity and Quality of Service Manual – 2nd Edition,* p. 3-33, 2003, http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp100/part%200.pdf

Average Travel Speeds

Average travel speeds are calculated using trip data between TAZs from the MWCOG model. The calculation of average travel speed uses all trips that originate in that TAZ, and is simply the average distance for all trips divided by the average travel time for all trips. The average time for a transit trip includes the in-vehicle travel time, the walk access time on both ends of the trip, and the waiting time necessary for the vehicle to arrive.

The measure of average travel speed provides a snapshot of the relative mobility of each neighborhood to surrounding nearby neighborhoods and to other areas throughout the District. The average transit travel speed to anywhere within the District is 7.6 miles per hour. The average transit travel speed for local travel to nearby neighborhoods is 4.7 miles per hour.

The average transit travel speed for local travel (defined as the nearest 20 TAZs) is slowest in the following neighborhoods:

- Brentwood (Average Local Transit Travel Speed of 3.47 mph)
- Foggy Bottom (Average Local Transit Travel Speed of 3.82 mph)
- Fairmount Heights (Average Local Transit Travel Speed of 3.84 mph)
- Mount Vernon Square (Average Local Transit Travel Speed of 3.86 mph)
- Takoma (Average Local Transit Travel Speed of 3.90 mph)

The average transit travel speed to the District as a whole are among the slowest in the following neighborhoods:

- Foxhall (Average District Transit Travel Speed of 5.83 mph)
- Palisades (Average District Transit Travel Speed of 5.89 mph)
- Georgetown (Average District Transit Travel Speed of 5.98 mph)
- Brentwood (Average District Transit Travel Speed of 6.07 mph)
- Wesley Heights (Average District Transit Travel Speed of 6.17 mph)

Transfers

One of the causes of longer transit travel times is the number of transfers (alighting from one transit vehicle to board another on a different route) that are required to reach the passenger's destination. Each transfer adds both actual time to the trip and also inconvenience, which greatly influences the passenger's perception of trip quality. Transfers require a period of time spent outside waiting for the next bus, and introduce uncertainty into travel times. For these and other reasons, the need to transfer should be minimized wherever possible.

The average number of transfers was quantified by using information programmed into the MWCOG model. The model provided the minimum number of transfers necessary to travel by transit from any TAZ within the District to any other TAZ within the District. The study team used this information to calculate a measure of average number of transfers (the average number of transfers required, as estimated by the model, to travel from one origin TAZ to all other TAZs within the district). This measure was used to determine which areas had high and low transfer rates, which indicates the quality of transit service.

For the entire District the average transfer rate is 0.62 per trip. The Bellevue community in Southeast requires the largest average number of transfers – an average of 1.19 transfers per trip – to reach destinations within the District. Other areas with a high number of transfers

include Capitol Heights (1.15 average transfers per trip), Marshall Heights (1.07 average transfers per trip), and Benning Heights (1.07 average transfers per trip).

Weighted Connectivity Indexes

A set of weighted connectivity indexes were calculated using combinations of measures such as transit travel time, average number of transfers, transit mode share, and accessibility to transit. These connectivity indices consider the number of passengers or potential passengers experiencing issues with transit connectivity by highlighting areas where transit improvements would benefit the greatest number of people. For example, Peak Period Connectivity to Local Area is a measure in units of "number of persons per miles per hour," calculated by taking the estimated number of people traveling between each zonal pair and dividing by the average transit travel speed between that pair. The higher the number of people making the trip and the slower the trip results in a lower score. The results of the connectivity indexes were weighted for various measures, including time of day, local versus regional trips, transit dependent population, and total population.

For work trips, those areas where the most benefit can be achieved include:

- Adams Morgan/Columbia Heights area
- Trinidad
- Benning Heights
- Wesley Heights
- Burleith
- Brightwood Park
- Garfield Heights
- Bellevue.

For non-work (shopping) trips, those same areas appear in addition to:

- The western portion of Wesley Heights
- Tenleytown
- Barnaby Woods

Much of the loss of connectivity related to shopping trips can be attributed to reduced transit service frequencies during non-peak hours.

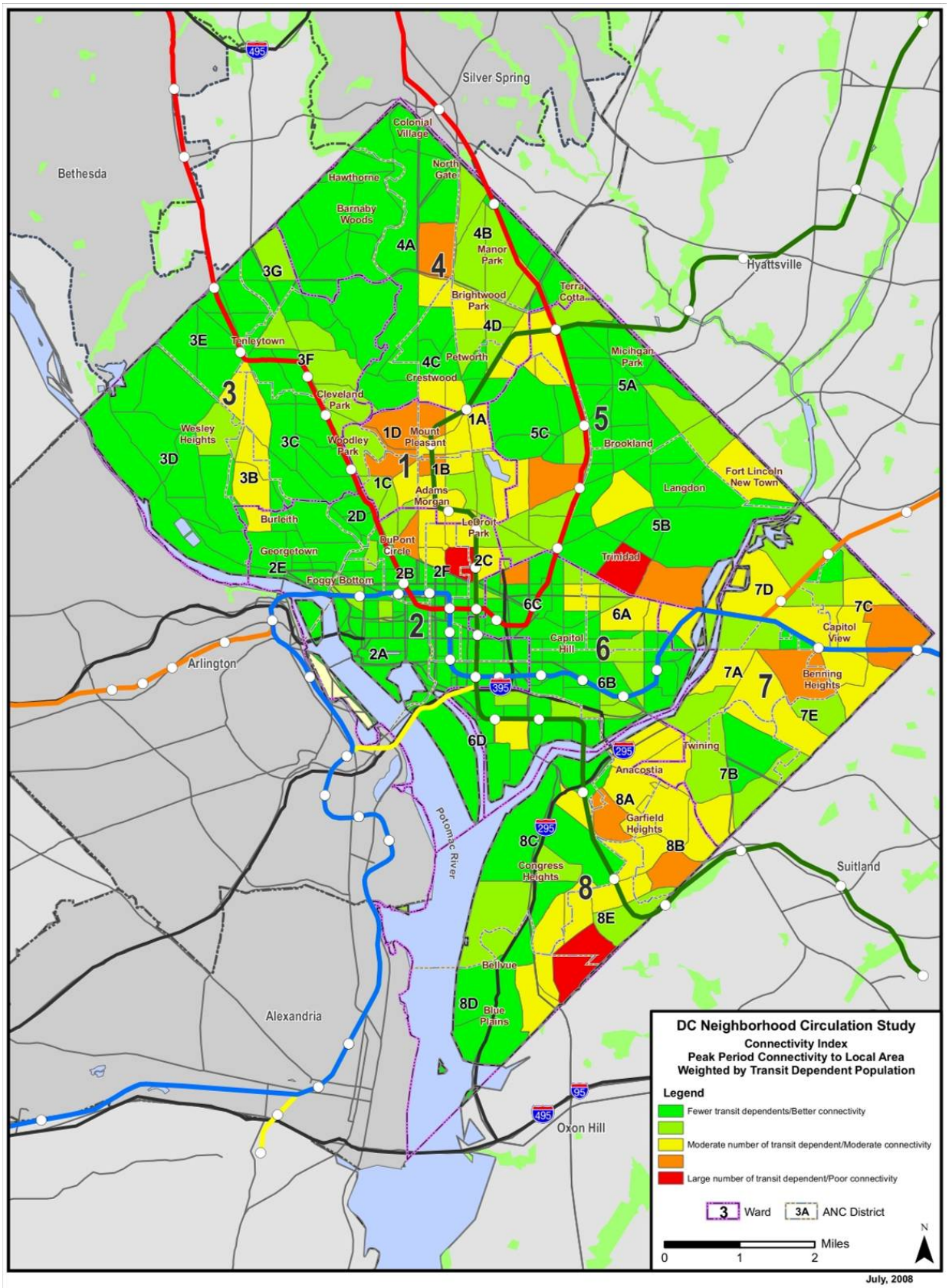
When travel times are weighted by TAZ population, one can account for areas with higher numbers of non-riders who might use transit if service were improved or implemented. Areas where the greatest potential ridership growth can be obtained by improving transit travel times include:

- Adams Morgan/Columbia Heights
- Trinidad
- Benning Heights
- Brightwood Park
- Garfield Heights
- Bellevue

This list is very similar to the list of neighborhoods with the highest potential benefit level that were highlighted in the trip-weighted analysis identified in the previous paragraph.

Finally, connectivity with travel time was weighted by the transit-dependent population in each TAZ using the same areas from the previous paragraph. The idea here was to give more "weight" to connectivity issues when they occur in places where persons are more likely to use transit. The resulting numbers indicate areas with poor connectivity and large concentrations of transit-dependent population. Figure 2-2 shows the peak period connectivity indices of all District TAZs, weighted by transit-dependent population.

Figure 2-2: Peak Period Connectivity Index for the District



Focus Areas

These various analyses identify the same relatively small number of areas that would benefit from transit improvements. Based on the results of the above analysis, the following areas were selected as focus areas:

Focus Area 1: Adams Morgan/Columbia Heights/Mount Pleasant/Edgewood

Focus Area 2: Takoma/Brightwood/Manor Park/Petworth

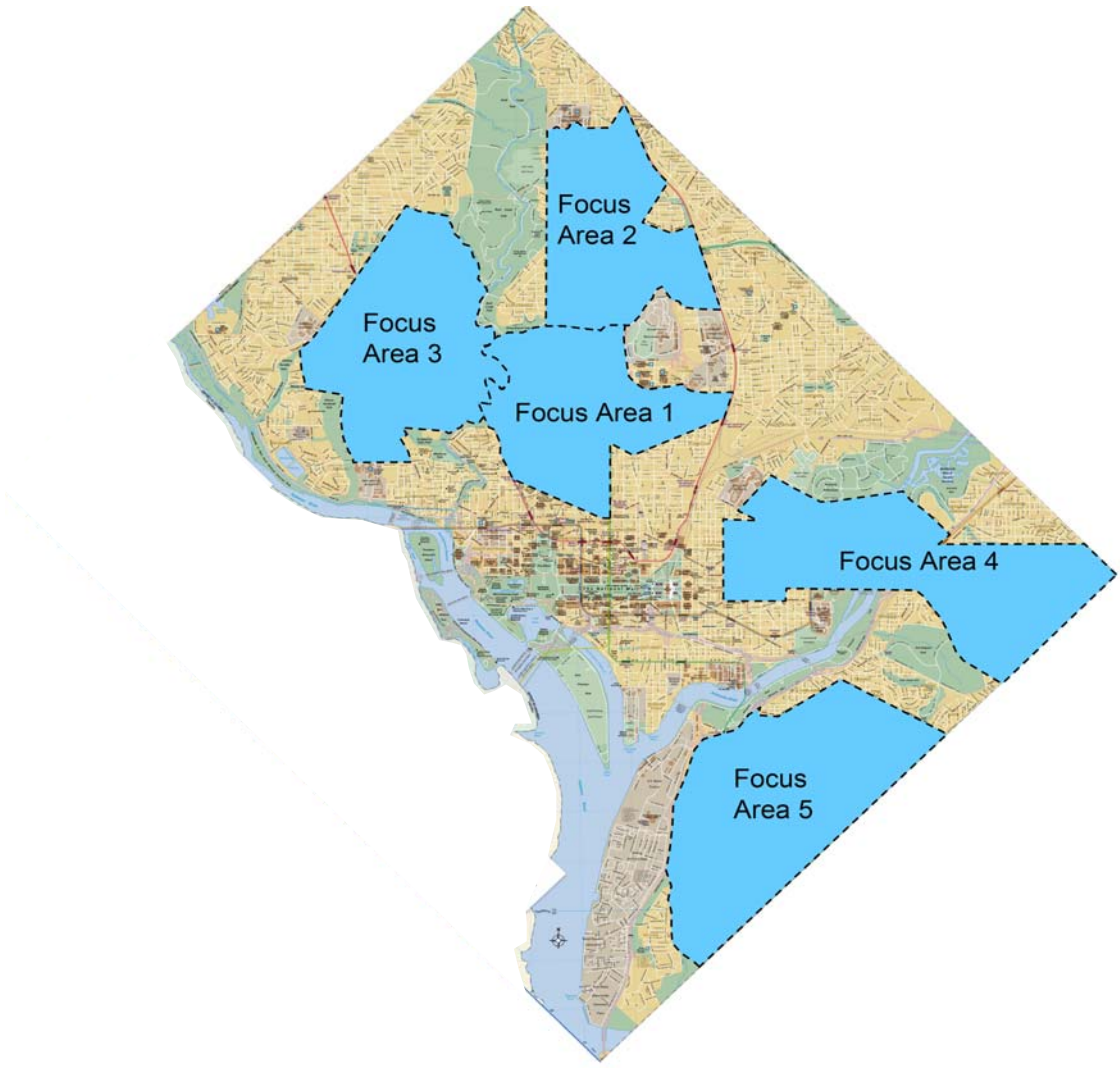
Focus Area 3: Cleveland Park/Glover Park/Woodley Park

Focus Area 4: Lincoln Heights/Benning Heights/Lincoln Park/Trinidad

Focus Area 5: SE DC/Anacostia/Washington Highlands

Figure 2-3 highlights these areas within the District. The analysis and recommendations for the rest of the study were completed using the focus areas as the unit of analysis.

Figure 2-3: Locations of Focus Areas



Focus Area Transit Assessment

The assessment of current transit service within each of the five focus areas included two distinct efforts: identification of destinations followed by a gaps assessment. The destination assessment indicated the locations to which people wanted to travel. The gaps assessment identified the locations that are difficult to reach by transit. The result at the end of this process is a list of potential transit connections that could be made to improve connectivity, accessibility, and mobility for each focus area and between the focus areas.. The recommendations for each focus area in Chapter 3 are based on these potential connections.

This process began by identifying desired destinations within each of the five focus areas. Information on population density and number of jobs was gathered for each neighborhood within the focus area, and maps of existing and future activity centers were developed. Also important was questionnaire results from the first set of public meetings in September 2008. The questionnaire asked meeting participants to name destinations that are difficult to access using transit. This information was used to identify the important local destinations to which focus area residents might need access.

Once the major desired destinations were identified and understood, the next step was to assess where gaps in existing transit service were located and how those service gaps affected trips to desired destinations. The existing WMATA transit network and transit mode share were evaluated to identify locations where important origin and destinations are not connected or where service exists but the trip requires a large number of transfers. The measure of transit travel speed also was assessed to find places where service is not efficient. Traffic congestion, local topography, and the existing street grid also were examined to determine why transit service is less available or is underperforming in some areas.

The final piece of the puzzle for the focus areas transit services assessment was to identify those desired trips that are not occurring using transit. The information gathered on destinations and service gaps were used to develop a list of potential connections in each focus area between neighborhoods and destinations that may need more transit service.

Methodology

The following section describes in detail the information and methodologies used to determine the gaps and destinations used for this analysis of each focus area.

Demographics

Key demographic information was gathered for each of the focus areas to help determine which areas have high population density, and thus may have large number of transit riders, and which areas have many jobs. The unit used for this analysis is the traffic analysis zone (TAZ). TAZ employment information is divided into various categories such as office, industrial, and retail employment, to show precisely what types of employment or activity destinations exist within each of the TAZs. This is important because it can show if a destination is primarily a daytime destination for office workers, or if the focus area is well served or poorly served by retail space, which affects transportation characteristics of the focus area.

Existing and Planned Activity Centers

A key portion of the analysis focused on connections to existing and planned activity centers within each of the focus areas. The major question to be answered when planning for neighborhood circulation is: what destinations would people want to access within a neighborhood?

A preliminary list of activity centers include:

- High employment areas
- Schools
- Universities
- Recreation Centers
- Shopping centers
- Restaurants/Bars
- Metrorail Stations
- Hospitals
- Special event venues (arenas, concert halls, etc.)
- Museums/Monuments
- Special Attractors (such as a government agency)

Each focus area was assessed to determine types and locations of activity centers. Specific activity centers identified in each of the focus areas, and the traffic and transit implications of these activity centers, can be found in the individual sections pertaining to each focus area.

Comments and Suggestions from Residents

The opinion of residents is vital to understanding local transit needs. Residents who use the public transit system understand it best and know which destinations are not well served by the transit network. The results of Public Involvement Meetings, including questionnaire results and public comments, are summarized in Appendix B. Many of the resident comments are referenced in the recommendations section of the document, as partial justification for the various recommendations for service changes and new service.

The set of public meetings in September 2008 included meetings at locations in northwest DC (for Focus Areas 1, 2 and 3), Trinidad and Benning Heights (two meetings for Focus Area 4), and Bellevue (Focus Area 5). In order to assess transit circulation problems in each focus area, public comments, suggestions, and identified deficiencies in the transit network were summarized and are included in their respective sections.

Gaps Assessment

Street Grid Continuity and Geographic and Topographic Barriers

The existing street grid and topographic features of the District are an important part of understanding why transit services do not operate in certain areas or do not provide connections between certain areas.

The street grid assessment examines where streets are available for Metrobus use, as well as the character of development that exists within a particular area. Much of the city was planned before the advent of motor vehicle travel, and it lacks the street continuity and city-wide grid system that is most efficient for motor vehicle travel, which can ensure challenges in the provision of public transportation.

The street grid and the character of surrounding development are a factor in determining how easy it is for riders to access the routes. Older parts of the city typically have a uniform street grid and many repeating blocks, which allows transit users to have many paths to access the bus route or their ultimate destination. Newer parts of the city are more likely to have curvilinear "suburban-style" street grids and "superblock" development. These areas are much more difficult for a transit rider to access and can increase walking time. The ultimate result is to reduce accessibility of origins and destinations to transit.

The region's distinct topography contributes to circulation issues. Elevation rises quickly outside of the relatively flat ground surrounding the Potomac River, resulting in topographic conditions that shaped the development of streets and neighborhoods throughout the city. Washington's numerous rivers, creeks, valleys and parks can also be an issue for transportation since many of these topographical barriers isolate neighborhoods.

Local shuttle routes should pay attention to topography, noting where difficult-to-reach developments are located, whether those areas are worth serving with local shuttle service based on their population density and other characteristics, and ways for transit service to work around particularly difficult terrain. Both street grid and topography were considered in assessment of connectivity and circulation within focus areas.

