ON-STREET
BUS TERMINAL STUDY

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March 2013

ON-STREET
BUS TERMINAL STUDY

Washington Metropolitan Area Transit Authority

March 2013

Lead Agency

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Executive Summary

Study Scope and Context

As part of its efforts to continuously improve the Metrobus service, the Washington Metropolitan Area Transit Authority (WMATA) launched the *On-Street Bus Terminal Study* to analyze 11 on-street bus terminal locations in the Washington Metropolitan area and evaluate the adequacy of the available bus passenger amenities. For the purpose of this study, an on-street bus terminal will be considered as a bus stop serving multiple bus lines and/or a bus stop that serves as a terminus (start or finish) of one or more routes. The 11 study locations are detailed in Table ES-1.

The majority of the on-street bus terminal locations assessed in this study accommodates more than one bus stop. Each bus stop is identified by a unique bus stop identification number (ID), which is used and referenced throughout this report. In few instances, there were bus stops that did not have a unique ID number associated. Those bus stops are identified as No ID.

Table ES-1: Summary of Terminal Locations in Study

Location Name	Jurisdiction	Routes
10th Street NW	District of Columbia	7Y, 13G, 32, 34, 37, 63, 64, A42, A46, A48, D1, N3, P1*, P2*, P6, S2, S4
C Street SW	District of Columbia	V7, V9
Columbus Circle	District of Columbia	96, 97, D6, D8, X8
Farragut Square	District of Columbia	11Y, 32, 36, 37, 38B, 39, 42, 43, D5, G8, L2, N2, N4, N6, P17, P19, W13
Federal Center SW	District of Columbia	P1*, P2*
Franklin Square	District of Columbia	42, 43, 52, 53, 54, 63, 80, D1, D3, D4, D6, G8, P17, P19, S2, S4, S9, W13, X2, DC Circulator
Lafayette Square	District of Columbia	11Y, 32, 36, 37, 39, 42, G8, L2**, P17, P19, S2, S4, W13, X2
L'Enfant Plaza	District of Columbia	5A, 52, 54, A9**, V5
McPherson Square	District of Columbia	3Y, 11Y, 16Y 32, 36, 37, 39, 42, 43, 80, A9, G8, P17, P19, S2, S4, W13, X2
Potomac Park	District of Columbia	31, 32, 36, 39, 80, N3, P1, S1, X1
Washington Street at King Street	Alexandria, VA	9A, 10A, 10B, 29K, 29N

**Service discontinued during development of the study.*
***Route change discontinued service at the stop location.*

Bus Stop Classification

The passenger facilities at each on-street bus terminal were evaluated using the 2*009 WMATA Guidelines for the Design and Placement of Transit Stops* (*WMATA Design Guidelines)*. These guidelines provide WMATA and jurisdictional partners with specific criteria that help plan and design safe and accessible passenger amenities for local transit facilities.

There is a range of design criteria that may or may not be applicable to a specific type of bus stop. The facilities required at each stop can only be assessed correctly by determining the bus stop's activity-based hierarchy and stop's placement outlined in the *WMATA Design Guidelines*.

Bus Stop Hierarchy

The *WMATA Design Guidelines* provides a hierarchy that helps determine the passenger amenities required at each bus stop, based on the bus and passenger activity levels. This hierarchy defines three typical bus stop classes:

- Basic Stop
- Enhanced Service Stop
- Transit Center

Basic stops constitute the majority of all bus stops in the Washington Metropolitan area. Basic stops that have 50 or more passenger boardings per day should provide a shelter with interior seating.

Enhanced service stops are those that are served by limited or skip stop service and/or Bus Rapid Transit (BRT). In addition to the amenities provided by a basic stop, the stops classified as enhanced service require a minimum of one shelter with interior seating. Enhanced service stops with 300 or more boardings per day should have additional shelter(s) and NextBus real-time travel information (both LED display dynamic messaging system [DMS] and an audio system).

Transit centers are typically served by multiple routes and have over 500 boardings per day. Transit centers should provide the complete array of passenger amenities listed by the *WMATA Design Guidelines*, including the provision of at least two shelters, an interactive phone system on–site, and an expanded boarding and alighting area.

Table ES-2: Passenger Amenities Requirements Based on Bus Stop Hierarchy

Bus Stop Element/Passenger Amenity	Basic Stop	Enhanced Service	Transit Center
Bus Stop Sign	Yes	Yes	Yes
ADA 8'x5' Landing Area	Yes	Yes	Yes
Sidewalk	Yes	Yes	Yes
Lighting	Evening Service	Yes	Yes
Seating	Trip Generator Based	Yes	Yes
Expanded Boarding & Alighting Area (Rear Door Access)	No	Site Specific	Yes
Bus Bay (pull off)	No	Site Specific	Yes
Shelter(s)	1 (50+ boardings/day)	1	2+
Trash Receptacle	Site Specific	Yes	Yes
Information Case	Yes	Yes	Yes
System Map	Contingent on Shelter	Yes	Yes
Real-time Display (LED + Audio)	Optional	Yes	Yes
Interactive Phone System On-Site	No	No	Yes

Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Bus Stop Placement

The *WMATA Design Guidelines* define three types of bus stop placement (i.e., near-side, far-side, and mid-block), and provides a detailed description on the advantages, disadvantages, recommendations, and considerations that should be evaluated for the adequate implementation of each stop placement type. The requirements for each placement type are detailed below.

Near-Side Stops

Near-side stops are typically located immediately upstream of an intersection, and are typically placed in areas where the primary trip generator and congestion points are located downstream of the intersection. If a crosswalk is present at the intersection, the stop should be placed at least five feet from the crosswalk. This type of stop placement generally requires a minimum bus zone of 100 feet for a standard 40-foot bus.

Far-Side Stops

Far-side stops are located immediately downstream of an intersection, and are typically recommended at locations where the primary trip generator and congestion points are located near-side or upstream of the intersection (e.g., heavy volume of right-hand turns traffic on the near-side of the intersection). To avoid vehicle conflict with pedestrians on the crosswalk at the intersection, the bus stop sign should be located at least 75 feet from the intersection (for a standard 40-foot bus). Furthermore, an additional 30 to 50 feet of bus zone should be provided downstream of the bus stop location to allow sufficient room for the buses to transition into the adjacent through lane. In total, the length of a far-side bus zone is generally between 70 and 90 feet.

Mid-Block Stops

Mid-block stops are placed midway between intersections. Typically, mid-block stops are discouraged, as intersections provide traffic lights and/or crosswalks that facilitate pedestrian access. If the primary trip generator is not near an intersection or the traffic conditions at the intersections are problematic, a mid-block stop may be recommended if pedestrian crossings have been factored into the placement of the stop. For a standard 40-foot bus, a mid-block stop will require a minimum of a 110 feet bus zone, with at least 30 feet downstream and 80 feet upstream of the bus stop.

Table ES-3: Summary of Requirements by Stop Placement Type

Placement Location Type	Stop Placement from Crosswalk (feet)	Bus Zone Length (feet)	Recommended Application
Near-Side	5	minimum 100	Congestion points/trip generators are downstream.
Far-Side	50	70-90	Congestion points/trip generators are upstream.
Mid-Block	N/A	110-150	Trip generator far from any intersection. Pedestrian condition at nearest intersection is problematic.

Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Recommendations

The recommendations take into consideration the existing conditions, future requirements (based on the future conditions analysis), and physical or regulatory constraints present at each location. At some locations, the existing constraints may impede the upgrade of all stop facilities to the requirements set by the *WMATA Design Guidelines*. See below for the summaries of the recommendations for each terminal location. For full recommendations, see Section 5 of the study.

10th Street NW

The most prevalent issue along the bus stops on 10th Street NW (between Pennsylvania and Constitution Avenues NW) pertains to the provision of *American Disabilities Act* (*ADA*)-compliant passenger facilities.

The planters installed along the sidewalk on both sides of 10th Street NW would need to be shifted to ensure that the four feet clear pathway (edge-to-edge) is maintained between the planters, especially around the passenger waiting area of the stops.

C Street SW

Stop 1000690 (located on the 12th Street SW end of C Street SW) provides approximately 56 feet of space for the bus zone, which is not enough to meet either the mid-block or far-side bus zone requirements. The study recommends the removal of this bus stop, as it is physically impossible to accommodate the required bus zone in the existing space. This curbside space could accommodate two to three additional parking spaces. If this bus stop is to be maintained, the existing condition would be maintained with the addition of a sign post indicating the rear (east) end of the bus zone.

In addition, the installation of a new bus shelter and additional amenities required for a basic stop is recommend at stop 1000692 (located on the 14th Street SW end of C Street SW).

Figure ES-1: C Street SW - Proposed Shelter

Columbus Circle

No recommendations would be made at Columbus Circle as the new (permanent) stop locations have not been designated by WMATA.

Assuming that the boarding activities at this stop would be similar or greater to the existing conditions, it would be safe to consider that the new stops would have all amenities required by a transit center, with each stop providing a minimum of two standard size shelters.

Farragut Square

At Farragut Square, the study recommends the removal of stop 1001192 (located on 17th Street NW [east] at K Street NW) and stop 1001212 (located on 17th Street NW [west] at K Street NW). The curbside space at stop 1001212 could accommodate approximately three or four additional metered parking spaces. The space used by stop 1001192 would be replaced as a shuttle operating zone (during the peak hours) and would allow the maintenance of metered parking spaces during the non-peak hours. This conversion would help separate bus and shuttle operation, and reduce operational conflicts, especially during peak hours.

In addition, the study recommends the installation of two standard three-panel shelters (or a custom size shelter with similar capacity) at stop 1001193 (located on 17th Street NW [west] at I Street NW) and add a standard three-panel shelter at stop 1001183 (on I Street NW) just east of the existing shelter location.

Federal Center SW

No recommendation has been provided as all bus service has been suspended at this location.

Franklin Square

At Franklin Square, the most extensive recommended modifications would occur along I Street NW. A mid-block curb extension on I Street NW would accommodate transit center class passenger amenities. The existing five stops along I Street NW would be consolidated into three stops (stop number 1003653, 1003661, and 1003662).

In addition, a standard three-panel shelter is recommended at stop 1001190 (on 13th Street NW at I Street NW) and an additional standard three-panel shelter at stop 1001209 (on 14th Street NW at K Street NW) just south of the location of the existing shelter.

Lafayette Square

Assuming the existing route service remains at Lafayette Square, the location would require transit center and enhanced service class passenger amenities, including at least three standard three-panel shelters. The limited space and the presence of large tree boxes along the curb side limit the opportunity to install large amenities at this location. In addition, the location of the stops, next to a historic park in the proximity of the White House, may raise further constraints on what recommendations would be possible at Lafayette Square.

Figure ES-2: Franklin Square - Curb Extension and Shelters on I Street NW

In addition, WMATA is continuously searching to relocate the X2 terminus from Lafayette Square. One of the locations that has been identified is along 15th Street NW [west] of McPherson Square, but there is no official confirmation on the relocation. If the X2 terminus is relocated, stop 1003702 would be removed from Lafayette Square.

L'Enfant Plaza

The study recommends the installation of two standard three-panel shelters at stop 1003665 (located on the south side of D Street SW).

McPherson Square

The study recommends the extension of the existing bus zone (approximately 20 feet north) of stop 1001199 (located on 15th Street NW [west] at I Street NW). The extended bus zone would also have a new curb extension that would provide enough space to accommodate a new standard three-panel shelter and the required four feet clear pathway along the sidewalk.

Stop 1003476 (located on 15th Street NW [west] at K Street NW) would be eliminated permanently and stop 1001185 (located on I Street NW) would have an additional standard three-panel shelter just east of the existing shelter location.

Potomac Park

The bus zones of stop 1000983 (located on Virginia Avenue NW at 21st Street NW) and stop 1001021 (located on Virginia Avenue NW at 22nd Street NW) are currently signed as non-peak hour parking spaces, and observations indicate buses have been alighting passengers at this location from the through lane during non-peak hours when the parking spaces are filled. The study recommends the removal of parking spaces at the bus zones of both stops, which would convert them into all day service stops.

In addition, the western sidewalk approach to stop 1003537 (located on Virginia Avenue NW at E Street NW) does not provide the four feet minimum clear pathway due to an obstruction caused by a large tree root growing in the adjacent tree box. The study recommends shifting the existing shelter several feet to the north and/or to the east to allow the expansion of the existing sidewalk to meet the required four feet minimum width.

Washington Street at King Street

Due to the limited space available to implement bus zones and passenger waiting areas that comply with the *WMATA Design Guidelines*, the study recommends the reassignment of bus routes at each stop to assign the routes with higher boarding activities at the Washington Street stops with larger space to accommodate higher passenger volumes.

Study Cost Estimate

A planning-level, order-of-magnitude cost estimate was developed for the proposed recommendations. The costs reflect the conceptual nature of the work to date. These numbers could help WMATA prioritize and phase implementation of the recommendations. In future work, WMATA should conduct a design-level cost estimate when more detailed design is performed, before implementing parts of the study. The study's estimated cost for the entire suite of *On-Street Bus Terminal Study* improvements is approximately USD $430,000.

Costs were compiled using unit costs from various sources and include the following allowances:

- 5 percent for drainage and utility relocation
- 2.5 percent for maintenance of traffic during construction
- 20 percent project management and other contingency, to reflect the conceptual nature of the design

The costs do not include other projects costs such as additional planning and engineering, overhead, profit and fees, contractor's contingency, or escalation beyond 2012 dollars.

The majority of the cost data was taken from several state departments of transportation (i.e. DDOT, VDOT) and previous WMATA studies. Unit costs estimates that were not in 2012 were escalated utilizing the consumer price index (CPI) escalation rate from the year 2011 to 2012 (approximately 1.7 percent).

Detailed breakdown of the cost estimate items are provided under Appendix A.

Table ES-4: Concept Level Project Cost Estimate Summary

Location	Cost (2012 USD)
10th Street NW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	17,200
C Street SW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	12,500
Bus Amenities and Facilities	3,600
Columbus Circle	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	unknown
Bus Amenities and Facilities	unknown
Farragut Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	14,400
Bus Amenities and Facilities	7,900
Federal Center SW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	-
Franklin Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	54,700
Bus Amenities and Facilities	29,400
Lafayette Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	9,400
L'Enfant Plaza	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	40,500
Bus Amenities and Facilities	28,200
McPherson Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	27,000
Bus Amenities and Facilities	12,600
Potomac Park	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	23,700
Bus Amenities and Facilities	12,400
Washington Street at King Street	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	39,500
Bus Amenities and Facilities	5,600
ALL LOCATIONS	
Major Infrastructure Work	212,300
Drainage, Utility, MOT	15,900
Bus Amenities and Facilities	126,300
Contingency	70,900
TOTAL (Subtotal + Contingency)	**425,400**


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19TH & I

Section 1: Introduction

Study Scope and Context

As part of its efforts to continuously improve the Metrobus service, the Washington Metropolitan Area Transit Authority (WMATA) launched the *On-Street Bus Terminal Study* to analyze 11 on-street bus terminal locations in the Washington Metropolitan area and evaluate the adequacy of the available bus passenger amenities. For the purpose of this study, an on-street bus terminal will be considered as a bus stop serving multiple bus lines and/or a bus stop that serves as a terminus (start or finish) of one or more routes. The 11 study locations are detailed in Table 1.

The majority of the on-street bus terminal locations assessed in this study accommodate more than one bus stop. Each bus stop is identified by a unique bus stop identification number (ID), which is used and referenced throughout this report. In few instances, there were bus stops that did not have a unique ID number associated. Those bus stops are identified as No ID.

Table 1: Summary of Terminal Locations in Study

Location Name	Jurisdiction	Routes
10th Street NW	District of Columbia	7Y, 13G, 32, 34, 37, 63, 64, A42, A46, A48, D1, N3, P1*, P2*, P6, S2, S4
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Columbus Circle	District of Columbia	96, 97, D6, D8, X8
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Federal Center SW	District of Columbia	P1*, P2*
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Lafayette Square	District of Columbia	11Y, 32, 36, 37, 39, 42, G8, L2**, P17, P19, S2, S4, W13, X2
L'Enfant Plaza	District of Columbia	5A, 52, 54, A9**, V5
McPherson Square	District of Columbia	3Y, 11Y, 16Y 32, 36, 37, 39, 42, 43, 80, A9, G8, P17, P19, S2, S4, W13, X2
Potomac Park	District of Columbia	31, 32, 36, 39, 80, N3, P1, S1, X1
Washington Street at King Street	Alexandria, VA	9A, 10A, 10B, 29K, 29N

**Service discontinued during development of the study.*
***Route change discontinued service at the stop location.*

Report Organization

- **Section 2** provides a summary of the criteria and guidelines used to evaluate terminal locations in this study. The passenger facilities at each on-street bus terminal were evaluated using the 2*009 WMATA Guidelines for the Design and Placement of Transit Stops* (*WMATA Design Guidelines)*. These guidelines provide WMATA and jurisdictional partners with specific criteria that help plan and design safe and accessible passenger amenities for local transit facilities.
- **Section 3** provides an inventory of the existing conditions at each bus terminal location.
- **Section 4** summarizes the assessment of the future bus service characteristics and the associated infrastructure needs at each bus terminal location.
- **Section 5** presents the conceptual recommendations focused on improving the bus facilities and passenger amenities at each stop.
- **Section 6** summarizes the concept level cost estimates of the recommended improvements.

Section 2: Guidelines and Concepts

This section provides a summary of the design criteria and bus amenity specifications that were used to not only evaluate the existing and future conditions of the on-street bus terminals, but also used to develop recommendations to improve the bus stop amenities. The amenities assessed and the criteria used to evaluate each bus stop facility were based on the guidelines provided by the *WMATA Design Guidelines*. The following amenities were assessed at each bus stop:

- Bus Stop Sign
- Sidewalk (width and connectivity)
- Seating
- Bus Bay (pull off)
- Trash Receptacle
- System Map
- Interactive Phone System On-Site
- American Disability Act (ADA) Compliant 8'x5' Landing Area
- Lighting
- Expanded Boarding & Alighting Area (Rear Door Access)
- Shelter(s)
- Information Case
- Real-time Display (LED + Audio)

The rest of this section summarizes some of the notable requirements that were taken into consideration throughout this study. For greater details on the design specifications for a particular bus stop and/or passenger amenity please see the *WMATA Design Guidelines*.

Bus Stop Classification

There is a range of design criteria that may or may not be applicable to a specific type of bus stop. Choosing the criteria that is adequate for a particular bus stop depends on factors related to the location and level of activity at the stop. In other words, in order to correctly assess a bus stop and/or passenger amenity, one must first determine the activity-based hierarchy and bus stop's placement outlined in the *WMATA Design Guidelines*.

Bus Stop Hierarchy

The *WMATA Design Guidelines* provides a hierarchy that helps determine the passenger amenities required at bus stops, based on the level of bus and passenger activity. This hierarchy defines three typical bus stop classes:

- Basic Stop
- Enhanced Service Stop
- Transit Center

Basic stops constitute the majority of all bus stops in the Washington Metropolitan area. Basic stops that have 50 or more passenger boardings per day should provide a shelter with interior seating.

Enhanced service stops are those that are served by limited or skip stop service and/or Bus Rapid Transit (BRT). In addition to the amenities provided by a basic stop, the stops classified as enhanced service require a minimum of one shelter with interior seating. Enhanced service stops with 300 or more boardings per day should have additional shelter(s) and NextBus real-time travel information (both LED display dynamic messaging system [DMS] and an audio system).

Transit centers are typically served by multiple routes and have over 500 boardings per day. Transit centers should provide the complete array of passenger amenities listed by the *WMATA Design Guidelines*, including the provision of at least two shelters, an interactive phone system on–site, and an expanded boarding and alighting area.

Bus Stop Placement

The *WMATA Design Guidelines* generally define three types of bus stop placement (i.e., near-side, far-side, and mid-block), and provides a detailed description on the advantages, disadvantages, recommendations, and considerations that should be evaluated for the adequate implementation of each stop placement type. The requirements for each placement type are detailed below.

Table 2: Summary of Requirements by Stop Placement Type

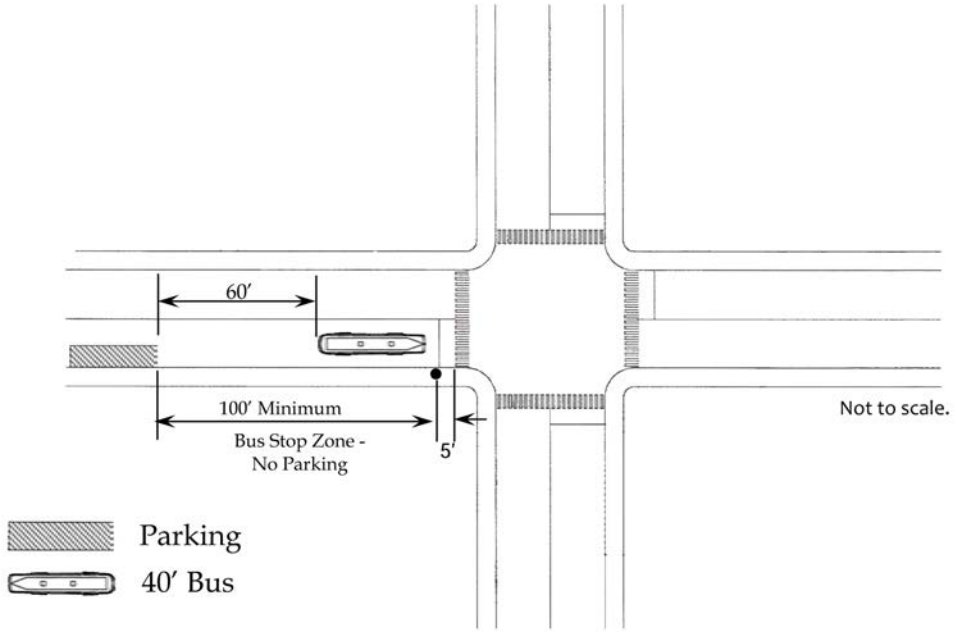
Placement Location Type	Stop Placement from Crosswalk (feet)	Bus Zone Length (feet)	Recommended Application
Near-Side	5	minimum 100	Congestion points/trip generators are downstream.
Far-Side	50	70-90	Congestion points/trip generators are upstream.
Mid-Block	N/A	110-150	Trip generator far from any intersection. Pedestrian condition at nearest intersection is problematic.

Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Near-Side Stops

Near-side stops are typically located immediately upstream of an intersection (Figure 1), and are typically placed in areas where the primary trip generator and congestion points are located downstream of the intersection. If a crosswalk is present at the intersection, the stop should be placed at least five feet from the crosswalk. This type of stop placement generally requires a minimum bus zone of 100 feet for a standard 40-foot bus.

Figure 1: Typical Near-Side Bus Stop Location



Notes:

- Add 20 feet to bus stop zones for a 60-foot articulated bus
- Increase bus stop zone by 50 feet for each additional 40-foot bus or 70 feet for each additional 60-foot articulated bus

Where Recommended

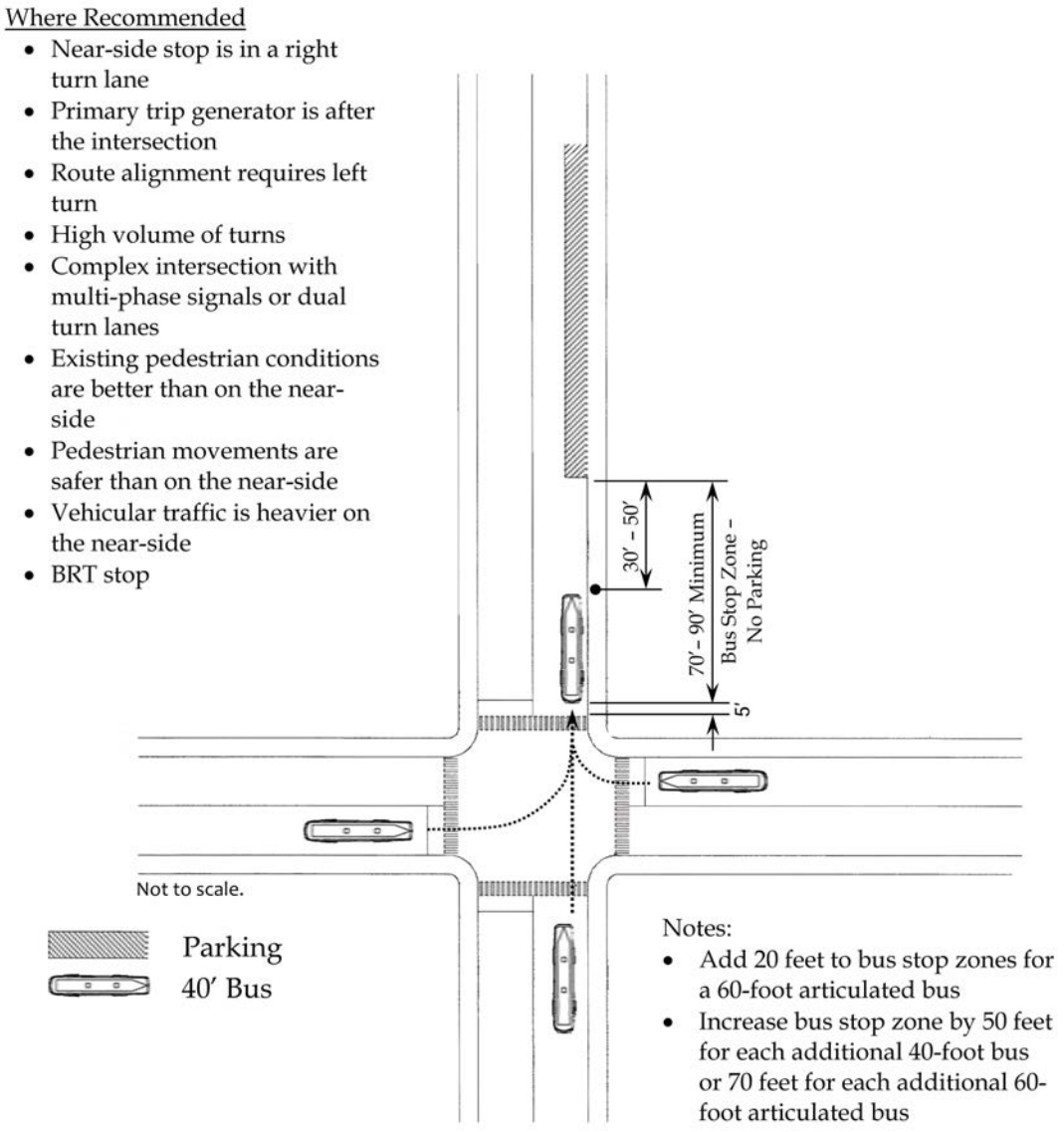
- Primary trip generator is before the intersection
- Existing pedestrian conditions are better than on the far-side
- Pedestrian movements are safer than on the far-side
- Vehicular traffic is heavier on the far-side

Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Far-Side Stops

Far-side stops are located immediately downstream of an intersection (Figure 2), and are typically recommended at locations where the primary trip generator and congestion points are located near-side or upstream of the intersection (e.g., heavy volume of right-hand turns traffic on the near-side of the intersection). To avoid vehicle conflict with pedestrians on the crosswalk at the intersection, the bus stop sign should be located at least 75 feet from the intersection (for a standard 40-foot bus). Furthermore, an additional 30 to 50 feet of bus zone should be provided downstream of the bus stop location to allow sufficient room for the buses to transition into the adjacent through lane. In total, the length of a far-side bus zone is generally between 70 and 90 feet.

