

***X1-X2-X3* Metrobus Benning Road/H Street Line Study**

# **Final Summary Report**

**January 2010**



**d.**

DISTRICT DEPARTMENT OF TRANSPORTATION



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## 1.0 Introduction to the Benning Road-H Street Line Study

The Washington Metropolitan Area Transit Authority (WMATA), in partnership with the District Department of Transportation (DDOT), is studying ways of improving transit service along Metrobus routes X1, X2 and X3 – collectively known as the Benning Road-H Street Line. These existing routes are shown in **Figure 1-1**. This final report summary describes the development and evaluation of service improvement options for the Metrobus Benning Road-H Street Line prepared in 2009. This information provides an overview of the public outreach efforts and the recommended improvements that emerged from the study process.

### 1.1 Project Purpose

The main purpose of the study was to conduct a comprehensive review of methods for improving the performance of transit service along the Benning Road-H Street Line, and to develop an improvement strategy that would include service, operations, and customer information enhancements. Challenges facing the Benning Road-H Street Line included:

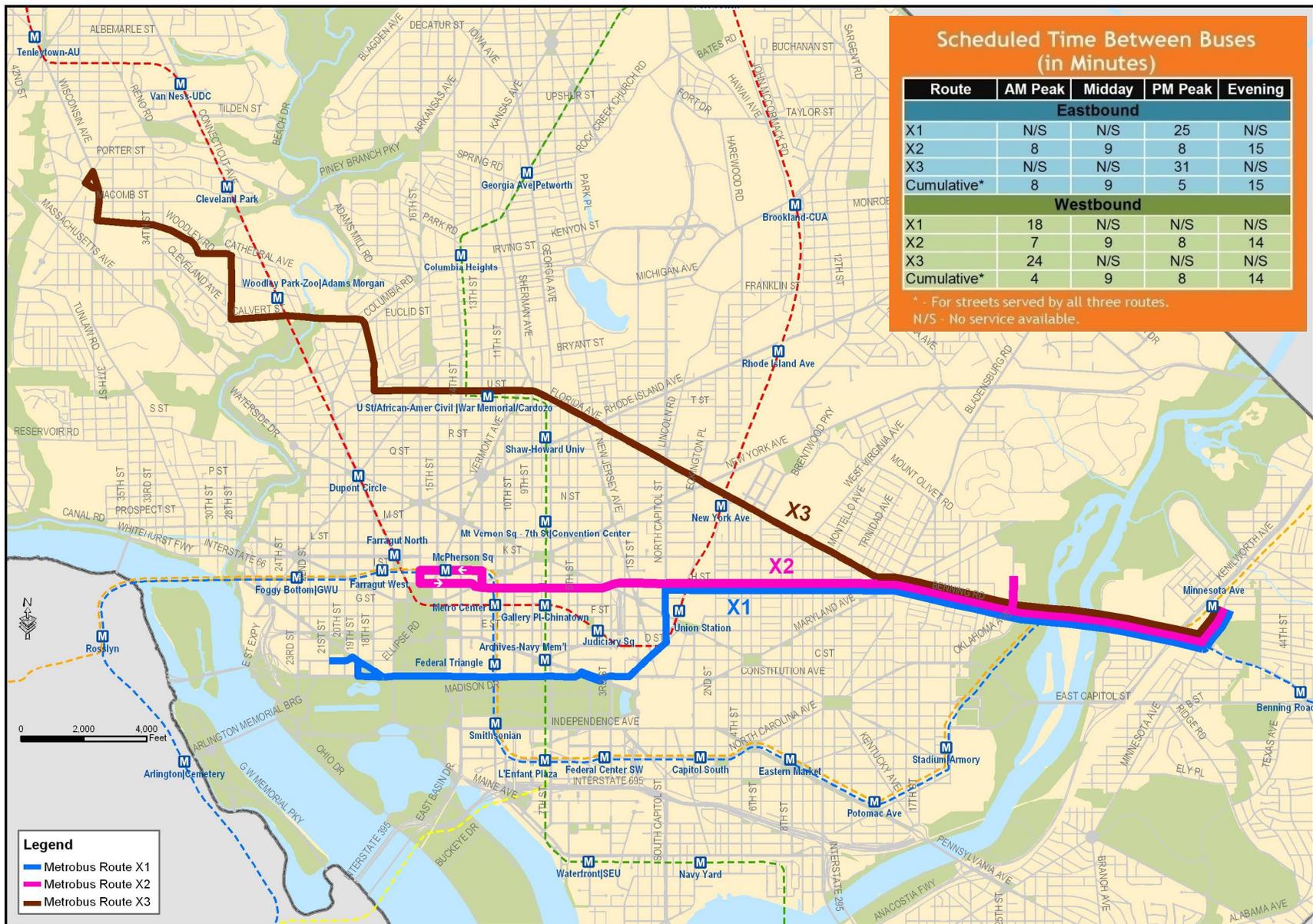
- Improving the customer experience
- Updating services and operating plans to sustain good performance
- Improving reliability, travel times, and safety/security
- Reducing passenger crowding
- Establishing a strategy for implementing recommendations
- Planning for future demand and new services to accommodate District initiatives

### 1.2 Planning Process

The Benning Road-H Street Line study included a coordinated planning effort to link implementation of the proposed service options with the development of community support. This work consisted of:

- Reviewing the existing Benning Road-H Street Line services, operations, and customer information and conducting a rider survey to identify deficiencies to be addressed by the study.
- Conducting two community workshops to develop public and agency support for enhancing Benning Road-H Street Line services.
- Recommending an integrated set of service, operations, and customer information strategies to respond to consumer needs, minimize costs, and enhance effectiveness and performance of the Benning Road-H Street Line.
- Identifying related enhancements, budgets, and funding needs for:
  - Service and supervision plan
  - Vehicle types and uses
  - Bus stop locations and design
  - Customer information
  - Traffic management strategies
- Developing a coordinated implementation timetable and strategy with DDOT.
- Requesting funding and WMATA Compact-required approvals.
- Implementing the service and enhancements in coordinated phases to meet project and District transportation deadlines and requirements.

Figure 1-1: Existing Bus Routes X1, X2, and X3



## 2.0 Public Outreach and Input

Public outreach was a significant part of the Benning Road-H Street Line study process. Opportunities for public participation included a rider survey, three rounds of public meetings, a project website, and other activities.

### 2.1 Rider Survey

The purpose of this informal survey was to obtain feedback from riders about problems with the line, and suggestions on how to improve service. The 18-question survey was administered on Thursday, June 25, 2009 between 6 am and 10 pm. The surveys were bilingual—English on one side, Spanish on the other. In all, approximately 4,000 surveys were distributed at high-ridership stops along the X1, X2, and X3 bus lines. The on-line version of the survey was available for two months after June 25.

A total of 620 completed surveys were received: of these, 520 were paper surveys while the other 100 were completed on-line. The following is a compilation of key issues from the survey:

- 1) **Crowding** - the Benning Road-H Street Line suffers from overcrowding. Although 62 percent of riders were able to find a seat on the day of the survey, buses are reported to be at capacity or over capacity during peak periods and sometimes at mid-day and in the evening.
- 2) **Schedules** - the frequency with which buses arrive is also a significant issue for X Line riders. Schedule adherence is reported to be a problem, along with the bus bunching that comes with it. Even when respondents generally have an overall favorable view of the line, most believe that the schedules are not accurate.
- 3) **Safety and Security** - 57 percent of riders said that they are “very” or “somewhat” concerned about safety and security on X Line buses and at bus stops. Many riders reported unruly teenage passengers.
- 4) **Operators** - most riders rated their bus operator highly, although there were some complaints about unprofessional behavior.
- 5) **Conditions** - many respondents indicated that the condition, comfort, and cleanliness of buses and bus stops need improvement, particularly shelters and benches. There were many reports of leaking buses, poor climate control, and excessive trash.

Slightly more than half of riders indicate that they transfer to or from the X Line. Answers varied widely, but Metrorail was the most popular mode to transfer to or from. The 90s Line buses and the U routes were the most popular bus lines to transfer to or from.

Riders indicated that they would use new transit services on the Benning Road-H Street corridor—particularly a limited-stop route—if they were available.

### 2.2 First Series of Public Meetings: Problem Identification

Two public meetings were conducted for the first round of public input for the Benning Road-H Street Line study in July, 2009. The first of two public meetings for this phase of the study was held on Tuesday, July 14, 2009, at Sherwood Recreation Center at 10th and G Streets NE. The second meeting took place two nights later on July 16 at the Marshall Heights Community Development Organization, 3939 Benning Road NE. Both meetings were held from 6:30 pm to 8:30 pm. The sites were selected for their proximity to the corridor and convenience to residents on both sides of the Anacostia River.

The purpose of the first round of public meetings was three-fold: 1) to engage X Line riders in dialogue about challenges facing the routes; 2) to hear rider concerns, identify issues, and set

priorities for the study; and 3) reveal the preliminary results of the rider survey conducted in June. The project team hoped to get a sense of the problems that are of greatest importance to riders and use this information for developing service improvement recommendations.

About 20 members of the public and media attended the two public meetings. The following is a list of issues that were voiced by participants, and includes several potential solutions that were identified:

- As with the rider survey, the main area of concern for meeting participants was overcrowding on buses, especially in PM peak.
- Related to crowding, there were requests for larger buses.
- Several participants noted that bus operators sometimes pass stops entirely; mostly for crowding, possibly because they don't want to pick up someone in a wheelchair.
- Buses continually run late; schedules are unreliable and out of date.
- Double parking and road construction affect bus schedules. Congestion in Chinatown is particularly bad.
- Safety and security were more of an issue on buses, rather than at stops. There have been assaults and threatening behavior, and unruly, loud school-age children.
- Participants would like fare collection machines at high-volume stops. They noted adding fare to SmarTrip cards on buses is often time-consuming.
- Participants would like buses to be maintained in better condition; they offered several reports of leaking, broken windows and seats, no A/C, and dirty buses. Participants also stated that some bus operators are rude and don't enforce bus rules (eating/drinking, priority seating for elderly, standing in front of yellow line, etc.)
- Overflow ridership on the X2 line negatively affects the X1 line.