Traffic Analysis

The Washington Metropolitan Area ranks as fifth worst in the country in terms of delay and lost productivity due to traffic congestion.[4] The District's traffic problems are also compounded by the discontinuities of the street grid, which cannot always provide adequate alternate routes for drivers, as noted in the previous section.

Traffic patterns are difficult to define within Metropolitan Washington due to the location of regional employment centers outside of the central business district. However, within the District itself traffic congestion follows a typical commuting pattern towards the center of the city—for example, along Pennsylvania Avenue, New York Avenue, 14th Street NW, and 16th Streets NW. In DC, the arterials that experience the most congestion are those oriented to/from

[4] Washington Business Journal, *D.C.-area congestion drops 26% in 2008,* http://www.bizjournals.com/washington/stories/2009/02/23/daily102.html

the primary downtown employment district, with inbound congestion in the morning and outbound congestion in the afternoon. Additionally, traffic volumes are typically heavier in the afternoon as a large amount of non-work trips join the commuter trips.

Two main criteria were used to assess traffic congestion in the focus areas: the presence of high-volume intersections within DC, and arterial congestion. High-volume intersection information was provided by DDOT, which showed that the most congested intersections in the district are along major commuting arterials. Arterial congestion was calculated using the ratio of hourly traffic volume-to-capacity of the roadway for both the AM and PM peak periods.

Assessment of the Transit Network

Assessment of the transit network was completed to determine where neighborhood circulation is and is not occurring, and what might be done to improve service in District neighborhoods.

Assessment of the transit network started with a listing of all bus routes and Metrorail stations within each of the five focus areas. Also included in the assessment were shuttles provided by universities in certain focus areas. All bus routes were considered in the final analysis of existing transit service in each of the focus areas.

The WMATA Regional Bus Study was also used to identify routes of local importance. Like many bus networks, WMATA designates routes based on their primary function. The functions of routes were used to determine which routes best served local designations in each of the focus areas. From the list of route types, two types were identified as being important to local neighborhood trips: urban circulator and urban feeder/distributor. Service information for these local routes on frequency, span of service, and location was assessed and is included in Appendix A.

Number of Transfers and Average Transit Travel Time

Passengers often complain that WMATA bus routes lack adequate connections to other routes. One way to assess how well a transit network serves a particular area is to look at the number of transfers and the average travel time needed when using transit to access different areas.

Information on the average number of transfers and average transit travel time was gathered at the TAZ level using information from the MWCOG regional transportation model. For each TAZ, the AM peak average number of transfers and the AM peak average transit travel time were calculated. The AM period was chosen for simplicity, because the travel patterns during the morning period are fewer and simpler than in the afternoon and provide a clearer picture of commuting travel. For transfers, the average number of transfers required to access every other TAZ within the District of Columbia was calculated. For travel time, the average travel time between that TAZ and the 20 closest TAZs was calculated.

These numbers were then used to determine which neighborhoods within each focus area have gaps in transit service due to relatively high number of transfers or relatively low transit travel speeds. It should be noted there are no commonly-held industry standards for what is considered “high” or “low” for these measures since cities and transit systems differ significantly in these measures. Thus numbers are best used by comparing them to the District-wide average (0.62 transfers per trip, average transit travel speed of 4.7 mph).

Transit Mode Share within the Focus Area

An origin-destination analysis for transit mode share was tabulated using data from the MWCOG regional transportation model. The tables were used to determine which areas had low transit usage to desired local destinations.

The analysis used the transit mode share for travel between traffic analysis zones (TAZs). The transit mode share was generated for two types of trips represented in the model – work trips and non-work trips. In Washington, most work trips are well served by the Metrorail system, and thus typically have higher transit mode shares. Non-work trips typically have lower transit mode shares and are sometimes served better by the Metrobus network.

The transit mode share analysis was completed by creating a matrix to show the transit mode share for travel between all TAZs within each focus area, with each TAZ acting as an origin point and a destination point. The result was a square matrix of the transit mode shares between all TAZs in the focus area.

A transit mode share of five percent was used as the threshold to identify places with an already low transit mode share. Five percent is well below the average transit mode share for work trips in each of the five focus areas, and below the average for non-work trips in all but one of the focus areas. Using a standard cutoff level of five percent for all focus areas yielded a subset of TAZs that was both large enough to show where enhanced service is needed and small enough to be meaningful. The average transit mode shares by TAZ are shown in Table 2-1.

Also flagged were destination TAZs – those areas known to be desired places to access. Thus, cells which were flagged for a low transit mode share and flagged for having a desired destination were identified as places where new transit service should be considered. The overall result of the analysis was a quantitative way to identify which origins and destinations need to be connected in order to provide better transit connectivity in each focus area.

Table 2-1: Average Transit Mode Shares in the Five Focus Areas

	Work Trips	**Non-Work Trips**
Focus Area 1	24.7%	8.4%
Focus Area 2	8.2%	5.8%
Focus Area 3	19.6%	4.4%
Focus Area 4	15.9%	6.9%
Focus Area 5	21.3%	7.9%

3. RECOMMENDATIONS

Recommendations presented here are based on the main components of the study: connectivity, accessibility, and mobility, and they are in numerical order for each focus area. Recommendations for new bus routes include two types: neighborhood shuttles and cross-town routes. Shuttle routes are recommended to connect people, neighborhoods, and activity centers inside each focus area. Cross-town routes are recommended to provide connections between neighborhoods and activity centers across the District that are not well connected today.

Public comments and public meetings were important to the final outcome of these recommendations. Each focus area section includes references to comments made at public meetings that were influential in the outcome of the recommendations in this study. A more detailed explanation of the public meetings can be found in Appendix B of this document, including dates of the first set of meetings (Appendix B page 94), the questionnaire used at the first set of meetings (Appendix page 95), questionnaire results (Appendix B pages 96-117), and a summary of comments from the second set of meetings where preliminary recommendations were presented (Appendix B pages 118-123).

The phasing of the recommendations is divided into two categories, Phase I and Phase II. Recommendations in Phase I could be implemented within six months to two years (although delays remain possible), while Phase II recommendations are those that are expected to take more than two years. Phase I improvements include items such as route extensions and changes to service frequency and span. The implementation of Phase II improvements would require a longer effort in public engagement and budgeting. Phase II improvements would include implementation of new bus routes.

It should be noted that recommendations are conceptual in nature and will require further analysis and development when they are implemented. The NCS includes a more detailed case study of Focus Area 1, which includes the Adams Morgan neighborhood. The Adams Morgan/U Street NW/Columbia Heights Case Study (Appendix D) includes more specific changes and recommendations for changes to transit service in the Adams Morgan neighborhood, which are presented in greater detail than they are presented in this chapter.

Focus Area-Specific Recommendations

Focus Area 1

Focus Area 1, located just north of downtown Washington, has both excellent connectivity and challenging mobility issues due to its location. There are many arterial roads running through the area in a north-south direction, and transit service on these is excellent for getting to-and-from downtown Washington. North-south travel within the focus area corridors is relatively easy, and is not considered an issue for connectivity, although overcrowding is an issue on some routes like the 50s on 14th Street NW.

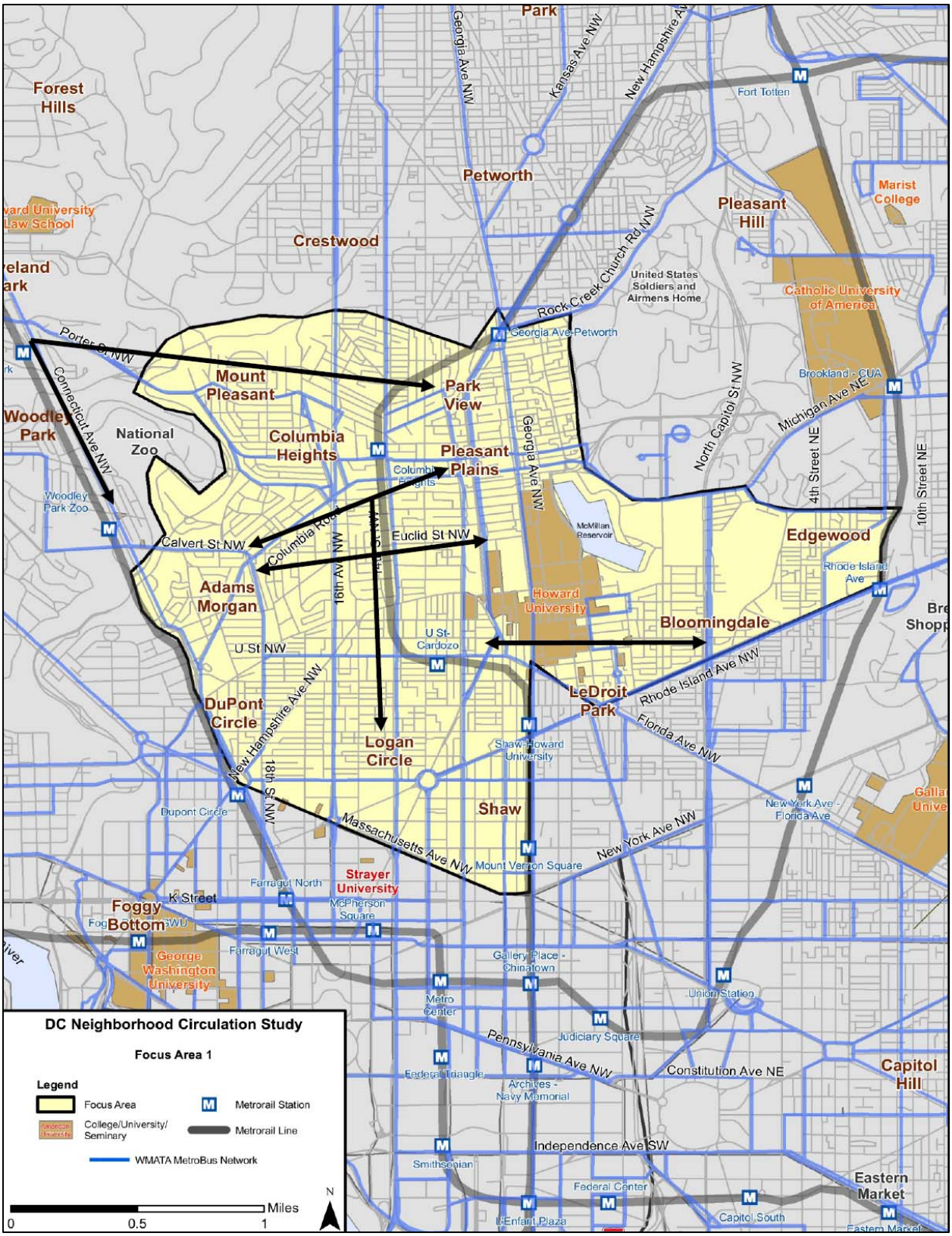
East-west travel, however, was identified as having connectivity challenges. The transit mode share, transfer, and travel speed information all indicated that the residents of neighborhoods in the east and northeast part of the focus area have difficulty connecting to desired destinations. Isolated neighborhoods include Mount Pleasant, Park View, LeDroit Park, and Bloomingdale. Additionally, Focus Area 1 has a lack of through streets and various barriers (Howard University, Meridian Hill Park, McMillian Reservoir, etc.) that make present east-west travel to desired destinations difficult.

As a result of the analysis completed within Focus Area 1, the following potential connection improvements were identified:

- East-west between Edgewood and Bloomingdale neighborhoods and Howard University, U Street NW, and Adams Morgan destinations.
- East-west between Mount Pleasant and Park View.
- Southwest-northeast between Petworth, Park View and Adams Morgan.
- North-south between Logan Circle, Columbia Heights, and Adams Morgan destinations.
- East-west between Pleasant Plains, Columbia Heights and Adams Morgan.

Connectivity issues in Focus Area 1 are shown graphically in Figure 3-1.

Figure 3-1: Focus Area 1 Potential Connections



The study findings and preliminary recommendations based on technical analysis were presented to the public for comments and suggestions at the meeting for Focus Areas 1, 2, and 3 on December 11, 2008.

Six route options for Focus Area 1 were presented at the meeting, and participants were asked to give their opinion on these routes. Many residents expressed a preference for the route that operated nearest to their house or was most convenient for them. However, residents were also encouraged to evaluate other routes that might be beneficial to the area at-large.

Comments made at the meetings about these potential routes included the following:

- The majority of the residents preferred the Petworth-Adams Morgan loop shuttles because those routes served places to which they traveled.
- Sometimes, it is a long walk between Adams Morgan and Woodley Park, so a proposed route in that direction would be good.
- It is helpful to have buses that go to locations where the Metro does not go.
- Residents would like transit service to the Washington Hospital Center.
- Some residents feel that the potential routes only serve high income residents.

Participants liked the Petworth-Adams Morgan loop shuttles because they were short and connected to the most desirable destinations along Columbia Road, 18th Street NW, and U Street NW. When forced to choose, meeting participants favored the clockwise route to the counterclockwise, but thought that the route would work best if it could run in both directions. Meeting participants preferred short routes with quick trips over longer ones that served more destinations.

Participants also commented on the proposed NW DC Circulator. The potential extension of the Circulator into Ward 1 was met with enthusiasm, although some meeting participants felt that other transportation projects deserved greater priority than a Circulator extension.

Participants were also questioned about connecting to the Edgewood, Bloomingdale, and LeDroit Park neighborhoods. Although none of the participants in the meeting lived in any of these neighborhoods, those in attendance stated that connections to neighborhoods to the east would be helpful for residents of those neighborhoods.

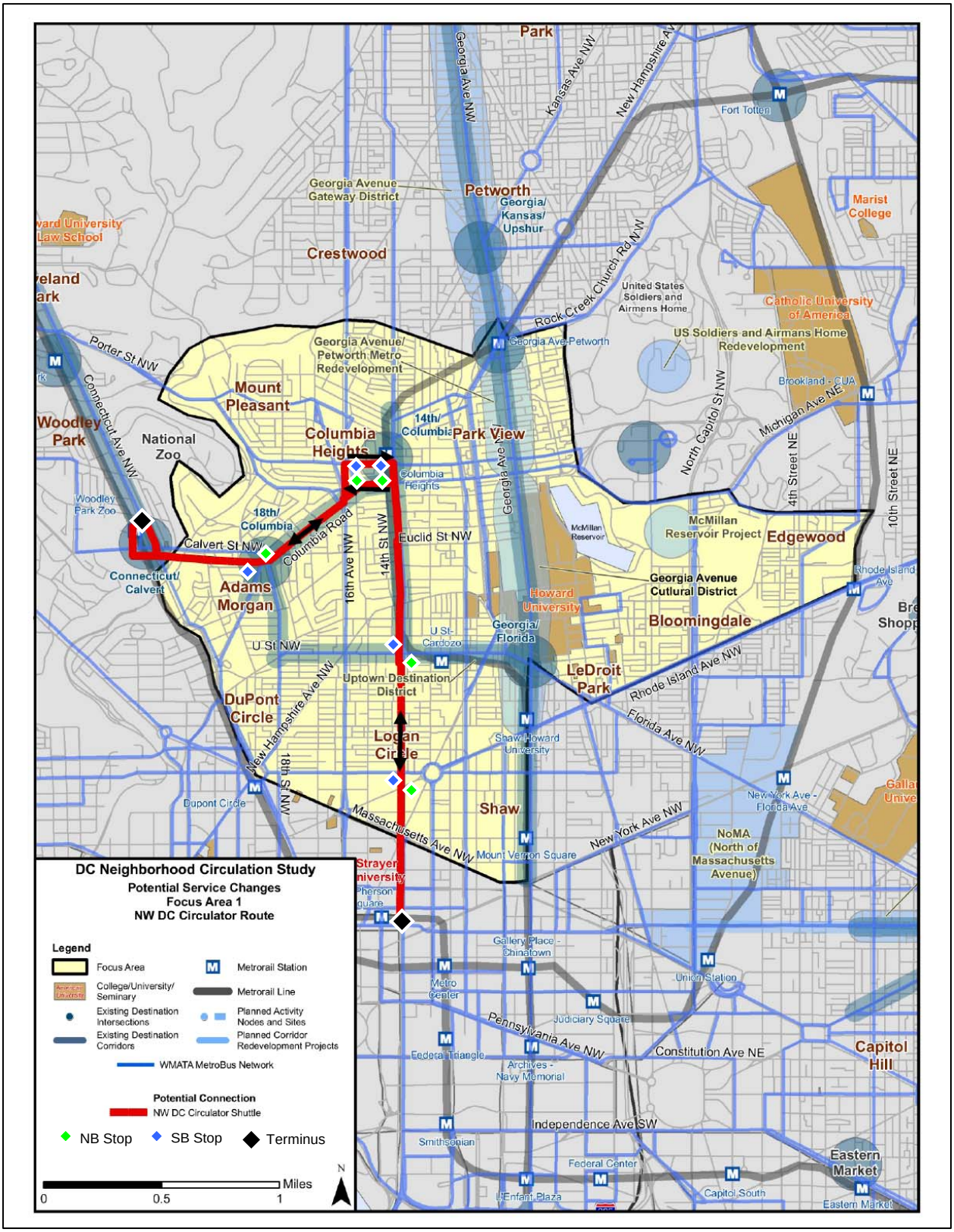
The recommended routes for Focus Area 1 took into account the preferences stated at the public meeting.

Phase I

Implement NW DC Circulator

The NW DC Circulator is proposed to be an extension of the DC Circulator network that includes the Convention Center-SW Waterfront route, the Georgetown-Union Station route, and the Smithsonian/National Gallery of Art Loop. It is recommended to run on 14th Street NW from the McPherson Square Metrorail Station north to the Columbia Heights Metrorail Station. The route will then turn southwest to operate on Columbia Road NW through the Adams Morgan neighborhood. The route will then operate west on Calvert Street NW, ending at the Woodley Park Metrorail Station. The proposed route alignment for the NW DC Circulator is shown in Figure 3-2.