Figure 2: Typical Far-Side Bus Stop Location

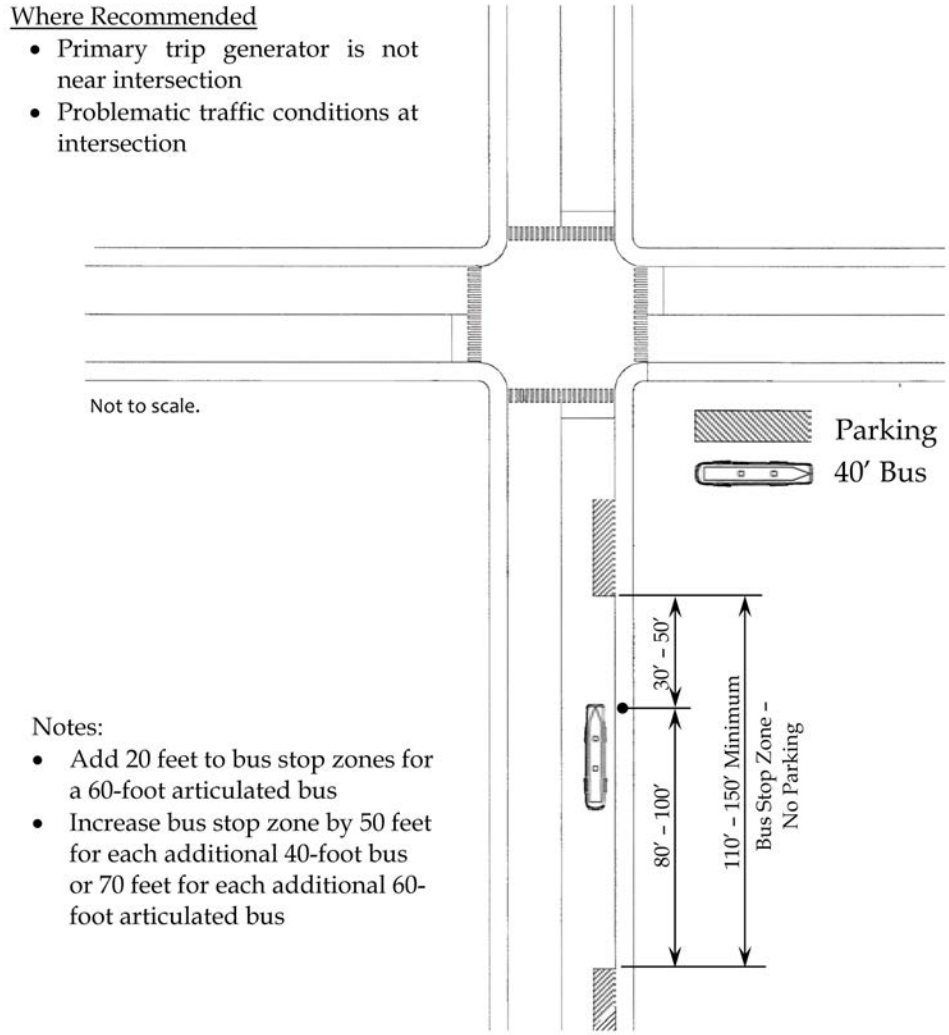


Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Mid-Block Stops

Mid-block stops are placed midway between intersections (Figure 3). Typically, mid-block stops are discouraged, as intersections provide traffic lights and/or crosswalks that facilitate pedestrian access. If the primary trip generator is not near an intersection or the traffic conditions at the intersections are problematic, a mid-block stop may be recommended if pedestrian crossings have been factored into the placement of the stop. For a standard 40-foot bus, a mid-block stop will require a minimum of a 110 feet bus zone, with at least 30 feet downstream and 80 feet upstream of the bus stop.

Figure 3: Typical Mid-Block Bus Stop Location



Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Bus Stop Passenger Amenities

Table 3 presents a summary of the hierarchy of bus stop classes and a guide on the passenger amenities that each stop class should provide.

The following paragraphs summarize the design criteria and requirements outlined by the *WMATA Design Guidelines* for bus stop passenger amenities. Under some of the amenities listed below, this study provides some examples of innovative concepts that have been used in bus facilities in other U.S. cities that could be considered for implementation in the future.

Table 3: Passenger Amenities Requirements Based on Bus Stop Hierarchy

Bus Stop Element/Passenger Amenity	Basic Stop	Enhanced Service	Transit Center
Bus Stop Sign	Yes	Yes	Yes
ADA 8'x5' Landing Area	Yes	Yes	Yes
Sidewalk	Yes	Yes	Yes
Lighting	Evening Service	Yes	Yes
Seating	Trip Generator Based	Yes	Yes
Expanded Boarding & Alighting Area (Rear Door Access)	No	Site Specific	Yes
Bus Bay (pull off)	No	Site Specific	Yes
Shelter(s)	1 (50+ boardings/day)	1	2+
Trash Receptacle	Site Specific	Yes	Yes
Information Case	Yes	Yes	Yes
System Map	Contingent on Shelter	Yes	Yes
Real-time Display (LED + Audio)	Optional	Yes	Yes
Interactive Phone System On-Site	No	No	Yes

Source: WMATA Guidelines for the Design and Placement of Transit Stops (2009)

Figure 4: Sample Bus Stop Amenities

Bus Zone Signage

In addition to the clear space requirements established by the bus stop placement, the bus zone should be clearly demarcated by street signs, which should also limit parking and loading/unloading activities of non-bus vehicles.

Figure 5: Sample Street Signs Indicating Metrobus Zone

Bus Stop Signs

Typically, WMATA mounts Metrobus stop signs on posts and perpendicular to the street. The sign posts should be installed at a distance of at least two feet from the edge of the curb to prevent the buses from hitting the sign and/or the sign post. Currently, WMATA is working on replacing all the existing bus stop signs (Figure 6) with a new version of the sign (Figure 7).

All bus stop signs should conform to ADA requirements for height, width and visibility, and should include at minimum, information on stop operator name, contact phone number, and route numbers or names. For more details on bus stop sign requirements, please see the *WMATA Design Guidelines*.

Figure 6: Old WMATA Metrobus Stop Sign

Figure 7: New WMATA Metrobus Stop Sign

Passenger Waiting Area

According to the *WMATA Design Guidelines*, an adequate waiting area provides a safe, secure, and non-slippery space at the stop.

Typically, the passenger waiting area should be connected to streets, sidewalks, and the rest of the public space by a clear pathway that is at least four feet wide. The waiting area should also provide an ADA-compliant passenger landing area (clear of obstructions) that is at least eight feet by five feet (8'x5') (Figure 9).

In some cases, on-street bus stops accommodate curb extensions to facilitate boarding and alighting operations. Typically, bus stop curb extensions should be at least six feet wide and 30 to 40 feet in length to accommodate a standard 40-foot bus (Figure 10). For the concept level analysis of curb extensions in this study, radii of the curb returns were assumed to be approximately five feet.

The *WMATA Design Guidelines* states that "the current Federal Transit Administration's (FTA) interpretation of the ADA requirement is that the construction of a landing area is not required unless other improvements such as shelters are constructed. Stops which are inaccessible obligate the transit provider to offer ADA complementary paratransit for customers who could otherwise use the accessible stop." For more details on bus stop accessibility requirements, please see the *WMATA Design Guidelines*.

Figure 8: Typical Urban Metrobus Passenger Waiting Area

Figure 9: Typical Layout of On-Street Bus Stop Passenger Waiting Area

Figure 10: Typical Curb Extension Layout for On-Street Bus Stops Serving Standard 40-foot Bus

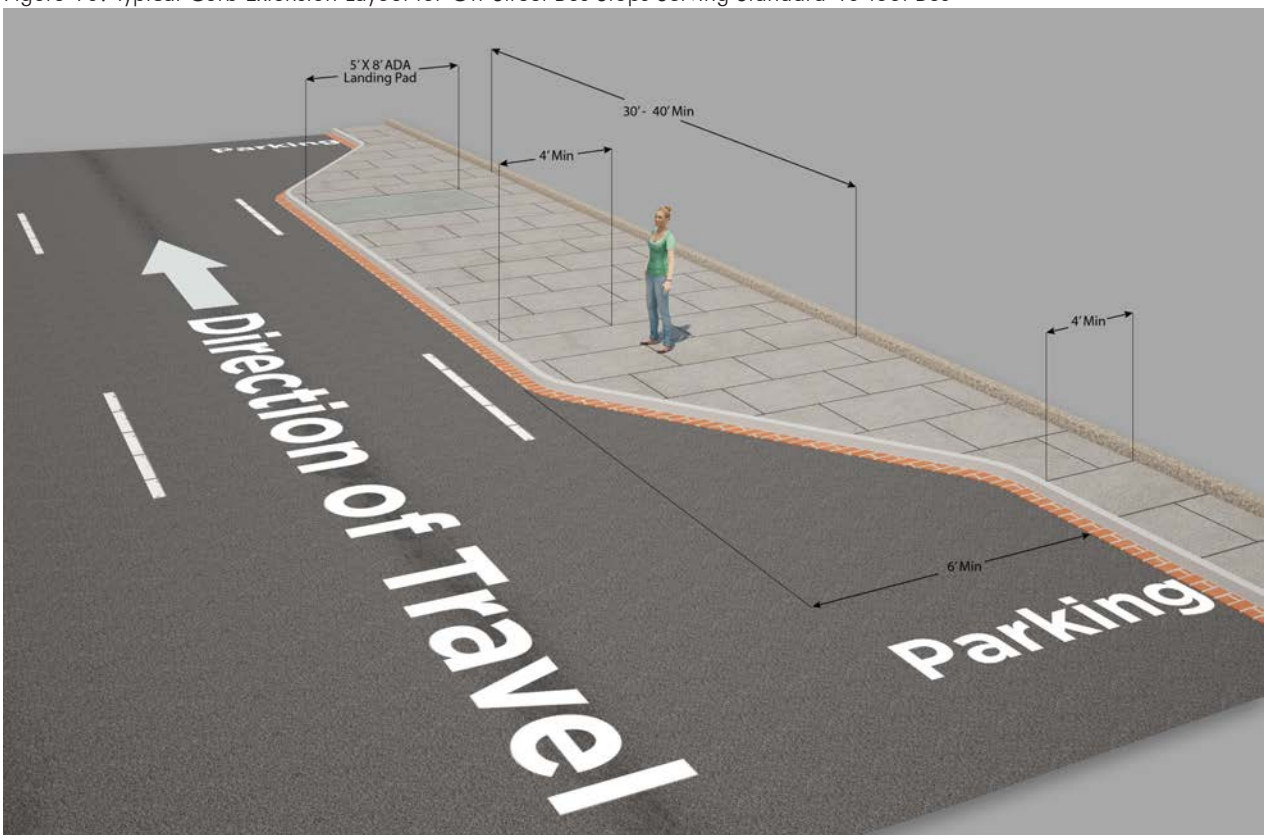


Figure 11: Narrow Three-Panel Shelter

Benches and Shelters

Within this study, a stop that requires a free standing bench is also assumed to require a shelter. With the exception of stops along Washington Street at King Street, the stops that require a shelter would already provide built in seating and meet the ADA requirements specified by the *WMATA Design Guidelines*.

Metrobus shelters within the District of Columbia (DC) are owned by the District Department of Transportation (DDOT), and are provided through a contract with Clear Channel Communications. There are some variations available in regards to the design specifications of the shelter, but the two most commonly used shelter types are:

- The narrow three-panel shelter, which is approximately 14 feet long, three feet wide, and eight feet tall (Figure 11).
- The standard three-panel shelter, which is approximately 14 feet long, four and a half feet wide, and eight feet tall (Figure 12).

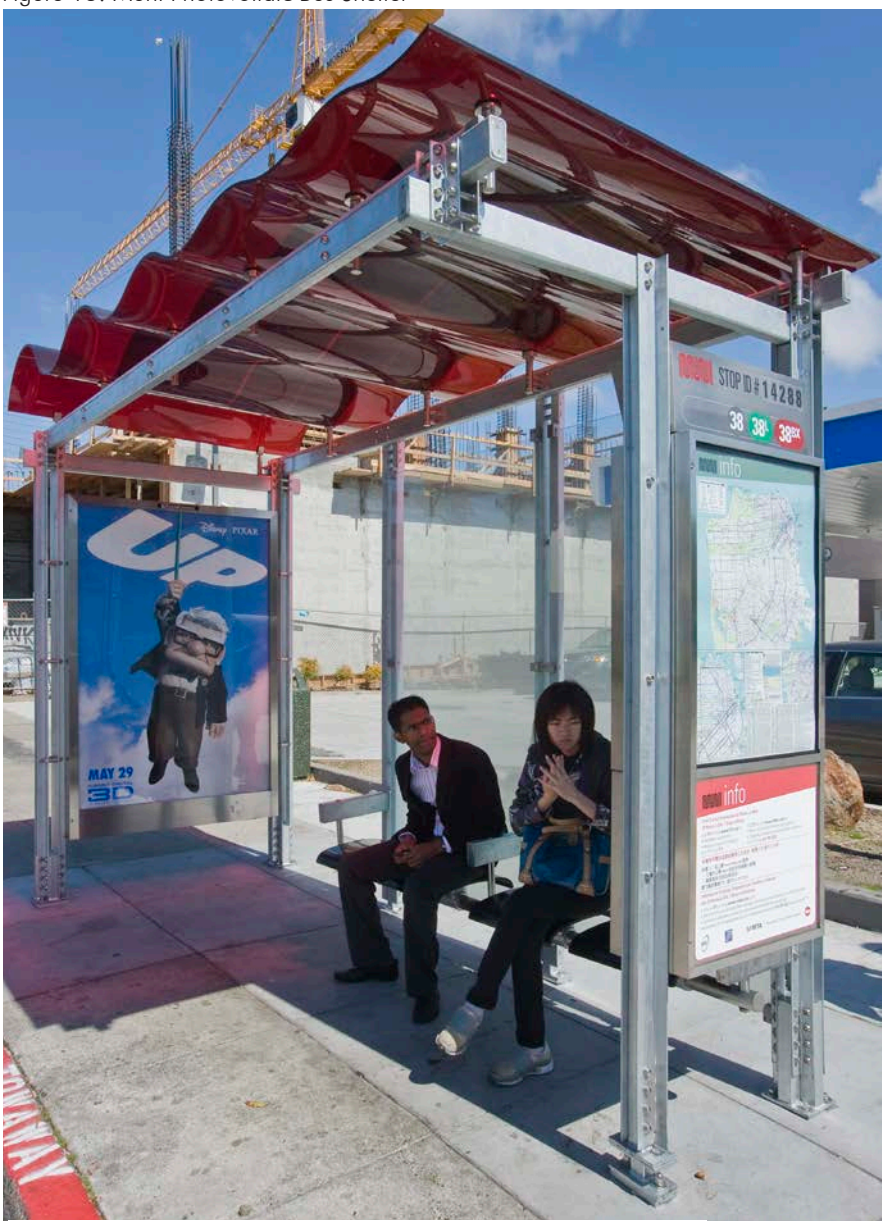
Figure 12: Standard Three-Panel Shelter

Innovative Shelter Concepts

Transit agencies throughout the United States have adopted innovative designs to their bus shelters in an attempt to reduce the environmental footprint of the transit stops. The concepts below do not necessarily follow WMATA guidelines, but do provide some innovative ideas that could be successfully applied at bus terminals in the future.

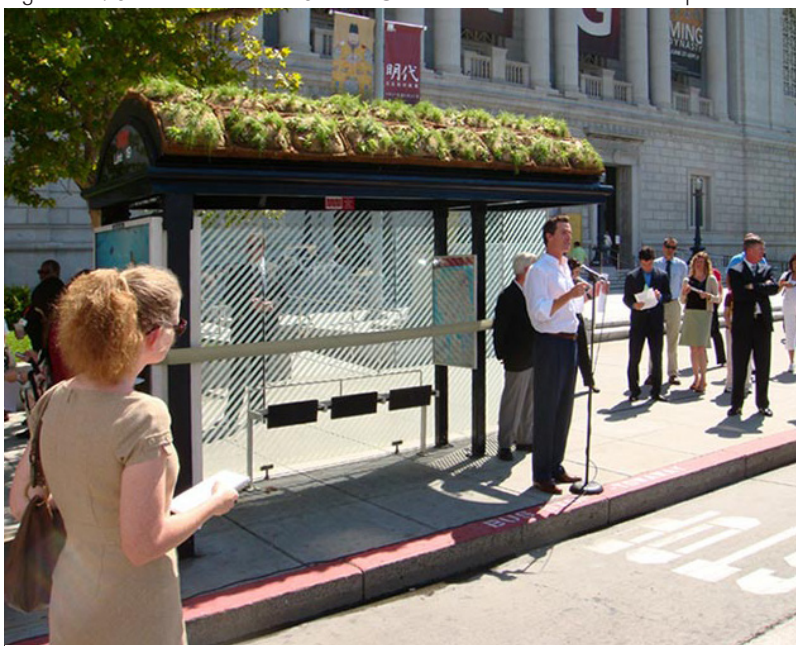
Solar Shelters: Numerous transit agencies have started to install solar panels on the roof of their bus shelters to fully or partially provide electrical power to those stop amenities requiring electricity. In one example, the San Francisco Municipal Transportation Agency (Muni) has installed environmentally friendly bus shelters that contain photo voltaic cells on its roof that store power during the day and illuminate the shelter or feed power back into the local electric grid at night (Figure 13).

Figure 13: Muni Photovoltaic Bus Shelter



Source: Green Architecture Notes (2012)

Figure 14: San Francisco Bus Shelter Green Roof Demonstration Project



Source: 450 Architects Inc., (2012)

Figure 15: City of Philadelphia and SEPTA Shelter Green Roof Demonstration

Source: Inhabitat.com (2012)

Photovoltaic cells on the roof may or may not capture and store enough power to operate all the electrical components of the bus shelter, but can at least reduce the electrical power consumption of each shelter.

Green Roof Shelters: An effective way to reduce the heat island effect and stormwater runoff at bus stops could be the installation of green roofs on the bus shelters. Several cities across the U.S., including San Francisco and Philadelphia (Figure 14 and Figure 15), have launched demonstration projects to test the effectiveness of green roofs at transit stops. Although the green roofs have not been implemented at a large scale, this innovative concept could incorporate low impact development (LID) and sustainability designs into typical transit stops.

Although the existing contract between DDOT and Clear Channel may not allow for modification or innovations on the current shelters, the above and/or other innovative concepts could be considered in the future design of bus shelters.

Passenger Information

In addition to the route information provided on the bus stop signs, route maps and bus schedules should be provided at all bus stops. Wherever present, shelters should have cases or panels that can accommodate passenger information such as maps, routes, and schedule information (Figure 16).

At locations where bus shelters are not provided, customer information should be available in cases that are mounted on the bus stop posts. Typically, most Metrobus information is provided in fixed cases (Figure 17). The bus passenger information posted at the stop is not subject to ADA compliance, so long as the cases holding the information do not create hazardous pedestrian circulation conditions. For more information on the different ways bus information can be provided and required specifications on the way the information should be displayed and installed please see the *WMATA Design Guidelines*.

In addition to static passenger information, WMATA provides bus passengers with real-time bus information at stops. Currently, WMATA has deployed the Next Bus real-time bus arrival information, which attempts to leverage on the customers accessibility to internet, mobile phones, and personal digital assistants (PDAs). Passengers can access Next Bus information through the internet or calling the Next Bus number and using stop identification provided at each stop (Figure 18).

Figure 16: Sample Passenger Information Case Provided by a Bus Shelter

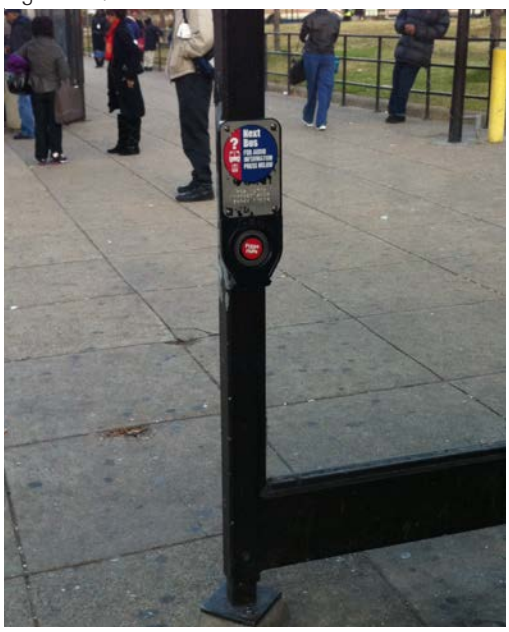
According to the *WMATA Design Guidelines*, all stops that can be classified as enhanced service or transit center require Next Bus information delivered through LED dynamic message signs (DMSs) (Figure 19) and/or Next Bus push button audio boxes (Figure 20). This study recommends that all shelters should accommodate the facilities, or at least supporting infrastructure, to allow the provision of the DMSs and the Next Bus audio boxes.

Figure 17: Typical Fixed Information Case

Figure 18: Typical Next Bus Signs

Figure 19: DMS at Anacostia Station

Figure 20: NextBus Audio Box



In some cases, physical or regulation constraints may not allow for a shelter to be installed at a bus stop, yet high ridership values could demand the provision of real-time passenger information. Real-time passenger information can be provided using DMS on structures that require less of the passenger area footprint than a bus shelter. For instance, an electrified panel structure could be used that provides real-time passenger information (using DMS) at the top and has room for system maps or advertisement at the bottom (Figure 21 and Figure 22). The panel structure would be illuminated, which would also help provide additional lighting (if needed) for the passenger waiting areas at night. Allowing the bottom half (or ¾) of the panel available for advertisement provides the flexibility for revenue generation that could cover the cost of the manufacturing and installation of the structure.

The *WMATA Design Guidelines* also stipulates for the installation of interactive phone systems at transit centers. It was agreed by WMATA that none of the stops categorized as transit centers in this study would require the installation of Interactive Phone Systems.

Figure 21: Sample 1 - DMS on Panel Structure

Figure 22: Sample 2 - DMS on Panel Structure

Figure 23: Typical DC Street Light Design

Lighting

According to the *WMATA Design Guidelines*, transit stops should be located within 30 feet of an overhead (street or ambient) light source (Figure 23).

In this study, all recommended shelters would accommodate the facilities to provide a light source for the stop. The existing DDOT contract with Clear Channel (the contracted providers of the shelters) requires that the shelters to be illuminated and have electrical power. For more details on lighting requirements, please see the *WMATA Design Guidelines*.

Trash Receptacles and Vendor Boxes

The *WMATA Design Guidelines* indicate that both trash receptacles and vendor boxes must be organized and located to prevent obstruction of pedestrian circulation or the movement of bus passengers (including ADA accessibility). The trash receptacles installed at or near the bus stop should resemble the surrounding street furniture owned and maintained along the corridor or neighborhood (Figure 24). Vendor boxes are typically provided along the curbside space.

For more details on requirements for trash receptacles and vendor boxes, please see the *WMATA Design Guidelines*.