### **Potential Solutions**

- Most meeting participants liked the idea of a limited-stop or express bus service.
- They also suggested bus-only lanes, located at the curbside.
- Some requested that larger buses be provided all day, and a greater frequency of service during peak periods.
- Several participants suggested a parallel route on K or F Street as a potential "bypass route".
- Many asked about transit signal priority and Next Bus information to improve scheduling.
- Lastly, they noted the need for security cameras and undercover officers who would ride along the entire route (not just at the ends).

## **2.3 Second Series of Public Meeting: Improvement Concepts**

The second series of public meetings were held to present improvement concepts to the public and receive feedback. The first meeting was held on Tuesday, September 22, 2009, at Sherwood Recreation Center at 10<sup>th</sup> and G Streets NE. The second meeting took place two nights later on Thursday, September 24, 2009 at the Marshall Heights Community Development Organization, 3939 Benning Road NE. Both meetings were held from 6:30 pm to 8:30 pm.

The following is a summary of the comments received at the public meetings.

- Primary issues and suggested improvements:
  - Provide signal priority for buses, NextBus technology (especially digital displays), and GPS tracking of buses.
  - Improve the supervision of, and better communication with, bus operators.

- Offer “real-time” responses to delays, detours, and other issues that may impact schedules; provide better customer service and information at stops; improve the accuracy of bus schedules.
- Increase parking enforcement and other traffic flow management techniques.
- Provide newer, larger vehicles at all times, not just during peak periods.
- Increase the emphasis on maintaining frequency of service and decreasing overcrowding.
- In addition, there was some support for the following improvements:
  - Short-turn services (with western terminals at Gallery Place or North Capitol). A few didn’t like the short-turn idea, as they may force transfers, may not be good for ADA riders, and might be confusing.
  - Limited-stop service. Most favored it, but several objected on the grounds of cost and the fact that riders may have to walk farther to stops.
- The meeting participants stated their concerns about safety and security, both at stops and on the buses themselves, including:
  - Drivers ignore or appear oblivious to altercations that occur on the bus.
  - Operators should have training on how to deal with rude, loud passengers on overcrowded buses.
  - Overcrowding exacerbates bad behavior.
- There was significant opposition to the elimination of the X1, particularly the week after the public meetings.
  - More than 20 e-mails were received from X1 riders.
- Several members asked about the lessons that were learned from the implementation of the 79, 37, 39, and S9 bus routes. Did they have similar issues to the X Line, and how can Metro avoid repeating mistakes?
- Regarding the eastward extension of a potential X9 limited-stop service, there was no clear consensus about which alternative is best; however, the ANC representative stated that the Nannie Helen Burroughs Avenue option makes the most sense from a redevelopment standpoint.

## 2.4 Third Series of Public Meetings: Draft Recommendations

At the third and final pair of public meetings for this study, the project team presented draft recommendations that were identified based on analyses of existing transit service deficiencies and feedback from the previous public meetings. The first was held on Tuesday, November 10, 2009, at Sherwood Recreation Center at 10th and G Streets NE. The second meeting took place two nights later on Thursday, November 12, at the Marshall Heights Community Development Organization, 3939 Benning Road NE. Both meetings were held from 6:30 pm to 8:30 pm.

Participants at the meetings were generally in favor of the recommended improvements. The following is a summary of comments and questions voiced by meeting participants:

- The consensus is that the X9 is a good idea, but several participants said they’d like the western terminal extended a few blocks to connect with the 30s Line and the 52/54. One member asked for an X9 stop at 12th Street NE. A few stated they would prefer that X2 resources not be transferred to the X9.

- A few riders asked for additional X2 buses westbound in the AM peak, and for larger buses to be used sooner than Phase 2 in September 2010.
- Several riders expressed gratitude that the X1 is being preserved, asked that the route be extended further west to Foggy Bottom Metro, and that the last PM trip from 21st & C Streets NW be at 6:00 pm or 6:15, rather than 5:45.
- There was no opposition heard to the potential elimination of the X3. Several participants asked why its resources were needed for the X9, and another said she didn't ride the X3 anymore (in favor of Metro Access).
- Many of the comments reiterated what was heard at previous public meetings for this study: solve the bunching problem, make the buses less crowded, etc. But at these meetings, there was an extra emphasis on driver training so that: 1) the NextBus system will work properly; 2) operators can enforce rules with more authority; and 3) operators not drive so aggressively.
- It was also stated that traffic control officers do more harm than good.
- There was strong support for increased supervision, traffic management, and police involvement on the X routes.

## 2.5 Other Outreach Activities

To maintain contact with those interested in the progress of the Benning Road-H Street Line study, a project website was created: [www.metrobus-benning-h-dc.com](http://www.metrobus-benning-h-dc.com). The website features an overview of the study, maps, links, contacts, and publications and reports related to the Benning Road-H Street Line study. The site also listed upcoming public meetings and featured an on-line version of the rider survey.

In addition, a hotline was established for those wishing to speak with someone about the study. The number, which remains active, is 703-682-5060.

### 3.0 Recommendations

This section describes the guiding principles of and recommended improvements for the Benning Road-H Street Line.

#### 3.1 Guiding Principles

The Benning Road-H Street Line serves a community of residential and commercial neighborhoods that value diversity, inclusiveness, and connectivity with each other. The Benning Road-H Street Line serves a community that:

- Is experiencing the early stages of economic improvements, with expectations for continuing growth.
- Includes several important intermodal connections including Union Station, Minnesota Avenue, McPherson Square, and Gallery Place-Chinatown Metro Stations.
- Has a long tradition of transit service alignment, stops, and connections.
- Represents multiple travel markets inclusive of major activity centers, mixed use corridors and residential neighborhoods.
- Incorporates major District initiatives to accommodate future growth and enhance quality of life including streetscape improvements and future streetcar service along portions of Benning Rd NE and H Street NE.
- Relies on bus and rail transit as a major component of their mobility.

Based on the results of the review of the existing services, bus rider survey, and public comments, the following overarching principles were identified to guide the development of recommended improvements.

#### **Principles of Service for the Benning Road-H Street Line:**

- There should be a basic level of service offered in the corridor where transit service is currently provided.
- Retain a high-frequency “trunk” service along Benning Road-H Street NW.
- New service types should be in addition to retaining some all-stops local service.
- Match service type, frequency, and capacity to demand based on route segment; trip purposes, time of day; travel direction; day of week; and origins and destinations to preserve effectiveness and efficiency.

#### **Principles of Operations for the Benning Road-H Street Line:**

- Active service management and supervision is essential to success of service.
- Technology should be used to improve the ability to monitor and direct buses.
- Increased enforcement of parking regulations is essential to improving running times and bus stop access.
- Optimize route and schedule performance of the trunk portion of the Benning Road-H Street Line.
- Commit lanes of traffic and street operations to sustained transit-first principles to serve needs of buses in congested areas.
- Communication is important among bus operators, supervisors and passengers, especially when there are delays, detours, or when buses are being held to avoid bunching.

- Incorporate the access needs of seniors and the disabled in determining locations and number of bus stops.

### 3.2 Recommended Service Improvements

Service improvements to the Benning Road-H Street Line would include several changes from the existing service. Some of the service improvements would be implemented in successive phases. The service recommendations include the following elements:

#### 3.2.1 Increase Frequency of Service on Metrobus X2 Route

An immediate improvement will include five additional PM peak-period trips in the eastbound direction on the Metrobus X2 Route. These trips will not be full-length trips; rather, they will start at H Street and 9<sup>th</sup> Street NW and end at the Minnesota Avenue Metrorail Station. These additional trips will increase the peak period frequency of the X2 line from 6-minute headways to 5-minute headways.

#### 3.2.2 Articulated Buses on the X2

New articulated buses have been purchased for use on the X2 route. They have not been deployed on the X2 due to construction along the corridor. Once the construction on the curb lane finishes, the X2 will operate all trips with these new articulated buses. This change will have no impact on the operating cost of the X2 line.

#### 3.2.3 New Limited Stop X9 service

This recommendation implements a new Metro Express X9 service between H Street NW at 13<sup>th</sup> Street NW and Capitol Heights Metro Station as shown in **Figure 3-1**. The new X9 service would operate with 40-foot vehicles. Initially the new service would be operated only in the peak period with 15 minute frequency on weekdays. In the future the service would expand to all day service on weekdays and weekends with peak hour frequencies improved to 10- minute service.

The list of proposed bus stops for the new X9 service is as follows:

- Stop 1 – 13th & H Streets NW
- Stop 2 – 11th & H Streets NW (westbound service only)
- Stop 3 – 11th Street NW & New York Avenue NW (eastbound service only)
- Stop 4 – 7th & H Streets NW
- Stop 5 – H & North Capitol Streets
- Stop 6 – 8th & H Streets NE
- Stop 7 – 15th Street NE & Benning Road NE
- Stop 8 – 19th Street NE & Benning Road NE
- Stop 9 – Benning Road NE & Minnesota Avenue NE
- Stop 10 – Minnesota Avenue Metrorail Station
- Stop 11 – 44th Street NE & Nannie Helen Burroughs Avenue NE
- Stop 12 – 49th Street NE & Nannie Helen Burroughs Avenue NE
- Stop 13 – Division & Nannie Helen Burroughs Avenues NE
- Stop 14 – 58th & Foote Streets NE
- Stop 15 – 62nd & Dix Streets NE
- Stop 16 – Capitol Heights Metrorail Station

### **3.2.4 X1 Extension and Span Expansion**

This recommendation does two things; first, it provides later evening service on the X1; secondly, the western terminal is moved further north to the Foggy Bottom Metrorail station near Washington Circle. The extended span on the X1 is achieved by adding one additional PM peak trip. The extension to Foggy Bottom should not have any impact on cost as this would represent a minor extension that would be covered by existing recovery and deadhead time. The X1 service extension is shown in **Figure 3-2**.

### **3.3 Recommended Operations Improvements**

The operations related recommendations include the following elements:

#### **3.3.1 Route X1 Scheduling**

Currently the X1 is an extra board service, which results in trips being missed if drivers are not available to run the service. Having this service operate as a regular driver schedule would ensure that there would always be a driver on this route, thereby making service more reliable. This is a scheduling issue that would not impact the operating cost of the service. This service should be operated according to the regular driver schedule, which would make the route more reliable and encourage people to use the service.

#### **3.3.2 Dedicated Supervision**

Additional street supervision is needed to better manage the line. Increased supervision will allow the line to flow more smoothly and help alleviate issues such as any bus bunching that may occur. It is recommended that one additional Full Time Equivalent (FTE) supervisor position be dedicated to the Benning-H Street Line services.