Figure 3-2: NW DC Circulator



A key finding for Focus Area 1 was the need for a north-south connection between K Street NW, Logan Circle, Columbia Heights, Mount Pleasant, Adams Morgan, and Woodley Park. The proposed NW DC Circulator is a route that will promote connectivity between these key points within the District. Mobility will also improve, especially on the 14th Street NW corridor, which has overcrowded buses at multiple points during the day. The route will promote accessibility by operating through several neighborhoods (Columbia Heights, Adams Morgan) that have difficulty with access from the Logan Circle and K Street NW corridor areas.

Phase II

As noted in the Public Input section, several routes were developed to make connections between isolated neighborhoods and desired destinations. The five preliminary recommendations were narrowed down to two routes that were selected for final recommendation, based on preferences expressed at public meetings. Those two recommended routes are detailed below.

Implement Petworth-Adams Morgan Shuttle

The proposed Petworth-Adams Morgan Shuttle is a two-way loop route. Its primary routing (clockwise) is on New Hampshire Avenue NW, Sherman Avenue NW, U Street NW, 18th Street NW, Columbia Road NW, 14th Street NW, and Park Road NW. The route connects neighborhoods identified in the study as having connectivity issues, including Petworth, Pleasant Plains, Park View, and Columbia Heights. The route serves desired destinations in Focus Area 1, including the Georgia Avenue NW-Petworth Metrorail Station, the U Street NW corridor, the 18th Street NW corridor, the Columbia Road corridor, and the DC USA development at Park Road and 14th Street NW. The proposed route alignment for the Petworth-Adams Morgan Shuttle is shown in Figure 3-3.

Overall, the proposed Petworth-Adams Morgan Shuttle improves connectivity between neighborhoods where residents have a difficult time using transit to reach important destinations. Accessibility is improved by providing service to desired destinations in Adams Morgan, the U Street NW corridor, and the Petworth neighborhood. Further, the route is a relatively short loop that can be operated in a timely manner, which will improve mobility for the neighborhoods listed above.

Implement Woodley Park-Rhode Island Avenue Shuttle

The proposed Woodley Park-Rhode Island Avenue Shuttle is an east-west running route that would operate between the Woodley Park Metrorail Station and the Rhode Island Metrorail Station. Its primary alignment from west to east is Calvert Street NW, 18th Street NW, U Street NW, Florida Avenue NW, T Street NW/U Street NW, and Rhode Island Avenue NW and NE. The route connects the neighborhoods of LeDroit Park, Bloomingdale, and Edgewood to activity centers including Howard University, the U Street NW corridor, the 18th Street NW corridor, and the Woodley Park-Zoo and the Rhode Island Avenue Metrorail Stations. The proposed route alignment for the Woodley Park-Rhode Island Avenue Shuttle is shown in Figure 3-4.

The proposed Woodley Park-Rhode Island Avenue Shuttle is similar to the 90s routes. The major difference between the proposed route and the existing alignment of the 90s route is the extension of the proposed shuttle east through the LeDroit Park, Edgewood, and Bloomingdale

neighborhoods. This route connects to these previously disconnected neighborhoods that are not covered by the 90s route. Many of the quantitative measures used within the NCS indicated that transit riders in these neighborhoods are isolated from key destinations along the U Street NW corridor, Adams Morgan, and Woodley Park neighborhoods.

A trip from the Edgewood neighborhood to Adams Morgan now requires taking the G8 route west and then transferring to a 90s bus. The new Woodley Park-Rhode Island Avenue Shuttle would improve connectivity by providing a quick one-seat ride between these isolated neighborhoods, and would improve mobility by reducing travel and wait time between these areas. The route connects to underserved areas and provides access to desired destinations at Howard University, U Street NW corridor, and Adams Morgan.

Figure 3-3: Proposed Petworth-Adams Morgan Shuttle

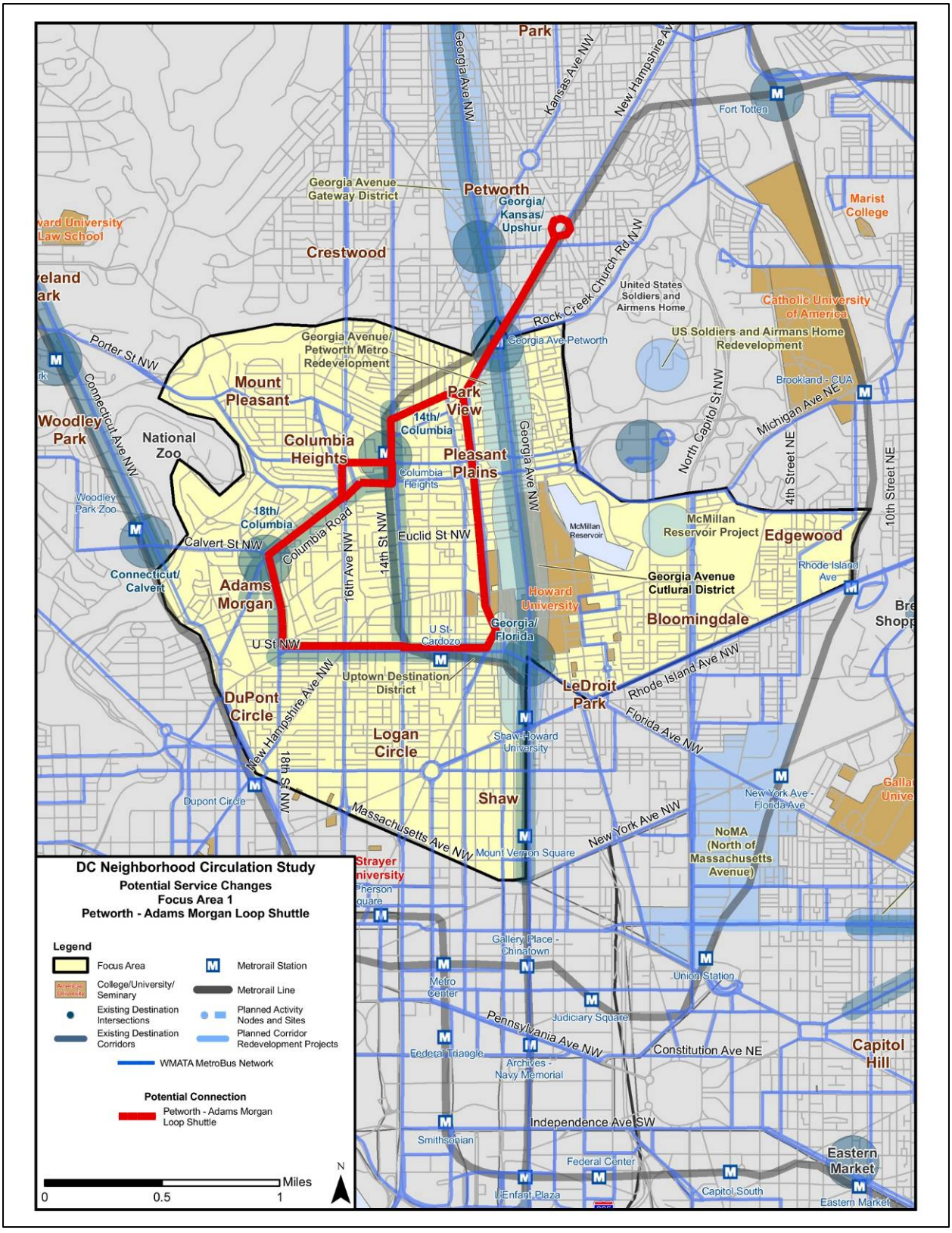
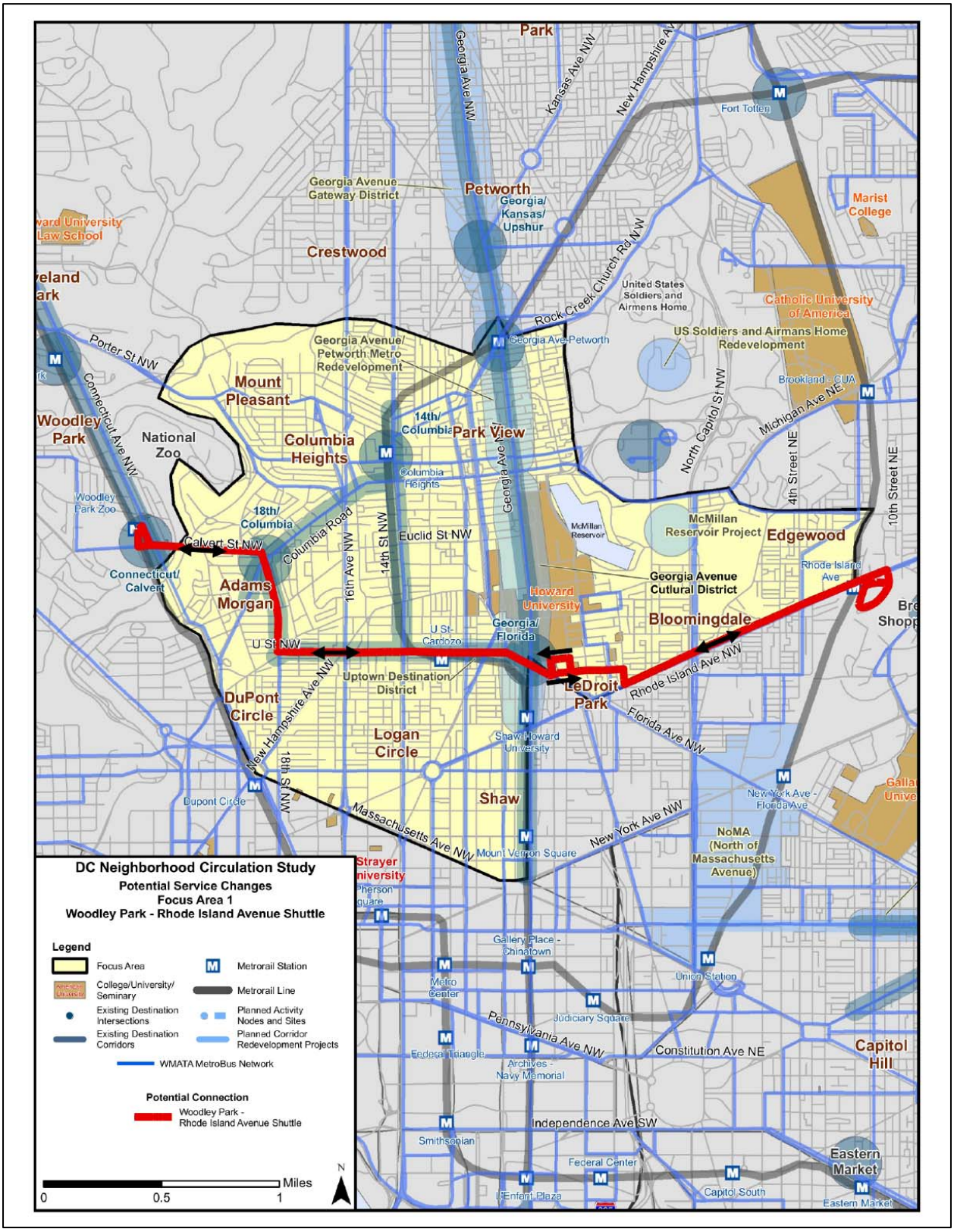


Figure 3-4: Proposed Woodley Park-Rhode Island Avenue Shuttle



Focus Area 2

Focus Area 2, located at the far northern edge of the District, has many assets that benefit neighborhood circulation. The street grid is well developed, with most streets aligned at 90-degree angles. The area is also served by a few major diagonal arterial streets. There are few barriers to travel, with no major developments that block neighborhood circulation. The Pleasant Hill neighborhood, located near Rock Creek Cemetery, is the only portion of the neighborhood that appears to be isolated by development patterns and topography.

The WMATA transit network map shows that most of the bus routes serving the focus area operate north-south on the major arterials that access downtown Washington (16th Street NW, 14th Street NW, Georgia Avenue NW, New Hampshire Avenue NW). Only two bus routes operate east-west through the focus area, the E2/E3/E4 route along Kennedy Street NW/Missouri Avenue NW, and the K1 route, which operates in an east-west direction through the far northern portion of the focus area between the Takoma Metro Station and Walter Reed Medical Center.

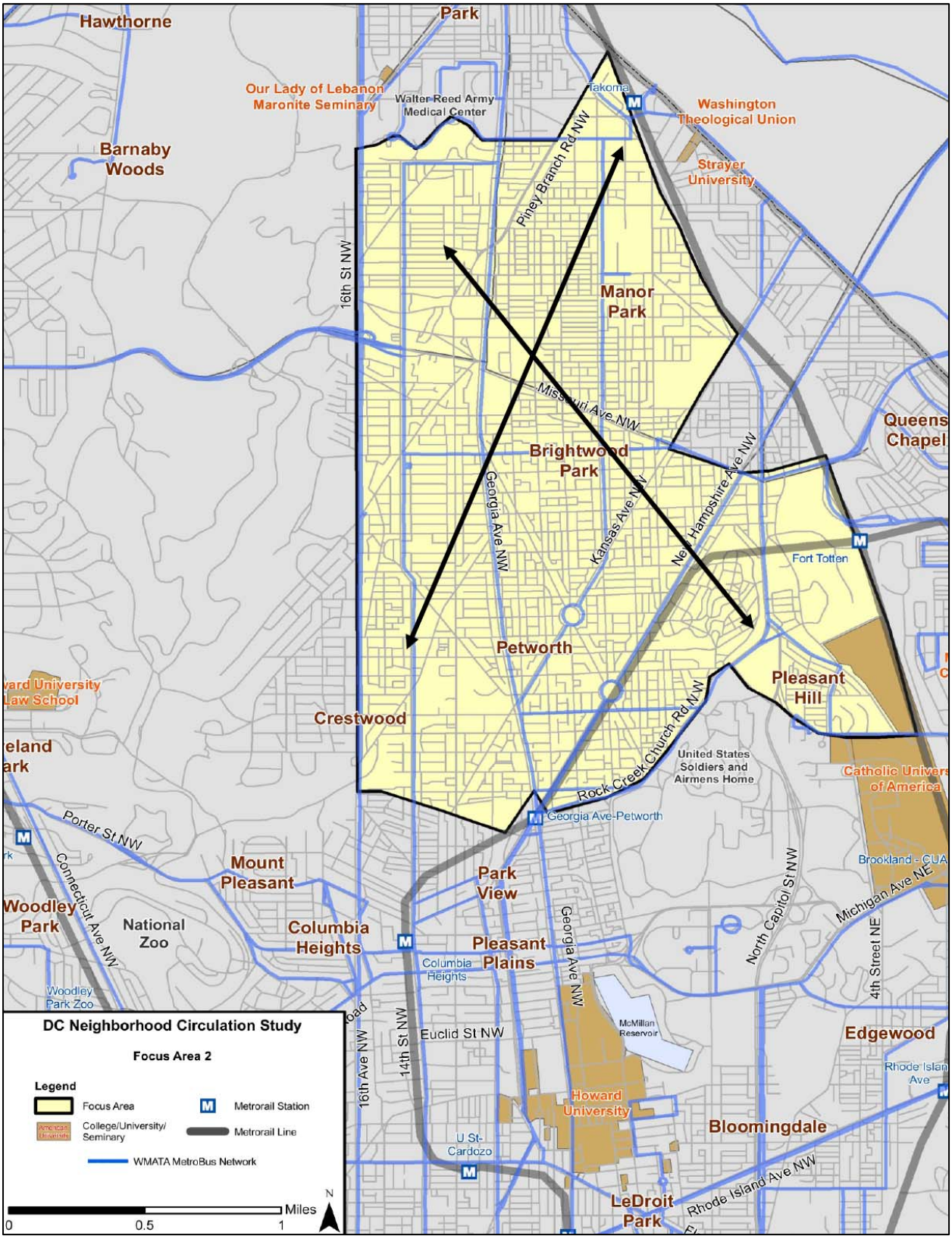
Connecting all parts of the focus area to the Georgia Avenue NW corridor, the Takoma Metrorail station, and the Walter Reed Medical Center would help to promote neighborhood connectivity.

As a result of the analysis completed for Focus Area 2, the following potential connections were identified for improved or new transit service:

- Northwest-southeast between Walter Reed Medical Center (Brightwood) and Fort Totten Park/Pleasant Hill neighborhood.
- Southwest-northeast between West Petworth/Crestwood and Takoma neighborhoods

Connectivity issues in Focus Area 2 are shown graphically in Figure 3-5.

Figure 3-5: Focus Area 2 Potential Connections



The study findings and preliminary recommendations for Focus Area 2 were presented to the public for comments and suggestions at the meeting for Focus Areas 1, 2, and 3 on December 11, 2008. The recommendations stated below combine the findings of the analysis with the input from the public.

Phase I

Extend 60-series to downtown Washington during all times of day

Requests from riders during public meetings and some of the connectivity data indicate the potential need for a stronger bus connection between Petworth and downtown Washington. The 60-series are ideal for making the connection between Focus Area 2 and downtown. Routes 60, 62, and 64 all serve Focus Area 2, all ending at the Georgia Avenue-Petworth Metrorail Station. Routes 66 and 68 provide service between the Georgia Avenue-Petworth Metrorail Station and downtown Washington.

The recommendation is to combine some of the 60-series in order to provide connectivity to downtown Washington. This recommendation will improve access and connectivity to downtown from Focus Area 2 and will also promote greater mobility by reducing transfers needed to reach downtown from Petworth, Takoma, or Manor Park.

Please note that during the course of this study WMATA identified the 60-series for potential changes and implemented these changes in December 2008. The changes included extending the 64 to Federal Triangle during all times of day and implementing a new Route 63 to provide service from Takoma Metrorail Station to Federal Triangle via Georgia Avenue-Petworth Metrorail Station. Routes 66 and 68 were eliminated as part of the service restructuring.