Figure 24: Typical Downtown Washington DC Vendor Boxes and Trash Receptacles

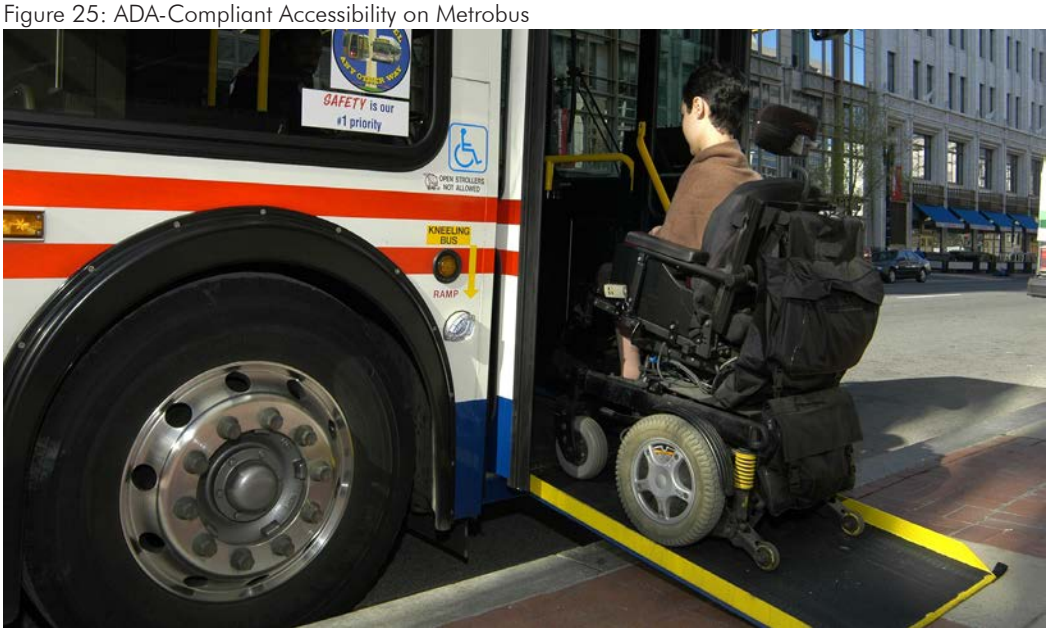
ADA Compliance

The *WMATA Design Guidelines* require that all bus stops should, at a minimum, meet the requirements set by the *Americans with Disabilities Act Accessibility Guidelines* (*ADAAG*). The design requirements set for amenities at transportation facilities by section 810 of the *ADAAG* include criteria for:

- Firm and stable surface
  - + Cross slope should not be steeper than a 1:48 ratio (rise to run).
  - + Sidewalk paved smooth, avoiding pavement material that may create uneven surfaces (e.g., brick pavers or pavers that allow for numerous joints).
- Landing area should provide a 8'x5' feet of clear space.
- Shelters should provide clear interior floor or ground space of 30 inches by 48 inches minimum.
- Accessible pathways – the pathways to the transit stops should be clear and accessible, meeting the following criteria:
  - + Walking surfaces with a running slope not steeper than 1:20
  - + Ramps and curb ramps, excluding flared sides, with running slopes not steeper than 1:12
  - + Clear width of at least 36 inches (three feet) - the *WMATA Design Guidelines* requires a minimum clear space of four feet

In addition, as mentioned earlier, the *WMATA Design Guidelines* presents that, "the current Federal Transit Administration's (FTA) interpretation of the ADA requirements is that the construction of a landing area is not required unless other improvements such as shelters are constructed. Stops which are inaccessible obligate the transit provider to offer ADA complementary paratransit for customers who could otherwise use the accessible stop." For more details, please see the *WMATA Design Guidelines*.

Figure 25: ADA-Compliant Accessibility on Metrobus




NO
PARKING
metrobus
202-637-7000
DASH
703-746-DASH
NO
TURN
ON
RED

Section 3: Existing Terminal Conditions

This section provides an inventory of the existing conditions at each bus terminal location including summaries of existing property boundaries, relevant bus operation information, and bus passenger amenities at each stop.

The summary of the bus stop facilities catalogues and describes the conditions of the essential bus stop element(s) or passenger amenities outlined by the *WMATA Design Guidelines*. The bus stop facilities that were evaluated are presented in Section 1.

This section does not cover a detailed description of every element at each stop, but it does identify the elements with significant issues or deficiencies at each terminal location. More detailed descriptions on the existing conditions of the bus facilities are provided in the *Existing Conditions Technical Memorandum* of this study.

Property Boundaries

The evaluation of the right-of-ways and property lines was performed using data available from the local jurisdictions' geographical information system (GIS) data. Maps of the property line and the relative location of the bus stops were generated for all locations within the District of Columbia, but not for the Washington Street at King Street location due to unavailable GIS data. The property boundaries can be seen in the plan views provided below.

Some assumptions were made to analyze the existing conditions of the bus infrastructure and right-of-ways. The accuracy of the property lines displayed on the maps depends greatly on the accuracy of the survey and information that were used to develop the GIS data. At some locations, like Potomac Park, there were squares and lots where the property line was missing or did not match with the development or infrastructure present.

In some cases, the existing bus facilities were located within the displayed property line of the adjacent properties. This was particularly true at bus stops adjacent to park land such as Franklin and Farragut Squares, where the bus shelters were built inside the property line under National Park Service jurisdictions. Through coordination and agreement with the National Park Service, it was assumed that installation of these bus facilities within the adjacent property lines were performed under documented easements or agreements between agencies and property owners. Therefore, for the purpose of this study, it was assumed that the existing footprints of the bus facilities were within the WMATA jurisdiction under previous agreements with the relevant stakeholders.

Washington Street at King Street, located in Alexandria, Virginia, is within the right-of-way of the George Washington Parkway, which is under the National Park Service jurisdiction. All facilities and modifications implemented within the Washington Street right-of-way, including the modifications to existing bus facilities, must comply with guidelines and standards set forth by the National Park Service.

Summary of Existing Conditions by Location

The summary of the existing conditions are presented by on-street terminal location. The existing conditions for each location describes the general area where the terminal is found, provides as summary of the existing bus and passenger amenities, and highlights ADA compliance and safety concerns relevant to each location.

The existing conditions of the bus and passenger amenities were assessed using the requirements set by the bus stop hierarchy presented in the *WMATA Design Guidelines*. The hierarchy of each stop was designated according to the types of service (i.e., number of route terminus, express routes) at each stop and the daily boardings that were estimated for each stop.

The bus operation data gathered for the existing conditions section of this study include the bus routes servicing each stop, ridership data, and other relevant bus operation observations at key locations. The data was gathered in fall of 2011, and all changes in the bus operation that occurred after this period have been included under the future conditions section of this study. For more detailed information on the bus operations at the locations relevant to the study, please see the Existing Conditions Technical Memorandum of this study.

The passenger boarding values at each stop were estimated for the year 2011 using available data, which in some cases was incomplete. It must be understood that the boarding numbers were not precise estimates and the values should be used as order of magnitude approximation to measure passenger needs and bus stop hierarchy. As a rule-of-thumb, in this study, it was assumed that whenever the stop ridership value did not clearly define the stop class, the determination erred on the side of including the amenities required by the higher stop class of the hierarchy.

The "Required Amenities" tables below summarize the placement type, stop class, and required and existing amenities for each stop. The blue shades represent the amenities that were required, the no-shades the amenities that were not required, and the orange shades the amenities that were considered optional. In addition, the "Xs" represent the amenities that were present at the location under the existing conditions.

In addition, the existing conditions summary includes the key safety and ADA compliance issues that should be considered in the process of implementing adequate bus stop amenities. According to the *WMATA Design Guidelines*, some amenities located at bus stops are exempt from meeting the ADA requirements described in Section 2.

10th Street NW

There are six total bus stops at this terminal location in DC. The stops are located on both sides of 10th Street NW between Pennsylvania and Constitution Avenues NW. There are four stops located on the west side of the street in the southbound direction (1000910, 1003431, 1003570, and 1003691), and two stops located on the east side of the street in the northbound direction (1003288 and 1003287). See Figure 26 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 31 for a closer look of each stop location.

Figure 26: General Location for 10th Street NW

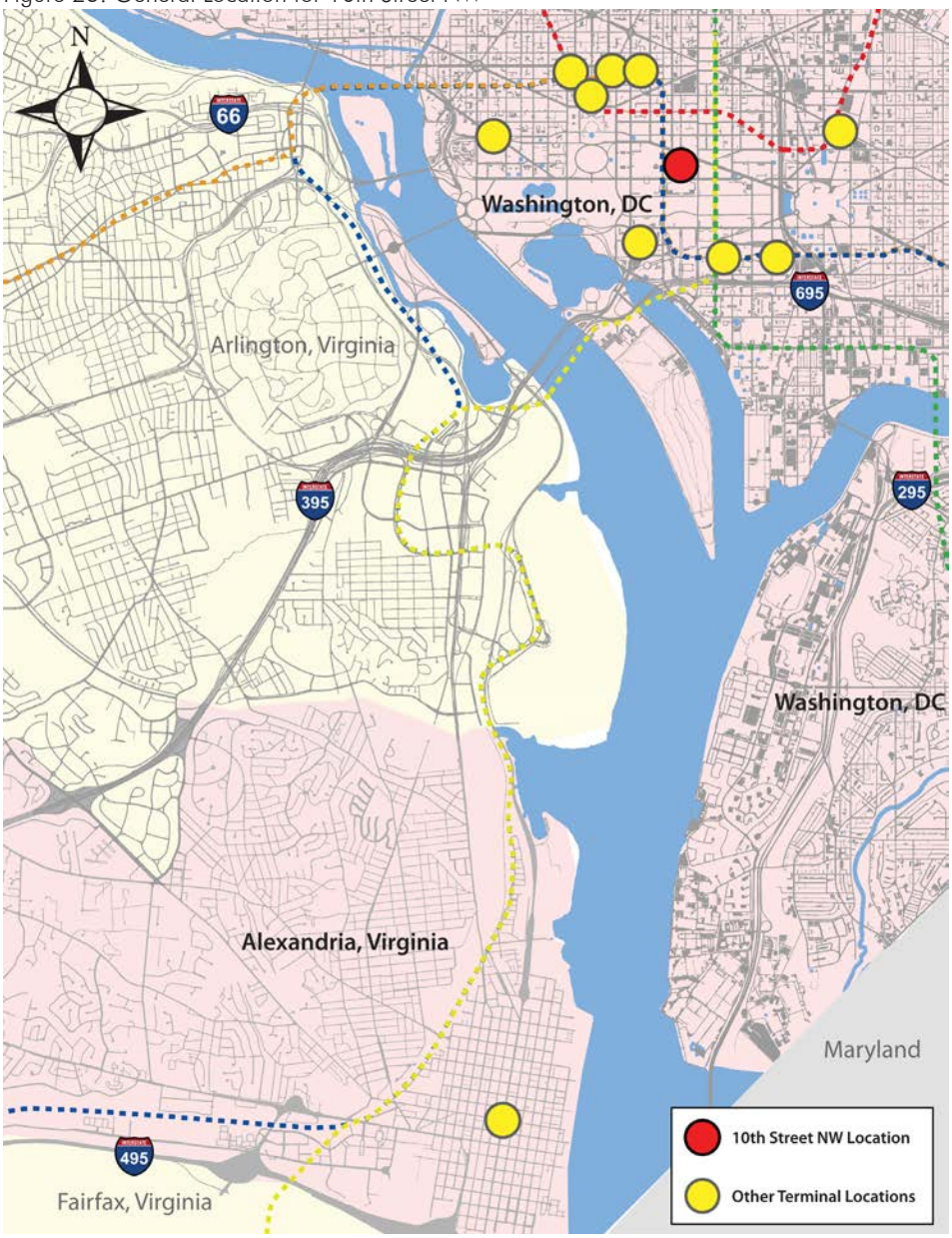


Figure 27: 10th Street NW between Pennsylvania and Constitution Avenues NW

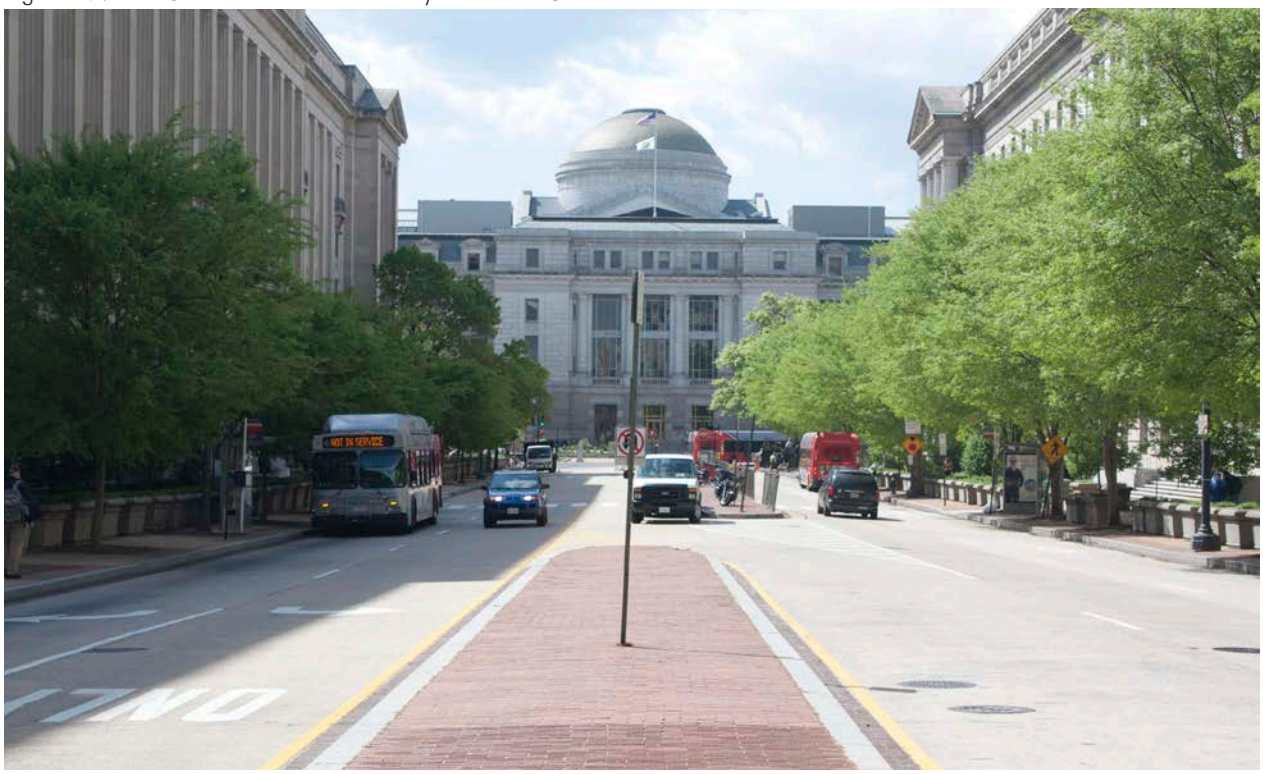


Table 4: 10th Street NW Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
13A*	Stop	10-25 min.	SB 10th Street NW	1000910
13B*	Stop	15-30 min.	SB 10th Street NW	1000910
13G (weekend only)	Stop	30-45 min.	SB. 10th Street NW	1003691
32, 36 (Westbound PM)	Stop	15 min.	NB 10th Street NW	1003288
34	Terminus	15-25 min.	NB 10th Street NW	1003288
37 (Northbound)	Terminus	15 min.	NB 10th Street NW	1003288
63	Terminus	15-20 min.	SB 10th Street NW	1003570
64	Terminus	15-30 min.	SB 10th Street NW	1003570
7Y**	Terminus	10-35 min.	SB 10th Street NW	1003691
A42, A46, A48	Terminus	10 min. (early AM)	NB 10th Street NW	1003287
D1	Terminus	10-25 min.	SB 10th Street NW	1003432
N3	Terminus	30-35 min.	SB 10th Street NW	1000910
P1***, P2***, P6	Stop	30 min.	NB 10th Street NW	1003287
S2, S4	Terminus	5-15 min.	SB 10th Street NW	1003432

**Service discontinued starting December 26, 2010.*

***New service starting December 26, 2010.*

****Service discontinued during the development of the study.*

Bus and Passenger Amenities

Most of the stops on 10th Street NW were classified as basic stops, with the exception of stop 1003288. Although the daily boarding number was estimated to be below 50 passengers, stop 1003288 was still classified as an enhanced service stop because it is served by an express route.

All the stops on 10th Street NW require shelters, with the exception of stops 1000910 and 1003570. Stop 1000910 was assumed to have low boarding numbers, as most passengers alight at this stop. On the other hand, due to incomplete data, it was assumed that stop 1003570, which serves as the terminus of routes 63 and 64 that have modest line ridership values, had a relatively modest number of boardings (classified as a basic stop).

The largest concern at the stops along 10th Street NW is related to the accessibility to and from the bus passenger waiting area. The presence of unevenly located planters and limited circulation space around the existing bus stops are obstacles in providing an ADA-compliant transit facility at this location (Figure 28).

Table 5: 10th Street NW Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
10th Street NW	**311**				
1000910	2	0	1	Mid-block	Basic
1003287	66	0	1	Near-side	Basic
1003288	30	1	2	Mid-block	Enhanced
1003432	131	0	2	Near-side	Basic
1003570	0	0	2	Near-side	Basic
1003691	82	0	1	Mid-block	Basic

= *Ridership values were not available for all routes that serve these stops.*

Figure 28: Limited Space for Passenger Waiting Area at 10th Street NW

Table 6: 10th Street NW Required Amenities

	1000910	1003691	1003287	1003288	1003432	1003570
Placement	Mid-block	Mid-block	Near-side	Near-side	Mid-block	Near-side
Bus Zone Requirement	X	X	X	X	X	X
Stop Hierarchy	Basic	Basic	Basic	Enhanced	Basic	Basic
Bus Stop Sign(s)	X	X	X	X	X	X
ADA Landing Area			X			X
Sidewalk Clearance	X	X	X	X	X	X
Lighting	X		X			X
Seating		X	X	X	X	X
Expanded Boarding/Alighting						
Bus Bay (Pull Off)						
Shelter(s)		X	X	X	X	X
Trash Receptacle						
Information Case		X	X	X	X	X
System Map			X	X		X
Real-Time Display (LED DMS+Audio)						
Interactive Phone System						

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

ADA and Safety Concerns

Both sides of 10th Street NW provide sidewalks far greater than the required minimum width of four feet. The most significant concern, in regards to ADA compliance, lies with the large planters placed throughout the sidewalks. The planters are supposed to be placed with an offset of at least four feet edge-to-edge, to allow ADA-compliant access from the main section of the sidewalk to the curbside section of the sidewalk. Observations indicate that the actual planters have been unevenly placed with an edge-to-edge spacing that range from two and a half feet to four and a half feet, where a great majority of them were spaced at a distance less than four feet.

Particularly on the west sidewalk, the spacing between the planters and the curb does not provide enough space to accommodate an 8'x5'ADA-compliant landing area (Figure 28). If bus stops that provide ADA-compliant amenities would be recommended in the future, the relocation and/or reorganization of the planters should be considered.

The current placements of the bus shelters do not provide accessible pathways, with the exception of the shelter at stop 1003287. Stop 1003691 (Figure 29) does not provide an 8'x5' clear space in the passenger waiting area nor does it provide a bus information case that is ADA-compliant access. In the future, all placements of shelters should provide ADA-compliant infrastructure.

Conflicts between pedestrian and bus circulation is a safety concern at 10th Street NW. If the location grows into a major bus layover and turnaround point, a high volume of bus circulation may increase the number of conflicts with pedestrians, especially at mid-block crossings such as the one shown in Figure 30.

Figure 29: Standard Shelter at Stop 1003691

Figure 30: Pedestrian Crosswalk at Stop 1003691

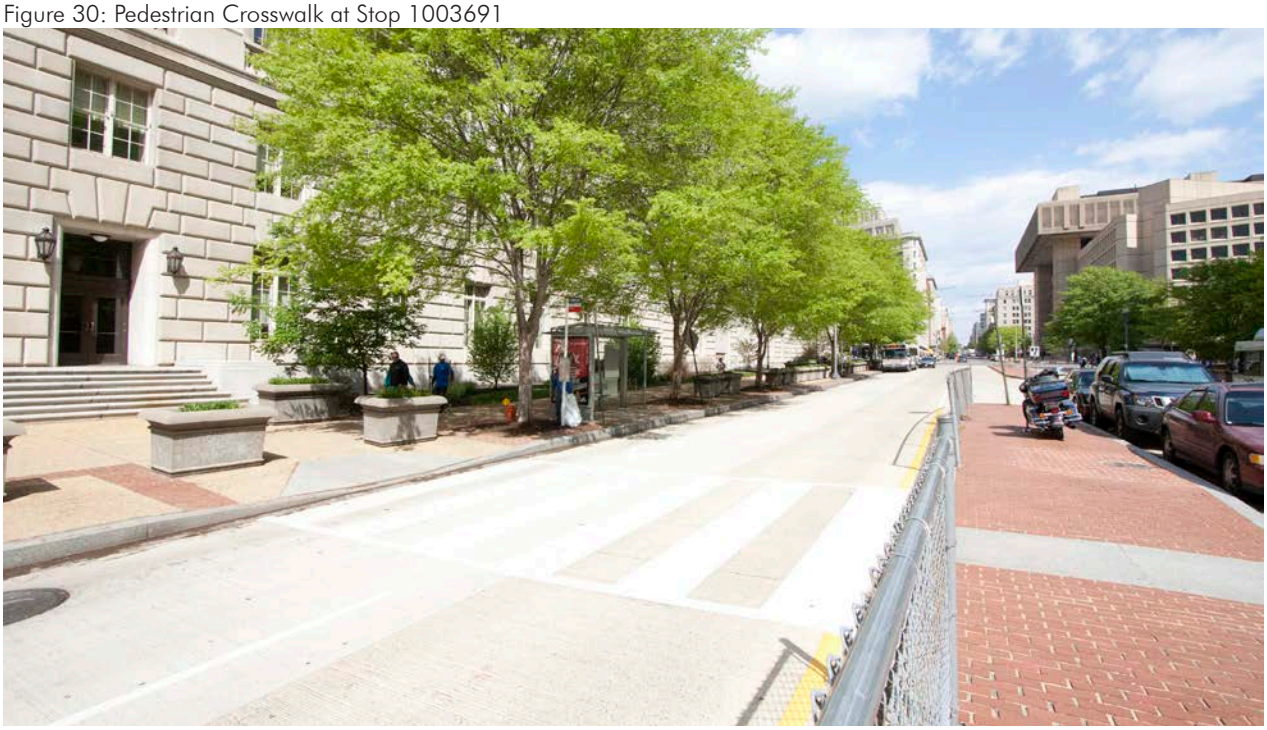


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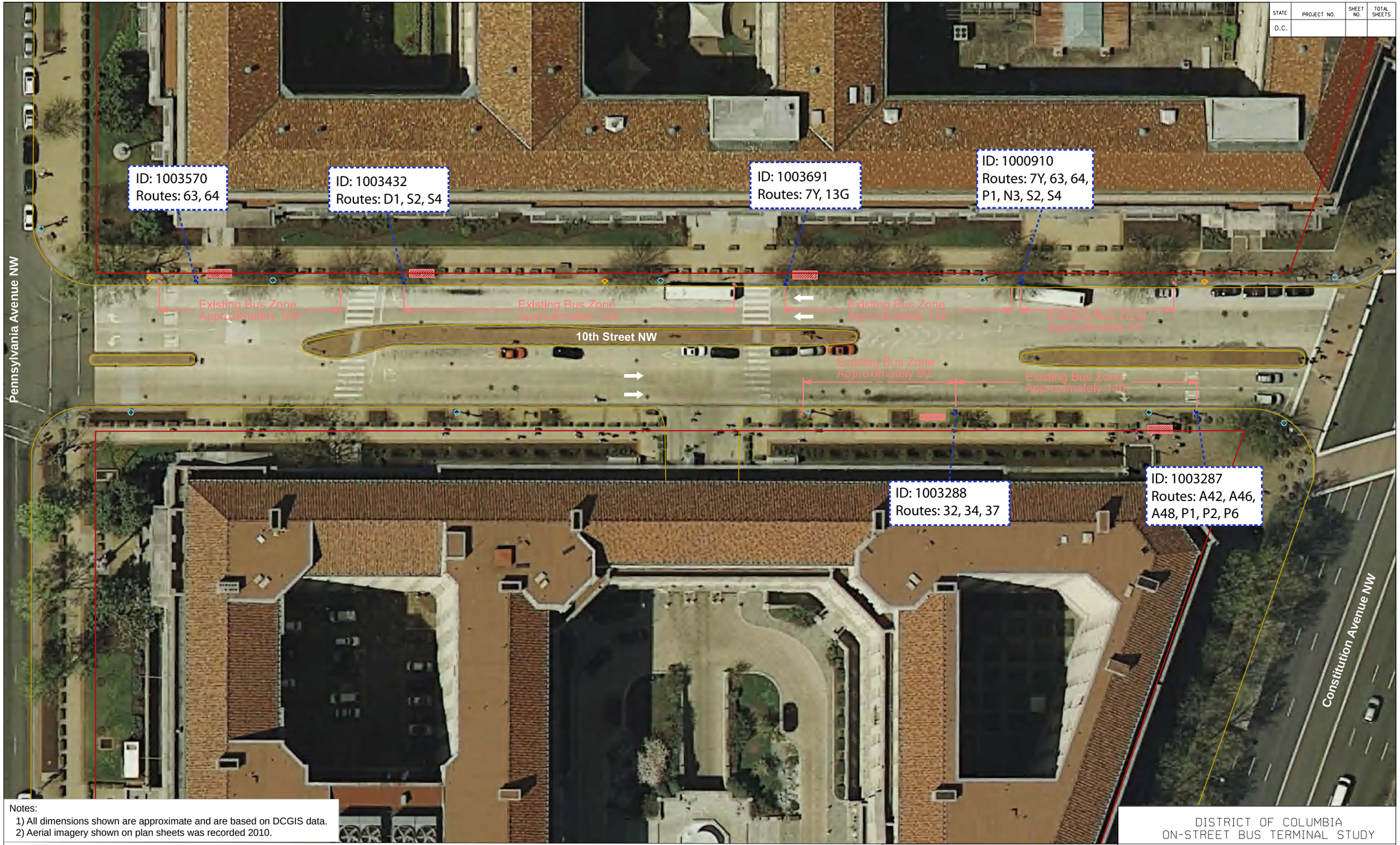
Figure 31: Foldout – Existing Conditions Plan View – 10th Street NW



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C Street SW

There are two bus stops at this terminal location in DC. Both stops are located on the north side of C Street SW (westbound) between 12th and 14th Streets SW. Stop 1000692 is located on the near-side of the block (closer to 14th Street SW) and stop 1000690 is located on far-side of the block (closer to 12th Street SW). There are several curb cuts along the block that provide vehicular access to the Department of Treasury – Bureau of Engraving and Printing building on the north side of C Street. See Figure 32 for the general terminal location in context of the Washington, DC Metropolitan area and Figure 35 for a closer look of each stop location.