Figure 3-1: Recommended New X9 Limited Stop Service

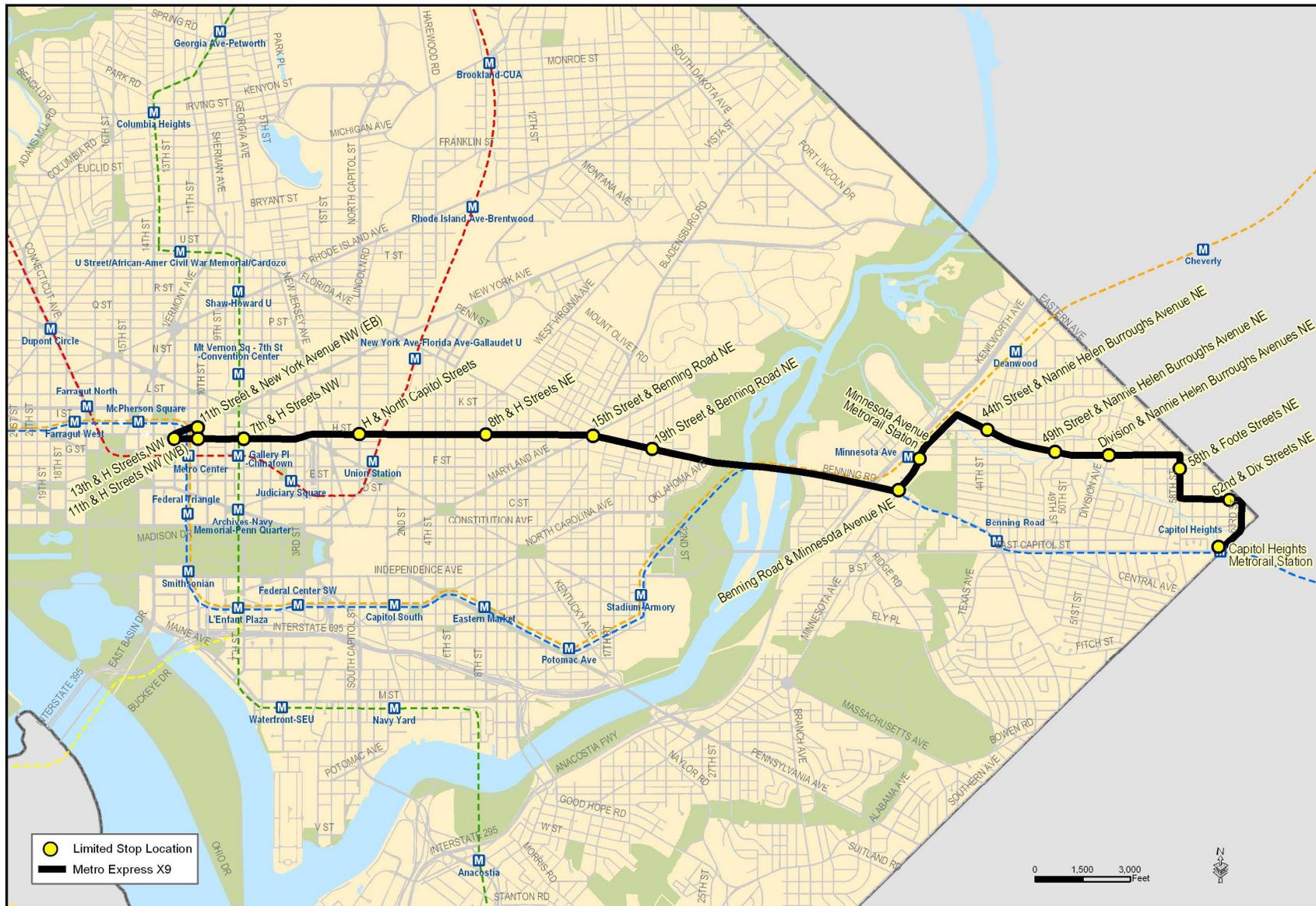


Figure 3-2: Expansion of X1 Service



### 3.3.3 Supervisor Playbook and Training

A Supervisor Playbook and training should address the issues that may occur while the bus is in operation. The playbook and training would help line supervisors address issues such as bus bunching, blocked lines due to severe traffic congestion or planned events, extreme crowding, and blocked bus stops. Training for situational responses would inform line supervisors of strategies to mitigate these types of issues.

### 3.3.4 Line-Specific Bus Operator Training

Drivers have specifically mentioned a desire for line-specific training, allowing them to become more familiar with the route as well as connecting bus and rail services and major destinations served by all routes in the Benning Road-H Street corridor. This training should also address the recommended changes to the route, so that operators are better prepared to respond to questions from riders. Such training should include:

- Information about major transit trip destinations along the route, and tourist destinations along the route;
- Transfer points for connecting bus routes and rail lines and major destinations served by those routes;
- Recommended route structure for the Benning Road-H Street Line including terminal points, headways, days of service, and span of service.
- Methods for operators to provide improved customer service.

Such training would encourage drivers to be better-informed and able to answer riders' questions about how best to reach their destinations, as well as clear, up-to-date information about changes to the Benning Road-H Street Line. They may also help promote destinations and attractions located along the line.

## 3.4 Recommended Facilities Improvements

### 3.4.1 Improved Bus Stops and Facilities

Planned improvements to stops and facilities are already underway. The improvements include new shelters with benches and lighting. In the future, WMATA will resume the installation and activation of next-bus arrival displays. New shelters will be installed at most stops that currently have a shelter. During the phased implementation of the Benning Road-H Street Line recommendations, project staff will work to expedite the replacement of shelters along the corridor.

Time spent at the bus stop constitutes the first and last experience each rider has with the transit service each time they ride the bus. This means that the customer experience at the bus stop is critical. The following recommendations cover bus stops and related facilities:

- **Location of Bus Stops** - Bus stops should be located in clear, visible, open spaces, preferably in places with a high amount of pedestrian traffic and ample sidewalk space for waiting passengers. Clear markings are important so that passengers know where they can board the bus, and visibility is important for safety reasons. When bus stops are moved or consolidated, extra consideration should be taken to ensure that they are placed in appropriate places.
- **Improved Shelters** - Bus stops should be well lit as well as clearly marked with a sign indicating the system name/logo, routes stopping there, and a number to call for information. The branding of the proposed Metro Express X9 Service should also be incorporated into the shelter design and flags at bus stops. Schedule and fare

information should be posted at each bus stop, and maps should be provided at all bus stops with shelters. Shelters as well as benches and trash receptacles should be provided at all stops for the recommended Metro Express X9, as well as at the busier local stops along the route. Emergency call boxes are also recommended at stops along the route, particularly in high-crime areas (see Safety/Security section). Additional amenities may include newspaper boxes and machines at which to purchase and/or refill SmarTrip cards, and improved lighting.

Currently the DC Shelter Replacement Program, led by DDOT and paid for by Clear Channel in exchange for advertising rights, is in the process of replacing all 700 bus shelters within the District of Columbia. This is underway in order to enhance the customer experience while waiting for buses and to provide weather protection and improved comfort and convenience. The new shelters will be constructed of aluminum and glass and include weather protection, enhanced lighting, and advertising space. Updated maps and schedules should be displayed in every bus shelter, and it is recommended that NextBus arrival displays be installed as well, particularly at X9 stops. Shelters located at high-volume stops and major transfer locations should also include maps and information about connecting services.

- **Missing or Damaged Stop Elements** - When stop elements are missing or damaged, passengers often feel that the transit provider is either negligent or does not care about the customer. Missing or damaged customer information, such as signs and posted maps and schedules should be replaced immediately as they are not that expensive to replace, but are heavily relied upon by riders. Damaged shelters, benches, trash receptacles, etc. should be fixed or replaced as soon as possible so as not to inconvenience passengers or give a poor impression of the service.

### 3.4.2 Branding of New Services

The proposed X9 service should be consistently branded with other Metro Express services, including not only the vehicle paint scheme, but also shelter design and flags at bus stop signs in order to make the public aware of the new services.

### 3.4.3 Sidewalk Improvements and Bulb-outs

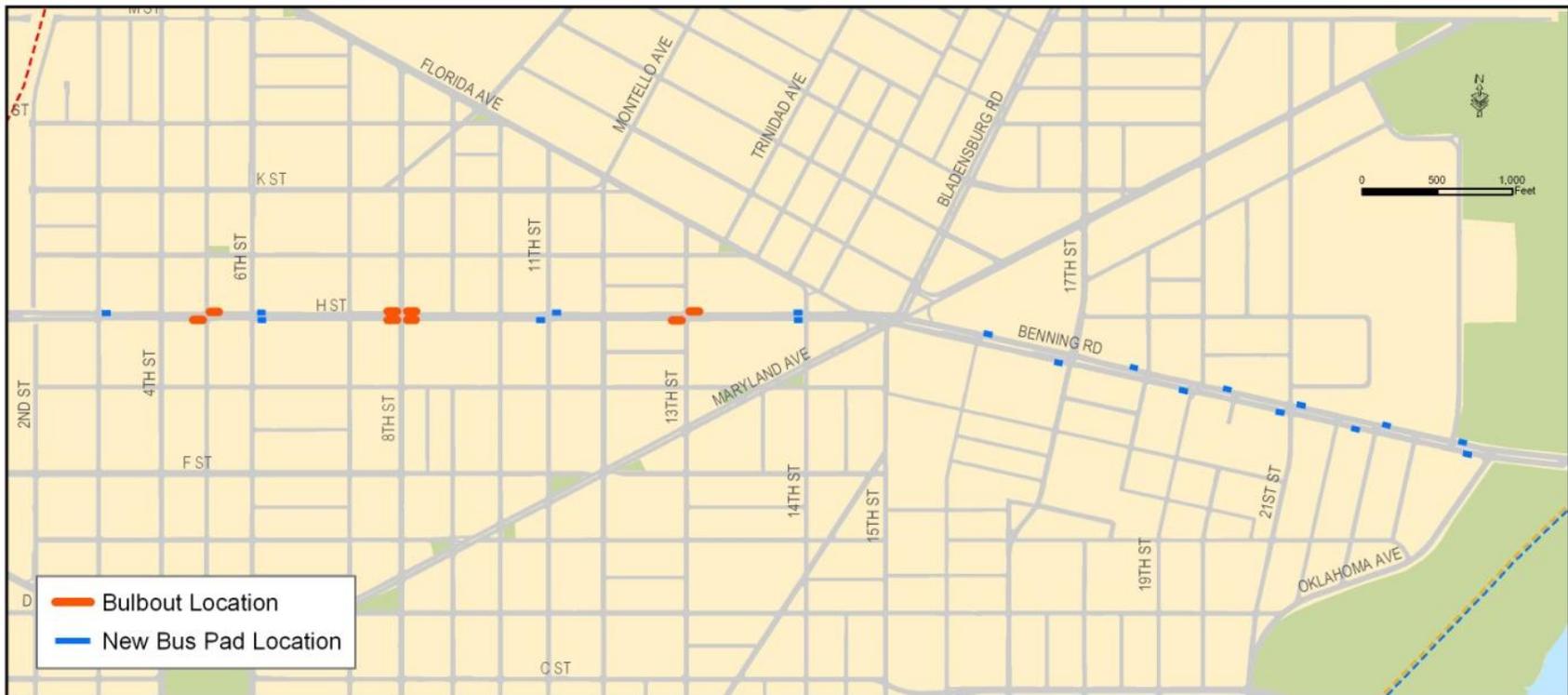
There is on-going construction along Benning Road and H Street to lay streetcar tracks along the street. The final configuration includes two travel lanes in each direction along with a parking lane accompanied by curb bulb-outs at the future streetcar station locations. These bulb-outs provide shorter crossing distances for pedestrians. The raised platform would also enhance the boarding and alighting of passengers in the future.