Phase II

Implement Petworth-Takoma-Manor Park Shuttle

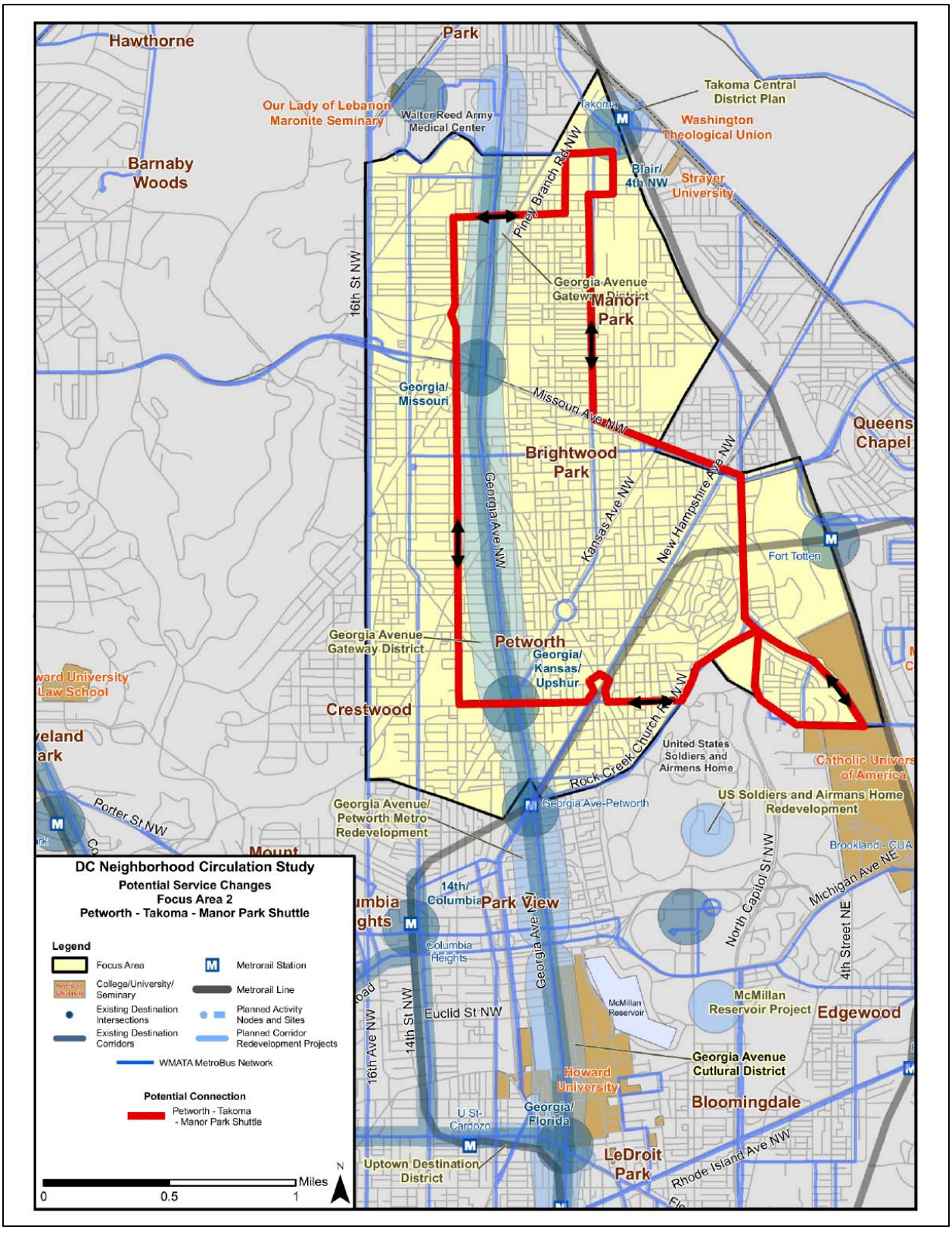
The proposed shuttle is a two-way route operating on a rectangular alignment through Focus Area 2. Its primary alignment (operating southeast from the Takoma Metrorail Station) is on 4th Street NW, Aspen Street NW, 5th Street NW, Missouri Avenue NW, North Capital Street, Hawaii Avenue NE, Taylor Street NE, Rock Creek Church Road, Upshur Street NW, 13th Street NW, Van Buren Street NW, 6th Street NW, and Cedar Street NW. The route connects the neighborhoods of Manor Park, Brightwood, Pleasant Hill, and the Grant Circle area. The route serves desired destinations in Focus Area 2, including Petworth, portions of the Georgia Avenue NW corridor, and the Takoma neighborhood and Metrorail Station. The proposed route alignment for the Petworth-Takoma-Manor Park Shuttle is shown in Figure 3-6.

This proposed shuttle reduces the number of transfers needed to travel between these neighborhoods and destinations. For example, a trip from the Missouri Avenue NW/Georgia Avenue NW intersection to Grant Circle requires riding on the 70s south on Georgia Avenue NW, followed by a transfer to the Route 60 or 64 bus, and then a short walk. The proposed Petworth-Takoma-Manor Park Shuttle provides a one-seat ride between these areas and serves multiple neighborhoods in between.

Accessibility is improved because the recommended alignment provides two east-west connections (one along Van Buren Street NW and the other along Upshur Street NW). The

route improves focus area connectivity, because it serves desired destinations in the Petworth neighborhood, Grant Circle, and the Takoma Metrorail Station, and both connectivity and mobility are improved because it reduces the number of transfers (especially for east-west travel) required for many trips.

Figure 3-6: Petworth-Takoma-Manor Park Shuttle



Focus Area 3

Focus Area 3 is located in the NW quadrant of the District, and is defined by several diagonal arterials that run towards major destinations including Georgetown, Dupont Circle, and downtown Washington. Neighborhood circulation in Focus Area 3 has many barriers, including several parks, heavy traffic congestion, large campus-like nodes of development (such as the Naval Observatory), and a non-uniform and discontinuous street-grid. Most bus routes running through this area are oriented along the major diagonal arterials. Routes rarely cross the arterials, inhibiting residents' ability to travel between neighborhoods and activity centers.

Information on transit travel speed, transit mode share, and average number of transfers identified several isolated neighborhoods within Focus Area 3. Isolated neighborhoods include Glover Park, Burleith, North Cleveland Park, and Forest Hills.

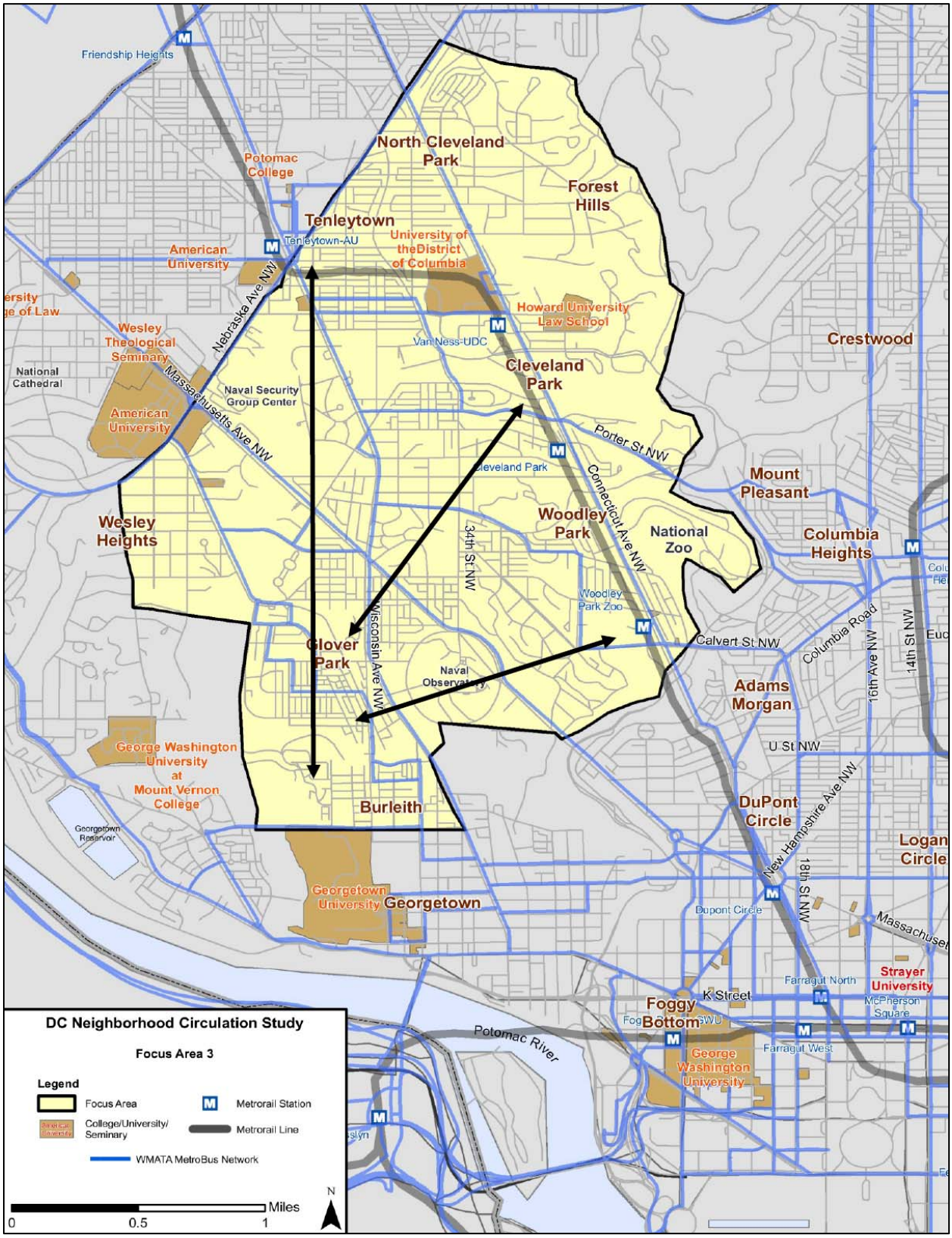
There are many important destinations within Focus Area 3. The Wisconsin Avenue NW and Connecticut Avenue NW corridors have numerous retail and restaurant destinations. The National Cathedral and Naval Observatory are two activity centers within the focus area, the latter also being a minor employment area. Georgetown University (GU) and the GU Hospital and UDC/Howard Law School are important educational and employment nodes within the Area.

As a result of the analysis of travel issues in Focus Area 3, the following potential connections were identified for improved transit services:

- North-south between Glover Park, Wesley Heights, the Tenleytown Metrorail, and Upper Wisconsin Avenue NW area.
- Southwest-northeast between Glover Park and Wesley Heights and the Connecticut Avenue NW destinations associated with the UDC-Van Ness and Cleveland Park Metrorail Stations.
- East-west between Glover Park and Woodley Park.

Connectivity issues in Focus Area 3 are shown graphically in Figure 3-7.

Figure 3-7: Focus Area 3 Showing Barriers to Circulation Found in Gap Analysis



The study findings and preliminary recommendations for Focus Area 3 were presented to the public for comments and suggestions at the meeting for Focus Areas 1, 2, and 3 on December 11, 2008. Three route options were originally presented to the public, but only one was selected to be included in the final recommendations of this report. Pages 88-89 in Appendix A show two preliminary recommendations for routes on 34th Street NW in Focus Area 3. Eventually, these routes were discarded due to a lack of interest from the public and because service had previously operated on 34th Street, NW but was discontinued.

Phase I

N8 Extension: GU-AU-UDC Shuttle

The existing N8 route operates in a northwest and east direction between Glover Park and the Van Ness-UDC Metrorail Station via the Tenleytown Metrorail Station. An extension of this route is proposed to go south through Glover Park and Burleith to end at Georgetown University Hospital. The route is proposed to operate south from Glover Park along 39th Street NW, Benton Street NW, 37th Street NW, S Street, 35th Street NW, and Reservoir Road NW. Northbound, the route would operate on Reservoir Road NW, 35th Street NW, Whitehaven Parkway NW, 37th Street NW, Benton Street NW, and 41st Street NW. The proposed route alignment for the N8 Extension is shown in Figure 3-8.

The proposed extension would serve two purposes. First, it would provide connectivity between the isolated Glover Park and Burleith neighborhoods to destinations near the Tenleytown-AU and Van Ness-UDC Metrorail Stations. Second, the extension of the route to Georgetown University Hospital would provide connections between neighborhoods in the northern part of the focus area and the major activity centers on the Georgetown campus. The extended N8 would serve isolated neighborhoods and connect to destinations in both the northern and southern portions of the focus area.

The extension of the N8 route would reduce the transfers that occur between the D2 and N8 in the Burleith neighborhood. It would also provide a connection between American Univeristy (AU) and Wesley Heights and GU Hospital that currently require at least one transfer (M4 to D6) or possibly two (N8 to 30s to D6), depending on the time of day.

GU and AU are both an important part of the DC community and they run free shuttles to connect students, employees and visitors with important destinations on or near their campuses. It is unknown how many people who are not affiliated with either AU or GU use the university shuttles. More detail on these shuttles is located on pages 47-48 in Appendix A. The extension of the N8 is not considered a replacement for any university-based shuttle.

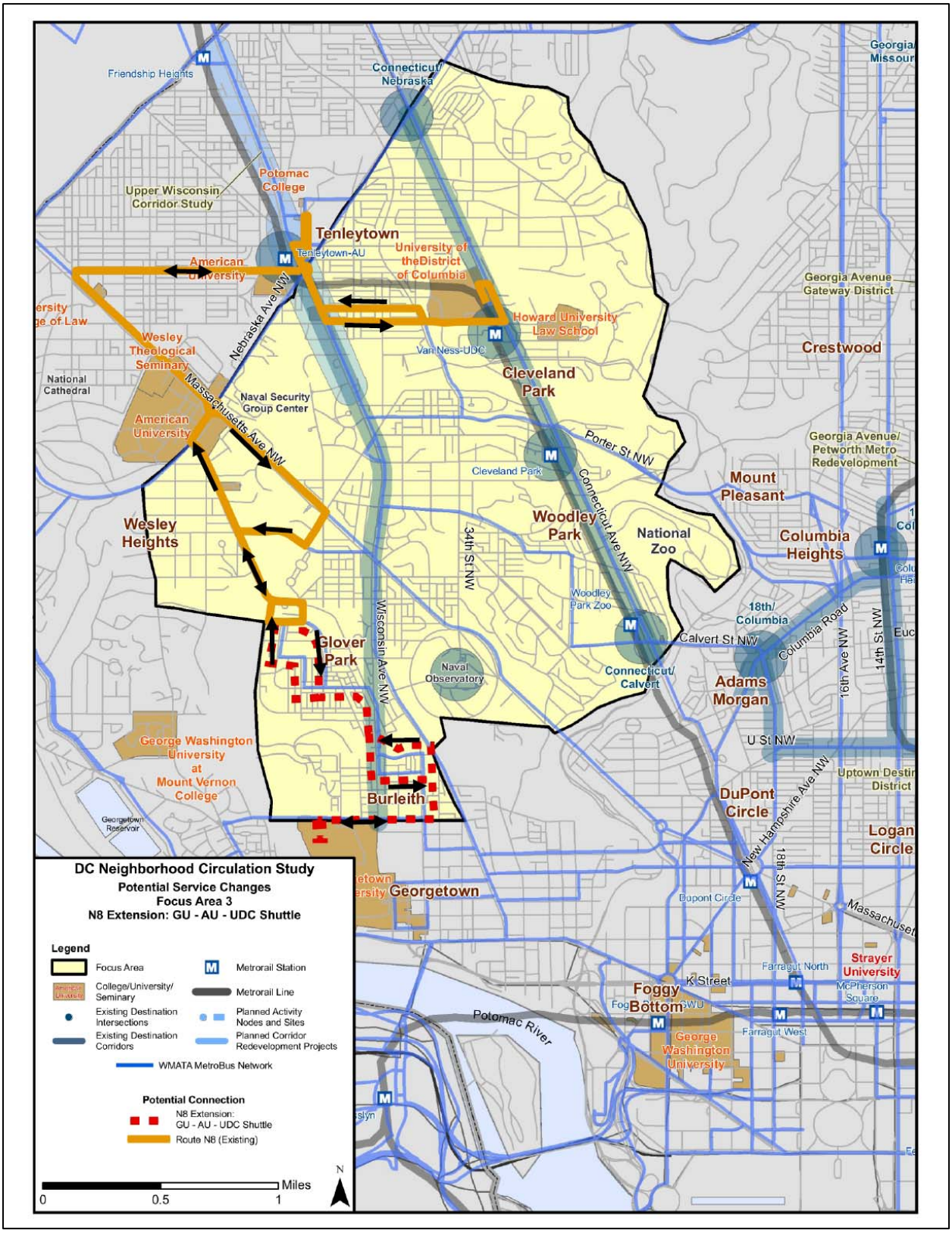
The route improves accessibility by providing a single route that provides service to multiple destinations. Mobility is improved due to the elimination of transfers that now occur between the D2 and N8. Connectivity is improved because new service is being provided to areas that currently have relatively less transit service, such as Wesley Heights.

Phase II

No Phase II route improvements are recommended as part of this study for Focus Area 3.

It should be noted that the potential east-west connection between Glover Park and Woodley Park is covered as part of the recommended new H-series cross-town route described in a later part of this chapter.

Figure 3-8: N8 Extension: GU-AU-UDC Shuttle



Focus Area 4

Focus Area 4 extends from east of Capitol Hill to the far eastern portion of the District. The boundary of the focus area is 8th Street SE and NE on the west side, a combination of Mt. Olivet Road NE, the National Arboretum, and Burroughs Avenue NE on the north side, Eastern Avenue and Southern Avenue on the east side, and Ridge Road SE, East Capitol Street, and Independence Avenue SE on the south side. The Anacostia River splits the focus area into two distinctive portions, east and west of the river.

Information on street grid, barriers, and transit travel speed, transfers, transit mode share all were analyzed to identify isolated neighborhoods and other travel issues. West of the river Trinidad and Lincoln Park were identified as isolated neighborhoods while east of the river neighborhoods identified as having connectivity issues include Benning Heights, Marshall Heights, and Capitol View.

The Transit Assessment also identified key destinations and activity centers within Focus Area 4. Destinations west of the river include Hechinger Mall, the H Street NE corridor, the Maryland Avenue NE corridor, and the area surrounding the Stadium-Armory Metrorail Station. East of the river, destinations include the Benning Road NE/Minnesota Avenue NE intersection, the Minnesota Avenue Metrorail Station, the Benning Road Metrorail Station, and the Capitol Heights Metrorail Station. Further, the East Capitol Street corridor has many social service destinations (such as the United Planning Organization) and has also been designated as an investment zone for economic development as part of the East of the River Initiative[5].