Figure 32: General Location for C Street SW

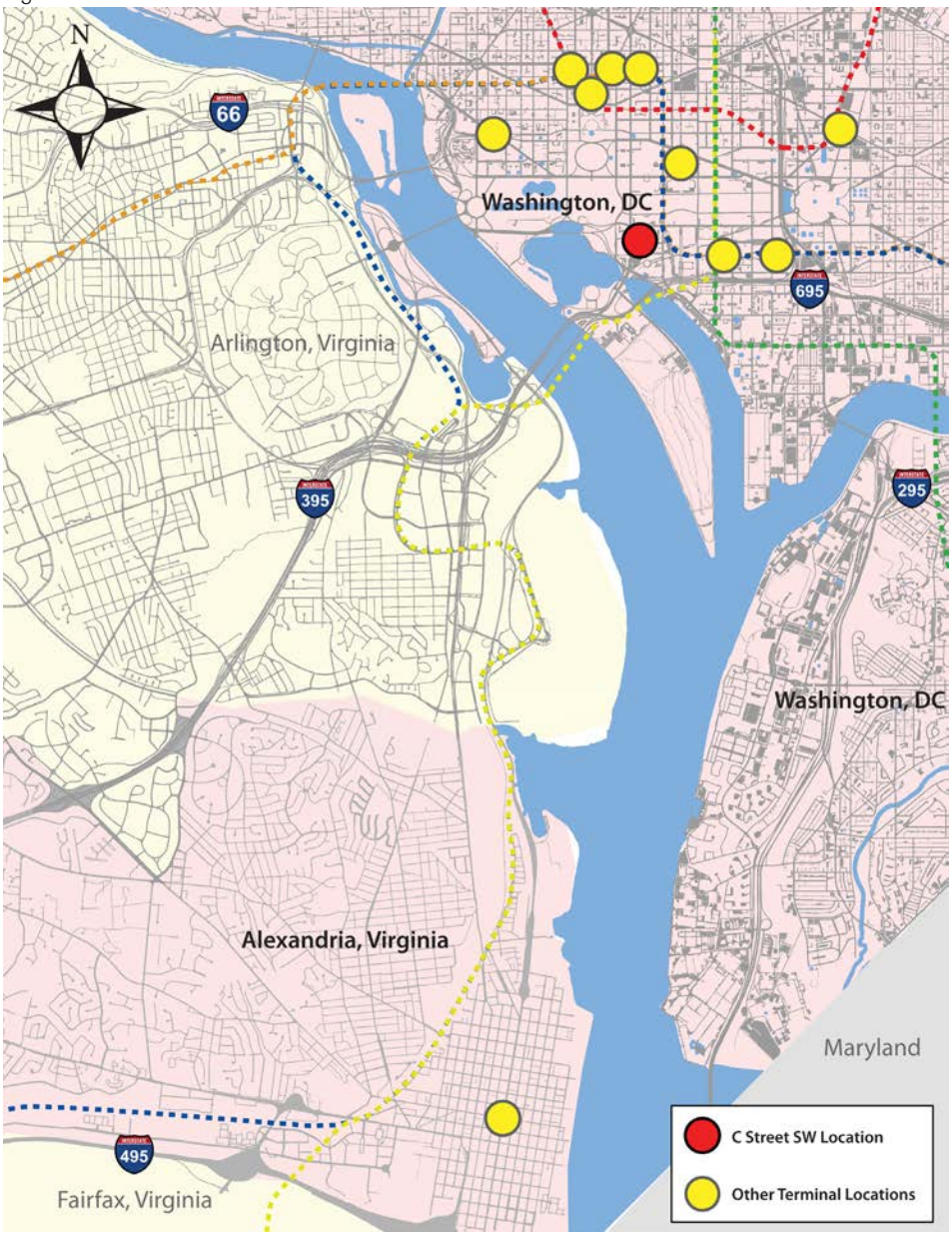

Table 7: C Street SW Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
V7, V9	Terminus, Stop	10-15 min.	C and 14th Street SW, C and 12th Street SW	1000692, 1000690

Figure 33: C Street SW between 14th and 12th Street SW

Bus and Passenger Amenities

Both stops at C Street SW were classified as basic stops. Although they were both classified as basic stops, stop 1000692 requires a shelter due to the higher number of daily boardings.

Table 8: C Street SW Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
C Street SW	**73**				
1000690	0	0	0	Mid-block	Basic
1000692	73	0	1	Mid-block	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 9: C Street SW Required Amenities

	1000690	100692
Placement	Mid-block	Mid-block
Bus Zone Requirement		
Stop Hierarchy	Basic	Basic
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting	X	X
Seating	X	X
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle	X	
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

ADA and Safety Concerns

Both stops are located on a wide sidewalk that accommodates four feet minimum ADA-compliant pathway and the 8'x5' landing area. However, if the bus loads or unloads passengers too close to the existing Metrobus stop sign posts, ADA-compliant access may be inhibited by the obstruction caused by the large planters and/or the fire hydrants (Figure 34). If in the future, a shelter is placed at stop 1000692, the spacing between the fire hydrant and the planters must be carefully considered.

Figure 34: C Street SW Stop 1000692

Figure 35: Foldout – Existing Conditions Plan View – C Street SW

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

ID: 1000692
Routes: V7, V9

ID: 1000690
Routes: V7, V9

Existing Bus Zone
Approximately 115'

Existing Bus Zone
Approximately 58'

C Street SW

13th Street SW

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

C Street SW
Existing Conditions

0 25 50
SCALE IN FEET

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Columbus Circle

There are two bus stops at this terminal location, both of which have been temporarily relocated due to the reconstruction of Columbus Circle. The former location of stop 1001031 was on the westbound direction of Columbus Circle at First Street NE, but it is currently on the north sidewalk of Massachusetts Avenue at First Street NE. Stop 1001029 was previously located inside Columbus Circle along Columbus Monument Drive NE, but has also been temporarily relocated to the south sidewalk of Massachusetts Avenue at E Street NE. See Figure 36 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 38 for a closer look of each stop location.

Figure 36: General Location for Columbus Circle

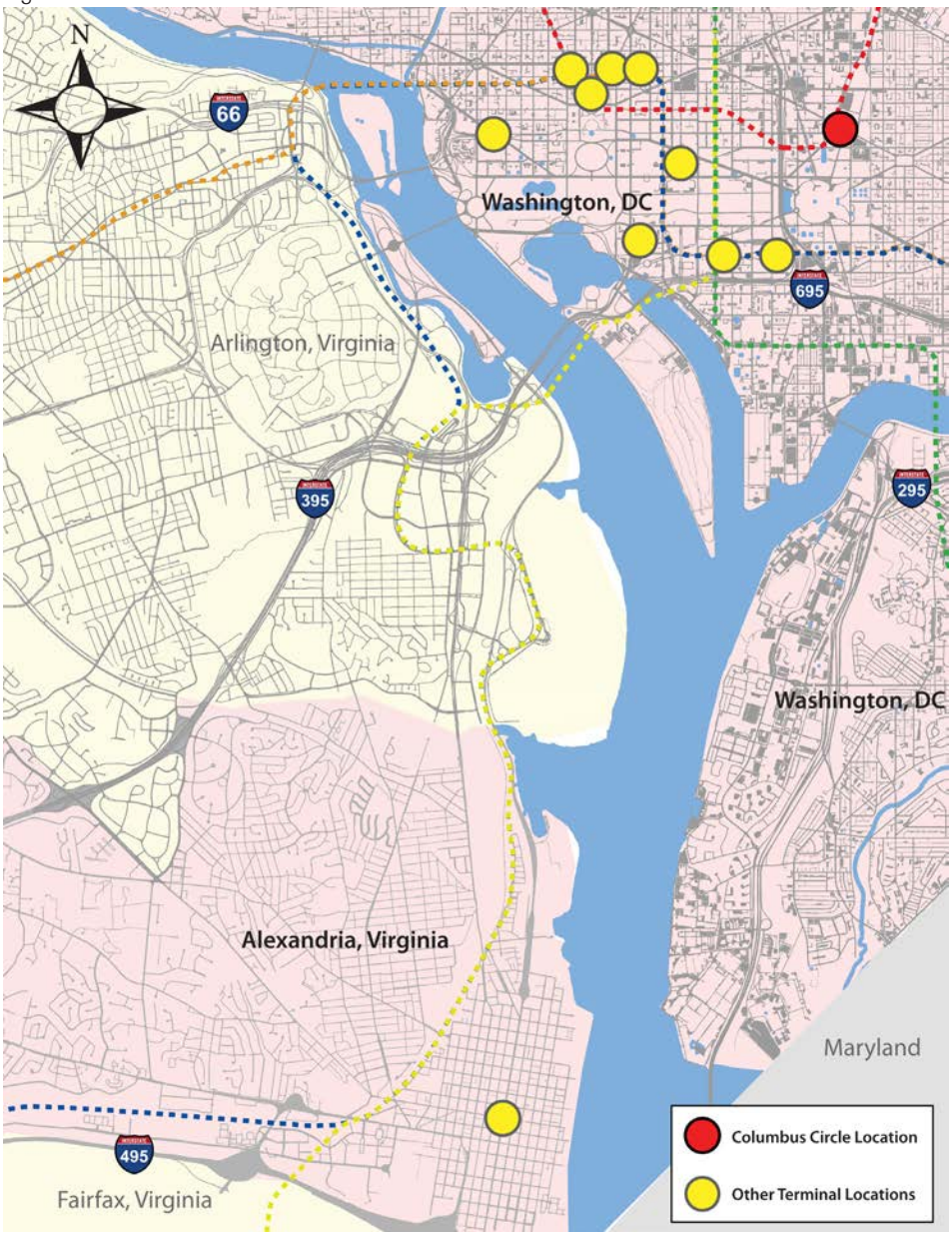

Table 10: Columbus Circle Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
96	Stop	15-20 min.	Columbus Circle and 1st Street NE	1001031
97	Stop	10-15 min.	Columbus Plaza	1001029
D6	Stop	10-30 min.	Columbus Circle and 1st Street NE	1001031
D8	Terminus, Stop	10-20 min.	Columbus Plaza, Columbus Circle and 1st Street NE	1001029, 1001031
X8	Terminus	15-20 min.	Columbus Plaza	1001029

Figure 37: Columbus Circle

Table 11: Columbus Circle Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Columbus Circle	**2,117**				
1001029	1,172	0	1	N/A	Transit Center
1001031	945	0	1	N/A	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Bus and Passenger Amenities

Historically, bus stops at Columbus Circle have had high daily boarding numbers. Although, the stops have been relocated away from Columbus Circle due to the construction work, it is assumed that the daily boardings of routes serving Columbus Circle would remain high once the stops are restored.

Due to the temporary relocation of the stops at Columbus Circle, assigning a stop placement was not applicable in this instance. Although the permanent locations of the restored stops at Columbus Circle are unknown, the historic high boardings at these stops warrant the provision of amenities reflecting the transit center class.

ADA and Safety Concerns

Due to the reconstruction of Columbus Circle and the uncertainty of the new bus stop locations, safety and ADA compliance concerns cannot be assessed at this location.

Table 12: C Street SW Required Amenities

	1001029	1001031
Placement	N/A	N/A
Bus Zone Requirement		
Stop Hierarchy	Transit Center	Transit Center
Bus Stop Sign(s)		
ADA Landing Area		
Sidewalk Clearance		
Lighting		
Seating		
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle		
Information Case		
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

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Figure 38: Foldout – Existing Conditions Plan View – Columbus Circle

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

Columbus Circle
Existing Conditions

0 25 50
SCALE IN FEET

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Farragut Square

There are four bus stops at this terminal location in DC. The stops are located on the east, west, and south sidewalks of Farragut Square. Farragut Square is located on 17th Street NW between I and K Streets NW. 17th Street NW splits into two segments around the park. In this study, the segment east of the park has been designated as 17th Street NW [east] and the other segment as 17th Street NW [west]. There are two stops (1001192 and 1001193) located on 17th Street [east], one stop (1001183) located on I Street NW, and another stop (1001212) on 17th Street [west]. See Figure 39 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 45 for a closer look of each stop location.

Figure 39: General Location for Farragut Square

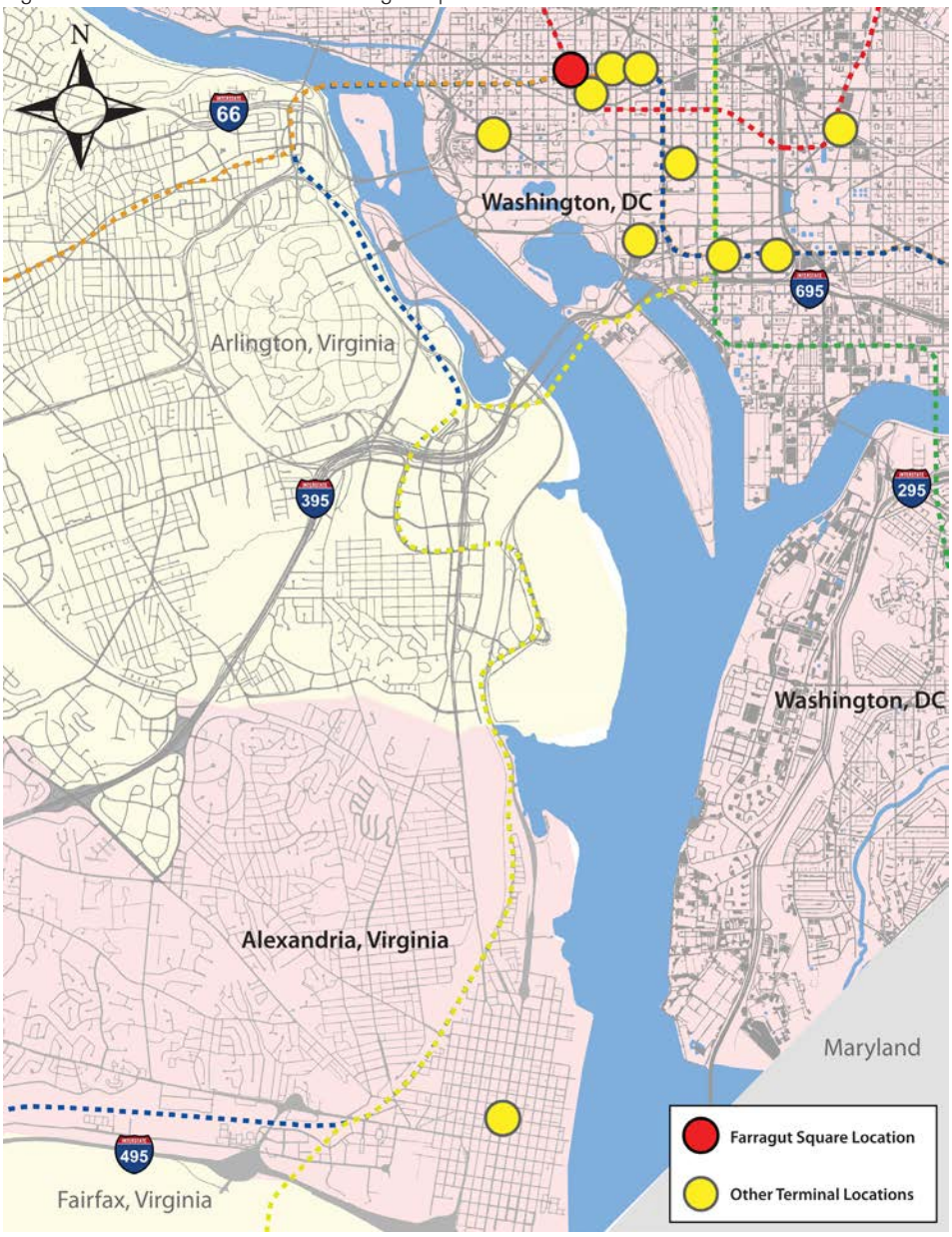
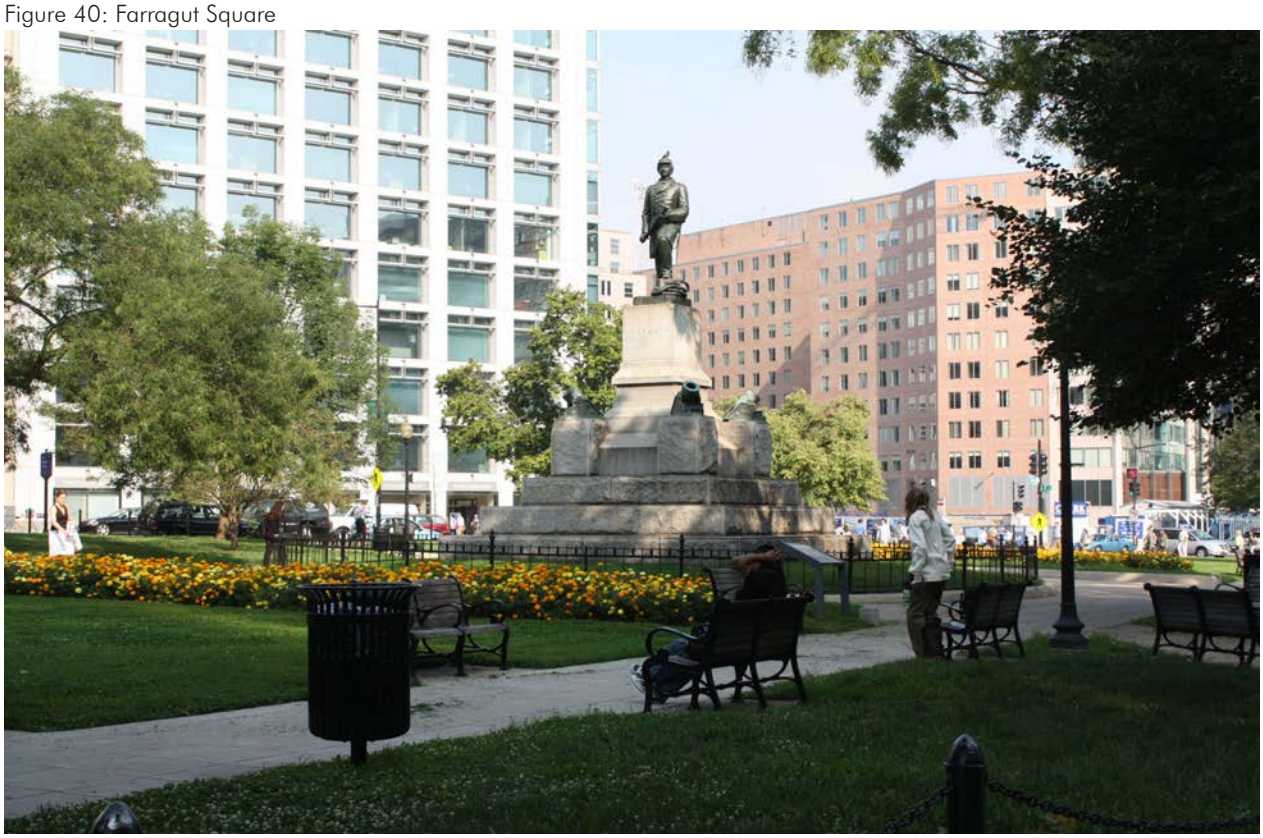


Table 13: Farragut Square Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
11Y	Stop	10-30 min.	I and 17th Streets NW	1001183
32, 36	Stop	10-20 min.	I and 17th Streets NW	1001183
37 (Northbound)	Stop	15 min.	I and 17th Streets NW	1001183
38B	Terminus	10-30 min.	17th [east] and K Streets NW, 17th [east] and I Streets NW	1001192 (4-6:30 PM), 1001193
39 (Westbound) (AM, PM Peak)	Stop	15 min.	I and 17th Streets NW	1001183
42, 43	Stop	5-30 min.	I and 17th Streets NW	1001183
D5	Terminus	30-60 min.	17th [east] and K Streets NW, 17th [east] and I Streets NW	1001192 (4-6:30 PM), 1001193
G8	Terminus	10-30 min.	I and 17th Streets NW, 17th [west] and I Streets NW	1001183, 1001212
L2	Terminus	15-30 min.	17th [west] and I Streets NW	1001193
N2, N4, N6	Terminus	5-30 min.	17th [east] and I Streets NW	1001193
P17, P19	Terminus	10-20 min.	I and 17th Streets NW	1001183
W13	Terminus	15-25 min.	I and 17th Streets NW	1001183

Figure 40: Farragut Square



Bus and Passenger Amenities

Two of the stops at Farragut Square were classified as basic stops and the other two were classified as transit centers. Both stops classified as basic stops would not require shelters, as stop 1001212 has low number of boardings (as it is a stop predominately for alightings) and stop 1001192 was assumed to have relatively low number of boardings due to its part-time operation.

Table 14: Farragut Square Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Farragut Square	**2,100**				
1001183	1,195	2	2	Far-side	Transit Center
1001192	0	0	0	Far-side	Basic
1001193	904	0	3	Near-side	Transit Center
1001212	1	0	0	Near-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 15: Farragut Square Required Amenities

	1001212	1001183	1001192	1001193
Placement	Near-side	Far-side	Far-side	Near-side
Bus Zone Requirement		?	?	?
Stop Hierarchy	Basic	Transit Center	Basic	Transit Center
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance	X	X	X	X
Lighting				
Seating		X		
Expanded Boarding/Alighting				
Bus Bay (Pull Off)				
Shelter(s)		X		
Trash Receptacle	X			X
Information Case	X	X	X	X
System Map		X		
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

? = *Enough space for bus zone, but the limit of the bus zone is not well defined with sign posts.*

With the exception of the stop 1001212, all the stops at Farragut Square have enough space to accommodate the required bus zone, but the presence of confusing street signs do not clearly indicate the extent of the bus zone at each stop. The lack of definition of the bus zone leads to the presence of other users (e.g., shuttles operating in the bus zone of stop 1001193) in the bus zone (Figure 41), which obstruct the efficient and safe operation of the buses.

In addition, during the weekday lunch hours, and especially on Fridays due to 'Farragut Fridays', the curbside space around Farragut Square hosts food trucks (Figure 42). Field observations indicate that most food trucks operate on both segments of 17th Street NW. There were no food truck operation observed at the bus stops, but in a few instances the food trucks were encroaching into the assumed bus zone for stop 1001193. The lack of proper street signs delineating the limits of the bus zone and the parking zone could be encouraging food trucks to utilize part of the bus zone for operation.

Figure 41: Shuttle Operating in Bus Zone at Farragut Square

Figure 42: Food Trucks at Farragut Square

ADA and Safety Concerns

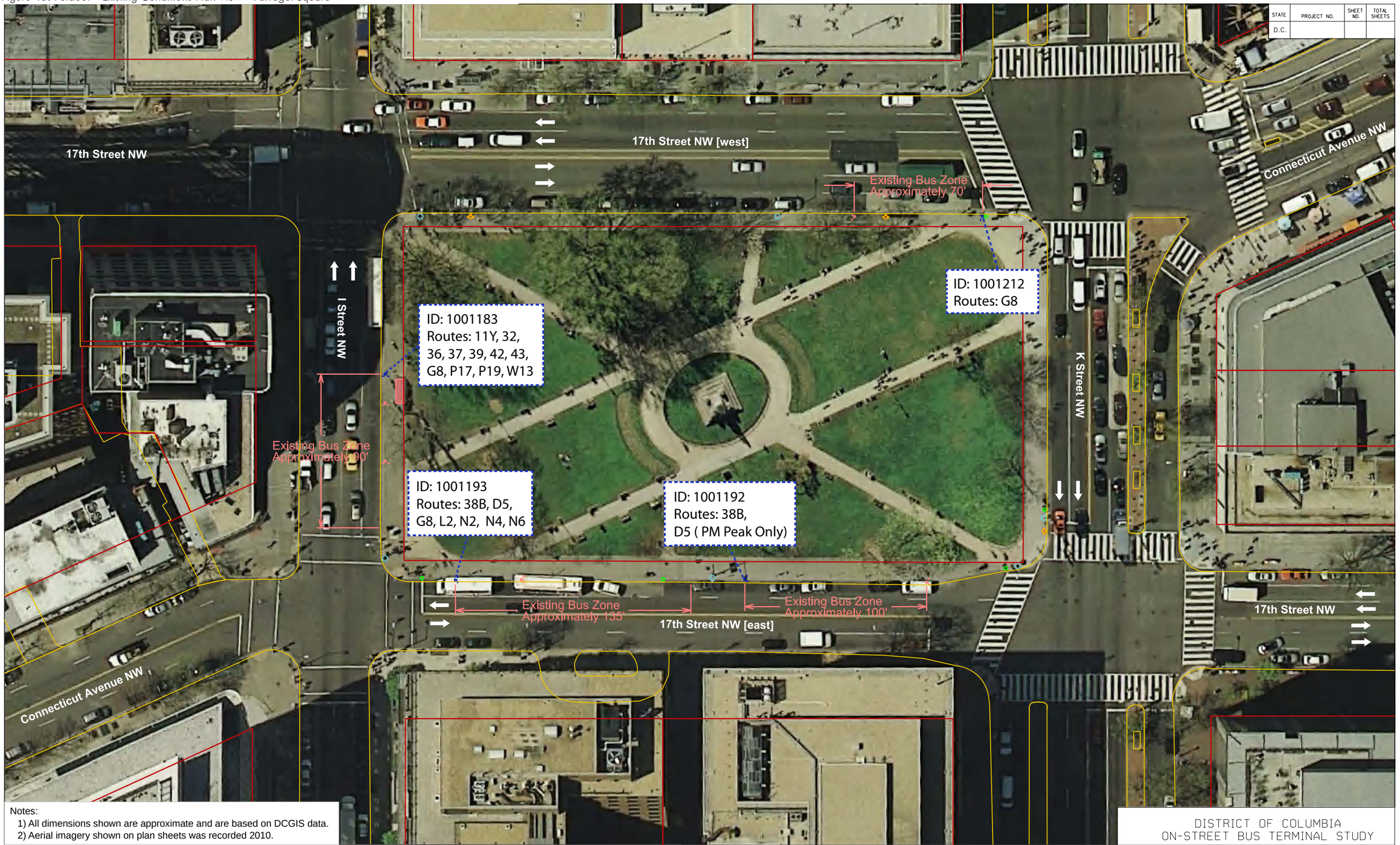
The existing infrastructure provide ADA-compliant amenities. The largest safety issues for pedestrians are the metal grates located on the sidewalks, close to the bus stops, along both I Street NW and 17th Street NW [west] (Figure 43 and Figure 44).