Over the long-term, the recommendations found in the H Street NE Corridor Study related to pedestrian infrastructure improvements include:

- Widen the current sidewalk by removing the acceleration and deceleration lanes and a new signal at the center of Hopscotch Bridge (H Street over Union Station rail yard).
- Add bulb-outs at the 5th, 8th and 13th Streets intersections to provide more sidewalk area at intersections with transit stops and high pedestrian volume.
- Add pedestrian crossings where Florida Avenue splits from H Street.
- Link H Street to the Metropolitan Branch Trail and bike lanes along Benning Road Bridge and Anacostia Riverwalk.
- Develop a pedestrian plaza area in the northeast quadrant of the Florida Avenue and Benning Road NE intersection.

The locations of these improvements are shown in **Figure 3-3** on the following page.

**Figure 3-3: Recommended Sidewalk and Curb Bulb-out Improvements**



### 3.5 Recommended Customer Information Improvements

One topic brought up by passengers and stakeholders has been the need for improved customer information. Enhanced customer information includes updated and improved schedules at stops and, eventually, real-time next-bus arrival information at stops.

Providing accurate, up-to-date, accessible information regarding transit service is critical to maintaining ridership and customer satisfaction. Ensuring that current and potential riders have access to route and schedule information means that transit riders are better able to make informed choices about how to best reach their destinations, likely travel times, and when to expect vehicles to arrive at their stops.

Route and schedule information should be provided at bus stops, bus and rail stations, on-board vehicles, by telephone, on the Internet, on real time bus arrival displays, and in messages, posters, and announcements. This section further elaborates on information that can and/or should be provided in each of these locations.

#### 3.5.1 Updated Schedules and Maps

**Bus Stops** – Up-to-date, accurate schedules should be posted for each line serving the stop, ensuring that any new services are included. Schedules should be easy to read and visible, with key information high-lighted or bolded. Any damaged or missing information cases should be promptly replaced. Proper signage ensures that passengers and potential passengers know where stops are, what routes serve each stop, and when the bus is scheduled to depart. Providing schedule information at each stop makes riding the bus easier for passengers and encourages more people to do so; however, illegible or out-of-date schedules can cause confusion among passengers and promote dissatisfaction with the bus service.

Since not all riders would immediately be familiar with service changes along the route, flags should be updated to show all routes serving each stop and new, branded flags added at Metro Express X9 stops. Maps should also be displayed at each bus shelter, and should highlight all routes serving the Benning Road-H Street Line as well as all connecting routes.

**Metrorail/Metrobus Stations** – Similar to bus stops, Metrorail and Metrobus stations should include clear signage denoting the system name and logo, routes serving the station, and a number to call for information. Stations should also include schedule and fare information for all routes serving them as well as visible, easy to read maps of the system and the immediate neighborhood. In addition, take-home copies of schedules and maps should be provided whenever possible and should be maintained with up-to-date schedules for all routes serving the area, system maps, SmarTrip Card information, and schedules for popular connecting routes.

#### 3.5.2 Customer Information On-Board Buses

Route and schedule information should be provided on buses for passengers. This information should be in print form so that passengers not using major Metrorail/bus stations/stops have access to hard copies of schedules. In order for schedules to be consistently available on board, operators should ensure that the appropriate schedules are available and stocked for the entire block before leaving the garage.

Additionally, all stops should be announced during all revenue trips – if electronic notifications are not available, operators should announce stops clearly so that all passengers can hear if their stop is coming up. Announcing each stop would avoid inconveniencing passengers who are unsure when to signal the driver that they would like to alight.

### **3.5.3 Customer Information over the Telephone and Internet**

A customer information telephone number should be displayed on every bus stop sign. By calling this number, passengers should be able to access route and schedule information as well as find out about any delays or service interruptions. In addition, real time bus arrival information should be provided, allowing passengers to find out when their bus will actually arrive. Passengers generally find waiting for a bus to be easier if they know when their bus will arrive.

WMATA's website currently shows route maps and schedule information, as well as short-term and long-term detours. NextBus information should be added to this site to allow passengers to obtain information on the status of a particular bus (see below).

### **3.5.4 Next Bus Displays**

Next bus displays at stops provide real time information regarding actual departure times for the next bus along a route. Such displays are popular with passengers, as they specify how long one will have to wait at a stop, reducing uncertainty and confusion when a vehicle does not arrive on schedule. These displays should be provided at stops with high activity, such as those serving limited-stop services, and should indicate what time the next bus will arrive and what route(s) the vehicle(s) will be serving. Additionally, this information should be available via telephone and the internet for passengers who are not at a stop with a NextBus display.

### **3.5.5 Marketing the New Services**

A multimedia marketing effort to inform the public about the improvements is also recommended. This should include the development and distribution of information and materials that:

- Describe changes to the existing Benning Road-H Street services.
- Describe new services (such as the X9).
- Advertise potential benefits for the typical rider.
- Provide details on how to get more information.

This campaign would coordinate potential project partners, such as the DC Business Improvement Districts, which include Downtown DC, NoMa, and Capitol Hill, as well as DC Main Streets, which include H Street NE and Deanwood Heights (along Nannie Helen Boroughs Avenue) located along the route. The campaign would allow for regular bus riders to be fully informed about upcoming changes to their bus services, such as new routes and changes in service hours and schedules, and how these changes will potentially improve the overall customer experience. Additionally, the campaign would encourage those who either do not regularly use transit or who used to use transit to try the new, improved system.

## **3.6 Safety and Security**

People are more likely to ride the bus when they feel safe doing so. One key comment by stakeholders was the need to improve safety and security along the Benning Road-H Street Line. The following strategies enhance safety and security at bus stops and on vehicles in order to maintain a safe, secure environment for passengers.

### **3.6.1 Safety and Security at Bus Stops**

As bus stops and shelters are improved and replaced, special attention should go to ensuring that they are well lit and visible in order to promote a more secure environment. Future bus stop consolidation should consider maximizing the visibility of stops and focus on areas with higher

levels of pedestrian activity. Additionally, emergency call boxes should be placed at specific stops along the route. Call boxes should be easily identifiable and lit, and passengers should be made aware as to their locations as well as encouraged to utilize stops with call boxes during early morning, late evening and nighttime hours.

### 3.6.2 Safety and Security on Buses

Several measures to improve safety and security while on the bus are recommended including the following:

- **Closer Coordination with Schools** - Metro Transit Police working more closely with school principals, offering incentives to maintain good behavior on the bus.
- **Education Campaign and Greater Police Presence** - Police patrols should include uniformed and plainclothes officers randomly patrolling onboard buses, particularly during early morning, late evening, and nighttime hours. Public service announcements to advertise the increased presence of undercover officers on buses. Riders are encouraged to call Metro Transit Police on a special number, 202-962-2118, to report disorderly conduct of minors.
- **Surveillance Cameras** - Potential use of cameras on buses and at bus stops, monitored by Metro Transit Police.
- **Enhanced Bus Operator Training** - Added training for bus drivers to enforce rules and to address potential conflicts before they become problems. Safety training to include increased awareness of bicyclists and pedestrians.