Circulation between neighborhoods on either side of the Anacostia is problematic. Only a few WMATA bus routes serve each of the Anacostia crossings (routes 96/97 on East Capitol Street and routes X1,2,3 on Benning Road). East of the river, routes 96/97 continue on East Capitol Street into Maryland, while route X3 terminates at the Minnesota Avenue Metrorail Station. Neither route circulates through neighborhood streets. As a result, transit riders in these neighborhoods need to transfer at least once, and in some cases more than once, to complete trips to destinations in neighborhoods across the river.

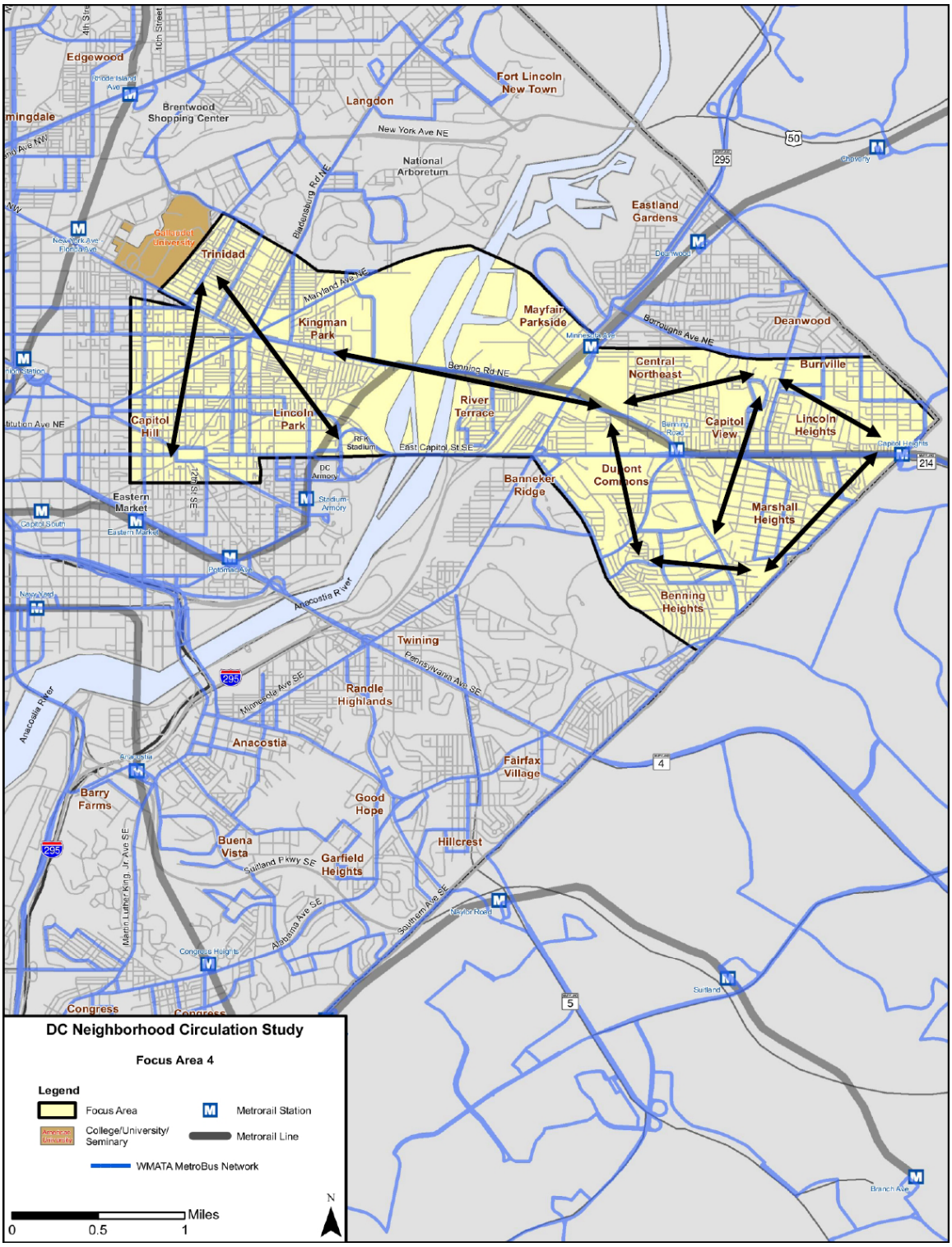
As a result of the analysis of transportation issues in Focus Area 4, the following potential connections were identified for improved or new transit service:

- North-south between Trinidad, Lincoln Park, and the Potomac Avenue SE corridor
- Southeast-northwest between Trinidad and Stadium-Armory Metrorail Station
- East-west between Lincoln Heights and Capitol View and the Minnesota Avenue and Benning Road Metrorail Station destinations
- North-south between Benning Heights, Capitol View, and Lincoln Heights
- East-west to provide greater general connectivity between neighborhoods on either side of the Anacostia River

Connectivity issues in Focus Area 4 are shown graphically in Figure 3-9.

[5] DC Office of Planning, *East of the River Initiative,* 2000, http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571371,planningNav,%7C32341%7C.asp

Figure 3-9: Focus Area 4 Showing Barriers to Circulation Found in Gap Analysis



The study findings and preliminary recommendations were presented to the public for comments and suggestions. Two meetings were held for Focus Area 4 – one in Trinidad on December 9, 2008; and another in Benning Heights on December 10, 2008.

During the Trinidad meeting participants evaluated a combined route that circulated through the neighborhoods west of the Anacostia River and then crossed over the river and circulated through eastern neighborhoods. Participants stated that there were very few destinations on the east side of the Anacostia that they wanted to access. However, they said that residents east of the river would be interested in destinations to the west.

Meeting participants also had suggestions for alignment through the western neighborhoods. They suggested that the proposed route should provide access to the New York Avenue Metrorail Station. They also suggested that the route be extended southeast to the Stadium-Armory Metrorail Station and possibly south to Potomac Avenue SE corridor. These suggestions were incorporated into the final recommendations shown below.

At the Benning Heights meeting, most of the participants were from neighborhoods east of the Anacostia River. Participants said that they were in need of connections to destinations west of the river, and they liked the shuttle routing. They suggested that, in addition to the proposed neighborhood shuttle route, there should also be an increase in service on the X3 route to provide access to destinations near Howard University and Adams Morgan.

The recommendations shown below combine the findings of the analysis performed by the study team with input from the public at both the Trinidad and Benning Heights meetings.

Phase I

Increase the frequency of the X8 route to every ten minutes in the AM and PM peaks, and operate the route at a frequency of every 15 minutes during off peak periods

Route X8 route runs on Maryland Avenue NE between Kingman Park and Union Station, and provides connectivity to many destinations in Kingman Park, Trinidad, and Lincoln Park. Members of the public suggested that an increase in service frequency for this route will help improve neighborhood mobility in this part of the District.

Increase route X3's span of service to 15 hours (6am to 9pm) and frequency to every 20 minutes

Currently, the X3 operates only during the AM and PM peak periods. Residents attending the Benning Heights Public Meeting noted that route X3 is the best way to reach Howard University Hospital, but that it is only available during AM and PM peak periods, and primarily served workers at the hospital. Attendees at the public meeting suggested increasing the service span and frequency of this route. Improvements to route X3 will result in better connectivity between Focus Area 4 and destinations at Howard University, the U Street NW corridor, and the Adams Morgan neighborhood.

Phase II

Implement Trinidad-Lincoln Park-Stadium-Armory Shuttle

The proposed Trinidad-Lincoln Park-Stadium-Armory Shuttle is a two-way loop route operating through Focus Area 4. In the clockwise direction, starting at the New York Avenue Metrorail Station, the route operates southeast on Florida Avenue NE, Trinidad Avenue NE, Mt. Olivet Road NE, Montello Avenue NE, Florida Avenue NE, Benning Road NE, 17th Street NE and SE, Massachusetts Avenue SE, 19th Street SE, C Street SE, 18th Street SE, Potomac Avenue SE, G Street SE, Pennsylvania Avenue SE, 8th Street NE and SE, and then Florida Avenue NE back to the New York Avenue-Florida Avenue-Gallaudet Metrorail Station. The proposed route alignment for the Trinidad-Lincoln Park-Stadium-Armory Shuttle is shown in Figure 3-10.

For the counter-clockwise direction, starting at the New York Avenue Metrorail Station, the route operates southeast on Florida Avenue, 8th Street NE and SE, Pennsyvania Avenue SE, G Street SE, Potomac Avenue SE, 19th Street NE and SE, Benning Road NE, Trinidad Avenue NE, Mt. Olivet Road NE, Montello Avenue NE, and then Florida Avenue NE back to the New York Avenue-Florida Avenue-Gallaudet Metrorail Station.

The proposed shuttle route connects the isolated neighborhoods of Trinidad and Lincoln Park to each other and to major destinations, including the New York Ave-Florida Ave-Gallaudet U Metrorail Station, Potomac Avenue, Eastern Market, the H Street NE corridor, Hechinger Mall, and the Stadium-Armory Metrorail Station.

The route improves access between the Trinidad neighborhood and existing and future destinations in Focus Area 4, including the development area around the New York Avenue-Florida Avenue-Gallaudet Metrorail Station. It also provides connectivity to desired neighborhood retail destinations.

The replacement of transfers by the implementation of this route will improve connectivity and mobility. For instance, travel between Trinidad and Eastern Market now requires taking the D-series and then transferring to the 90-92-93 route. The proposed Trinidad-Lincoln Park-Stadium-Armory Shuttle reduces the need to transfer. Travel between Stadium-Armory and Trinidad requires taking the D6 or the 90s and then transferring to the B2 and walking or transferring to the D4 or D8 at Union Station to access Trinidad. The proposed route provides a one-seat ride between these destinations.

Implement Benning Heights-Capitol View-Trinidad Shuttle as a replacement and extension of the U8

The proposed Benning Heights-Capitol View-Trinidad Shuttle is a slight route change and extension of route U8 through the eastern portion of the focus area, as shown in Figure 3-11. U8 service is proposed to be withdrawn from Benning Road between E Street SE and G Street SE, from 63rd Street NE north of East Capitol Street, and from Dix Road NE between 63rd Street NE and 58th Street NE. The route would also cease to deviate from Nannie Helen Burroughs in order to serve Woodson High School.

According to a ride check for route U8, for the portion along Dix Road NE and Southern Avenue, approximately 292 boarded the route and 376 alighted daily. This represents 4.3% of the total

daily boardings on the route. The eliminated portions of the route will be no farther than 0.35 miles from stops on the existing or new portions of the U8.

For the withdrawn segment of the route along Benning Road between E Street and F Street, only a single stop will be eliminated. This stop has approximately 180 boardings and only 26 alightings, and is representative of 2.7% of the total boardings on the route. This eliminated stop will be no farther than 0.10 miles from stops on the existing or new portions of the U8.

These segments would be removed in order to enable the now-longer U8 to maintain its schedule, and because the Benning Heights portion of the route is no longer a loop at the end of the line, but instead part of a larger loop. While rerouting of the U8 could be detrimental to some current users, the benefit of serving other areas in a full loop pattern is worth the gain. Further, the route will be located close enough that existing riders in these areas will be able to walk only a short distance to still access the new U8 route.

The new routing will connect the two ends of the existing U8 along G Street SE, Fitch Street SE and Southern Avenue. In Capitol Heights, the U8 will take slightly different routing along East Capitol Street and 58th Street NE before rejoining the existing alignment on Nannie Helen Burroughs Avenue NE.

The U8 will also be extended along Benning Road west to end at Hechinger Mall. This extension is meant to address the lack of connectivity between the eastern portion of the focus area and shopping located at the intersection of Florida Avenue NE, H Street NE, and Benning Road NE. The high number of transfers that occur between Metrobus routes at the Benning Road NE/Minnesota Avenue NE intersection is a factor supporting this route extension.

This reroute was suggested by residents at the public meetings as a way to better serve social service destinations on East Capitol Street, senior citizen populations in this area, and a new grocery store in the vicinity. Also, planned housing in Lincoln Heights (part of the New Communities Housing Initiative[6]) will benefit from the connection.

The reroute and extension of route U8 improves accessibility, connectivity, and mobility within Focus Area 4. Accessibility is improved because areas not previously served by the route will now be served by transit. This route promotes connectivity because the transfer between the U8 and the X1, X2, or X3 that now occurs for cross-river trips between the east and west sides of the Anacostia could be reduced. Mobility is improved because the route provides a faster connection between the east and west sides of the river by reducing the need to transfer between bus routes.

[6] DC Office of Planning, *East of the River Initiative,* 2000, http://www.planning.dc.gov/planning/cwp/view,a,1285,q,571371,planningNav,%7C32341%7C.asp

Figure 3-10: Trinidad-Lincoln Park-Stadium-Armory Shuttle

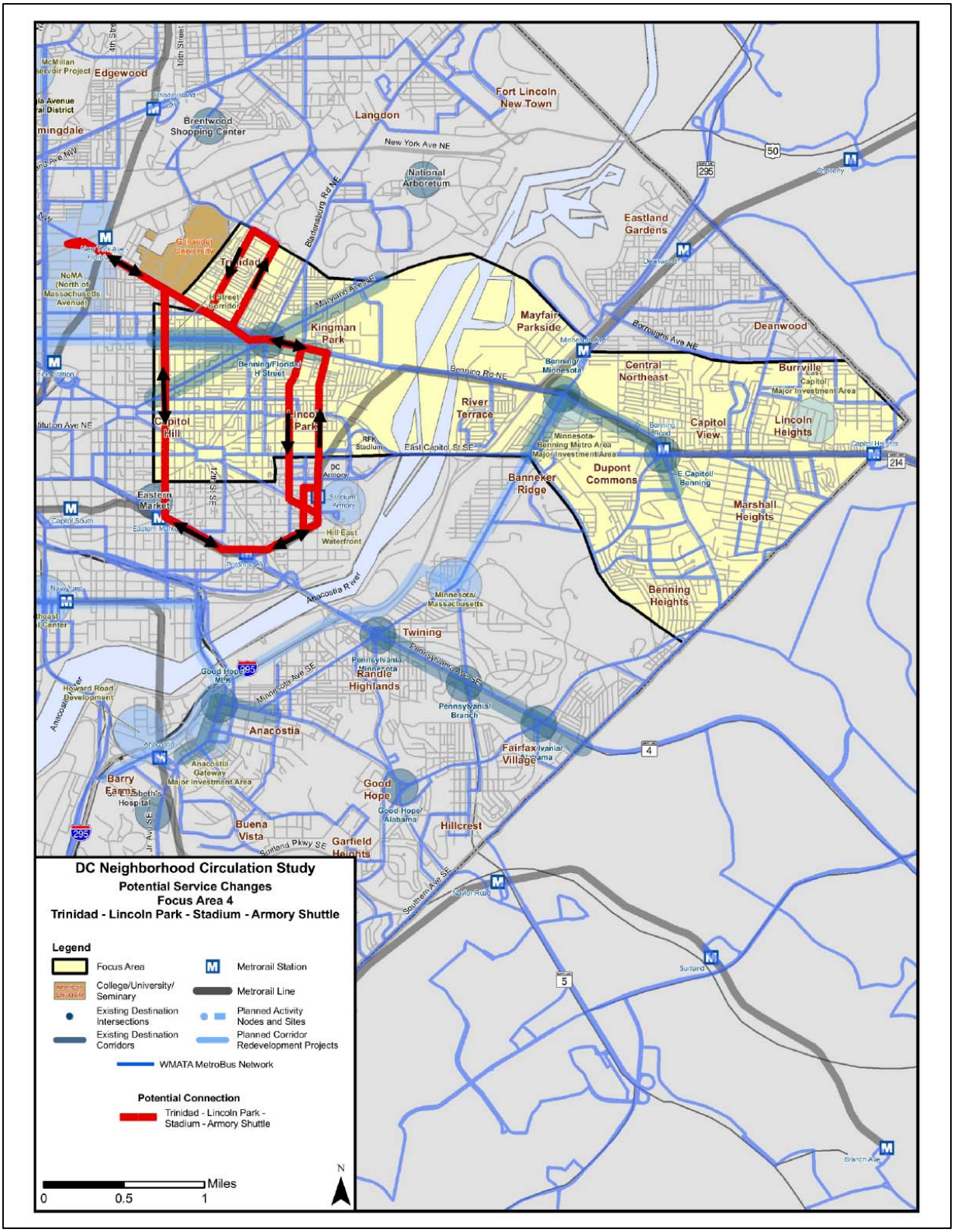
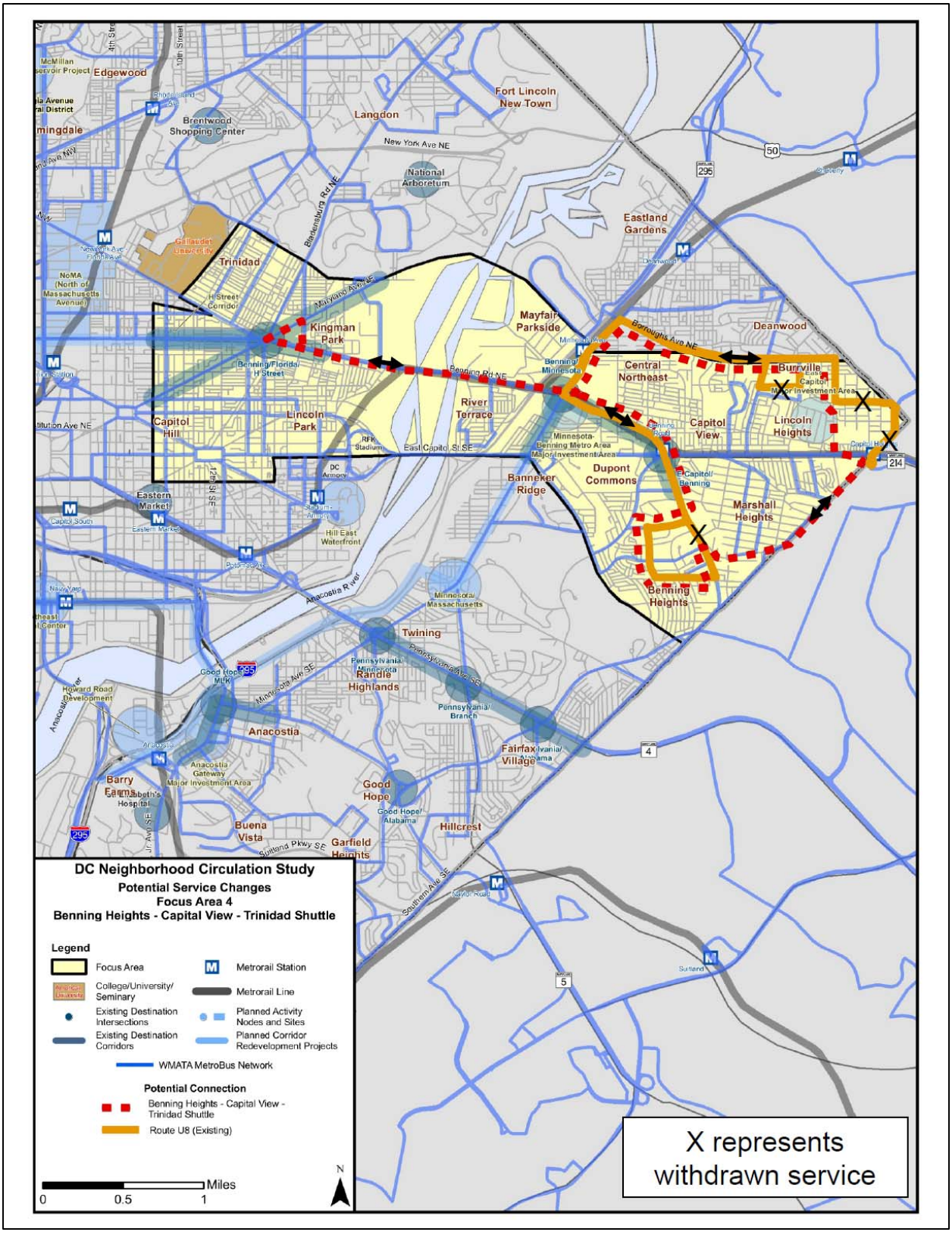