Although there is ample sidewalk space on the I Street NW and 17th Street NW [east] sides of Farragut Square, the placement of future shelter(s) must be considered with caution, as both sidewalks are used heavily by pedestrians. Similarly, future passenger amenities implemented at stop 1001212 (if it is maintained) should not inhibit the high volume pedestrian movement along the Farragut Crossing.

Figure 43: Metal Grates along I Street NW

Figure 44: Metal Grates along 17th Street NW [west]

Figure 45: Foldout – Existing Conditions Plan View – Farragut Square



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

Farragut Square
Existing Conditions

0 25 50
SCALE IN FEET

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Federal Center SW

There are two bus stops at this terminal location in DC. These stops are located just outside the entrances of the Federal Center SW Metrorail Station. Stop 1000669 was determined to be a near-side stop located on the south side of D Street SW (eastbound). An abandoned far-side stop (No ID) is located on the west side of 3rd Street SW (southbound). See Figure 46 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 49 for a closer look of each stop location.

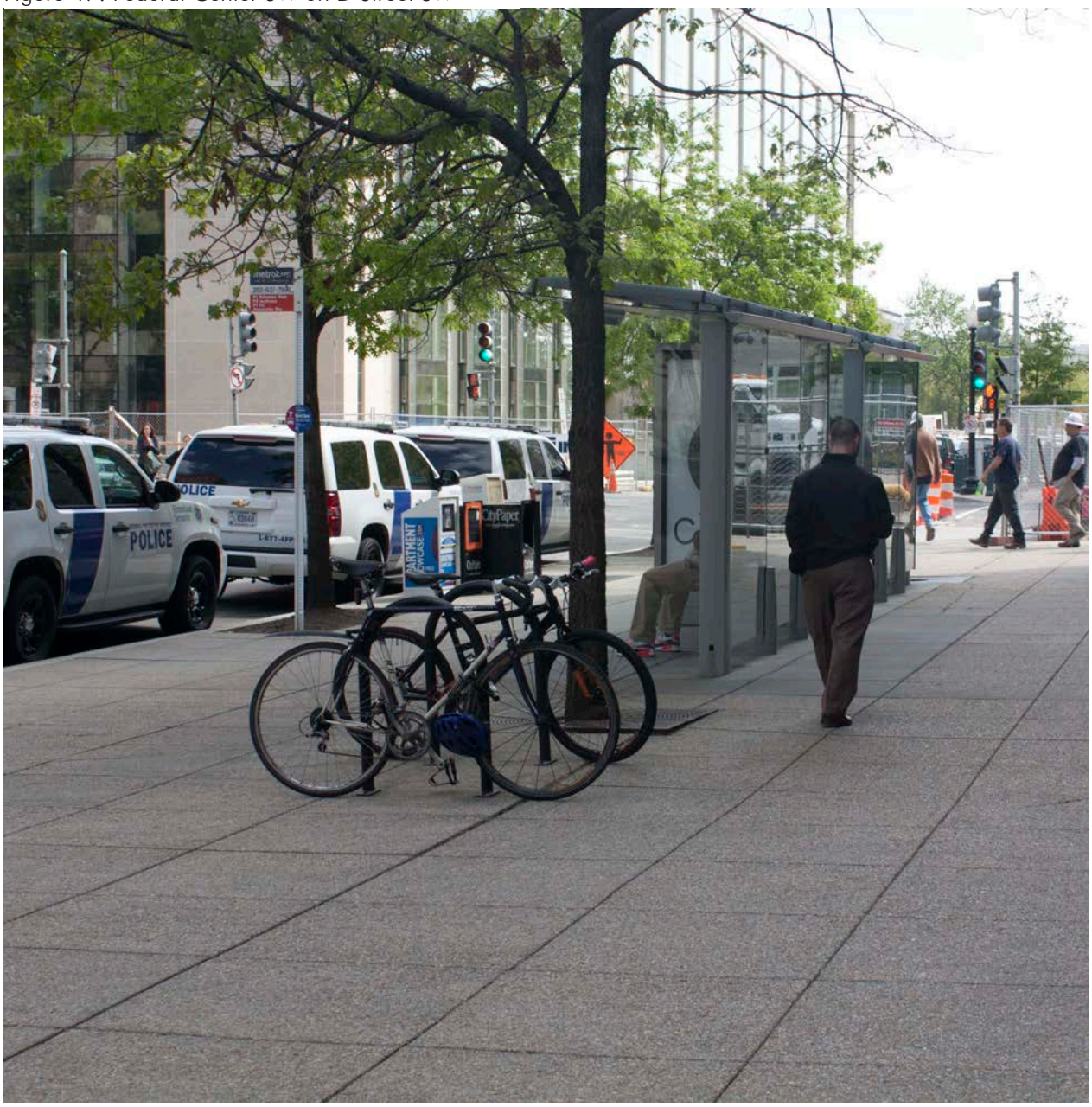
Figure 46: General Location for Federal Center SW

Table 16: Federal Center SW Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
P1, P2, P6*	Stop	20-40 min.	D and 3rd Street SW	1000669

**All services to Federal Center SW discontinued*

Figure 47: Federal Center SW on D Street SW



Bus and Passenger Amenities

Stop 1000069 was classified as a basic stop, as it serves a low number of daily boardings. The ridership at the 3rd and D Streets SW stop was not summarized, as currently, no bus routes serve this stop.

Stop 1000069 was classified as a basic stop but would not require shelters due to the low daily number of boardings. Although the stop on 3rd and D Streets SW does not serve any route, the available infrastructure was listed to document the existing conditions and if needed, to facilitate future considerations to reuse the stop amenities.

Table 17: Federal Centers SW Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Federal Center SW	**17**				
1000069	17	0	0	Mid-block	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 18: Federal Centers SW Required Amenities

	1000669	N/A
Placement	Mid-block	
Bus Zone Requirement	X	
Stop Hierarchy	Basic	
Bus Stop Sign(s)	X	X
ADA Landing Area	X	
Sidewalk Clearance	X	
Lighting		
Seating	X	X
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)	X	X
Trash Receptacle		
Information Case		
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

Since the dates the field observations were conducted, bus service at Federal Center SW has been terminated. There has been no confirmation on whether Federal Center SW would reinitiate service to bus routes in the future.

ADA and Safety Concerns

Although bus service has been terminated, if new bus service is planned for this location, there is ample sidewalk space to provided ADA–compliant amenities at the bus stop/terminal.

Safety concerns at this location include the presence of metal grates on the sidewalk and the lack of adequate lighting along D Street SW (Figure 48).

Figure 48: Sidewalk Along D Street SW

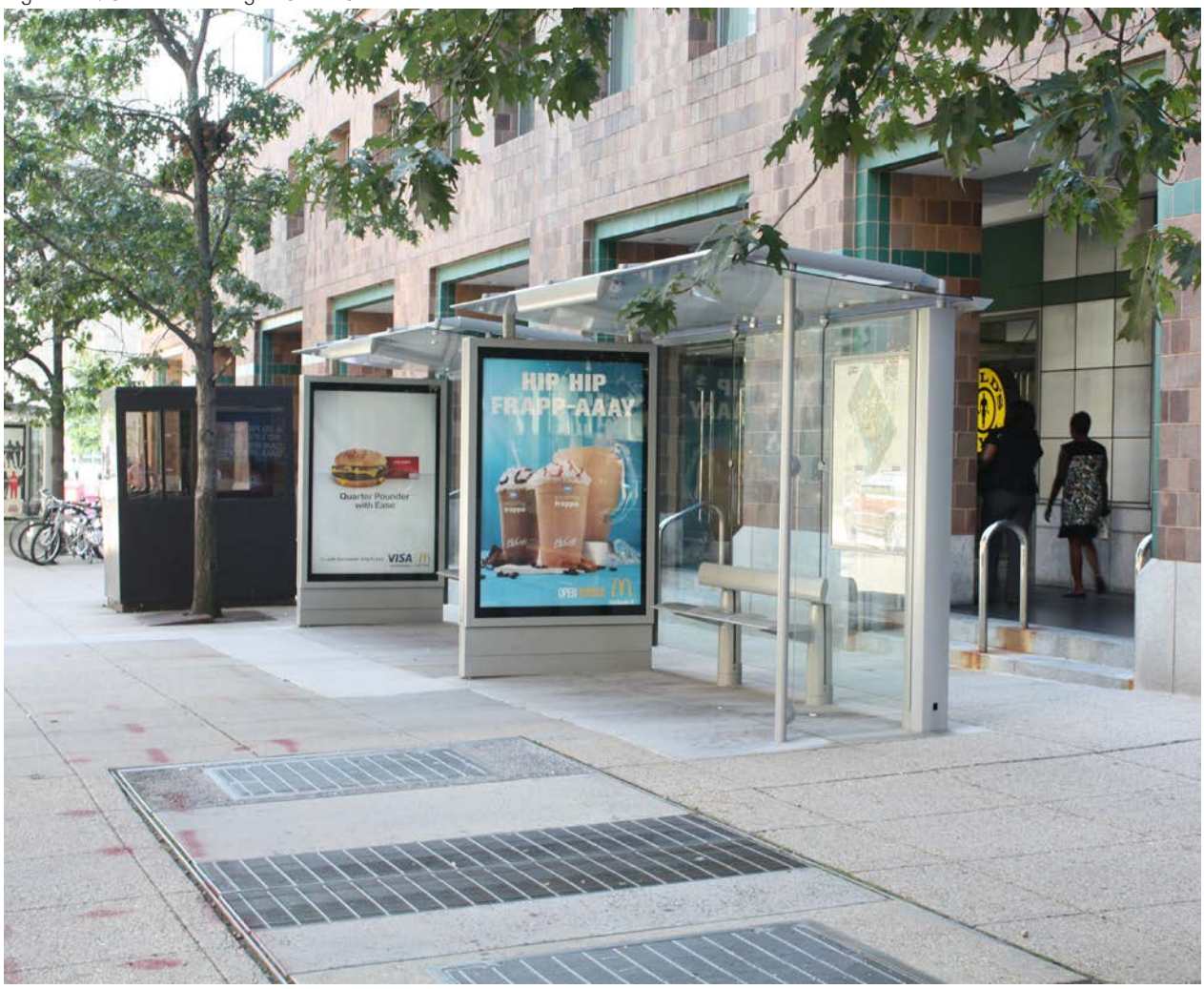
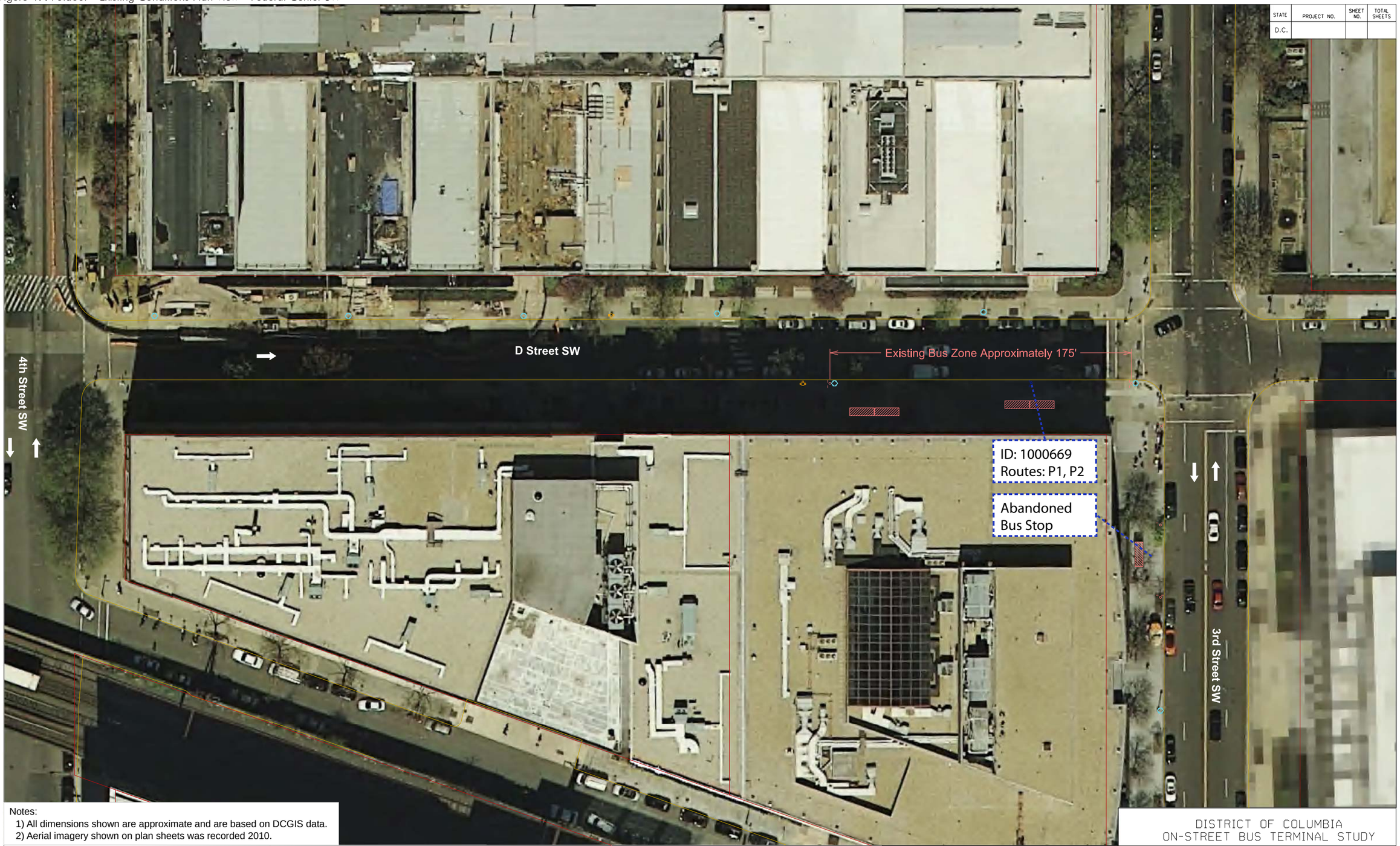


Figure 49: Foldout – Existing Conditions Plan View – Federal Center SW



Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

Federal Center SW
Existing Conditions

0 25 50
SCALE IN FEET

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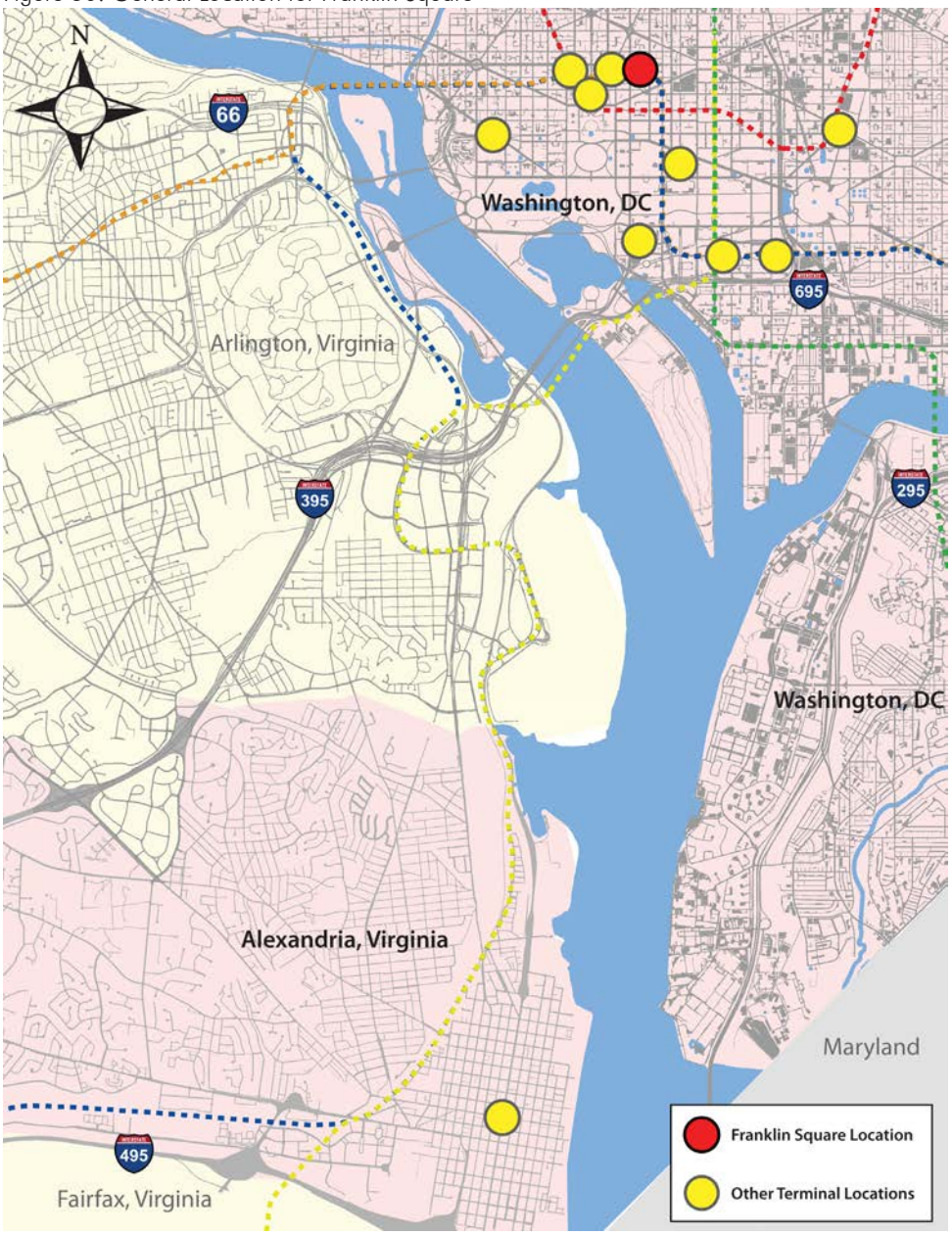
Franklin Square

There are eight bus stops on Franklin Square (located in DC), which is bounded by 14th and 13th Streets NW to the east and west, and K and I Streets NW to the north and south. Stops 1001220, 1001190, and 1001209 were all classified as near-side stops that are located on the south side of K Street NW (eastbound direction), the west side of 13th Street NW (southbound direction), and the east side of 14th Street NW (northbound direction). Additionally, there are five stops (1001187, 1001191, 1003653, 1003661, and 1003662) located on the

Figure 50: General Location for Franklin Square



north side of I Street NW (westbound direction). Stops 1001187, 1003653, 1003661, and 1003662 are utilized as route termini for Metrobus routes 43, 53, D4, S4, and S9. In addition, the Georgetown-Union Station DC Circulator route stops at stop 1001220, and the Woodley Park-McPherson Square DC Circulator route serve stop 1001209 and terminate at stop 1001191. See Figure 50 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 54 for a closer look of each stop location.

Table 19: Franklin Square Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
DC Circulator	Stop, Terminus	10 min.	I and 14th Streets NW, 14th and K Streets NW, K and 13th Streets NW	1001191, 1001220, 1001209
42, 43	Stop, Terminus	5-30 min.	I and 14th Streets NW	1001191, 1003662
52, 53, 54	Stop, Terminus	5-15 min.	14th and K Streets NW, I and 14th Streets NW, 13th and I Streets NW, K and 13th Streets NW	1001209 1003653, 1001190, 1001220
63	Stop	10-30 min.	13th and I Streets NW	1001190
80 (PM)	Stop	30 min.	K and 13th Streets NW, 13th and I Streets NW, I and 14th Streets NW	1001220, 1001190, 1001191
D1	Stop	10-20 min.	K and 13th, 13th and I Streets NW	1001190, 1001220
D3	Stop	15-30 min.	13th and I Streets NW, K and 13th Streets NW	1001190, 1001220
D6	Stop	15-30 min.	13th and I Streets NW, K and 13th Streets NW	1001190, 1001220
G8	Stop	10-30 min.	I and 14th Streets NW	1001191
P17, P19	Stop	10-20 min.	I and 14th Streets NW	1001191
S2, S4	Stop	5-10 min.	I and 14th Streets NW, K and 13th Streets NW	1001191, 1003662, 1001220
S9	Terminus	10 min.	I and 14th Streets NW	1003661
W13	Stop	15-25 min.	I and 14th Streets NW	1001191
X2	Stop	15-45 min.	I and 14th Streets NW	1001191

Table 20: Franklin Square Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Franklin Square	**4,487**				
1001187	838	0	1	Far-side	Transit Center
1001190	81	0	0	Near-side	Basic
1001191	740	1	1	Near-side	Transit Center
1001209	1,097	1	0	Near-side	Transit Center
1001220	338	1	0	Near-side	Enhanced
1003653	853	0	1	Mid-block	Transit Center
1003661	314	1	1	Mid-block	Enhanced
1003662	226	0	1	Mid-block	Enhanced

= *Ridership values were not available for all routes that serve these stops.*

Figure 51: Franklin Square

Bus and Passenger Amenities

Franklin Square is a terminal location with high daily boardings at majority of the stops. Only one stop falls under the basic stop class, while the rest fall under enhanced service or transit center classes. Following the guidelines set by WMATA, stop 1003662 could be classified as a basic stop, but in this study it would be classified as an enhanced service stop due to high number of boardings (approximately 226 daily boardings).

If the *WMATA Design Guidelines* are followed, the passenger boarding numbers required all stops to have a minimum of one shelter within each bus zone. Furthermore, boarding numbers at stops 1001187, 1001191, 1001209, 1001220, 1003653, and 1003661 required more than one shelter for each stop.

One of the major concerns at Franklin Square is the lack of passenger amenities along I Street NW even though a high volume of bus service and operation take place. The lack of passenger amenities distributed evenly along the entire block of I Street NW (on Franklin Square) leads to the congested and unsafe operation of both passengers and buses at the corner of I and 14th Streets NW (Figure 52).

Table 21: Franklin Square Required Amenities

	1001187	1001190	1001191	1001209	1001220	1003653	1003661	1003662
Placement	Far-side	Near-side	Near-side	Near-side	Near-side	Mid-block	Mid-block	Mid-block
Bus Zone Requirement	X		X		X			
Stop Hierarchy	Transit Center	Basic	Transit Center	Transit Center	Enhanced	Transit Center	Enhanced	Enhanced
Bus Stop Sign(s)	X	X	X	X	X	X	X	X
ADA Landing Area	X	X	X	X	X	X	X	X
Sidewalk Clearance	X	X	X	X	X	X	X	X
Lighting	X			X		X		
Seating	X		X	X	X			
Expanded Boarding/ Alighting			X	X	X		X	
Bus Bay (Pull Off)								
Shelter(s)	X		X	X	X			
Trash Receptacle		X	X	X	X			
Information Case	X	X	X	X	X	X	X	X
System Map			X					
Real-Time Display (LED DMS+Audio)								
Interactive Phone System								

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

ADA and Safety Concerns

The majority of the stop locations along Franklin Square accommodate sidewalk space to provide ADA-compliant amenities (if needed) in the future. One accessibility concern lies with the possible provision of multiple shelters along I Street NW. The placement of standard three-panel shelter(s) may obstruct the mobility along the I Street NW sidewalk, as the existing narrow bus shelter provides evidence that a full-size shelter on the existing sidewalk would not allow for ADA-compliant clear pathways (Figure 53).

In addition, another safety issue to be considered would be the provision of adequate lighting around all the bus stops.

Figure 52: Congested Bus Operation at the Corner of I and 14th Streets NW

Figure 53: Narrow Shelter at Stop 1001187 on I Street NW

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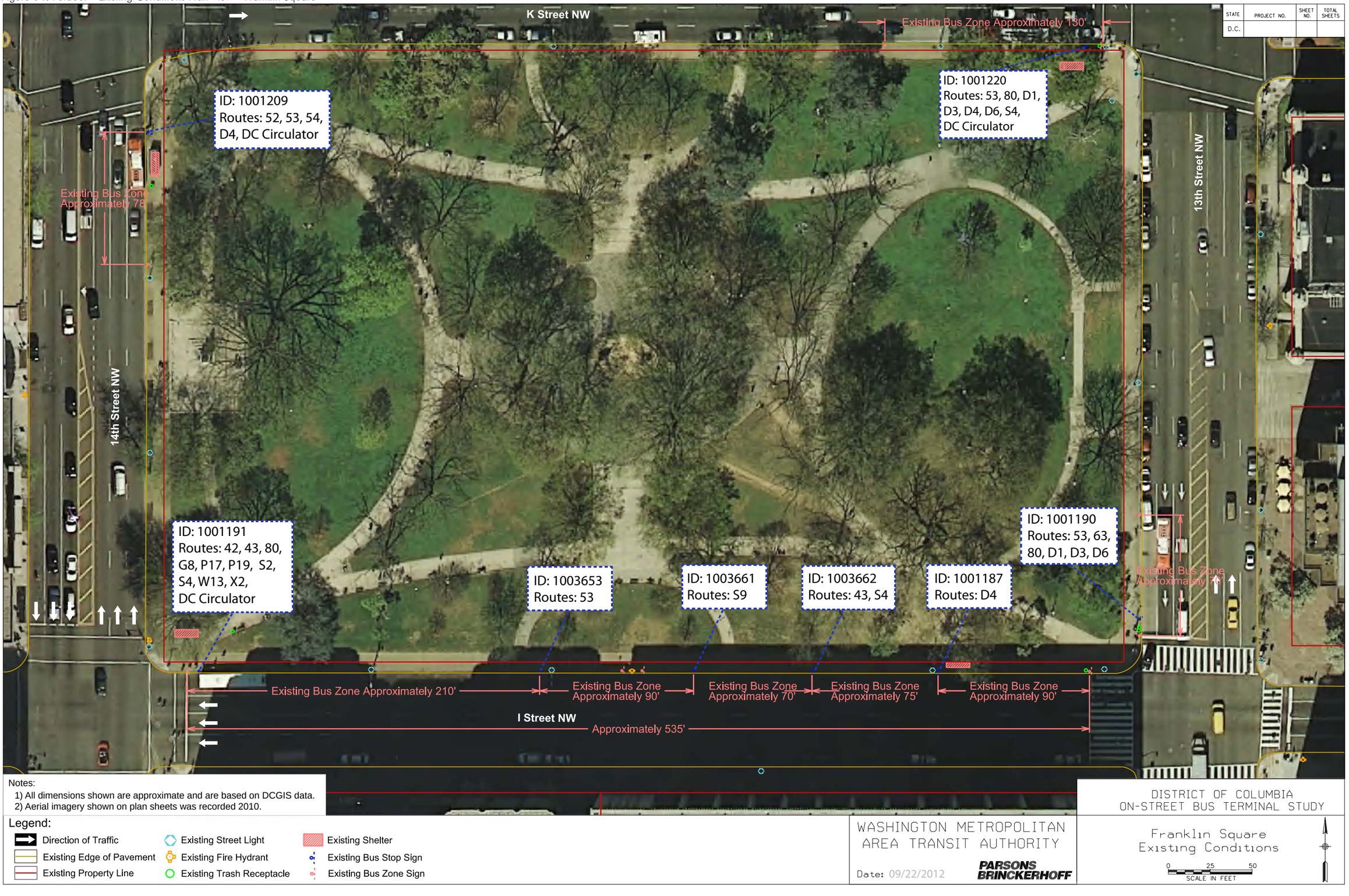
Figure 54: Foldout – Existing Conditions Plan View – Franklin Square



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Lafayette Square

There are three bus stops at this terminal location in DC. The stops are located on the south side of H Street NW between Jackson Place and Madison Place NW on Lafayette Square. There is an abandoned far-side stop located at Jackson Place NW, and two near-side stops 1003702 and 1001141, which are located closer to the intersection with Madison Place NW. The abandoned far-side stop did not service a bus route at the time of observation and the Metrobus stop sign has since been removed permanently. See Figure 55 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 60 for a closer look of each stop location.