## 3.7 Traffic Operations and Management

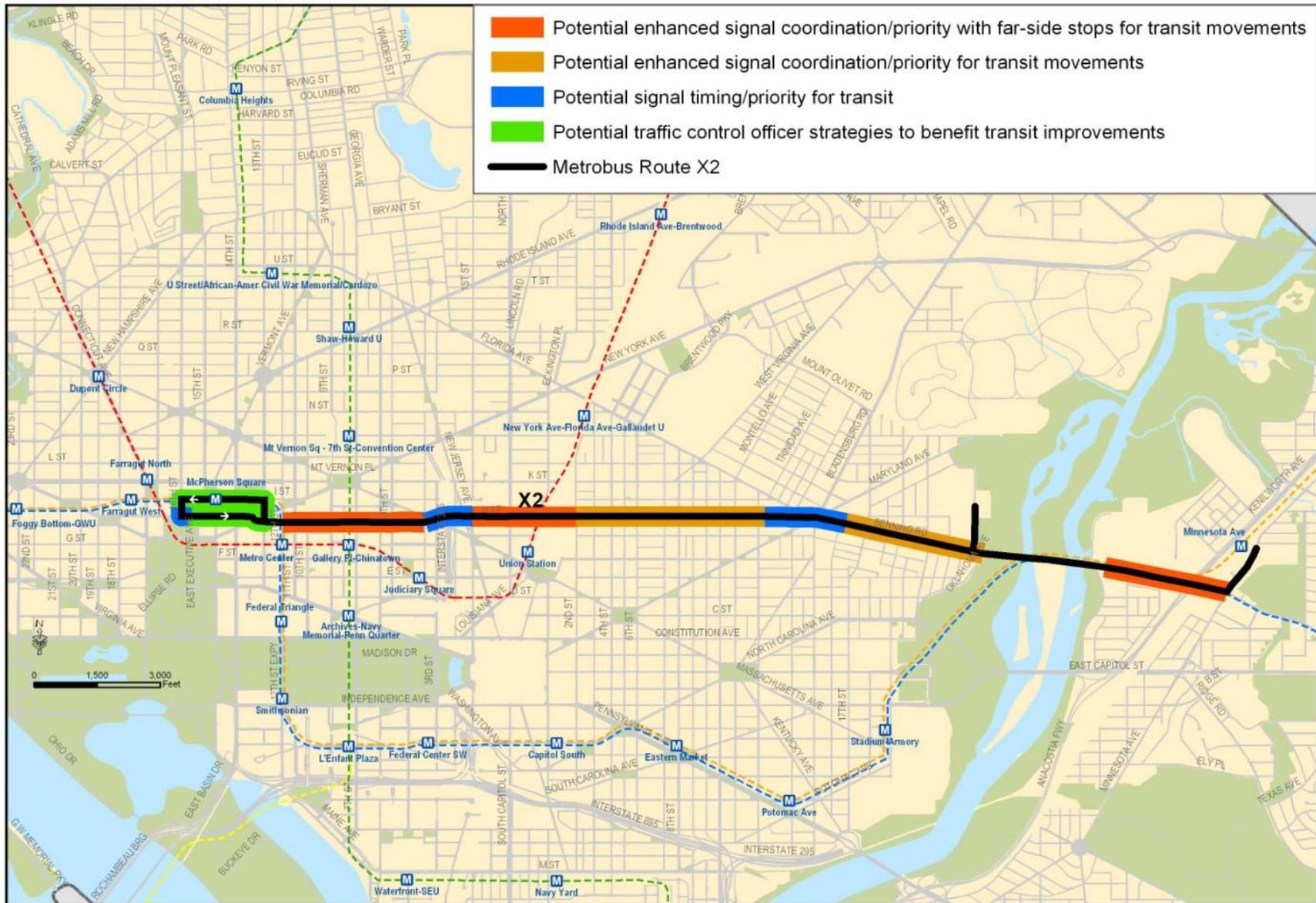
In order to overcome delays caused by congestion, there are several strategies that could be implemented in the Benning Road-H Street corridor. These improvements would provide a means for buses to travel more quickly on congested roadway segments and improve travel times and schedule adherence and reduce bus bunching.

### 3.7.1 Potential Signal Improvements

Recommended signal improvements are highlighted in **Figure 3-4** include the following.

- **Queue Jumps** - could be implemented at busy intersections that are a significant cause of delays. Examples could include the intersection of H Street and 15<sup>th</sup> Street, NE, and the intersection of H Street and North Capitol Street.
- **Signal Timing** - changes including additional green time for specific bus movements as well as the addition of DDOT traffic control officers during peak hours to facilitate bus movements, particularly in the heavily-congested McPherson Square area downtown.
- **Transit Signal Priority (TSP)** - as currently in use in the Georgia Avenue-7<sup>th</sup> Street Corridor, would allow for signals to favor buses that are running behind schedule. This should be considered for the portion of the X2 route between Minnesota Avenue and 13<sup>th</sup> Street NW.

Figure 3-4: Recommended Intersection and Traffic Signal Improvements



### 3.7.2 Potential Intersection and Dedicated Transit Lane Improvements

As shown in **Figure 3-5**, transit-only lanes are recommended along the Benning Road-H Street corridor in the future, and could be implemented where the streetcar tracks are being currently being built. This would provide a transit-only lane to accommodate both buses and streetcars during peak hours. Due to the physical constraints barring the co-location of streetcar and bus stops, only the streetcar lanes adjacent to the curb would be used as transit-only lanes and not for the portion along Benning Road where the streetcar is located in the median. For this area bus service would continue to run along the curb lane. A detailed traffic impact/feasibility study of dedicated peak hour transit lanes will need to be conducted to further refine this recommendation before it could be implemented.

### 3.7.3 Parking Polices and Enforcement

Illegally parked vehicles, whether they are vehicles parked in curb lanes while no-parking restrictions are in effect, double parked vehicles, or vehicles parked in bus stops, can cause significant delays in bus service as well as prevent buses from reaching the curb to make stops, further inconveniencing disabled riders. Better enforcement of parking restrictions along Benning Road and H Street would help eliminate the possibilities of such delays especially in the area west of 5<sup>th</sup> Street NW and between 6<sup>th</sup> St NE and 12<sup>th</sup> St NE as shown in **Figure 3-6**.

Several additional strategies could help reduce congestion due to parked vehicles including the elimination of spaces adjacent to bus stops to make it easier for buses to pull in and out of the curb. This should occur concurrently with the recommended shift to more 60-foot articulated vehicles on Route X2. Other strategies include:

- Restrictions on delivery vehicle and tour bus parking near stops. This would be particularly helpful both downtown (where tour buses add to congestion) and along the H Street, NE commercial corridor (where many businesses are located).
- Enhanced enforcement of parking restrictions around stops through better direct communication with the Department of Public Works parking enforcement staff.
- Extension of peak period parking restrictions.

Through expansion and better enforcement of parking restrictions, travel times could be increased, dwell times reduced, and schedule adherence and bus bunching improved throughout the corridor.

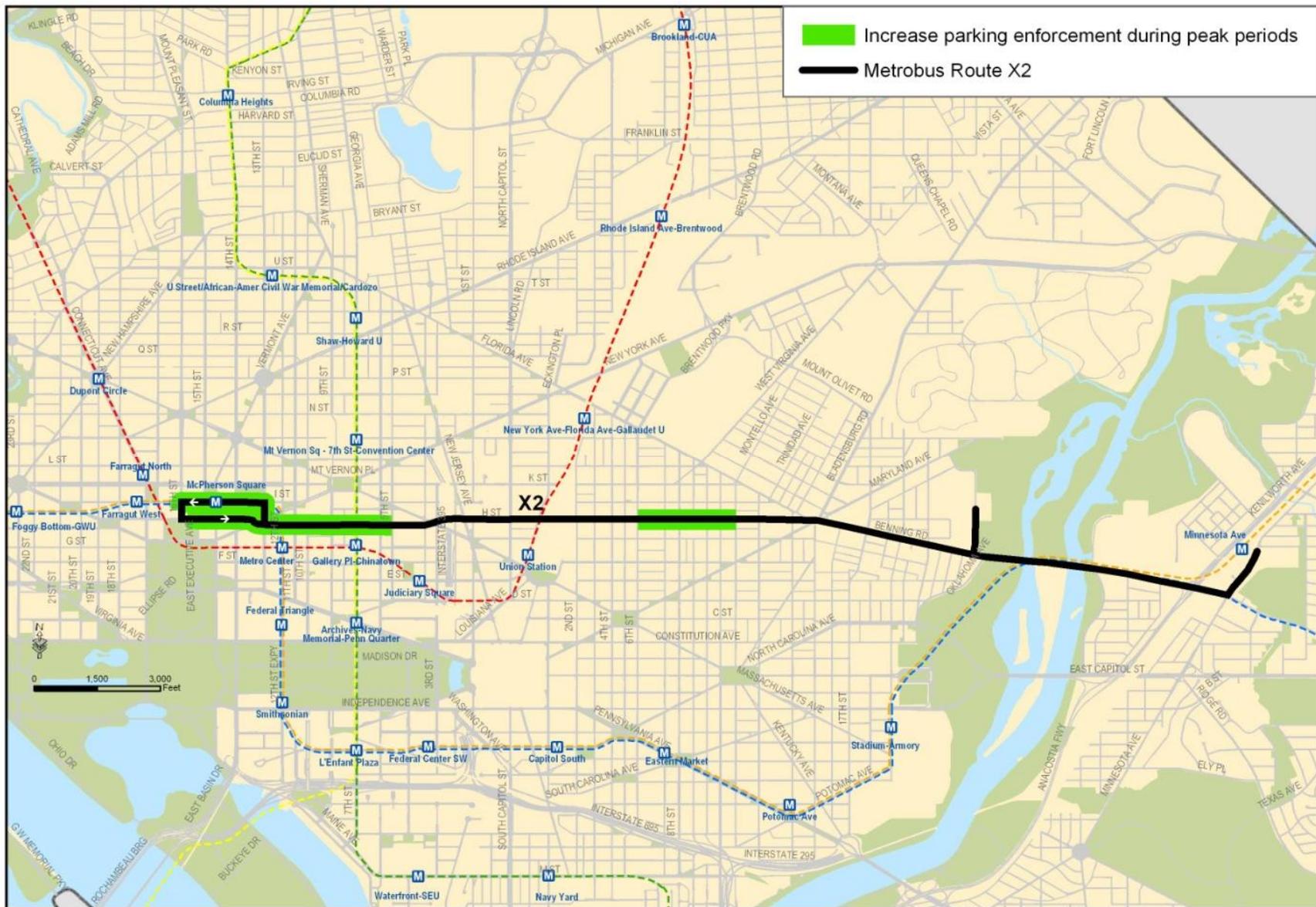
## 3.8 Vehicles

One common request during stakeholder and rider interviews was to use newer vehicles on the Benning Road-H Street services. Since crowding was noted as a problem, particularly on the X2 service, the use of articulated buses on this route is recommended. WMATA has already purchased new articulated buses for use on the route, and is waiting for roadway construction in the curb lane along the corridor to be completed before putting them into service on the line.

Figure 3-5: Recommended Intersection and Dedicated Transit Lanes



Figure 3-6: Recommended Parking Enforcement Areas



In addition to new articulated buses on the X2, specifically branded Metro Express buses should be utilized for the Metro Express X9 service. This branding and vehicle paint scheme should be consistent with the branding and paint schemes of other Metro Express routes so as to reduce confusion about the service. It is assumed that the vehicles for the X9 Metro Express service would be standard 40-foot buses that accommodate approximately 37 seated passengers each. All vehicles should be low-floor to facilitate easy boarding and alighting, and minimize the time required for disabled passengers to board. An estimated 12 vehicles, including spares, is required for the X9 route for the time periods where peak service is every 10 minutes (phases 3 and beyond). Eight vehicles are required for both phase 2A and 2B.

Route maps and schedules for the Benning Road-H Street services should be available on board all vehicles at all times. In addition, over time additional features should be introduced, such as the capability to update automated announcements on the bus from a single location via the internet and WiFi equipped vehicles, as well as video screens on board to provide visual information to riders regarding next stops, detours, delays, connecting routes, etc. Transponders for use in the recommended Transit Signal Priority (TSP) system should also be included on vehicles used for the line.