Figure 3-11: Benning Heights-Capitol View-Trinidad Shuttle



Focus Area 5

Focus Area 5 is a complex area with many assets, and many barriers to circulation. The information analyzed in the Transit Assessment chapter indicates that Focus Area 5 is actually comprised of several islands of development separated by park land and hills. Even more challenging for circulation, the protected park land means that only a handful of roads connect these isolated neighborhoods, and these are typically clogged with commuter traffic during the AM and PM peak periods. The result is that there are a limited number of ways to connect to the transit network within these neighborhoods and travel requires multiple transfers throughout the area.

Information on transit travel speed, average number of transfers, and transit mode share were used to identify neighborhoods with poor connectivity. Neighborhoods identified within Focus Area 5 include Buena Vista, Naylor Gardens, Randle Highlands, Washington Highlands, and Bellevue.

Destinations identified within the focus area include two large job centers: United Healthcare Medical Center and St. Elizabeths Hospital. Important corridors include Martin Luther King Jr. Avenue SE, Minnesota Avenue SE, and the intersection of Good Hope Road SE and Alabama Avenue SE. Another important destination identified by the residents is the Town Hall Education, Arts & Recreation Campus (THEARC), located at 1901 Mississippi Avenue SE.

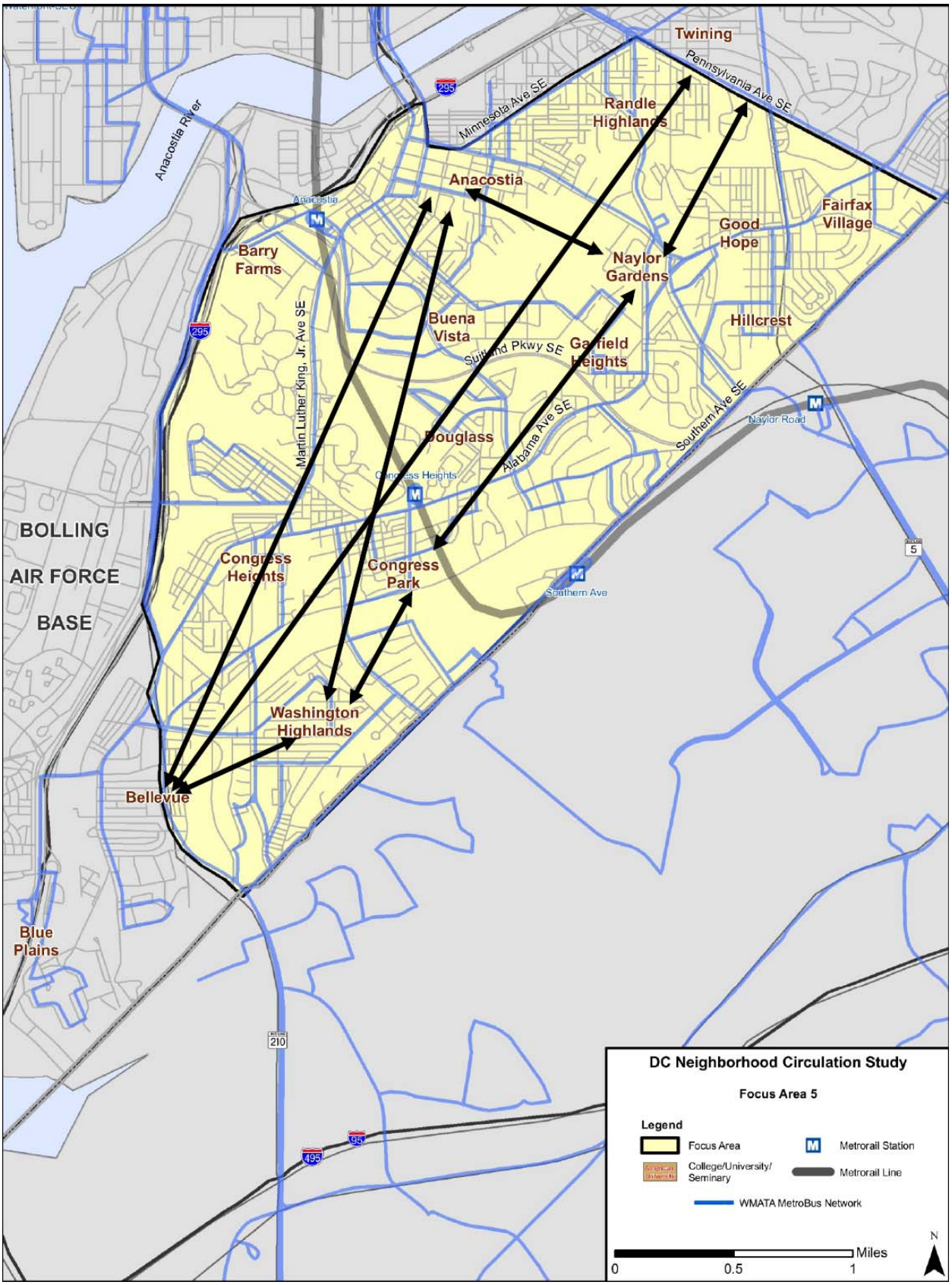
Multiple bus routes operate through the focus area; the lack of connectivity is not caused by lack of coverage, but rather by the large number of transfers required to circulate to many destinations within the focus area.

As a result of the analysis completed within Focus Area 5, the following connections were identified as having potential for new or improved transit service.

- From Bellevue:
    - to St. Elizabeths Campus and Anacostia
    - to Pennsylvania Avenue SE destinations
    - to Southern Avenue destinations
- From Washington Highlands:
    - to St. Elizabeths Campus and Anacostia
    - to Southern Avenue
    - to Good Hope Road SE/Alabama Avenue SE destinations
- From Buena Vista and Garfield Heights:
    - to Anacostia
    - to Good Hope Road SE/Alabama Avenue SE and Congress Heights destinations
    - to Pennsylvania Avenue SE destinations

Connectivity issues in Focus Area 5 are shown graphically in Figure 3-12.

Figure 3-12: Focus Area 5 Showing Barriers to Circulation Found in Gap Analysis



The study findings and preliminary recommendations for Focus Area 5 were presented to the public for comments and suggestions at a public meeting on December 16, 2008.

Originally a loop route was proposed to operate through most of the focus area (Page 92 of Appendix A). However, meeting participants pointed out that the proposed loop route would be slow and would take them longer to get to their destination. Participants stated that they would rather transfer using high frequency routes that intersect at key points, rather than using a one-seat loop route that hits all of the key destinations but is slower.

Other comments made at the meetings about these potential routes included the following:

- Provide better service to THEARC;
- No support for a circular or "loop" route; unnecessary travel time;
- General sentiment to reduce travel time by cutting down on transfers when riding within Ward 8;
- Residents stated that bus routes serving the needs of seniors should be a priority;
- Traveling to Washington Hospital Center requires too many transfers;
- Would like WMATA to implement bus line on Mississippi Avenue SE from Atlantic Street SE to Southern Avenue

The participants in the meeting were not enthusiastic about the loop route that was presented. They instead pointed out that Mississippi Avenue SE does not have linear transit service and suggested a route along this corridor that would serve THEARC, Southern Avenue Metrorail Station, and shopping at the Good Hope Road SE/Alabama Avenue SE intersection. The recommended routes for Focus Area 5 took into account the preferences stated at the public meeting.

Phase I

W6/W8 Extension to include the Pennsylvania Avenue SE Corridor.

The proposed extension of the W6/W8 would operate northeast on Minnesota Avenue SE, then southeast on Pennsylvania Avenue SE, then south on Branch Avenue SE, and southwest on Alabama Avenue SE. The route would provide a connection between the focus area neighborhoods and the 30s bus routes operating on Pennsylvania Avenue SE. The proposed route alignment for the W8/W6 Extension is shown in Figure 3-13.

At the intersection of Alabama Avenue SE and Good Hope Road SE, the extension returns to the original alignment of route W8/W6. The current alignment of route W8/W6 on Good Hope Road SE would be eliminated. According to a ride check for route W8/W6, approximately 230 boarded the route (both directions) and 222 alighted (both directions) daily. This represents about 7% of the total daily boardings on the two routes. While rerouting route W8/W6 could be detrimental to some current users, both the V5 and 92 bus routes provides transit service on Good Hope Road, which reduces the impact on current users of the W8/W6 in that area.

Despite removing service from Good Hope Road, the study team believes the extended route will provide additional riders on the W8/W6 by connecting the Buena Vista and Douglass neighborhoods with destinations on the Pennsylvania Avenue SE corridor. This particular connection currently requires transferring from a local route (W2/3/6/8 or 93/94) to the U2, B2 or 32/34/35/36 routes.

Phase II

Congress Heights-THEARC-Good Hope Shuttle.

As noted previously, several routes were presented at the Congress Heights public meeting. The proposed Congress Heights-THEARC-Good Hope Shuttle is based on the findings of the study combined with the public input.

The proposed route operates in a southwest-northeast direction. It would begin at the Eastover Shopping Center, just over the state line in Maryland. Then the route would operate north on South Capitol Street, east on Atlantic Street SE, north on 4th Street SE, then northeast on Mississippi Avenue SE. After accessing THEARC, the route would operate on Mississippi Avenue and then Southern Avenue to provide service at the Southern Avenue Metrorail Station. From the Southern Avenue station the route backtracks on Southern Avenue and Mississippi Avenue, and then operates on 19th Street SE, Savannah Terrace SE, and 22nd Street SE. Finally, the route operates on Alabama Avenue SE northbound, terminating at the intersection of Good Hope Road and Alabama Avenue SE. The proposed route alignment for the Congress Heights-THEARC-Good Hope Shuttle is shown in Figure 3-14.

This proposed route improves accessibility because it connects neighborhoods (Bellevue, Congress Heights, and Naylor Gardens) to important destinations such as THEARC and the Southern Avenue Metrorail Station, which were both major concerns of residents at public meetings. The route also provides connections to the Good Hope Road SE/Alabama Avenue SE intersection, where there are existing retail destinations and potential new development.

The proposed route also improves connectivity, by providing connections to destinations on Mississippi Avenue SE, which currently does not have continuous transit service along some stretches. Further, multiple routes pass through Mississippi Avenue SE, especially those on Wheeler Road SE, and MLK Avenue SE/4th Street SE. This proposed route will reduce the transfers that now occur on Mississippi Avenue SE between the A-series routes and routes W2 and W3. The proposed change will improve overall mobility in this part of the focus area.

Figure 3-13: W8/W6 Extension to Pennsyvania Avenue SE Corridor

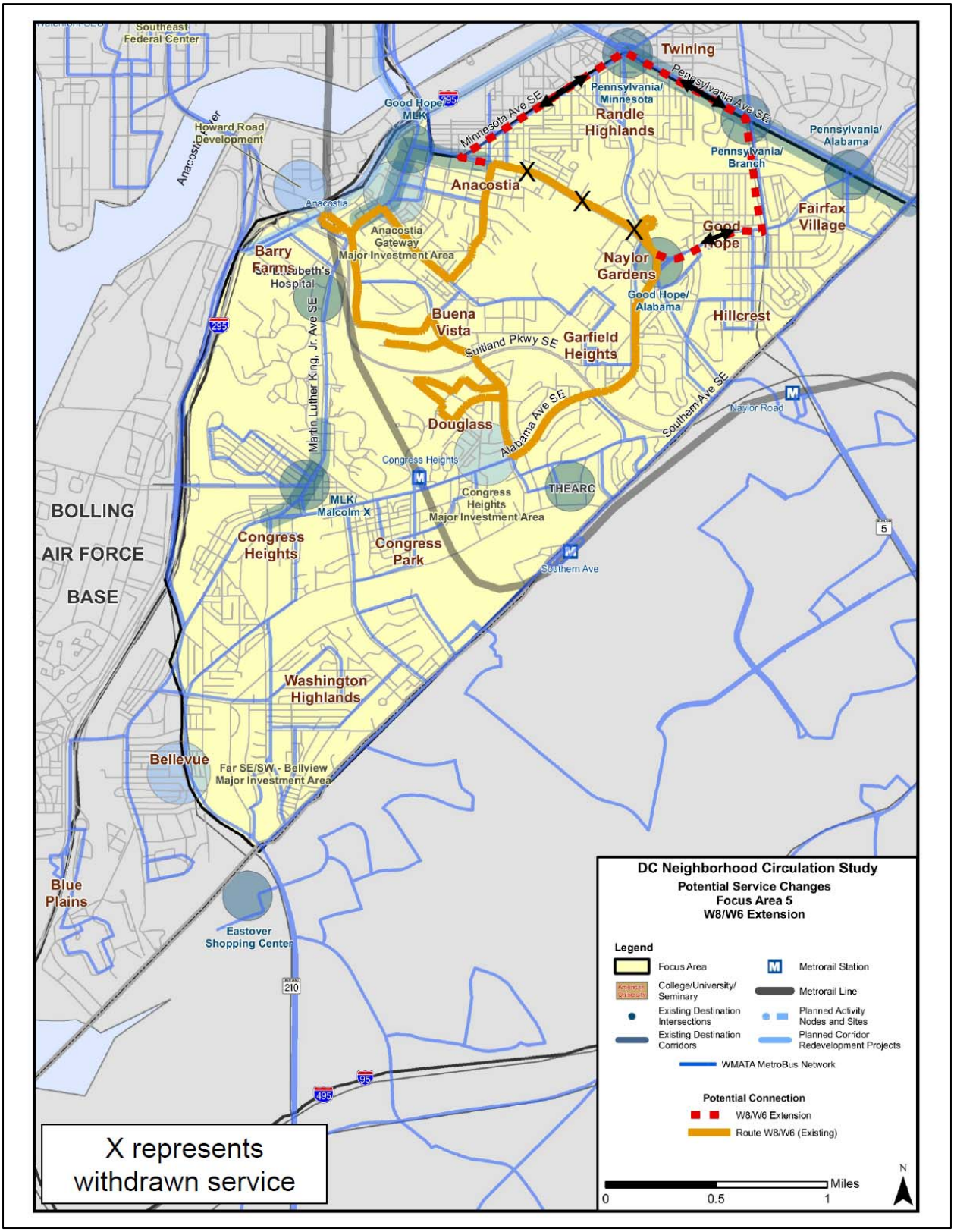
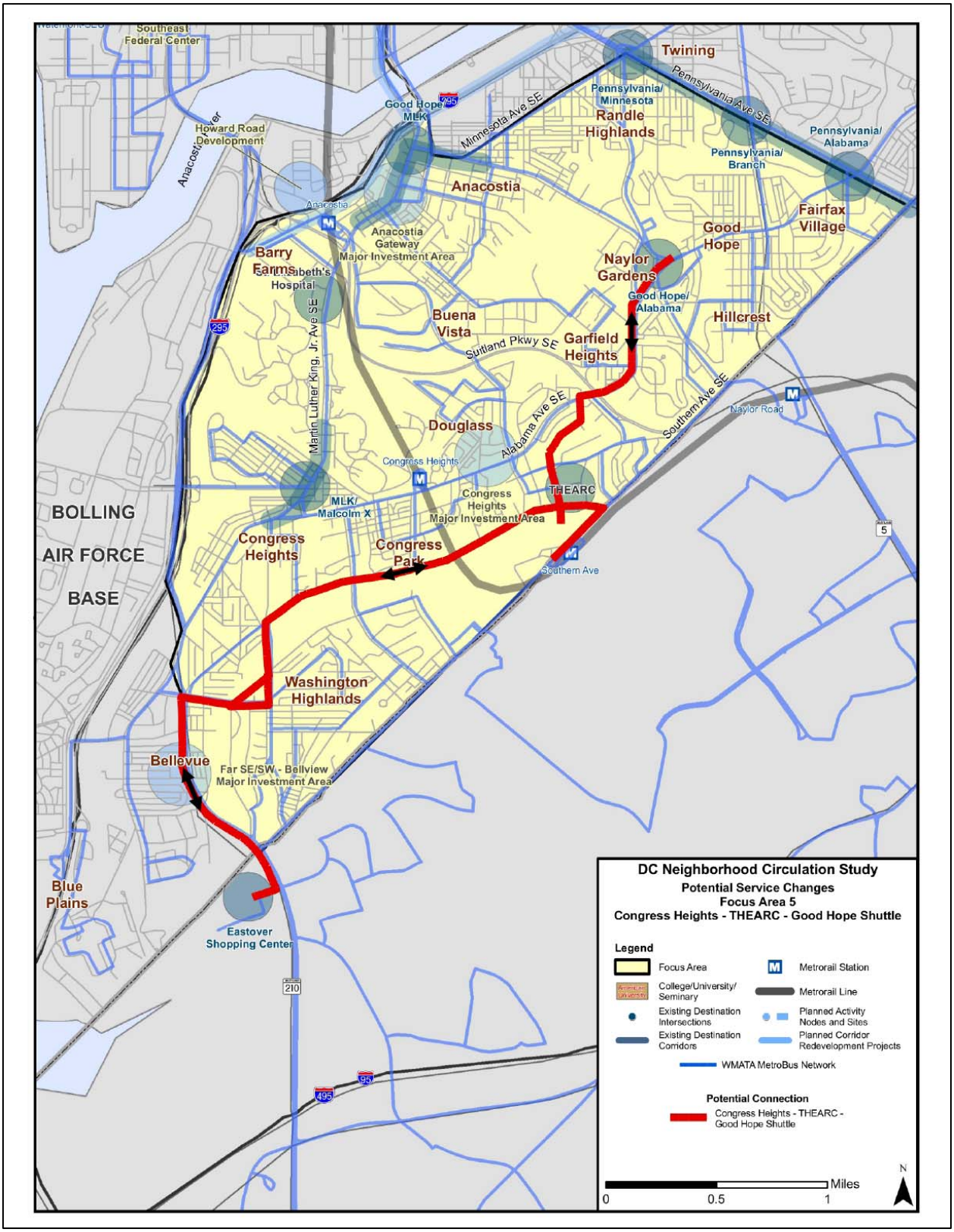


Figure 3-14: Congress Heights-THEARC-Good Hope Shuttle



Cross-Town Route Recommendations

Both the comments from participating residents at the public meetings and analysis of the transportation data from the MWCOG model indicate that additional cross-town bus routes are desired by local residents and would provide important connections to destinations throughout the city.