Figure 55: General Location for Lafayette Square

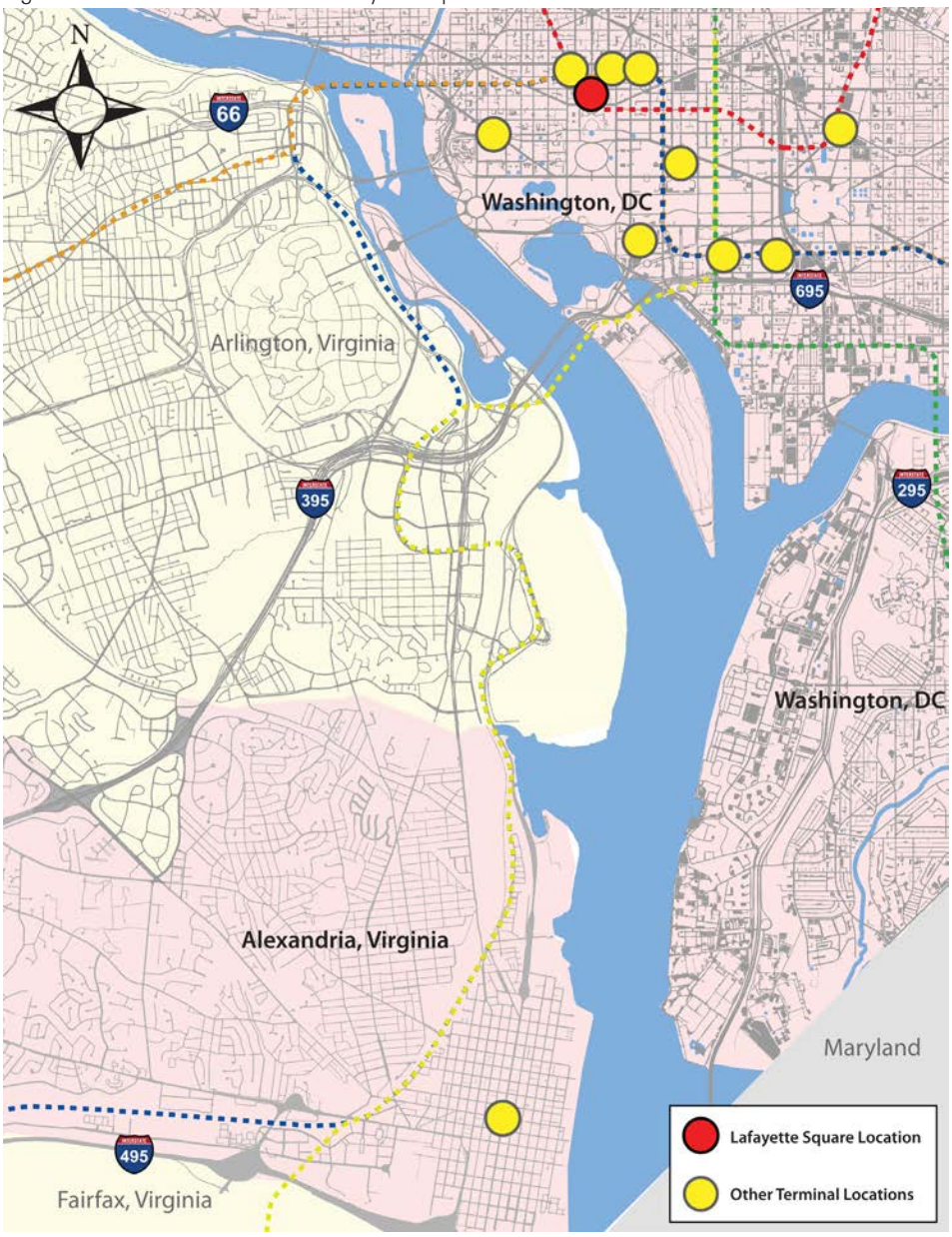

Table 22: Lafayette Square Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
11Y	Stop	15-30 min. (PM)	H Street and Madison Pl. NW	1001141
32, 36	Stop	10-20 min.	H Street and Madison Pl. NW	1001141
37	Stop	15 min. (Southbound)	H Street and Madison Pl. NW	1001141
39	Stop	15 min. (Eastbound)	H Street and Madison Pl. NW	1001141
42	Stop	10-30 min. (Southbound)	H Street, and Madison Pl. NW	1001141
G8	Stop	10-30 min.	H Street, and Madison Pl. NW	1001141
L2*	Stop	10-30 min.	H Street and Madison Pl. NW	1003702
P17, P19	Stop	10-20 min.	H Street, and Madison Pl. NW	1001141
S2, S4	Stop	5-10 min.	H Street and Madison Pl. NW	1001141
W13	Stop	15-25 min.	H Street, and Madison Pl. NW	1001141
X2	Terminus	5-40 min.	H Street and Madison Pl. NW	1003702

**Service to Lafayette Square discontinued*

Figure 56: Lafayette Square at H Street and Madison Place NW

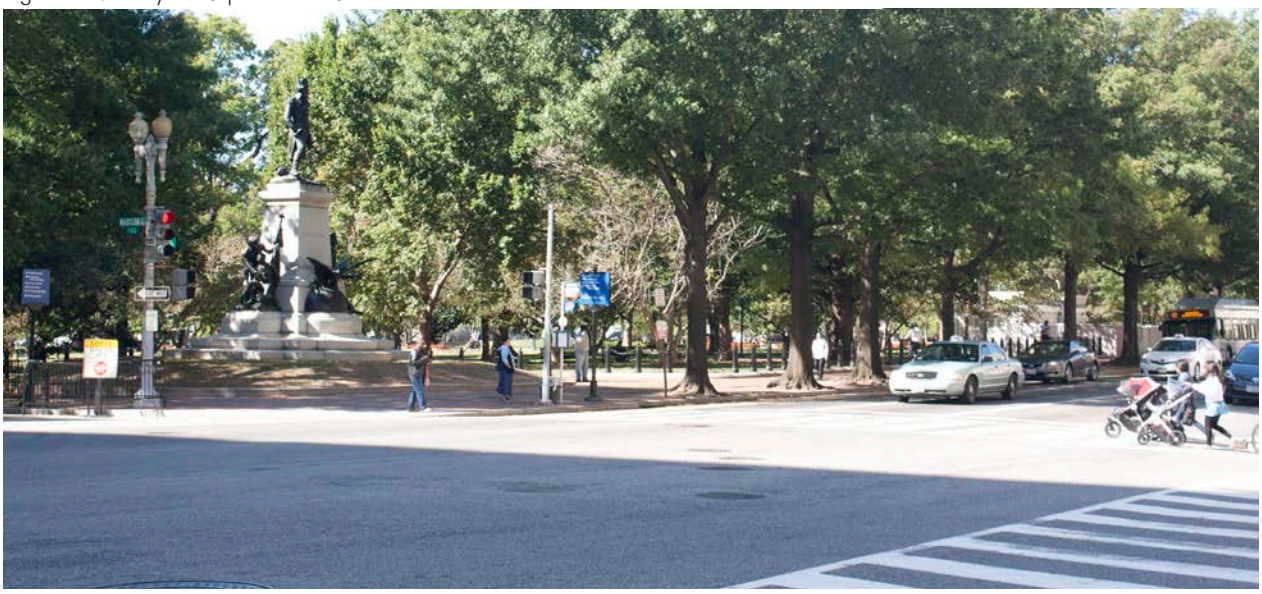

Table 23: Franklin Square Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Lafayette Square	**947**				
1001141	234	3	0	Near-side	Enhanced
1003702	713	0	1	Mid-block	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Bus and Passenger Amenities

Both stops at Lafayette Square have relatively high number of boardings. Stop 1003702, which predominately serves the X2 route, was classified as a transit center, and stop 1001141, served by three different express routes, was classified as an enhanced service stop.

ADA and Safety Concerns

The bus zone of stop 1003702 is often overcrowded with buses that are laying over (mostly X2) and buses that are trying to operate at stop 1001141. The congested operation at the bus zone leads to buses boarding and alighting passengers from the adjacent through lane, creating an unsafe environment for passengers. In addition, the cluttered street signs can cause confusion in determining the extent of the bus zone, which leads to the operation of other non-bus vehicles, which further congest the bus zone (Figure 57).

Table 24: Lafayette Square Required Amenities

	1003702	1001141
Placement	Mid-block	Near-side
Bus Zone Requirement		X
Stop Hierarchy	Transit Center	Enhanced
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting		
Seating		
Expanded Boarding/Alighting		X
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle	X	X
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

One particular safety concern around the passenger area is the brick paved sidewalk. As seen on Figure 58, the brick pavement is in poor conditions along some areas of the sidewalk adjacent to the bus stops. The uneven sidewalk surface creates a hazardous environment for both pedestrian and passenger activities.

The existing sidewalk space provides enough room to accommodate the minimum four feet wide passageway and the 8'x5' landing areas at both stops (Figure 59).

Although, the stop provides ADA-compliant access and amenities, the possible placement of shelters (if allowed) in the future would require creative designs to accommodate the shelter while maintaining the space required for ADA-compliant access.

Figure 57: Non-bus Vehicles Use of Bus Zone

Figure 58: Uneven Pacers at Stop 1001141

Figure 59: Existing Sidewalk and Passenger Landing Area

Figure 60: Foldout – Existing Conditions Plan View – Lafayette Square

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

Lafayette Square
Existing Conditions

0 25 50
SCALE IN FEET

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L'Enfant Plaza

There are two bus stops at this terminal location in DC. The stops are located on both sides of D Street SW between 6th and 7th Streets SW. The stops are located adjacent to one of the L'Enfant Plaza Metrorail Station entrances. Stop 1003599 is located mid-block on the north side (westbound direction) and stop 1003665 is located far-side on the south side (eastbound direction) of D Street SW. See Figure 61 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 63 for a closer look of each stop location.

Figure 61: General Location for L'Enfant Plaza

Table 25: L'Enfant Plaza Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
5A	Terminus	20-40 min.	D and 7th Streets SW	1003665
52, 54	Terminus	8-15 min.	D and 7th Streets SW	1003665
A9*	Terminus	20-30 min.	D and 7th Streets SW	1003665 (AM .Peak), 1003599
V5	Terminus	10-20 min.	D and 7th Streets SW	1003665 (AM Peak), 1003599

** Plans to modify or discontinue service to L'Enfant Plaza*

Figure 62: L'Enfant Plaza

Table 26: L'Enfant Plaza Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
L'Enfant Plaza SW	**582**				
1003599	0	0	2	Mid-block	Basic
1003665	582	1	2	Near-side	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Bus and Passenger Amenities

Although ridership data for both stops are incomplete, using the available daily boardings numbers, stop 1003665 was classified as a transit center. For stop 1003599, a moderate number of boardings in the PM peak was assumed, but not enough to classify the stop as an enhanced service or transit center class, as the line volumes of both routes were relatively low.

As a transit center, stop 1003665 required more than one shelter. On the other hand, stop 1003599 was classified as a basic stop that would not require a shelter.

ADA and Safety Concerns

Existing bus facilities provide ADA-compliant amenities. No further safety concerns were observed.

Table 27: L'Enfant Plaza Required Amenities

	1003599	1003665
Placement	Mid-block	Near-side
Bus Zone Requirement	X	X
Stop Hierarchy	Basic	Transit Center
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting		X
Seating		X
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle		
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

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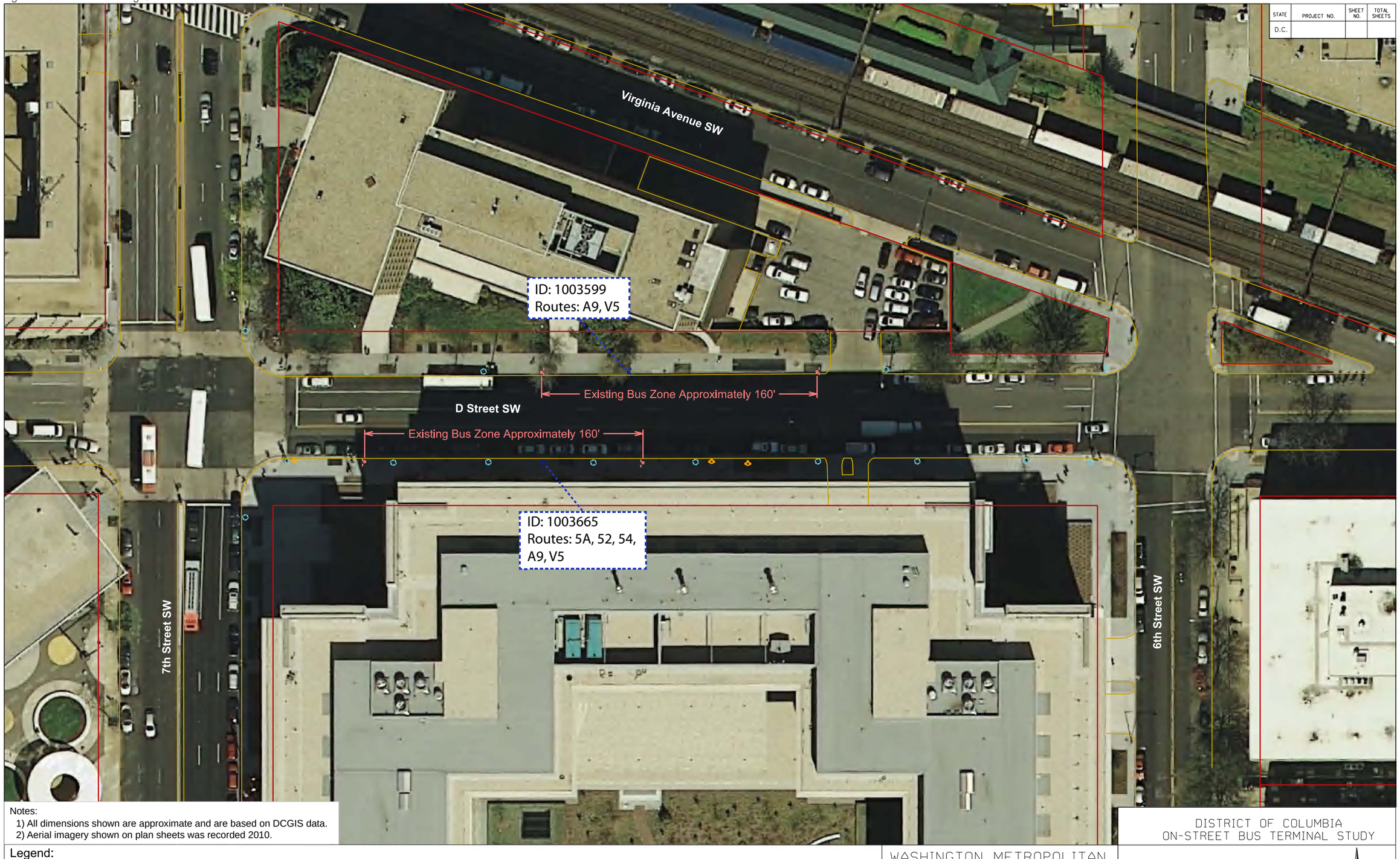
Figure 63: Foldout – Existing Conditions Plan View – L'Enfant Plaza



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

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DISTRICT OF COLUMBIA
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L'Enfant Plaza
Existing Conditions

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SCALE IN FEET

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McPherson Square

There are three bus stops at this terminal location in DC. The stops are located on both the west and south sidewalks of McPherson Square. McPherson Square is located on 15th Street NW between I and K Streets NW. 15th Street NW splits into two segments around the park, and in this study, the segment east of the park was designated as 15th Street NW [east] and the segment on the west side as 15th Street NW [west]. There are two stops, 1001199 and 1003476 located on 15th Street NW [west] and one stop (1001185) located on I Street NW. See Figure 64 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 67 for a closer look of each stop location.

Figure 64: General Location for McPherson Square

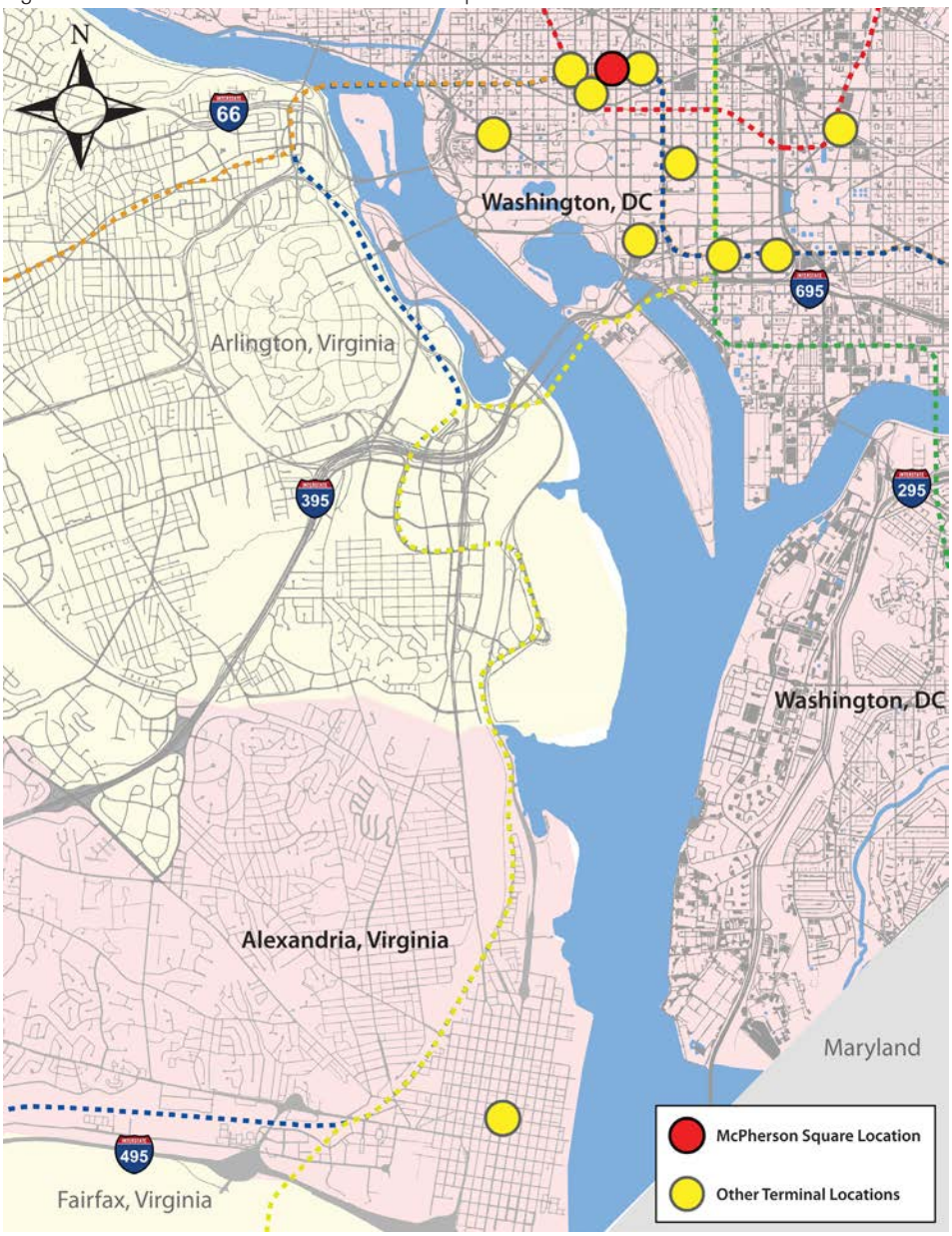
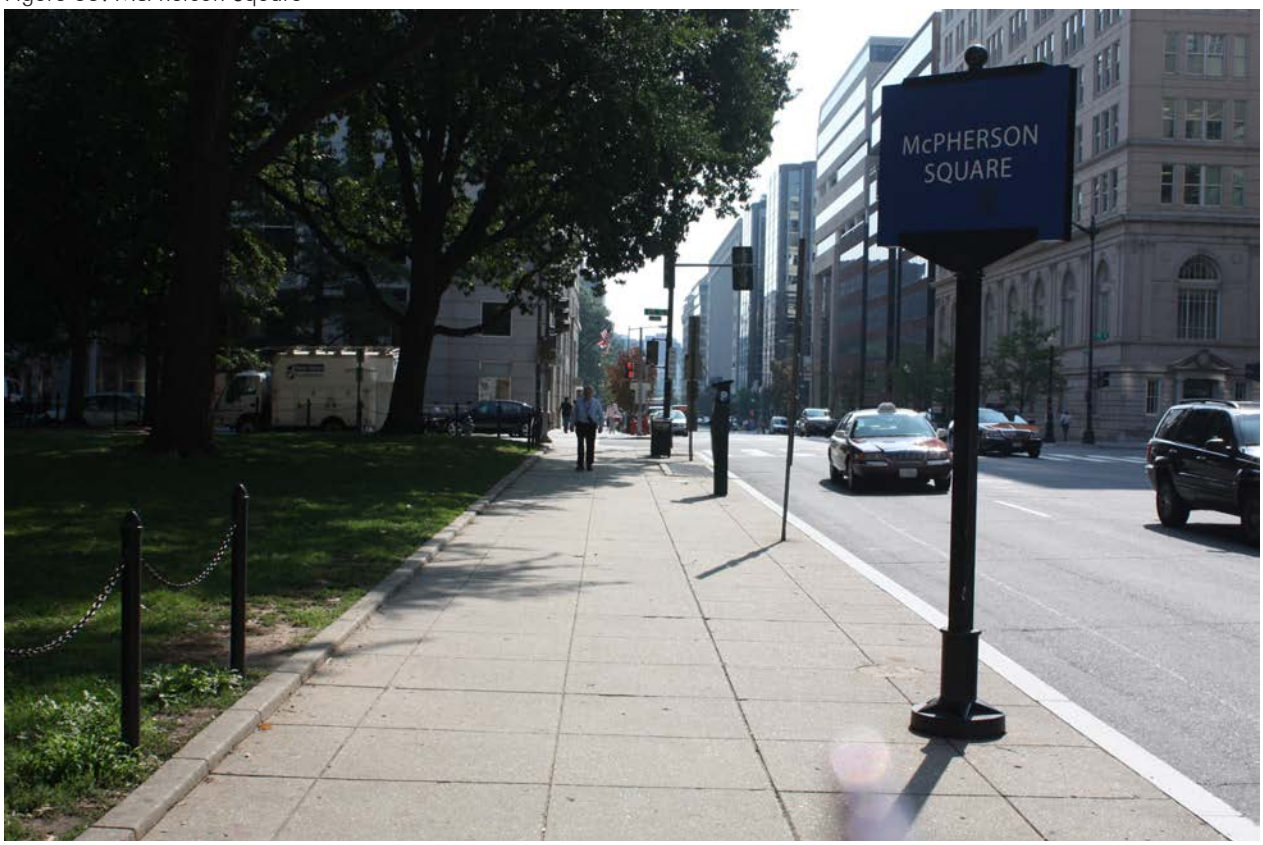


Table 28: McPherson Square Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
3Y	Terminus	20-30 min.	15th [West] and K Streets NW	1001199
11Y	Stop	10-30 min.	I and 15th Streets NW	1001185
16Y	Terminus	10-25 min.	15th [West] and K Streets NW	1001199
32, 36	Stop	10-20 min.	I and 15th Streets NW	1001185
37	Stop	15 min.	I and 15th Streets NW	1001185
39	Stop	15 min.	I and 15th Streets NW	1001185
42, 43	Stop	5-30 min.	I and 15th Streets NW	1001185
80	Terminus, Stop	30 min.	15th [West] and K Streets NW	1003476 (4-6:30 PM), 1001199
G8	Stop	10-30 min.	15th and I Streets NW	1001185
L2*	Terminus	15-30 min.	15th [West] and K Streets NW	1001199
P17, P19	Stop	10-20 min.	I and 15th Streets NW	1001185
S2, S4	Stop	5-10 min.	I and 15th Streets NW	1001185
W13	Stop	15-25 min.	I and 15th Streets NW	1001185
X2	Stop	5-40 min.	I and 15th Streets NW	1001185

** Service to McPherson Square discontinued*

Figure 65: McPherson Square



Bus and Passenger Amenities

Stop 1001185 presented the highest number of daily boardings and was classified as a transit center. The remaining stops were classified as basic stops. It was assumed that stop 1003476 had a low number of boardings as it serves a single bus route and it only operates part-time.