## **4.0 Future Issues**

The implementation of the Benning Road-H Street Line recommendations will need to be coordinated with other transportation infrastructure projects in the planning stages, as well as with the District land use plans.

### **4.1 Integration with Transportation Projects**

Several planned transportation infrastructure projects have the potential to affect the Benning Road-H Street Line bus services in the future. These projects, and how they can impact the Benning Road-H Street Line recommendations, are described as follows.

#### **4.1.1 H Street NE Corridor Study**

The DDOT study of the H Street NW Corridor proposed several short-term and long-term improvements for transit along the study corridor. The short-term improvements included signal retiming, extension of bike lanes crossing H Street and improvements to pedestrian and passenger considerations. Over the longer-term, realignment of lane configurations and turn lanes, adding visibility markers to the Hopscotch Bridge (H Street over the Union Station rail yard), and a complete redesign of the Florida Avenue and Benning Rd NE intersection were proposed. Those recommendations that have been incorporated into the current H Street NE roadway improvements have been considered in developing the recommendations as part of the Benning-H Street Line Study.

#### **4.1.2 Minnesota Avenue Extension Environmental Assessment**

This DDOT study was completed in June 2007. The study notes that the Minnesota and Benning Road intersection operates with a level of service of "D" during the weekday p.m. peak. A government center is under construction in the northwest quadrant of this intersection. The study assumed a 325,000 square feet office development along with 15,000 square feet of retail development. Because of the projected traffic growth in the area, traffic operations at this intersection will deteriorate to level-of-service "F". DDOT has indicated that there are on-going 30-percent design plans to improve the Minnesota Avenue and Benning Road intersection. The recommended improvements as part of the Benning-H Street Line study have incorporated these planned improvements. In addition, DDOT should consider the inclusion of a median fence in the center of Minnesota Avenue, to direct pedestrians to the intersection crosswalk. (The study determined that jaywalking is a serious safety issue for Metrobus riders transferring from one bus to another on Minnesota Avenue.)

#### **4.1.3 DC Streetcar**

In fall 2009, DDOT unveiled the agency's proposed plan to implement a city-wide modern streetcar system. The proposed streetcar network plan recommends streetcar service to operate along significant transportation corridors throughout the city. The corridors were chosen to reflect the projects goals:

- Improve access and mobility for District residents and businesses – Increase connections between neighborhoods and activity centers, and improve access to regional centers.
- Encourage community and economic development – Support the city's initiatives for community development and enhance development benefits.

- Enhance system performance – Increase the capacity of the transit network and improve transit efficiency and cost-effectiveness.
- Promote environmental quality – Limit adverse impacts and support environmental benefits.

Streetcars are recommended to run in mixed traffic along the Benning Road-H Street corridor between 3<sup>rd</sup> Street NE and Oklahoma Avenue NE among other corridors. Streetcar tracks and curb bulb outs to accommodate future streetcar stations are under construction as part of the reconstruction of H Street NE and Benning Road NE. Although some elements of the streetcar system have been constructed as part of the roadway reconstruction project the schedule for initiating streetcar service along the line is undetermined and may be several years away. As plans for streetcar service advance and schedules, service levels, and initiation dates are determined some further adjustments in bus service plans may be desirable to balance overall transit service levels in the corridor.

## **4.2 Integration with Land Use Projects**

### **4.2.1 Benning Road Corridor Redevelopment Framework Plan**

The Benning Road Corridor Redevelopment Framework Plan provides clear redevelopment guidance. Four study areas were delineated and potential redevelopment sites and an implementation matrix have been identified for each. The framework also includes a comprehensive market analysis which examined existing conditions along the corridor such as an inventory of businesses, an assessment of building conditions, identification of public properties in the study area and current development activity. Opportunity redevelopment sites, totaling 1.5 million square feet along the corridor, have been identified. The location of these opportunity sites have been considered in the development of the recommended services and stop locations as part of the Benning-H Street Line study.

### **4.2.2 H Street Corridor Revitalization**

The H Street NE Strategic Development Plan was developed to guide community, private sector, and public agency actions and investments in revitalizing the traditional neighborhood corridor over the next ten years. The Office of Planning and over 500 stakeholders, including residents, merchants, property owners, District agencies and investors participated in the strategic development plan. The goal of the plan is to help reestablish H Street as a safe, attractive destination offering a unique combination of neighborhood goods and services; places to live, work, shop, and eat; and settings for cultural enrichment and entertainment.

The H Street Strategic Plan outlined recommendations regarding a number of topic areas including Transit, Traffic and Parking that were considered in developing recommendations for the Benning-H Street Line study.

### **4.2.3 Benning Road-H Street Development Projects**

The development projects listed below are likely to increase the demand for the proposed X9 Limited Service to Capitol Heights Metrorail Station.

#### **Minnesota Benning Government Center**

- Location: 4058 Minnesota Avenue NE
- Total Square Footage: 227,000

- Major Use: Office – Five stories housing 500 Department of Employment Services (DOES) Employees
  - Office: 219,231
  - Retail: 7,769
- Parking Spaces: 102
- Estimated Cost: \$48 million
- Target Delivery Date: 1/2011

### **New Communities Redevelopment of Lincoln Heights**

- Location: Intersection of Division Avenue and Nannie Helen Burroughs Avenue
- Total Square Footage: 88,000 Commercial
  - Office: 30,000
  - Retail: 58,000
  - Total Residential Units: 1,469
  - *Town Center Units*
    - Townhouse Units: 108
    - Multi-family Units: 458
  - *Lincoln Heights Property*
    - Single Family Townhouse Units: 336
    - Stacked Townhouses: 62
    - Multi-Family: 176
  - *Richardson Dwellings Property*
    - Single Family Townhouse Units: 29
    - Stacked Townhouses: 132
    - Multi-Family: 168
- Estimated Cost: \$49 million
- Target Delivery Date: Phased over 10 years beginning in 2009

### **HD Woodson High School Redevelopment**

- Target Delivery Date: 2010
- Under Construction
- Estimated Cost: Unknown

### **Deanwood Community Center & Library**

- Total Square Footage: 63,000
- Target Delivery Date: 2010
- Under Construction
- Estimated Cost: \$33 million

## 5.0 Implementation Strategy

This section presents a phased implementation of the improvements described in Section 3.0 of this document. The work activities necessary to implement the improvements, the entity responsible for completing each of the activities, and a completion date are also presented.

### 5.1 Phased Implementation

The key elements of the recommended plan include local service enhancements of the X2 by operating new articulated buses on the route, maintaining the X1 service operating along the Benning Road corridor and the Constitution Avenue corridor, and the implementation of a new Metro Express X9 limited-stop service between Capitol Heights Metro and 13<sup>th</sup>/H Streets NW.

The implementation of the recommended Benning Road-H Street Line improvements has been divided into five phases. The initial phase (Phase 1) includes all of the improvements that could potentially be implemented in December 2009. Note: Phase 2A – Cost-neutral Restructuring and Phase 2B – Restructuring are presented as options and should not be viewed as sequential phases. The five phases are as follows:

#### **Phase 1 – Initial Phase**

The initial phase consists of five additional PM peak period trippers in the eastbound direction. These trips would not be full-length trips; rather they would start at H Street and 9<sup>th</sup> Street NW and end at Minnesota Avenue Metro. These additional trips would result in the frequency of the X2 Line going from 6 minutes to every 5 minutes in the eastbound direction. This phase was implemented in December 2009. The five additional trips cost an additional \$137,000 per year. It is recommended that the feasibility studies for the recommended traffic flow management improvements including transit signal priority, queue jump lanes, and peak hour dedicated transit lanes as described in Section 3.7 of this report be implemented in Phase 1.

#### **Phase 2A – Cost-Neutral Restructuring**

Given the limited resources available for transit services in the near term, the Phase 2 recommendations are cost-neutral, requiring no additional financial resources for operations. Phase 2A includes a combination of additional new services to address existing deficiencies as well as some cutbacks in existing services to offset the costs of the new service. Some minor capital costs to support marketing of the new service and replace missing or damaged info cases at stops would be required under this scenario. Capital costs are shown in Section 6.0 of this document. These recommended changes for Phase 2A are described as follows.

**Metro Express X9 Service** – This recommendation would implement a new Metro Express X9 service between H Street/13<sup>th</sup> Street NW and Capitol Heights Metro Station. This service would operate along H Street, Benning Road, and Minnesota Avenue and serve neighborhoods along Nannie Helen Burroughs Avenue. In Phase 2A, service would be limited to 3 hours during the AM peak period and 3 hours during the PM peak period. Service would operate every 15 minutes in both directions. This service would add a total of 10,730 revenue and recovery hours and 1,931 deadhead hours. The service would cost approximately \$1,213,000.

**Eliminate X3 Service** – To help cover the additional cost of the X9 service so that its implementation would be cost affordable, the elimination of the X3 service is

recommended. The X3 provides service that duplicates the existing 90, 92, 93, and 96 routes. With a transfer from the X1 or X2 routes to the 90s routes, passengers can still access trip origins and destination points currently served by the X3 route. Eliminating the X3 saves approximately \$532,000 per year based on saving 5,553 total hours.

**Adjustments to X2 Local Service** - To help cover the additional cost of the X9 service so that its implementation would be cost affordable, some reductions in the peak hour X2 local service is recommended. This would result in some reductions of service levels at stops compared to the Phase 1 service for the stops that aren't also served by the new X9 Limited Stop service. The reductions to X2 local service at these stops include the following:

- Increasing EB AM headway from 8.5 minutes to 15 minutes
- Increasing WB AM headway from 7.5 minutes to 10 minutes
- Increasing EB PM headway from 5.5 minutes to 7.5 minutes
- Increasing WB PM headway from 10 minutes to 12 minutes

**Articulated Buses on the X2** – New articulated buses have been purchased for use on the X2 route. They have not been deployed on the X2 due to construction along the corridor. Once construction on the curb lane is complete, the X2 would operate all trips with these new articulated buses. This would have no impact on the operating cost of the X2 route.

**X1 Reliability Improvements and Extension** – This recommendation would provide regular operational blocks for the X1 instead of operating the route as a small piece of another block. This is a scheduling issue that would not impact the operating cost of the service. Also, the western terminal of the X1 would be extended to Foggy Bottom-GWU Metro, and one additional pm peak trip would be added after 6:00 pm.