A cross-town bus route is generally considered to be a route which does not begin or terminate in the central employment district. There are a large number of Metrobus routes that operate as cross-town routes. However, given the high transit use in the District, the large number of origins and destinations, and the discontinuities in the roadway network; more connections could be supported by cross-town bus routes. During the first phase of public meetings, residents noted key destinations that they could not easily access using the existing transit network. In many cases, the destinations desired were located in adjacent focus areas – close enough that transit should be a viable option, but for which no convenient transit option existed.

Quantitative analysis of the transit mode share for travel between TAZs confirmed what the residents said at public meetings. Travel between certain TAZs had low transit mode shares, despite being relatively close together, due to a lack of bus routes or because multiple transfers are required to access the destination.

The study recommendations build on the qualitative and quantitative evidence to suggest four new cross-town bus routes. These routes connect key destinations across focus areas in a manner that is not provided by the current WMATA transit network. The connections between the following focus areas are supported by the findings of the study, including:

Focus Areas 1, 2, and 3

Focus Areas 1, 2, 4 and 5

Focus Areas 4 and 5

Focus Areas 1 and 3

The recommendations found here are conceptual, and would require additional analysis and development before implementation. No recommendations have been made with regard to service span or service frequency on these proposed routes.

Concept #1: Connection between Focus Areas 1, 2, and 3

Phase I

There is no recommendation for a cross-town route in Phase I.

Phase II

A New Cross-town Route Connecting Focus Areas 1, 2, and 3.

The alignment of the proposed cross-town route connecting Focus Areas 1, 2, and 3 is shown in Figure 3-15. The movement proposed is not represented by any of WMATA's current routes and would replace a trip that currently requires one or two transfers using the existing transit network.

The transit trip origin-destination assessment showed that portions of Focus Areas 1, 2, and 3 had trouble accessing the Upper Brightwood, Adams Morgan, and Tenleytown neighborhoods. This proposed cross-town route would connect these three areas with a single bus route.

The proposed route would begin on Georgia Avenue NW in Focus Area 2, which is the commercial spine of that focus area. It would provide access to a portion of Georgia Avenue NW slated for redevelopment in the Georgia Avenue Revitalization Initiative[7].

The route would operate on the New Hampshire Avenue NW and Columbia Road NW/Irving Road NW one-way pair before using the two-way portion of Columbia Road NW. It then would continue west on Calvert Street NW, Cleveland Avenue NW, and Garfield Avenue NW through Focus Area 3, eventually following Wisconsin Avenue NW to terminate at the Tenleytown-AU Metrorail Station.

The route will connect four Metrorail Stations, as well as commercial districts on Georgia Avenue NW, Columbia Road NW, Calvert Street NW-Connecticut Avenue NW, and Wisconsin Avenue NW. In addition, it will provide access to the area proposed for redevelopment in the Upper Wisconsin Avenue Corridor Study[8]. Most importantly, the route would connect residents to destinations outside of their neighborhoods. Residents of Focus Area 2 do not have an easy way to access Adams Morgan, Woodley Park, or Tenleytown using public transit. Conversely, residents in Focus Area 3 do not have an easy way to access the Columbia Heights and Petworth neighborhoods or upper Georgia Avenue NW using transit.

As the WMATA transit network currently exists, each of these trips would require multiple transfers. Residents in Focus Area 2 must take a north-south route (the 50-series on 14th Street NW or the 70-series on Georgia Avenue NW) and then transfer to the H-series or the 90-series to travel west to destinations in Focus Areas 1 and 3 or transfer to the Red Line or the 30-series in order to reach the upper Wisconsin Avenue corridor. The implementation of this cross-town route would reduce the multiple transfers that occur in order to make these connections.

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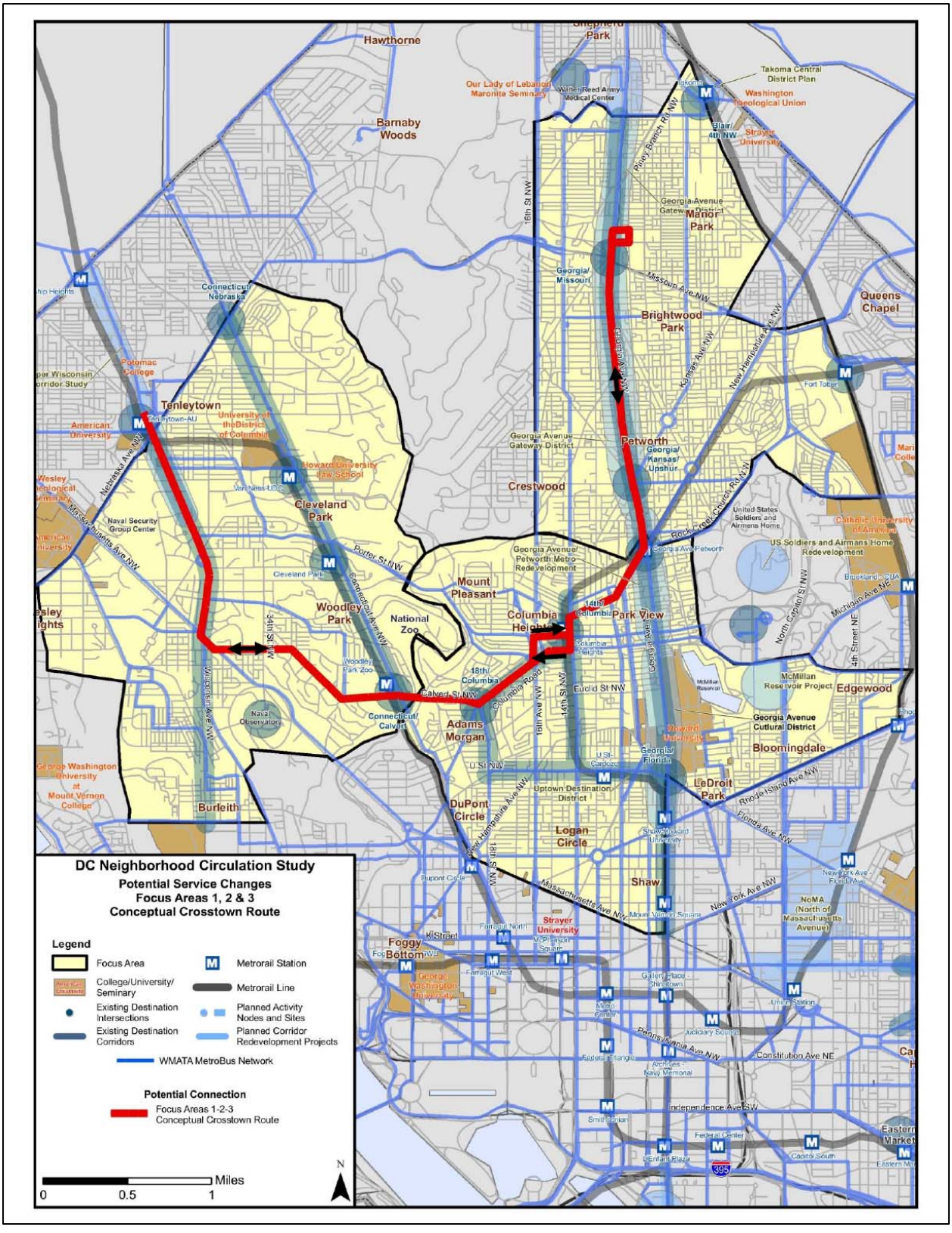
[7] DC Office of Planning, *Georgia Avenue Revitalization Initiative,* 2000, http://planning.dc.gov/planning/cwp/view.asp?a=1285&q=571441

[8] DC Office of Planning, *Upper Wisconsin Avenue Corridor Study,* 2004, http://www.planning.dc.gov/planning/cwp/view,a,1283,q,616339,planningNav_GID,1707.asp

Figure 3-15: Conceptual Cross-town Route Connecting Focus Areas 1, 2, and 3



Concept #2: Focus Areas 1, 2, 4, and 5

Phase I

There is no recommendation for a cross-town bus route connecting Focus Areas 1, 2, 4 and 5 in Phase I.

Phase II

A New Cross-town Route Connecting Focus Areas 1, 2, 4, and 5.

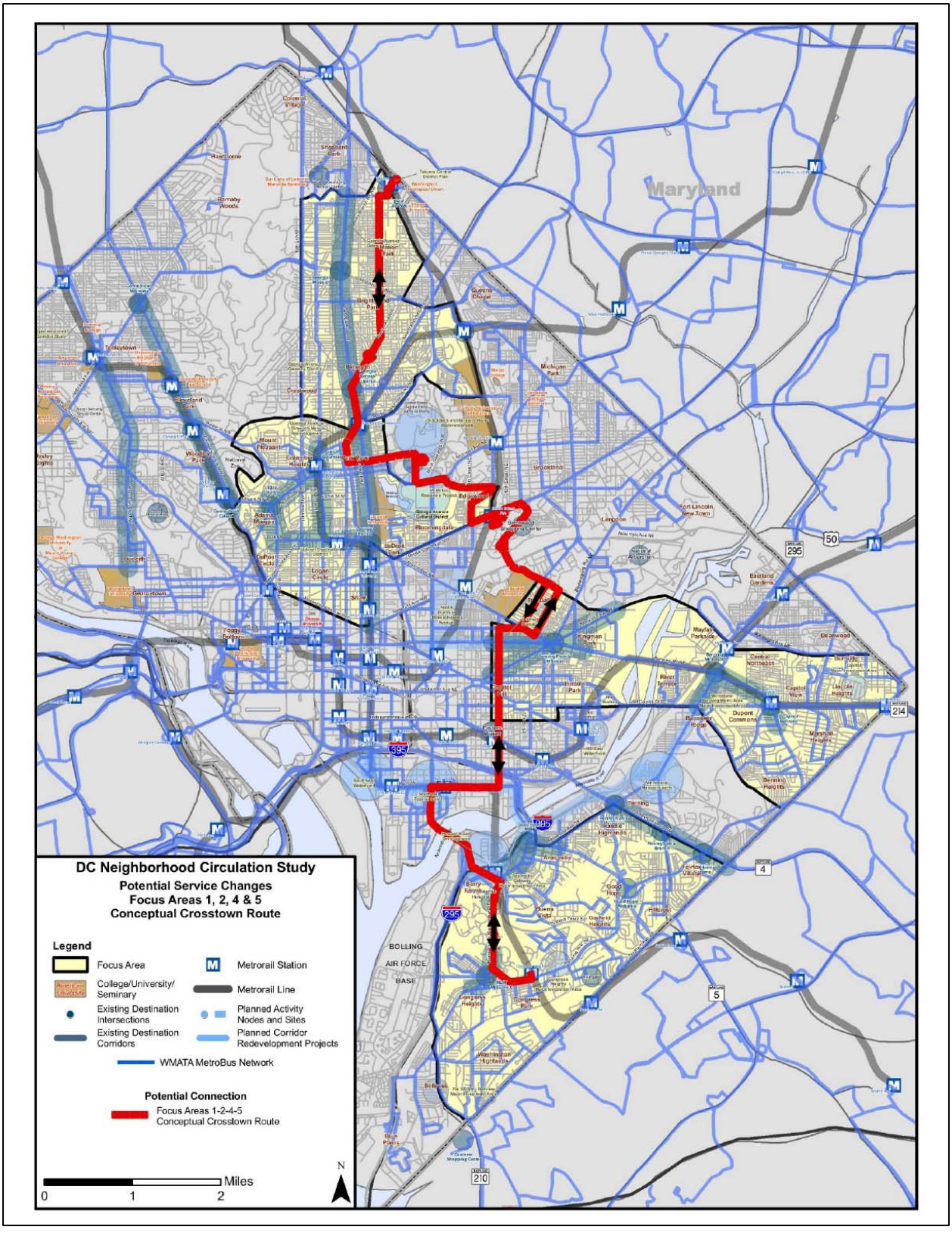
The alignment of the proposed cross-town route to connect portions of Focus Area 1, 2, 4, and 5 is shown in Figure 3-16. The proposed route parallels portions of the alignments of three different bus routes, the 62, D8, and 93, to provide north-south movement on the east side of the District.

Comments at the public meetings indicated that destinations such as Eastern Market and the Nationals Stadium are not easily accessible from Focus Area 5 or Focus Area 2. The conceptual routing for this cross-town route would link these destinations and run north-south through the eastern side of the District.

The route begins in Focus Area 2 at the Takoma Metrorail Station. It follows the 62 alignment down 5th Street NW and Kansas Avenue NW through the northern neighborhoods. After passing the Georgia Avenue-Petworth Metrorail Station, it heads east on Kenyon Street NW to access the Washington Hospital Center. The proposed route follows the route D8 alignment south from the Hospital Center to access the Rhode Island Avenue Metrorail station and the Brentwood Shopping Center before crossing New York Avenue NE. South of New York Avenue NE, the route follows the route D8 alignment as it accesses the far eastern portion of Focus Area 4 in the Ivy City neighborhood. At 8th Street NE, it leaves the route D8 alignment and picks up the route 90-92-93 alignment heading south. It deviates from the 90/92/93 alignment when it turns west onto M Street SE and then turns south on South Capitol Street to cross the Anacostia River. After crossing the Anacostia River, the route follows Martin Luther King Jr. Avenue SE south and then Alabama Avenue SE before ending at the Congress Heights Metrorail Station.

The proposed alignment provides residents in the Capitol Hill neighborhood with a way to access northern destinations such as Hospital Center and the Takoma Metrorail Station, as well as providing north-south movement to/from the Ivy City neighborhood to Eastern Market. It also provides access to Nationals Park and recent development along M Street SE.

Figure 3-16: Conceptual Cross-town Route Connecting Focus Areas 1, 2, 4, and 5



Concept #3: Focus Areas 4 and 5

Phase I

The Phase I recommendation to connect Focus Areas 4 and 5 is to increase service frequencies on the W4 route. At public meetings, many residents commented on their reliance on the W4 route to travel in a southwestern direction between Focus Areas 4 and 5. However, residents also said that the route is, at times, slow and unreliable.

Current headways on the W4 are 15 minutes during the peak and 30 minutes during off peak periods. The recommendation is to increase frequencies for the W4 to 10 minute headways during peak periods and 20 minute headways during off peak periods. No change proposed for weekend services. Schedule timings between time points also should be examined to determine whether they are adequate and, if necessary, link times should be increased to improve service reliability. The change will improve transit mobility and connectivity for trips between Focus Areas 4 and 5.