It was determined that stop 1001185 required more than one shelter and that stop 1001199 was a basic stop that required at least one shelter. 1003476 would not require a shelter.

Table 29: McPherson Square Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
McPherson Square	**1,535**				
1001185	1,272	3	0	Near-side	Transit Center
1001199	263	0	3	Mid-block	Basic
1003476	0	0	1	Near-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 30: McPherson Square Required Amenities

	1003476	1001199	1001185
Placement	Near-side	Mid-block	Near-side
Bus Zone Requirement		X	
Stop Hierarchy	Basic	Basic	Transit Center
Bus Stop Sign(s)	X	X	X
ADA Landing Area			X
Sidewalk Clearance	X	X	X
Lighting			X
Seating			X
Expanded Boarding/Alighting			
Bus Bay (Pull Off)			
Shelter(s)			X
Trash Receptacle	X		
Information Case	X	X	X
System Map			
Real-Time Display (LED DMS+Audio)			
Interactive Phone System			

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

ADA and Safety Concerns

The sidewalk along I Street NW provides ample sidewalk and space to allow for ADA-compliant amenities at stop 1001185. In contrast, the sidewalk along 15th Street NW [east] is quite narrow (less than seven feet) (Figure 66), which may require creative solutions to accommodate additional amenities for stop 1001199.

Figure 66: Sidewalk Along 15th Street NW [east]

Figure 67: Foldout – Existing Conditions Plan View – McPherson Square

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

McPherson Square
Existing Conditions

0 25 50
SCALE IN FEET

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Potomac Park

There are four bus stops at this terminal location in DC. The stops are located on the north and south sidewalks of Virginia Avenue NW. On the north side, there are three near-side stops located at 21st, E, and 22nd Streets NW (stops 1000983, 1003537, and 1001021 respectively). On the south side of Virginia Avenue NW, stop 1003131 is located at D Street NW. Stop 1003537 at Virginia Avenue and E Street NW is the termini for the 31 and 39 routes, and both stops 1001021 and 1003131 serve as the terminus for the S1 route. See Figure 68 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 72 for a closer look of each stop location.

Figure 68: General Location for Potomac Park

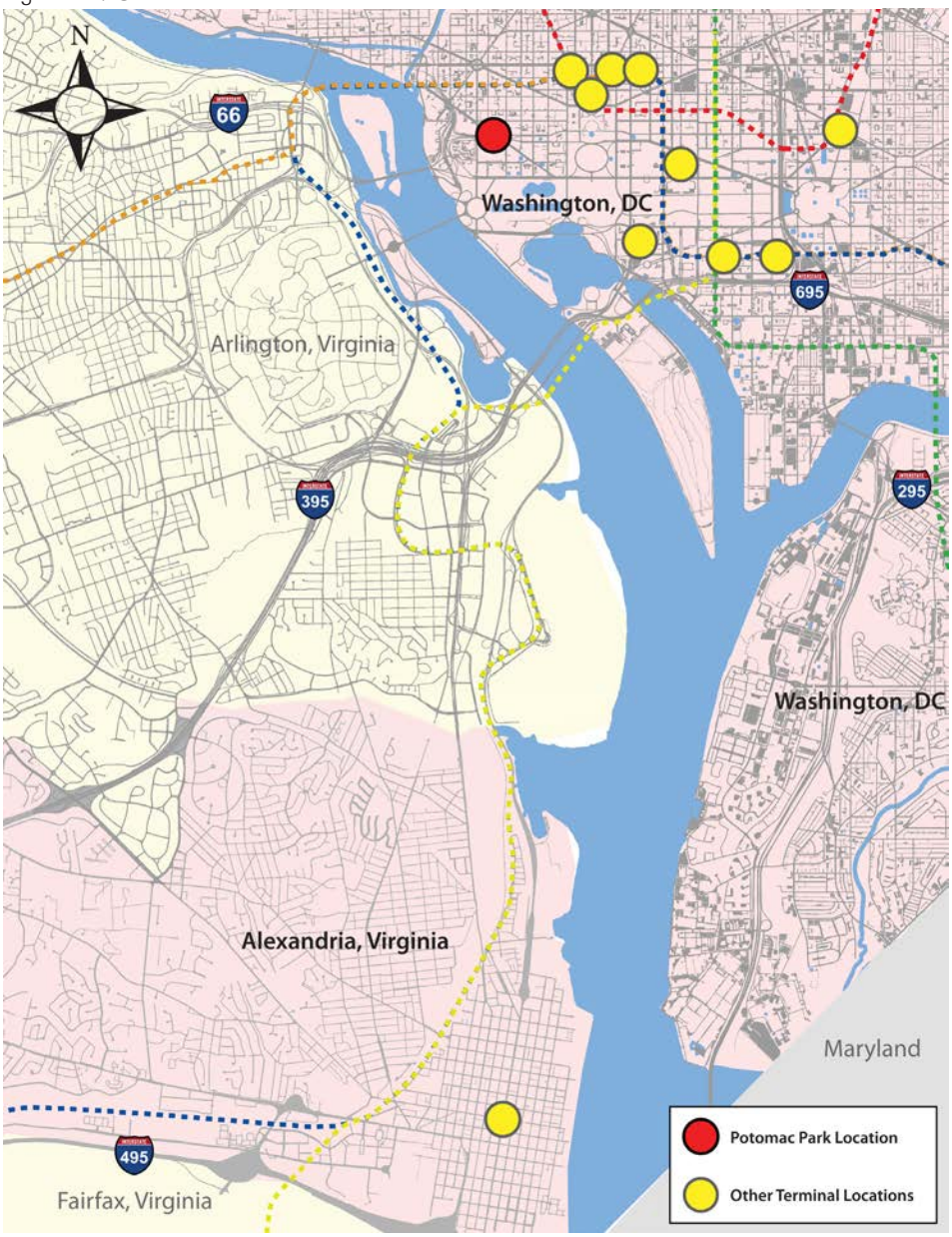


Figure 69: Potomac Park

Table 31: Potomac Park Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
31	Terminus	15-35 min.	Virginia Avenue and E Street NW	1003537
32, 36*	Terminus	5-10 min.	Virginia Avenue and E Street NW, Virginia Avenue and D Street NW	1003537 (PM Peak), 1003131 (AM Peak)
39	Terminus	15 min. (AM, PM Peak)	Virginia Avenue and E Street NW, Virginia Avenue and D Street NW	1003537 (PM Peak), 1003131 (AM Peak)
80	Stop	10-20 min.	Virginia Avenue and 21st Street NW, Virginia Avenue and 22nd Street NW	1000983, 1001021
N3	Stop	30 min.	Virginia Avenue and 21st Street NW, Virginia Avenue and 22nd Street NW, Virginia Avenue and D Street NW	1000983, 1001021, 1003131 (AM Peak)
P1*	Stop	20 min.	Virginia Avenue and D Street NW	1003131 (PM Peak)
S1	Terminus	5-20 min.	Virginia Avenue and 21st Street NW, Virginia Avenue and 22nd Street NW, Virginia Avenue and D Street NW	1000983, 1001021, 1003131 (PM .Peak)
X1	Stop	15-20 min.	Virginia Avenue and 21st Street NW, Virginia Avenue and 22nd Street NW, Virginia Avenue and D Street NW	1000983, 1001021, 1003131 (PM Peak)

**Not all 36 buses service these stops.*

***The Metrobus sign indicates that P1 services the stop, but the P1 service has been discontinued at Potomac Park.*

Bus and Passenger Amenities

Stop 1003537 was classified as an enhanced service stop as it serves an express route. Due to incomplete ridership data, stops 1000983 and 1001021 were assumed to have low number of boardings because they are located towards the end of the routes served (higher alightings). Stop 1000983 was assumed to have relatively low boardings due to its part-time operation.

Table 33: Potomac Park Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Potomac Park NW	**55**				
1000983	2	0	0	Near-side	Basic
1001021	0	0	1	Near-side	Basic
1003131	28	0	2	Far-side	Basic
1003537	25	1	3	Near-side	Enhanced

= *Ridership values were not available for all routes that serve these stops.*

Table 32: Potomac Park Required Amenities

	1003537	1000983	1001021	1003131
Placement	Near-side	Near-side	Near-side	Far-side
Bus Zone Requirement	X	?	?	X
Stop Hierarchy	Enhanced	Basic	Basic	Basic
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance		X	X	X
Lighting	X	X	X	X
Seating	X			
Expanded Boarding/Alighting	X			
Bus Bay (Pull Off)				
Shelter(s)	X			
Trash Receptacle		X		
Information Case	X			X
System Map				
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

? = *Enough space for bus zone, but the limit of the bus zone is not well defined with sign posts.*

Figure 70: Parking Zone Overlapping with Bus Zone along Virginia Avenue NW

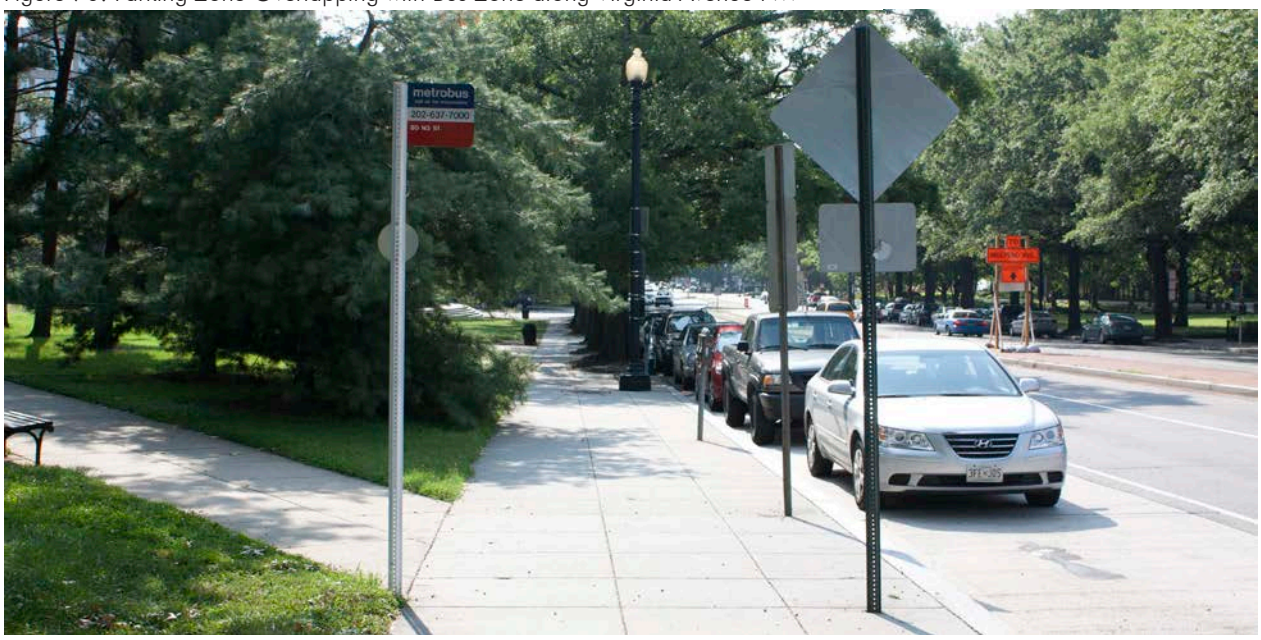


Figure 71: Sidewalk Connecting to Stop 1003537

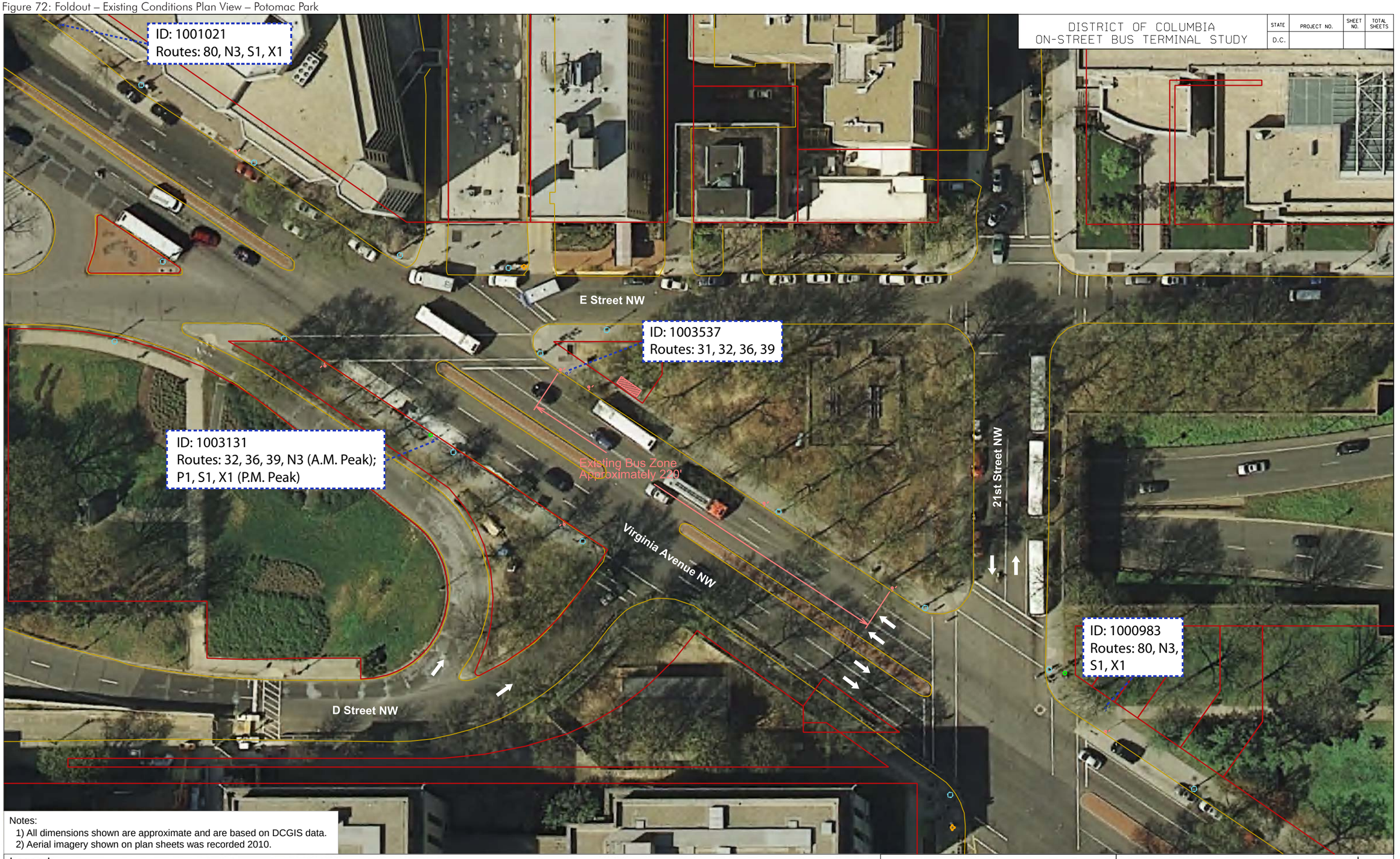
Under existing conditions, the bus zones for stops 1000983 and 1001021 overlap with metered parking zones that, as marked, are only available during non-peak hours (Figure 70). The street signs indicate that the bus zones are utilized as parking zones from 9:30 AM to 4:00 PM (typical weekday), but the 80 route operates all day and requires access to the stops at all times. Buses were observed stopping in the adjacent through lane when parked vehicles were obstructing the curb; a potentially unsafe practice that the bus operators are forced into by the presence of the cars.

ADA and Safety Concerns

At Potomac Park, field observation identified an accessibility issue along the sidewalk connecting to stop 1003537. On the eastbound approach to the existing shelter, the sidewalk is less than four feet wide and uneven due to the large tree roots growing beneath (Figure 71).

In order to meet the accessibility requirement the existing configuration of the bus facility would require creative designs due to the limited sidewalk space currently available.

Figure 72: Foldout – Existing Conditions Plan View – Potomac Park



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Washington Street at King Street

This is the only terminal location in this study that is not within DC. There are four bus stops along Washington Street just north and south of King Street (Alexandria, Virginia). In the northbound direction of Washington Street, there is a mid-block stop located south of King Street (4000025) and a far-side stop located north of King Street (4000028). Similarly, in the southbound direction of Washington Street, there is a near-side stop located north of King Street (4000027) and a far-side stop located south of King Street (4000026). See Figure 73 for the general terminal location in context of the Washington, DC Metropolitan area, and Figure 76 for a closer look of each stop location.

Figure 73: General Location for Washington Street at King Street

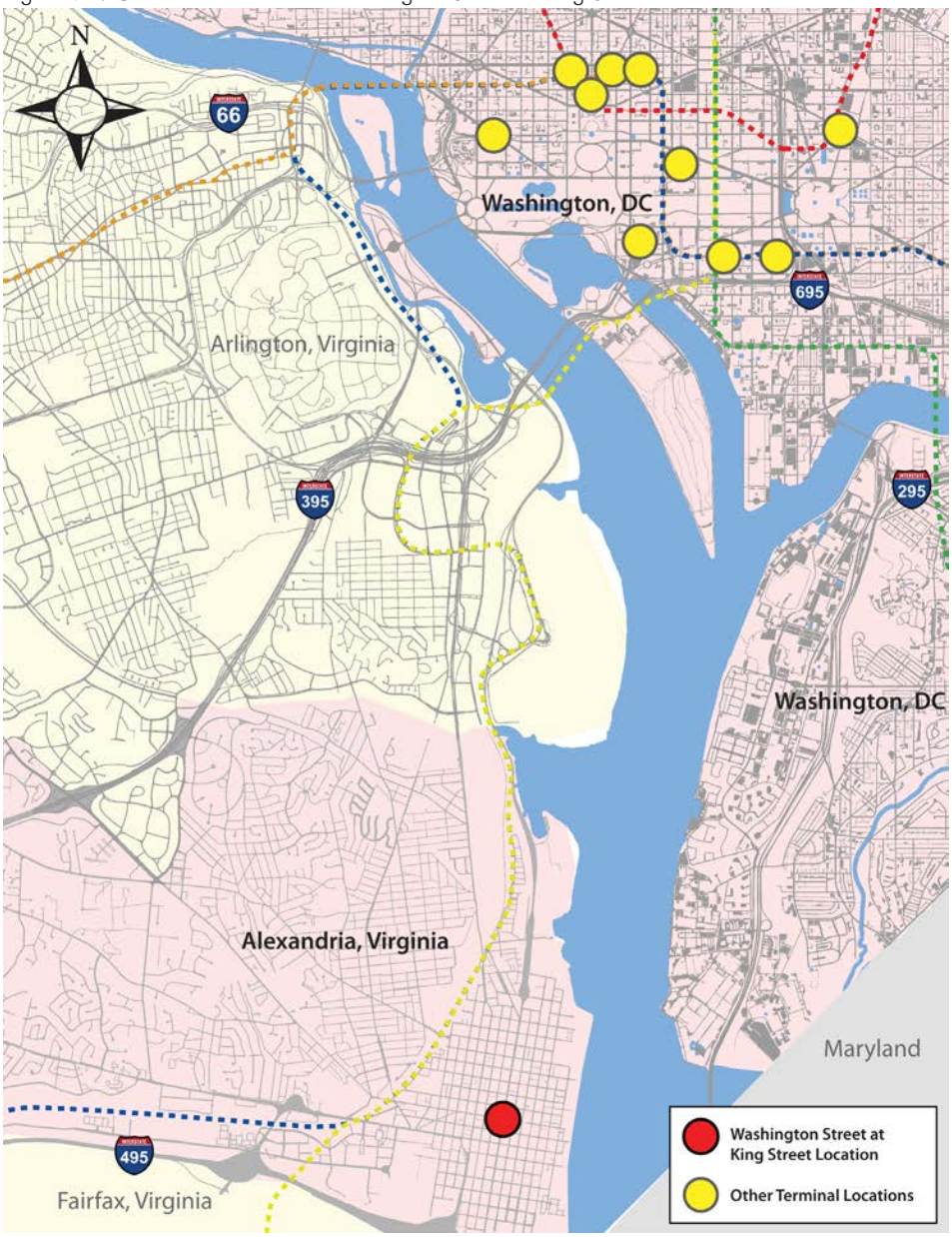

Table 34: Washington Street at King Street Metrobus Route Information

Route Name	Stop or Terminus	Headway(s) [Weekdays]	Location	Stop ID(s)
9A SB	Stop	20-30 min.	S. Washington Street at King Street	4000026
9A NB	Stop	20-30 min.	N. Washington Street at King Street	4000028
10A NB	Stop	20-30 min. 60 min. late PM	S. Washington Street at King Street	4000025
10A SB	Stop	20-30 min. 60 min. late PM	N. Washington Street at King Street	4000027
10B NB	Stop	20-30 min.	S. Washington Street at King Street	4000025
10B SB	Stop	20-30 min.	N. Washington Street at King Street	4000027
11Y NB (AM only)	Stop	15-20 min.	N. Washington Street at King Street	4000028
11Y SB (PM only)	Stop	15-30 min.	S. Washington Street at King Street	4000026
29K, 29N NB	Stop	20-60 min.	S. Washington Street at King Street	4000025
29K, 29N SB	Stop	20-60 min.	N. Washington Street at King Street	4000027

Figure 74: Washington Street at King Street

Bus and Passenger Amenities

All the stops on Washington Street at King Street were classified as basic stops. Although the ridership data is incomplete, there was sufficient information to assume that boardings at stops 4000027 and 4000028 were significantly lower than the boardings that take place at stops 4000025 and 4000026.

Table 35: Washington Street at King Street Stop Classification Based on 2011 Stop Boardings

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Washington Street	**219**				
4000025	119	0	0	Mid-block	Basic
4000026	70	0	0	Far-side	Basic
4000027	11	0	0	Near-side	Basic
4000028	19	0	0	Far-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 36: Washington Street at King Street Required Amenities

	4000025	4000026	4000027	4000028
Placement	Mid-block	Far-side	Near-side	Far-side
Bus Zone Requirement				X
Stop Hierarchy	Basic	Basic	Basic	Basic
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance	X	X	X	X
Lighting	X	X	X	X
Seating		X	X	
Expanded Boarding/Alighting				
Bus Bay (Pull Off)				
Shelter(s)				
Trash Receptacle	X	X	X	X
Information Case			X	
System Map				
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

ADA and Safety Concerns

In general the curbside spaces along the bus stop areas are very crowded. Currently, there is plenty of sidewalk space to provide the four feet minimum passageway around the stop, but the future provision of ADA-compliant shelters and other amenities within the limited curbside space may be difficult. In addition, the brick paved sidewalks may cause accessibility difficulties especially for vulnerable users (Figure 75).

Figure 75: Sidewalk Brick Pavers at Stop 400026

Figure 76: Foldout – Existing Conditions Plan View – Washington Street at King Street

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Existing Street Light
- Existing Fire Hydrant
- Existing Trash Receptacle
- Existing Shelter
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Date: 09/22/2012

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ON-STREET BUS TERMINAL STUDY

Washington Street
Existing Conditions

0 25 50
SCALE IN FEET

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Section 4: Future Conditions

This section presents information that is relevant to determine the future service conditions at each on-street terminal location. Understanding the future condition helps the study team develop recommendations on improvements to each bus stop and the corresponding amenities that would not only consider current needs but also future expectations.

The evaluation of future service conditions involved two main sections:

- Planned service changes
- Ridership projections

Estimating the future ridership at each stop would be the main parameter used to decide what passenger amenities would be necessary in the future. In particular, estimating the average weekday boardings at the stop helped determine the stop hierarchy (basic, enhanced, or transit center) and the number of shelter(s) required at each stop in the future.

Below is a summary of the planned service changes and future ridership projections. The information is presented by the on-street terminal location and by the stop identification number. For more information on the location of each stop please see the plan views corresponding to each on-street terminal location presented under Section 3.

Ridership Projection Estimation Methodology

As previously stated, the stop ridership data available for the study's analysis was incomplete. Some data was missing altogether, and much of the available stop ridership data was outdated (with some data as old as 2001). As a result, the projections made for 2040 stop ridership are order of magnitude checks to determine approximate passenger needs and bus stop hierarchy. As mentioned earlier, one of the assumptions made for this study is that whenever the stop ridership value does not clearly define the hierarchy, the determination will err on the side of including the amenities required by the higher stop hierarchy.

The method of calculation used to estimate 2040 weekday stop boardings varied based upon the vintage of the available stop ridership data. In those cases where stop ridership data from 2005 or later was available, 2040 ridership was estimated by applying the growth rates presented in WMATA's 2010 Metrobus Fleet Management Plan (Fleet Management Plan) on a year-by-year basis. Those rates are:

- Between 2005 and 2009: 0.6 percent annual growth in average weekday Metrobus ridership.
- Between 2009 and 2025: 1.4 percent annual growth in average weekday Metrobus ridership.

The same 1.4 percent linear growth rate used for years 2009-2025 in the Fleet Management Plan was used for the years 2026-2040.

In those cases where the most recent stop ridership was from before 2005, percent change values presented in WMATA's 2009 Transit Ridership Trends and Markets report (Trends and Markets Report) were utilized to create a 2005 stop ridership estimate. Those percent change values are:

- Between 2001 and 2003: 0 percent annual growth in average weekday Metrobus ridership.
- From 2003 to 2004: -2 percent growth (2 percent decline) in average weekday Metrobus ridership.
- From 2004 to 2005: 2 percent growth in average weekday Metrobus ridership.