**Enhanced Supervision** – Supervision of Benning Road-H Street services will be increased in this phase. This will involve assigning a supervisor exclusively to these services at an estimated cost of \$80,000 per year.

**Other Supporting Improvements** - Many of the improvements as described in Sections 3.3 through 3.6 of this report are also part of this phase and include:

- Line-specific driver training
- Continuing shelter replacements (as part of the DC program)
- Branding of the new X9 service
- Sidewalk and bulb-out improvements (part of the roadway reconstruction project)
- Replacement of missing or damaged info cases
- Updated schedules and maps at stops
- Enhanced customer information on buses and via telephone and internet
- Marketing for new services
- Safety and security programs for the line
- Signal timing adjustments to facilitate bus movements
- Provide transit preference by DC traffic control officers at key intersections west of 13<sup>th</sup> Street

## **Phase 2B – Restructuring**

Phase 2B would include all of the recommended changes describes for Phase 2A above but would not include any of the reductions in the X2 local service. The X2 local service levels would remain the same as in Phase 1. Phase 2B would also include the extension of Route X1

to Foggy Bottom Metro Station area. Overall, this phase adds approximately \$761,000 to the annual operating cost of the Benning Road-H Street Line. This phase also includes the addition of NextBus displays in shelters along the route, surveillance cameras on buses, and emergency call boxes at stops. If additional resources are available, then all or part of Phase 2B may be implemented instead of the Phase 2A (cost-neutral) reductions in X2 service levels.

Frequency and number of trips for the current service, Phase 1, Phase 2A, and Phase 2B are presented on **Table 5-1**.

**Table 5-2** presents the total capacity change for each of these phases at both common stops and local only stops.

**Table 5-1: Peak Hour Trips per Hour and Frequency - Phases 1, 2A, and 2B**

	Current		Phase 1 – Initial Phase		Phase 2A – Cost-Neutral Restructuring		Phase 2 – Restructuring	
	Trips	Frequency (minutes)	Trips	Frequency (minutes)	Trips	Frequency (minutes)	Trips	Frequency (minutes)
X2 EB AM	7	8.5	7	8.5	4	15.0	7	8.5
X9 EB AM	0	0.0	0	0.0	4	15.0	4	15.0
Combined EB AM	7	8.5	7	8.5	8	7.5	11	6.0
X1 WB AM	4	15.0	4	15.0	4	15.0	4	15.0
X2 WB AM	8	7.5	8	7.5	6	10.0	8	7.5
X9 WB AM	0	0.0	0	0.0	4	15.0	4	15.0
X3 WB AM	3	20.0	3	20.0	0	0.0	0	0.0
Combined WB AM	15	4.0	15	4.0	14	4.3	16	3.8
X1 EB PM	2	25.0	2	25.0	2	25.0	2	25.0
X2 EB PM	11	5.5	11	5.5	8	7.5	11	5.5
X2 EB Trippers	0	0.0	2	30.0	0	0.0	2	30.0
X3 EB PM	2	30.0	2	30.0	0	0.0	0	0.0
X9 EB PM	0	0.0	0	0.0	4	15.0	4	15.0
Combined EB PM	15	4.0	17	3.5	14	4.3	19	3.2
X2 WB PM	6	10.0	6	10.0	5	12.0	6	10.0
X9 WB PM	0	0.0	0	0.0	4	15.0	4	15.0
Combined WB PM	6	10.0	6	10.0	9	6.7	10	6.0

**Table 5-2: Peak Hour Capacity Change - Phases 1, 2A, and 2B**

	Current	Phase 1 – Initial Phase	Phase 2A – Cost-Neutral Restructuring	Phase 2 – Restructuring
EB AM Local Only Stops	280-420	280-420	240	420
EB AM Local/Limited Stops	280-420	280-420	400	580
WB AM Local Only Stops	600-760	600-760	520	640
WB AM Local/Limited Stops	600-760	600-760	680	800
EB PM Local Only Stops	600-820	680-900	560	820
EB PM Local/Limited Stops	600-820	680-900	720	980
WB PM Local Only Stops	240-360	240-360	300	360
WB PM Local/Limited Stops	240-360	240-360	460	520

### **Phase 3 – Improved Peak Service on X9 and Dedicated Transit Lanes/Signal Priority**

Phase 3 would provide increased peak period service on the Metro Express X9 service. Service frequency is expected to go from every 15 minutes to every 10 minutes in both directions. This would add approximately 5,400 revenue and recovery hours and 966 deadhead hours each year to the X9, increasing the cost of the service by approximately \$607,000 per year.

Phase 3 would also include initiating the implementation of the Transit Signal Priority for the portion of the line east of 13<sup>th</sup> Street NW, peak hour dedicated transit lanes along the X2 route west of North Capitol Street, and enhanced parking and dedicated lane enforcement along the route. This would be based on the recommendation to initiate the feasibility studies in Phase 1.

### **Phase 4 – Improved Midday Service on X9**

Midday service on the X9 would be implemented in Phase 4. Peak period service would remain at 10 minute headways, with additional service provided during the midday periods operating every 15 minutes in both directions. This would result in an additional 10,730 revenue and recovery hours for midday service, increasing deadhead hours by 1,931 hours. This would increase the cost of service by approximately \$1,213,000 per year.

### **Phase 5 – Full Time Service on X9**

Phase 5 would add evening and weekend service to the X9. All peak period services would remain at a 10-minute frequency. All off-peak services—including midday, evening, and weekend services—would operate every 15 minutes in both directions. This would add 18,971 revenue and recovery hours and 3,415 deadhead hours per year. This would increase the cost of service by approximately \$2,144,000 per year.

## **5.2 Work Activities, Responsibilities, and Schedule**

For each of the Benning Road-H Street Line study recommendations, a series of work activities associated with each of the improvements has been identified. Phase 1 improvements include the addition of some additional scheduled trips for the X2 that were implemented in December 2009. Phase 2A improvements have been identified to occur as early as September 2010. The Phase 2A improvements will require the completion of implementation activities to prepare for the proposed changes. **Table 5-3** highlights each of the work activities for the Phase 2A improvements, the entity responsible for leading each activity, and a completion date for the activity. Entities that are responsible for selected work tasks include various departments of the Washington Metropolitan Area Transit Authority (WMATA) and the District Department of Transportation (DDOT) as well as Metropolitan Police Department. Phases 2B through 5 would occur after September 2010, as soon as funding becomes available to implement them.

**Table 5-3: Responsibilities and Schedule for Phase 2A Implementation Activities**

<b>Activity</b>	<b>Responsibility</b>	<b>Complete By</b>
<b>Finalize Plans and Approvals</b>		
Finalize recommendations	WMATA/DDOT	1/2010
Community leader outreach	DDOT MTA	8/2010
WMATA Board approval	WMATA Board	3/2010
<b>Service Changes</b>		
Identify terminal stands and layover facilities	WMATA Bus Planning	4/2010
Identify stops served by X9	WMATA Bus Planning/DDOT	4/2010
Define and redesign schedule	WMATA Bus Planning/Marketing	7/2010
Bus driver assignments	WMATA Bus Operations	9/2010
Initiate service	WMATA Bus Operations	9/2010
<b>Customer Communications and Marketing</b>		
Develop marketing plan for new service	WMATA Marketing	6/2010
Develop updated maps for shelters	WMATA Marketing	8/2010
Develop media plan for new services	WMATA Marketing	7/2010
Initiate marketing campaign for new service	WMATA Marketing	8/2010
Print and distribute printed materials for service change	WMATA Marketing	8/2010
Announce/Advertise new routes to riders and public	WMATA Communications	8/2010
<b>Enhance Service Supervision</b>		
Modify "supervisor playbook" for Benning Road-H Street Line	WMATA Bus Operations	5/2010
Define supervisor equipment and information needs	WMATA Bus Operations	5/2010
Develop Benning Road-H Street Line training for supervisors	WMATA Bus Operations	6/2010
Obtain and install supervisor equipment	WMATA BMNT/BTSS	8/2010
Fill additional supervisor positions	WMATA HR	9/2010
Supervisor training	WMATA Bus Operations	9/2010
Additional scout car	WMATA Bus Operations	8/2010
<b>Benning Rd/H St Line Specific Training for Drivers</b>		
Prepare Benning Road-H Street Line FAQ and responses	WMATA Planning	7/2010
Modify Benning Road-H Street Line specific training module	WMATA Bus Operations	8/2010
Benning Road-H Street Line driver training session	WMATA Bus Operations	9/2010
<b>Stop Improvements</b>		
Update signage (incl. designation of X9 stops)	WMATA Bus Operations	9/2010
Replace damaged or missing information cases	WMATA Bus Operations	9/2010
Place updated schedules at stops	WMATA Bus Operations	9/2010
Place updated maps and information at shelters	DDOT	9/2010
Expedite shelter replacement (part of the District's ongoing shelter replacement program with Adshel)	WMATA	4/2010
<b>Additional Items</b>		
Initiate Traffic Flow Management Studies	WMATA/DDOT	1/2010
Safety and security – new initiatives	WMATA/MTPD	4/2010

## 6.0 Funding Requirements and Ridership Revenue

### 6.1 Funding Requirements

**Table 6-1** provides a summary of the number of service hours and operating cost implications for each phase. The operating costs for the line with all of the recommended improvements for all phases would be approximately \$12.6 million per year, which is about \$4.9 million more per year than the existing services. All costs are in Year 2009 dollars.

**Table 6-2** provides a summary of capital costs of the recommended improvements. The total one-time capital costs for all the improvements for all the phases are about \$1.6 million. These costs do not include vehicle costs, since the vehicle requirements are assumed to be accommodated by the existing vehicle fleet and fleet expansions already planned.