Phase II

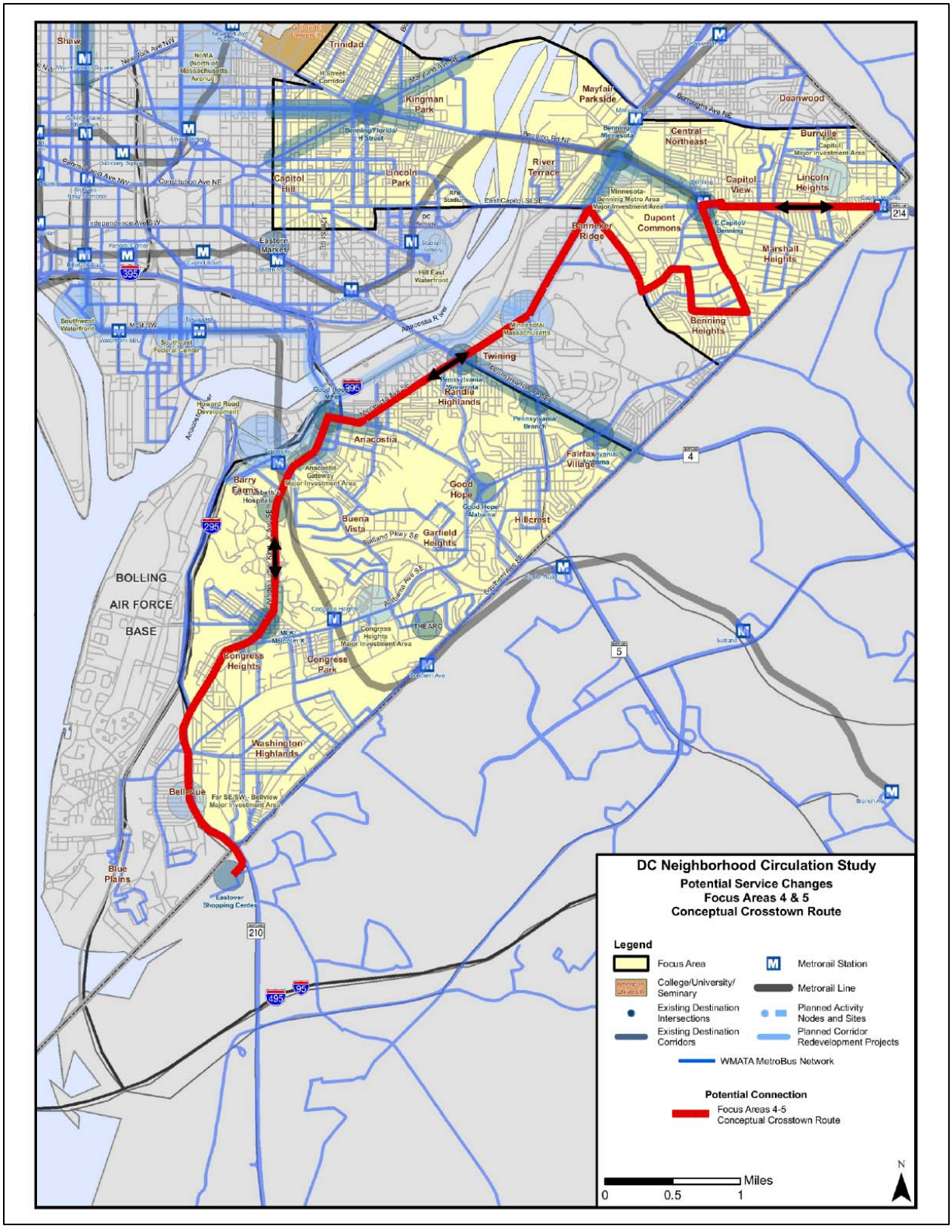
A New Cross-town Route Connecting Focus Areas 4 and 5.

The findings from this study indicate the need for a new cross-town route to serve trips between Focus Areas 4 and 5. The W4 already provides connectivity along Southern Avenue and Alabama Avenue SE. The proposed new route would operate farther to the northwest, primarily along Minnesota Avenue SE, MLK Avenue SE, and South Capitol Street.

The route, shown in Figure 3-17, is proposed to originate at the Capitol Heights Metrorail Station, first serving the East Capitol Street corridor and the Benning Road-East Capitol Street intersection. It would then head south on Benning Road SE before then joining the alignment of route V9, first west on H Street SE, Alabama Ave SE, E Street SE, and Ridge Road SE; then south on Minnesota Avenue SE. The route continues on Minnesota Avenue SE and Good Hope Road SE to Anacostia, and then follows the alignment of the A8 along MLK Avenue SE and South Capitol Street before terminating just over the Maryland state line at the Eastover Shopping Center.

This route improves connectivity by providing travel between neighborhoods and destinations that previously required several transfers. At public meetings, residents requested the connection to the Eastover Shopping Center in Maryland, the connection to DC government offices on MLK Avenue SE, and the connection to the Minnesota Avenue SE/Pennsylvania Avenue SE intersection. The Pennsylvania/Minnesota intersection is important because it allows connections to multiple routes that run on Pennsylvania Avenue SE, including the 30s routes.

Figure 3-17: Conceptual Cross-town Route Connecting Focus Areas 4 and 5



Concept #4: Focus Areas 1 and 3

Phase I

There are no proposed connections between Focus Areas 1 and 3 in Phase I.

Phase II

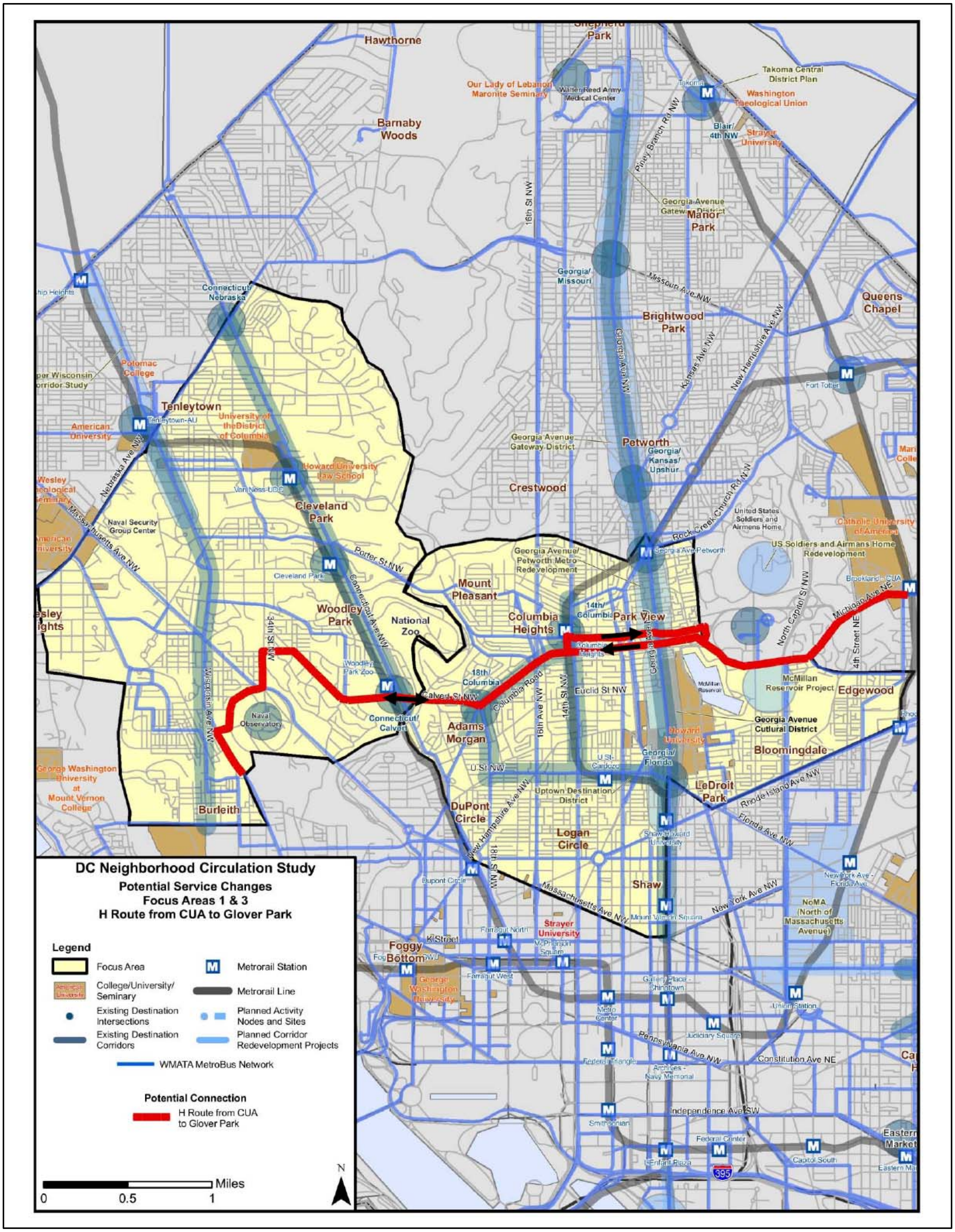
A New Cross-town Route Connecting Focus Areas 1 and 3.

The findings of this study indicate the need for broader east-west service across the northern part of the District. A new cross-town route, shown in Figure 3-18, connecting Focus Areas 1 and 3 will improve connectivity in this part of the District.

On the eastern end, the route would originate at the Brookland-CUA Metrorail Station. The route would operate west along Michigan Avenue NW, past Hospital Center. The route would then split into one-way pairs along Columbia Road NW (WB) and Irving Road NW (EB). The route then would operate southwest on Columbia Road NW in both directions before operating west on Calvert Street NW to Woodley Park. The route would then use Cleveland Avenue NW, 34th Street NW, Observatory Circle, Calvert Street NW, before finally terminating on Wisconsin Avenue NW at Whitehaven Parkway NW. This terminus is important because it provides a connection to the Georgetown-Union Station DC Circulator route.

This cross-town route improves local and regional connectivity across the District. As noted in the Focus Area 3 findings, there is an identified gap in travel between the Glover Park and Woodley Park neighborhoods. This new cross-town route would fill that gap. Further, this route would provide greater transit connectivity between Glover Park and destinations in both Adams Morgan and the Columbia Road corridor. Connectivity to destinations at Woodley Park, the Naval Observatory, and the Wisconsin Avenue NW corridor would be improved for residents of Pleasant Plains and Brookland, which includes Catholic University.

Figure 3-18: Conceptual New Cross-Town Route Connecting Brookland, Petworth, Adams Morgan, and Glover Park



4. IMPLEMENTATION PLAN

The Implementation Plan breaks down the recommendations into phases and also estimates the capital and operating costs involved with the recommendations. The full tables used to estimate all costs found here are located in Appendix C.

Phase I

Phase I improvements are easier to implement, have lower capital costs than the improvements proposed in Phase II, and could possibly be implemented within two years, subject to funding availability. Phase I recommendations include the following changes to existing Metrobus routes:

1. Implement NW DC Circulator Route
2. Woodley Park: Extend route N8 to Georgetown University Hospital
3. Adams Morgan & Trinidad Areas: Increase span of service on route X3
4. Takoma/Petworth: Restructure 60-series to provide service to downtown Washington (already completed as of December 2008)
5. Trinidad Area: Increase the service frequency of route X8
6. Bellevue Area: Extend route W6/W8 to include the Pennsylvania Avenue SE corridor
7. Bellevue Area: Increase the service frequency on route W4

Operating Costs:

Phase I recommendations only modify service characteristics of existing WMATA bus routes, whose current operating costs are already included in WMATA's operating budget. The cost estimates included here reflect the net increase in service required to fulfill the recommendations of the study.

Increased annual costs were calculated by multiplying new service hour estimates by an existing cost per platform hour, and then comparing the estimated existing and future operating costs for the route.

The estimated operating costs for each of the recommended service changes listed above are shown in Table 4-1. The full tables used to calculate these costs can be found in Appendix C.

Table 4-1: Phase I Operating Cost Estimates

Phase I Summary	Vehicles Needed	Platform Hours Required	Annual Operating Funds Required
1. NW DC Circulator	4	27,761	$2,776,100
2. Proposed N8	1	9,833	$983,250
3. Proposed X3	0	29,653	$2,965,275
4. Restructured 60-series	Already completed December 2008		
5. Proposed X8	2	11,575	$1,157,475
6. Extended W6/W8	2	9,170	$917,010
7. Proposed W4	5	17,302	$1,730,175
Totals	**14**	**105,293**	**$10,529,285**

Capital Costs

The service changes would require fourteen additional vehicles. WMATA's standard spare ratio is twenty percent, meaning a total of 17 buses (14 peak and 3 spares) will be required for the Phase I service improvements. At a cost of $550,000 per vehicle, this would be a capital cost of approximately $9.35 million in current year dollars.

The proposed changes to routes in Phase I would generally extend operations onto streets where service is already operating, requiring only minimal changes to bus stop signs. Therefore, bus stop improvements were assumed to not be required. Should bus stop improvements be required, each basic new bus stop with signage, lighting, and pedestrian waiting area is estimated to cost approximately $4,750 per improvement in current year dollars.

Implementation

Phase I Recommendations 3, 4, 5, and 7 will likely not require a public hearing because they involve improvements to existing service that have no detrimental effects.

Recommendations 1, 2, and 6 will likely require a public hearing because they require additional funding and involve extensions to routes, and may therefore affect the communities into which those routes will be extended. Table 4-2 shows the minimum steps that are required for the extensions specified in recommendations 1, 2 and 6.

It is important to market any service change to both existing riders and potential new riders. The following steps should be considered by WMATA and DDOT to help advertise the new service:

- Ensure that all bus stops on affected routes have current and accurate schedules, route maps, fare descriptions, and rider information.
- Update service changes on the WMATA website.
- Prepare a coordinated promotion plan that communicates the proposed changes.
- Ensure each bus operating on the affected routes has current service information and schedules.
- Install regional bus enhancement maps at Metrorail stations served by the affected routes.

Table 4-2: Responsibility for Route Extensions

Activity	Responsibility
Service Changes	
Check specific routing for road width, direction, and bus turning movements	WMATA OPAS
Identify terminal stands and layover facilities	WMATA OPAS
Identify bus stops and required improvements	WMATA/DDOT
Develop new schedules and estimate additional operating costs	WMATA OPAS
Estimate number of additional buses required	WMATA OPAS
Funding and Approvals	
Finalize recommendations	WMATA/DDOT
Allocate capital and operating funding	DDOT
Include project and funds in annual budget process	WMATA/DDOT
WMATA Board authorization for public hearing	WMATA Board
Community outreach	WMATA/DDOT
Prepare and hold public hearing(s)	WMATA
WMATA Board approval	WMATA Board
Customer Communications and Marketing	
Develop marketing plan for service extensions	WMATA Marketing
Develop updated maps and schedules for service extensions	WMATA Marketing
Print and distribute printed materials for service change	WMATA Marketing
Advertise service changes to riders and public	WMATA Communications
Bus Stop Improvements	
Make stop improvements	WMATA
Update signage	WMATA Bus Operations
Place updated schedules and maps at all stops	WMATA/DDOT
Implementation	
Bus driver assignments (driver picks)	WMATA Bus Operations
Initiate service	WMATA Bus Operations

Phase II

Phase II improvements would require a greater capital and/or operating cost investment, and have more issues related to their implementation. All these changes will require a public engagement process similar to Phase I. Lead times for the purchase of additional vehicles, if required, may also add time to the implementation process. Phase II recommendations include:

Shuttles

1. Implement Woodley Park-Rhode Island Avenue Shuttle
2. Implement Petworth-Adams Morgan Shuttle
3. Implement Petworth-Takoma-Manor Park Shuttle
4. Implement Trinidad-Lincoln Park-Stadium-Armory Shuttle
5. Implement Benning Heights-Capitol View-Trinidad Shuttle to replace the U8 route
6. Implement Congress Heights-THEARC-Good Hope Shuttle

Cross-town Routes

7. Implement new cross-town route connecting Focus Areas 1, 2, and 3
8. Implement new cross- town route connecting Focus Areas 1, 2, 4, and 5
9. Implement new cross-town route connecting Focus Areas 4 and 5
10. Implement new H-series cross-town route between Focus Areas 1 and 3

Phase II recommendations are all new bus routes except for the Benning Heights-Capitol View-Trinidad Shuttle, which replaces the U8 route.

Recommended shuttle routes were assumed to operate at 20-minute headways over an 18-hour service span on weekdays. 30-minute headways were assumed for weekend service, with a service span of 18 hours on Saturday and 12 hours on Sunday.

Recommended cross-town routes were assumed to operate at 15-minute headways during six hours of peak service, and 30-minute headways during the off-peak service on weekdays. For weekend service, these routes were assumed to run at 30-minute headways with 18 hours of service on Saturdays and 12 hours of service on Sundays.

Operating Costs

Table 4-3 lists the estimated additional operating costs for the Phase II recommendations, which were developed using the same process as was described for the Phase I improvements. The full tables used to calculate these costs can be found in Appendix C.

Table 4-3: Phase II Operating Cost Estimates

Phase II Summary	Additional Vehicles Needed	Platform Hours Required	Annual Operating Funds Required
1. Woodley Park-Rhode Island Avenue Shuttle	4	26,765	$2,676,510
2. Petworth-Adams Morgan Shuttle	4	26,765	$2,676,510
3. Petworth-Takoma-Manor Park Shuttle	6	39,206	$3,920,580
4. Trinidad-Lincoln Park-Stadium-Armory Shuttle	6	39,206	$3,920,580
5. Benning Heights-Capitol View-Trinidad Shuttle (replaces U8)	4	29,979	$2,997,878
6. Congress Heights-THEARC-Good Hope Shuttle	3	19,603	$1,960,290
7. Focus Area 1-2-3 cross-town	7	28,525	$2,852,460
8. Focus Area 1-2-4-5 cross-town	12	53,530	$5,353,020
9. Focus Area 4-5 cross-town	7	33,927	$3,392,730
10. Focus Area 1-3 cross-town	6	26,765	$2,676,510
Totals	**59**	**324,271**	**$32,427,068**

Capital Costs

The additional service proposed in Phase II requires an estimated 59 bus vehicles. WMATA's standard spare ratio is twenty percent, meaning an additional 71 buses total will be required for the Phase II service improvements. At a cost of $550,000 per vehicle, this would be a capital cost of approximately $39 million in current year dollars.

Required bus stop improvements were not determined as part of this study and therefore those cost improvements are not included. A basic new bus stop with signage, lighting, and pedestrian waiting area is estimated to cost approximately $4,750 per improvement in current year dollars.

Further Steps

The Phase II recommendations in this report, with the exception of the Adams Morgan Case Study, are conceptual in nature, with general alignments and service characteristics shown. These routes, other than those proposed for Focus Area 1, were not field surveyed. The implementation of these recommendations therefore requires a more thorough assessment of the costs and benefits of each, including the following steps:

1. Prioritize the new routes
2. Conduct a more detailed study of each potential route to determine best routing, stop locations, stop amenities, stop costs and construction phasing.
3. Determine whether each new route should be operated as a Metrobus or a DC Circulator route.
4. Develop detailed funding strategy and implementation plans.
5. Conduct public hearings.
6. Insert into the Metro operating budget cycle under either Metrobus or DC Circulator.
7. Market and implement the new service.