**Table 6-1: Summary of Annual Hours and Operating Costs for Benning Road-H Street Service (Year 2009 Dollars)**

Item	Current	Phase 1 Initial Phase	Phase 2A Cost-Neutral Restructuring	Phase 2B Restructuring	Phase 3 Improved Peaks	Phase 4 Improved Midday	Phase 5 Full-Time X9 Service
Phase elements	- Current service	- Add 5 additional PM peak trippers	- Add X9 service - Articulated buses - X1 scheduling - Eliminate X3 - Supervisors - Eliminate trippers - Reduce X2 service	- Add X9 service - Articulated buses - X1 scheduling - Eliminate X3 - Supervisors	- More frequent X9 peak period service	- Add midday X9 service	- Add evening and weekend X9 service
X1 Revenue Hours	2,847.5	2,847.5	2,847.5	3,013.3	3,013.3	3,013.3	3,013.3
X1 Recovery Hours	569.5	569.5	569.5	602.65	602.65	602.65	602.65
X1 Deadhead Hours	2,169.8	2,169.8	2,169.8	2,296.1	2,296.1	2,296.1	2,296.1
X2 Revenue Hours	53,473.9	53,473.9	48,195.4	53,473.9	53,473.9	53,473.9	53,473.9
X2 Recovery Hours	10,694.8	10,694.8	9,849.9	10,694.8	10,694.8	10,694.8	10,694.8
X2 Deadhead Hours	5,326.0	5,326.0	4,905.2	5,326.0	5,326.0	5,326.0	5,326.0
X3 Revenue Hours	2,830.5	2,830.5	0.0	0.0	0.0	0.0	0.0
X3 Recovery Hours	566.1	566.1	0.0	0.0	0.0	0.0	0.0
X3 Deadhead Hours	2,156.8	2,156.8	0.0	0.0	0.0	0.0	0.0
X9 Revenue Hours	0.0	0.0	10,730.0	10,730.0	16,096.0	26,826.0	45,797.0
X9 Recovery Hours <sup>1</sup>	--	--	--	--	--	--	--
X9 Deadhead Hours	0	0	1,931.40	1,931.40	2,897.30	4,828.70	8,243.50
X2 Trippers Revenue Hours	0	790.5	0	790.5	790.5	790.5	790.5
X2 Trippers Deadhead Hours	0	637.5	0	637.5	637.5	637.5	637.5
Total Revenue Hours	59,151.90	59,942.40	61,772.90	68,007.65	73,373.65	84,103.65	103,074.65
Total Recovery Hours	11,830.40	11,830.40	10,419.40	11,297.45	11,297.45	11,297.45	11,297.45
Total Deadhead Hours	9,652.60	10,290.10	9,006.40	10,191.00	11,156.90	13,088.30	16,503.10
Total Hours	80,634.90	82,062.90	81,198.70	89,496.10	95,828.00	108,489.40	130,875.20
Total Service Cost	\$7,724,017	\$7,860,805	\$7,778,023	\$8,572,831	\$9,179,364	\$10,392,199	\$12,536,535
Articulated Bus Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0
X1 Scheduling Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Supervisor Cost	\$0	\$0	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000
<b>Total Cost</b>	<b>\$7,724,017</b>	<b>\$7,860,805</b>	<b>\$7,858,023</b>	<b>\$8,652,831</b>	<b>\$9,259,364</b>	<b>\$10,472,199</b>	<b>\$12,616,535</b>
<i>Change from previous phase</i>		\$136,788	(\$2,782)	\$792,026 <i>(relative to Phase 1)</i>	\$606,533 <i>(relative to Phase 2B)</i>	\$1,212,836	\$2,144,336

<sup>1</sup> X9 recovery hours accounted for in X9 revenue hours

**Table 6-2: Capital Cost Requirements (Year 2009 \$ - Not Including Vehicle Costs)**

Phase	Item	Estimated Capital Cost
1	Feasibility Studies for TSP and Dedicated Lanes	\$80,000
2A	Marketing Campaign for New Service	\$250,000
2A	New Information Cases and Schedules	\$6,000
2A	Supervisor Laptop Computer/Equip	\$3,500
2B	On-board Camera Surveillance	\$235,000
2B	Emergency Call Boxes at Shelters	\$174,000
2B	System Maps and Schedules	\$600
2B	NextBus Displays	\$145,000
2B	Signal Timing Improvements	\$70,000
3	Conditional Transit Signal Priority	\$272,000
3	Dedicated Transit Lanes	\$325,000
<b>TOTAL</b>		<b>\$1,561,100</b>

Note: Does not assume any new vehicle costs, since these improvements can be covered with the existing fleet and fleet expansion already underway. Also does not assume costs for street improvements already under construction as part of the H Street-Benning Road NE Roadway Reconstruction Project.

## 6.2 Ridership and Revenue Estimates

Ridership analyses using the proposed phasing show a ridership increase in each phase of the plan for the services in the corridor. Current X1, X2, and X3 annual boardings are 4,504,386. Estimated ridership increases by route are shown in **Table 6-3**. Ridership impacts were determined based on current ridership numbers, including Ridecheck data to determine geographic and temporal distribution of riders as well as elasticities of demand for both travel time and frequency changes. Revenue impacts were calculated based on an average fare of \$0.80.

**Table 6-3: Annual Projected Ridership and Revenue for Proposed Benning Road-H Street Service**

	Current	Phase 1 Initial Phase	Phase 2A Cost-Neutral Restructuring	Phase 2B Restructuring	Phase 3 Improved Peaks	Phase 4 Improved Midday	Phase 5 Full-Time X9 Service
X1	218,790	218,790	218,790	226,313	226,313	226,313	226,313
X2	4,082,361	4,096,483	3,862,351	4,012,179	4,012,179	3,788,126	3,558,237
X3	203,235	203,235	0	0	0	0	0
X9	0	0	742,423	654,175	871,772	1,351,194	1,920,436
Total Ridership	4,504,386	4,518,408	4,823,564	4,892,666	5,110,263	5,365,632	5,704,986
Revenue	\$3,603,509	\$3,614,807	\$3,858,851	\$3,914,133	\$4,088,211	\$4,292,506	\$4,563,989
Ridership Change from Prior Phase		14,022	305,156	374,258 <i>(relative to Phase 1)</i>	217,597 <i>(relative to Phase 2B)</i>	255,369	339,354
Revenue Change from Prior Phase		\$11,298	\$244,044	\$299,326 <i>(relative to Phase 1)</i>	\$174,078 <i>(relative to Phase 2B)</i>	\$204,295	\$271,483

A priority for additional revenue generated by the Benning Road-H Street services in Phase 2A (i.e., the cost-neutral restructuring) would be to restore trips to the X2 local baseline service. **Table 6-4** below presents the annual cost per one-way trip to operate each route along Benning Road-H Street corridor. Based on the \$244,000 in Phase 2A in additional revenue generated by the introduction of the X9 versus Phase 1, an additional 2 to 3 one-way trips can be restored to the local X2 services, which would help restore some of the frequency of X2 local service lost to help fund the X9 service.

Phase 2B, which includes all the route modifications as well as keeping today's service level on the X2, would result in an additional \$299,000 over the Phase 1 revenue. For this and all of the other phases, the gain in revenue would be utilized to help lower the subsidy required to operate the Metrobus system.

**Table 6-4: Annual Cost per One-Way Trip for Benning Road-H Street Service**

Route	AM Peak		Midday		PM Peak	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
X1	\$0	\$33,547	\$0	\$0	\$40,736	\$0
X2	\$19,047	\$23,269	\$21,682	\$21,161	\$25,396	\$19,047
X3	\$0	\$47,295	\$0	\$0	\$47,295	\$0
X9	\$45,627	\$45,627	\$45,627	\$45,627	\$45,627	\$45,627

## 7.0 Contacts and Information Sources

**Table 7-1** is a list of staff that has participated in the Benning Road-H Street Line Study and will serve as contacts and sources of information for the implementation of recommended improvements.

**Table 7-1: Contacts and Information Sources**

Name	Phone	E-mail
Office of DC Councilmember Tommy Wells		
Anne Phelps	202-727-8275	aphelps@dccouncil.us
DC Executive Office of the Mayor (EOM)		
Derrick Woody	202-727-2981	derrick.woody@dc.gov
DC Office of Planning		
Colleen Mitchell	202-442-7604	colleen.mitchell@dc.gov
Gizachew Andardeh	202-724-4314	gizachew.andargeh@dc.gov
District Department of Transportation		
Tomika Hughey	202-673-1744	tomika.hughey@dc.gov
Allen Fye	202-671-2407	allan.fye@dc.gov
Ali Shakeri	202-671-4612	ali.shakeri@dc.gov
Zahra Dorriz	202-671-4653	zahra.dorriz@dc.gov
Mark Frost	202-673-1371	mark.frost@dc.gov
Elois Cleckley	202-671-0682	elois.cleckley@dc.gov
Downtown Business Improvement District		
Ellen Jones	202-626-1145	ellen@downtowndc.org
Matt Pearson	202-486-3595	mpearson@downtownbid.org
WMATA, Long Range Planning		
Douglas Stallworth	202-962-2761	dstallworth@wmata.com
David Erion	202-962-1266	derion@wmata.com
Gloria Harris	202-962-2487	gharris@wmata.com
James Hamre	202-962-2870	jhamre@wmata.com
WMATA, Government Relations		
Art Lawson	202-962-1050	alawson@wmata.com
WMATA, Quality Assurance		
Charles Briscoe	202-236-1278	cibriscoe@wmata.com
WMATA, Corporate Strategy and Communications		
John Pasek	202-962-2891	jpasek@wmata.com
Samantha Rapoza	202-962-2878	srapoza@wmata.com
Melissa Buia	202-962-2314	mbuia@wmata.com
Donna Murray	202-962-1188	dmurray@wmata.com
WMATA, Office of Civil Rights		
Corinne Remy	202-962-6331	cremy@wmata.com
WMATA, Bus Services		
Stan Williams	202-269-8980	swilliams1@wmata.com
Stephen Edwards	202-962-5607	sdedwards@wmata.com
Michael Sherman	202-997-8068	msherman@wmata.com
Douglas Wiseman	202-379-8786	dwiseman@wmata.com
Donald Tapp	202-962-5607	datapp@wmata.com
Frank Machado	202-962-5607	fmachado@wmata.com
Chaya Downtin	202-281-6691	cdowntina@wmata.com
Beck Pak	202-962-5607	bpak@wmata.com
Sheldon Battles	202-962-1815	slbattles@wmata.com

<b>Name</b>	<b>Phone</b>	<b>E-mail</b>
Letroy Baker	202-962-5607	lbaker@wmata.com
Delores L. Proctor	202-962-5607	dlproctor@wmata.com
<b>Metro Transit Police</b>		
Joseph D. Green	202-635-6618	jdgreen@wmata.com
Tom Boyer	202-635-6618	twboyer@wmata.com
Randolph Dawson	202-962-2696	rdawson@wmata.com
<b>Consultants</b>		
Chris Bell, AECOM	410-637-1716	chris.bell@aecom.com
Mark Niles, AECOM	703-682-5024	mark.niles@aecom.com