Three lines (16, 30s, and X2) had specific ridership trends specified in the Trends and Markets Report that deviated from Systemwide trends. Those trends are:

- 16 routes: 2003-2004 (19 percent); 2004-2005 (19 percent).
- 30s routes: 2003-2004 (11 percent); 2004-2005 (-2 percent).
- X2: 2003-2004 (-21 percent); 2004-2005 (29 percent).

For these lines, the specific trends shown were used in place of the general trends shown above to develop 2005 ridership estimates.

After a 2005 ridership estimate was developed for these cases, a 2040 ridership estimate was developed through the same method used for the stops where 2005 or later data was available.

Example 1: For the S2, S4 route at stop 1000910, the most recent stop ridership available was from 2005. The 2005 stop ridership of 222 was increased by a factor of 0.6 percent per year through 2009, resulting in an estimated 2009 stop ridership of 227. That 2009 estimate was then increased by a factor of 1.4 percent per year through 2040, resulting in an estimated 2040 stop ridership of 326.

Example 2: For the V7, V9 route at stop 1000690, the most recent stop ridership available was from 2001. The 2001 stop ridership of 35 was reduced by 2 percent for the year 2004 (34) and increased 2 percent for the year 2005 (35). The 2005 ridership of 35 was increased by a factor of 0.6 percent per year through 2009, resulting in an estimated 2009 stop ridership of 36. That 2009 estimate was then increased by a factor of 1.4 percent per year through 2040, resulting in an estimated 2040 stop ridership of 51.

Example 3: For the X2 route at stop 1001185, the most recent stop ridership available was from 2003. The 2003 stop ridership of 474 was reduced by 21 percent for the year 2004 (374) and increased 29 percent for the year 2005 (483). The 2005 stop ridership of 483 was increased by a factor of 0.6 percent per year through 2009, resulting in an estimated 2009 stop ridership of 495. That 2009 estimate was then increased by a factor of 1.4 percent per year through 2040, resulting in an estimated 2040 stop ridership of 709.

The projection methodology help determine the stop ridership, which is a combination of boardings and alightings. In order to estimate the weekday average daily boardings, the boardings vs. alightings splits at each stop (from WMATA data) were applied on the 2040 stop ridership values. In some instances, stop ridership values were not available for certain routes, which are presented as "N/A" on the ridership summary tables. For purpose of estimating total stop boardings, the routes with "N/A" ridership numbers were assumed to have zero boardings at the specific stop.

For further details on the ridership projections and future conditions analysis, please see the *Future Needs Assessment Technical Memorandum* of this study.

Summary of Bus Operations and Amenity Needs

Similar to the summary provided under Section 3, below is a summary of the bus operation characteristics and amenity needs at each stop based on the future conditions. Under this section, the implementation of the amenities required for each stop class was not evaluated against the physical constraints that may be present at each location.

In addition, the summary provides changes in service plans (confirmed by WMATA) that would affect the configuration and function of the terminals evaluated in this study.

10th Street NW

Service Changes

Under the current service plan, every stop at the 10th Street NW location will be operating as a terminal for at least one route. The 37 route will be the only express route operating at stop 1003288, although WMATA is researching the possibility of adding the 53 route to 10th Street NW and converting it into a MetroExtra route (to be called the 59 route). The 53 route might also be added to 10th Street NW in its existing, non-express configuration. The rest of this report section assumes that the 37 route will be the only express route serving the 10th Street NW location.

Table 37: 10th Street NW Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
10th Street NW	**437**				
1000910	3	0	1	Mid-block	Basic
1003287	92	0	1	Near-side	Basic
1003288	43	1	2	Mid-block	Enhanced
1003432	184	0	2	Near-side	Basic
1003570	0	0	2	Near-side	Basic
1003691	115	0	1	Mid-block	Basic

= *Ridership values were not available for all routes that serve these stops.*

Future Needs

The future daily boarding numbers at stops 1003287, 1003432, and 1003691 would warrant each of them to be classified as basic stop with a shelter. Although stop 1003288 would have a relative low number of boardings, it would still serve the express service 37 route, which would warrant the classification as an enhanced service stop.

Table 38: 10th Street NW Future Needs Summary

	1000910	1003691	1003287	1003288	1003432	1003570
Placement	Mid-block	Mid-block	Near-side	Near-side	Mid-block	Near-side
Bus Zone Requirement	X	X	X	X	X	X
Stop Hierarchy	Basic	Basic	Basic	Enhanced	Basic	Basic
Bus Stop Sign(s)	X	X	X	X	X	X
ADA Landing Area			X			X
Sidewalk Clearance	X	X	X	X	X	X
Lighting	X		X			X
Seating		X	X	X	X	X
Expanded Boarding/Alighting						
Bus Bay (Pull Off)						
Shelter(s)		X	X	X	X	X
Trash Receptacle						
Information Case		X	X	X	X	X
System Map			X	X		X
Real-Time Display (LED DMS+Audio)						
Interactive Phone System						

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

C Street SW

Service Changes

No additional service changes would be expected at the C Street SW location. Stop 1000692 would be the only one operating as a terminal, and no express services would be operating at this location.

Future Needs

Both stops at C Street SW would be classified as basic stops, and the future number of daily boardings at stop 1000692 would warrant a shelter.

Table 39: C Street SW Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
C Street SW	**102**				
1000690	0	0	0	Mid-block	Basic
1000692	102	0	1	Mid-block	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 40: C Street SW Future Needs Summary

	1000690	100692
Placement	Mid-block	Mid-block
Bus Zone Requirement		
Stop Hierarchy	Basic	Basic
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting	X	X
Seating	X	X
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle	X	
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

Columbus Circle

Service Changes

With the reconstruction of Columbus Circle, the buses serving these stops have been temporarily rerouted. The routes that served former stop 1001031 currently serve a temporary stop at the north sidewalk of Massachusetts Avenue NE at 1st Street NE. The routes that served former stop 1001029 are currently serving a temporary stop located on the south sidewalk of Massachusetts Avenue NE at E Street NE.

WMATA is coordinating with the District Department of Transportation (DDOT) to establish permanent bus terminal locations to replace the former Columbus Circle stops. The possible locations that have been evaluated include, the east end of westbound Massachusetts Avenue NE, both sides of E Street NE, convert the temporary Massachusetts Avenue NE at E Street NE location as permanent, and/or re-establish the stop located on westbound Massachusetts Avenue NE on the Columbus Circle (location of former stop 1001031).

No assumptions have been made with regards to additional service changes, such as express and terminal service, as there is no confirmation that these stops would be operating at Columbus Circle in the future.

Future Needs

A complete future needs table is not be presented for Columbus Circle, as there is no agreement or confirmation on the final placement and/or operation of these stops after the completion of the Columbus Plaza project. As a result, no determination would be made on the details of the stops. Assuming that exact location would not significantly affect the future daily boardings estimates for stops 1001029 and 1001031, both stops would be classified as transit centers. DDOT and WMATA should coordinate to provide at least two stops with transit center level passenger amenities in replacement of the existing stops after the completion of the Columbus Plaza reconstruction project

Table 41: Columbus Circle Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Columbus Circle	**2,978**				
1001029	1,649	0	1	N/A	Transit Center
1001031	1,329	0	1	N/A	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Farragut Square

Service Changes

The Golden Triangle Business Improvement District (BID) is working on a study that evaluates pedestrian circulation around Farragut Square. WMATA and DDOT are both stakeholders of the project. The project has not been completed, but WMATA provided a list of issues and considerations that were discussed during a workshop for the project:

- Widen the sidewalk along the west side of Farragut Square and incorporate tree wells. That portion of the square can be used by food truck customer queues.
- Curb extensions at both K and I Streets NW ends of the west side of Farragut Square.
- Incorporate curb extensions and ramps on 17th Street NW [east] at K Street NW.
- No curb extension recommended on I Street NW to avoid conflicts with potential bus-only lane on I Street NW.
- Prohibit right turn from I Street NW onto 17th Street NW [west] (this would require the rerouting of the 42, 43, D5, and G8 routes).
- Relocate the G8 terminal to Connecticut Avenue NW (between I and H Streets NW); this change would result in the removal of G8 stops from Farragut Square and in the G8 turning left onto Connecticut Avenue NW directly from I Street NW.
- Relocate the terminal for the N2, N4, N6 routes from 17th Street NW [east] to 17th Street NW [west] (southbound direction) and I Street NW.
- Relocate the current bus shelter on I Street NW and replace it with a narrow body style.
- The L2 route would no longer serve 17th Street NW [east] at stop 1001193.

In addition, WMATA provided information on other plans for bus service changes, including the plans for bus-only lanes on H and I Streets. That bus-only lane plan will need to be considered for all stops along I Street NW, including stop 1001183 at Farragut Square.

If the plan locates a bus-only lane along I Street NW, stop 1001183 would be served by at least two express routes (the 37 and 39), in addition to any other express route(s) that may be established in the future. If the bus-only lane is implemented along H Street, the number of buses serving and the number of boarding occurring at stop 1001183 may decrease significantly.

Future Needs

If the considerations discussed in the Golden Triangle BID's study are carried forward, the existing stop configuration would change significantly. Some of the modifications to be considered would include:

- A G8 stop would not be located along Connecticut Avenue, as it was confirmed by DDOT that the curbside lane of Connecticut Avenue NW operates as a through lane in the PM peak period. With this in mind, the G8 would not be rerouted, but stop 1001212 on 17th Street NW [west] at K Street NW, could still be removed due to very limited ridership.
- The rerouting of the N2, N4, N6 would significantly reduce future ridership at stop 1001193; the stop would still be classified as a basic stop with multiple shelters.
- Stop 1001183 would still serve over ten different routes and have the highest stop boardings at Farragut Square. This terminal would still be classified as a transit center.

- The reroutes considered by the Golden Triangle BID's study may affect the placement location of the stops (near-side, far-side, mid-block), but would not affect the amenities required at each stop/terminal.

If the Golden Triangle BID's study recommendations are carried forward, stop 1001212 would be removed, stop 1001192 and 1001193 would be classified as basic stops, and stop 1001183 would be classified as a transit center (Table 42 and Table 43). Stop 1001192 would not require a shelter, while stop 1001193 would require at least one shelter.

Table 42: Farragut Square Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Farragut Square	**2,058**				
1001183	1,680	2	2	Far-side	Transit Center
1001192	0	0	0	Far-side	Basic
1001193	377	0	0	Near-side	Basic
1001212	1	0	0	Near-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 43: Farragut Square Future Needs Summary

	1001212	1001183	1001192	1001193
Placement	Near-side	Far-side	Far-side	Near-side
Bus Zone Requirement		?	?	?
Stop Hierarchy	Basic	Transit Center	Basic	Basic
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance	X	X	X	X
Lighting				
Seating		X		
Expanded Boarding/Alighting				
Bus Bay (Pull Off)				
Shelter(s)		X		
Trash Receptacle	X			X
Information Case	X	X	X	X
System Map		X		
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

? = *Enough space for bus zone, but the limit of the bus zone is not well defined with sign posts.*

Federal Center SW

WMATA has confirmed that the current bus services (routes P1, P2, P6) at the Federal Center SW stops have be terminated. Currently, there is no confirmation on new service to be implemented at Federal Center SW, but WMATA will be looking at opportunities to relieve bus operation congestion at other locations or extend new services to the Washington, DC core by using this facility.

Franklin Square

Service Changes

The H and I Streets bus-only lanes, if implemented, would require adequate amenities and infrastructure, meeting at a minimum, the enhanced service class, on the I Street NW stops/terminals of Franklin Square. Similarly, WMATA is looking into the possibility of relocating the 53 route terminal to 10th Street NW (no specific plan has been completed yet).

Future Needs

At this on-street terminal location, all those that would be classified as basic and enhanced service stops would warrant at least one shelter.

Similar to the existing conditions, stop 1003662 would be classified as enhanced service stop due to the high number of daily boardings. In addition, the possible implementation of the H and I Street bus-only lane may elevate stops along I Street NW to a minimum of enhanced service class regardless of the boardings number.

Table 44: Franklin Square Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Franklin Square	**6,308**				
1001187	1,178	0	1	Far-side	Transit Center
1001190	113	0	0	Near-side	Basic
1001191	1,040	1	1	Near-side	Transit Center
1001209	1,543	1	0	Near-side	Transit Center
1001220	476	1	0	Near-side	Enhanced
1003653	1,199	0	1	Mid-block	Transit Center
1003661	441	1	1	Mid-block	Enhanced
1003662	318	0	1	Mid-block	Enhanced

= *Ridership values were not available for all routes that serve these stops.*

Table 45: Franklin Square Future Needs Summary

	1001187	1001190	1001191	1001209	1001220	1003653	1003661	1003662
Placement	Far-side	Near-side	Near-side	Near-side	Near-side	Mid-block	Mid-block	Mid-block
Bus Zone Requirement	X		X		X			
Stop Hierarchy	Transit Center	Basic	Transit Center	Transit Center	Enhanced	Transit Center	Enhanced	Enhanced
Bus Stop Sign(s)	X	X	X	X	X	X	X	X
ADA Landing Area	X	X	X	X	X	X	X	X
Sidewalk Clearance	X	X	X	X	X	X	X	X
Lighting	X				X	X		
Seating	X		X	X	X			
Expanded Boarding/ Alighting			X	X	X		X	
Bus Bay (Pull Off)								
Shelter(s)	X		X	X	X			
Trash Receptacle		X	X	X	X			
Information Case	X	X	X	X	X	X	X	X
System Map			X					
Real-Time Display (LED DMS+Audio)								
Interactive Phone System								

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

Lafayette Square

Service Changes

The H and I Streets bus-only lanes, if implemented, would require amenities and infrastructure meeting enhanced service class on the Lafayette Square stops/terminal, located on H Street NW. WMATA is also seeking to relocate the X2 terminal from Lafayette Square to some other location in proximity to the current route. In addition, the L2 has discontinued its service to Lafayette Square.

Although motorcoaches are currently prohibited from stopping on H Street NW at Lafayette Square, the high volume of motorcoach activity has prompted DDOT's Motorcoach Action Plan to identify Lafayette Square as one of the possible locations where public space may be dedicated for curbside motorcoach use in the future (for loading, unloading, or short term parking). DDOT has not yet reached a final decision on this matter.

Future Needs

Stop 1003702 would be classified as a transit center. If the X2 terminal is relocated away from Lafayette Square, the stop ridership at stop 1003702 would be zero, which would remove the need for bus amenities at this stop.

Table 46: Lafayette Square Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Lafayette Square	**1,331**				
1001141	329	3	0	Near-side	Enhanced
1003702	1,002	0	1	Mid-block	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Table 47: Lafayette Square Future Needs Summary

	1003702	1001141
Placement	Mid-block	Near-side
Bus Zone Requirement		X
Stop Hierarchy	Transit Center	Enhanced
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting		
Seating		
Expanded Boarding/Alighting		X
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle	X	X
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

L'Enfant Plaza

Service Changes

Route A9 would be extended to McPherson Square, which means that L'Enfant Plaza would no longer be a terminus. There is no confirmation on the final route schedule and configuration for the A9; hence, it would be hard to determine any effects on ridership. For this study, it is assumed that the A9 would no longer serve the stops at L'Enfant Plaza in the future.

Future Needs

The stop ridership data available to determine the hierarchy of stop 1003599 was incomplete. It is assumed that the stop would have low number of boardings due to the low volume of line ridership of the bus routes serving the stop. Consequently, stop 1003599 would be classified as a basic stop that does not require a shelter.

Table 48: L'Enfant Plaza Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
L'Enfant Plaza SW	**818**				
1003599	0	0	1	Mid-block	Basic
1003665	818	1	1	Near-side	Transit Center

= *Ridership values were not available for all routes that serve these stops.*

Table 49: L'Enfant Plaza Future Needs Summary

	1003599	1003665
Placement	Mid-block	Near-side
Bus Zone Requirement	X	X
Stop Hierarchy	Basic	Transit Center
Bus Stop Sign(s)	X	X
ADA Landing Area	X	X
Sidewalk Clearance	X	X
Lighting		X
Seating		X
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle		
Information Case	X	X
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

McPherson Square

Service Changes

Several service changes that would impact McPherson Square are identified in the *Anacostia – Congress Heights Line Service Evaluation Study*. This study includes the following recommendations:

- MetroExtra route A9, which would operate peak period/peak direction limited stop service between the Livingston Loop and McPherson Square in central Washington, DC.
- Extension of overnight service of Metrobus routes A2/A42, A6/A46 and A8/A48 to McPherson Square from the Archives in central Washington, DC.
- MetroExtra Route A7, which would operate peak period/peak direction, limited stop service between the Southern Avenue Metrorail Station and McPherson Square in central Washington, DC.

The above changes could possibly increase the ridership at the McPherson Square stops, which would require an increase in the stop's capacity to handle greater number of passengers.

Implementation of the H and I Streets bus-only lanes, if implemented, would require amenities and infrastructure meeting enhanced service class on the I Street NW stops/terminals of McPherson Square.

Additionally, the L2 has discontinued service to McPherson Square.

Future Needs

Stop 1003476 would be classified as a basic stop with no shelter due to low number of daily boardings. Stop 1001199 would be classified as a basic stop with at least one shelter, which would most likely change with the extension of the A9 service and the possible relocation of the X2 terminus from Lafayette Square.

Table 50: McPherson Square Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
McPherson Square	**2,009**				
1001185	1,788	3	0	Near-side	Transit Center
1001199	221	0	3	Mid-block	Basic
1003476	0	0	1	Near-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 51: McPherson Square Future Needs Summary

	1003476	1001199	1001185
Placement	Near-side	Mid-block	Near-side
Bus Zone Requirement		X	
Stop Hierarchy	Basic	Basic	Transit Center
Bus Stop Sign(s)	X	X	X
ADA Landing Area			X
Sidewalk Clearance	X	X	X
Lighting			X
Seating			X
Expanded Boarding/Alighting			
Bus Bay (Pull Off)			
Shelter(s)			X
Trash Receptacle	X		
Information Case	X	X	X
System Map			
Real-Time Display (LED DMS+Audio)			
Interactive Phone System			

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

Potomac Park

Service Changes

No service changes would be expected for the stops located at Potomac Park.

Future Needs

Although the daily boardings at stop 1003537 would be relatively low, the operation of an express route (39) would justify the enhanced service stop classification. Stops 1000983 and 1001021 would have low numbers of boardings, as they both serve as predominately alighting stops. Consequently, both stops would be categorized as basic stops with no shelters.

Although stop 1003131 would still be served by an express route (route 39), it would still only operate during peak periods. Under this analysis, stop 1003131 would be classified as a basic stop due to the limited operation period.

Table 52: Potomac Park Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Potomac Park NW	**78**				
1000983	3	0	0	Near-side	Basic
1001021	0	0	1	Near-side	Basic
1003131	40	0	2	Far-side	Basic
1003537	35	1	3	Near-side	Enhanced

= *Ridership values were not available for all routes that serve these stops.*

Table 53: Potomac Park Future Needs Summary

	1003537	1000983	1001021	1003131
Placement	Near-side	Near-side	Near-side	Far-side
Bus Zone Requirement	X	?	?	X
Stop Hierarchy	Enhanced	Basic	Basic	Basic
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance		X	X	X
Lighting	X	X	X	X
Seating	X			
Expanded Boarding/ Alighting	X			
Bus Bay (Pull Off)				
Shelter(s)	X			
Trash Receptacle		X		
Information Case	X			X
System Map				
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*

? = *Enough space for bus zone, but the limit of the bus zone is not well defined with sign posts.*

Washington Street at King Street

Service Changes

No service changes would be expected for the stops located on Washington Street at King Street.

Future Needs

All stops would be classified as basic stops, but only stops 4000025 and 4000026 would warrant shelters.

Table 54: Washington Street at King Street Stop Classification Based on Future Conditions

Location ID	Estimated Stop Boardings	Express Route(s)	Route Terminus	Placement	Hierarchy
Washington Street	**309**				
4000025	167	0	0	Mid-Block	Basic
4000026	99	0	0	Far-Side	Basic
4000027	16	0	0	Near-Side	Basic
4000028	27	0	0	Far-side	Basic

= *Ridership values were not available for all routes that serve these stops.*

Table 55: Washington Street at King Street Future Needs Summary

	4000025	4000026	4000027	4000028
Placement	Mid-block	Far-side	Near-side	Far-side
Bus Zone Requirement				X
Stop Hierarchy	Basic	Basic	Basic	Basic
Bus Stop Sign(s)	X	X	X	X
ADA Landing Area	X	X	X	X
Sidewalk Clearance	X	X	X	X
Lighting	X	X	X	X
Seating		X	X	
Expanded Boarding/Alighting				
Bus Bay (Pull Off)				
Shelter(s)				
Trash Receptacle	X	X	X	X
Information Case			X	
System Map				
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				

= *Amenities Required*

= *Optional or Site Specific Amenities*

X = *Amenities Already in Place*


NO STANDING OR PARKING METRO BUS ZONE
NO PARKING ANYTIME

Section 5: Recommendations

This section provides recommendations for bus amenities that would aim to upgrade each stop to the requirements set by the *WMATA Design Guidelines*. The recommendations take into consideration the existing conditions, future requirements (based on the future conditions analysis), and physical or regulatory constraints present at each location. At some locations, the existing constraints may impede the upgrade of all stop facilities to the requirements set by the *WMATA Design Guidelines*.

Specific implementation timelines are not defined in this study. The implementation of many of the recommendations in this study would require further design and analysis work, as well as additional coordination between WMATA and various local, regional, and federal agencies, and members of the community.

Recommendations by Stop Location

The following paragraphs provide summaries of the amenities recommended at each stop. The recommendations are provided by stop locations. The symbols presented in the table are:

M ..... Maintain existing facility/amenity

R ..... Relocate existing facility/amenity

P ..... Prepare shelter(s) to be illumination and real-time bus information ready.

S ..... Seating and/or lighting amenities provided via shelter facility.

+1, +2, etc. ..... Add new or additional amenities/facilities in the quantity indicated.

-1, -2, etc. ..... Remove existing amenities/facilities in the quantity indicated.

Please refer to the plans presented under each on-street terminal location's section to identify the stop locations in the recommendations.

10th Street NW

Bus Zone and Bus Signs

All stops along 10th Street NW accommodate the required bus zones, but could add additional street signs to clearly indicate the extent of each bus zone. New signs would be installed to indicate the front limit of the bus zones for stops 1003432, 1003287 (combined bus zone with stop 1003288), and stop 1003691 (combined bus zone with stop 1000910). Stop 1003570 would require a sign to indicate the rear limit of the bus zone.

The existing Metrobus stop signs would need to be updated with the new version, which should reflect any changes in routes serving each stop.

Passenger Waiting Area

The most prevalent issue along the stops on 10th Street NW pertains to the provision of ADA-compliant facilities. The planters installed along the sidewalk would need to be shifted to ensure that the four feet clear pathway (edge-to-edge) is maintained between the planters, especially around the passenger waiting area of the stops. Also, the passenger waiting areas

Table 56: Recommendations 10th Street NW

	1000910	1003691	1003287	1003288	1003432	1003570
Placement	Mid-block	Mid-block	Near-side	Near-side	Mid-block	Near-side
Bus Zone Requirement	M	M	M	M	M	M
Bus Zone Street Sign(s)	M	+1	M	+1	+1	M
Stop Hierarchy	Basic	Basic	Basic	Enhanced	Basic	Basic
Bus Stop Sign(s)	M	M	M	M	M	M
ADA Landing Area			M			M
Sidewalk Clearance	M	M	M	M	M	M
Lighting	M	S	S	S	S	S
Seating		S	S	S	S	S
Expanded Boarding/Alighting						
Bus Bay (Pull Off)						
Shelter(s)		M	M	M	M	M
Trash Receptacle	+1	+1	+1	+1	+1	+1
Information Case	+1	M	M	M	M	M
System Map		+1	M	M	+1	M
Real-Time Display (LED DMS+Audio)		P	P	+1	P	P
Interactive Phone System						
Concrete Bus Pad	M	M	M	M	M	M
Curb Extensions						

= *Amenities Required*

= *Optional or Site Specific Amenities*

for stops 1000910, 1003288, 1003432, and stop 1003691 does not provide sufficient space to accommodate an ADA-compliant 8'x5' landing area. Under existing conditions, the only way to accommodate the 8'x5' landing areas at these stops would be to shift the shelters and/or the planters back (away from the curb). Following FTA guidelines, as no other major construction would be required at the stop locations, the installation of ADA-compliant landing area is not required and would not be recommended in this study.

Bench and Shelters

10th Street NW functions mostly as a bus layover and turnaround location and has relatively limited passenger boarding activities. Due to its limited boarding activities, the installation of additional shelters would not be recommended at this location. The analysis indicates that maintaining the existing number of shelters would be sufficient to accommodate the future conditions.

Passenger Information

The stops with existing shelters would each require a system map and/or relevant maps for passenger use, and stop 1000910 would require the addition of a bus information case (mounted on the bus post). Additionally, all the bus information in the post mounted information cases would be updated to ensure passengers have access to adequate bus route and schedule information.

Stop 103288 would be the only terminal that would require the installation of both real-time DMS and audio box systems for passenger information, but all shelters should accommodate the necessary infrastructure (i.e., wirings, conduits, and power) to accommodate real-time passenger information displays in the future.

Lighting

As per the existing Clear Channel contract with DDOT, the existing shelters would have lighting/illumination. Under this assumption, all stops with shelters would provide lighting in the passenger waiting area through the existing shelters. The shelter illumination would supplement lighting for passenger areas of stops that already located in the proximity of street lighting.

Trash Receptacle and Vendor Boxes

Although the installation of a trash receptacle is only required at stop 1003288 (trash receptacles are optional at all other stops), the study recommends the installation of trash receptacles in the vicinity of all bus stops, so long as it maintains the necessary clear paths to-and-from each bus stop.

Although vendor boxes are not present at the 10th Street NW location, there is curbside space to locate them, if needed, within the bus zone of each stop.

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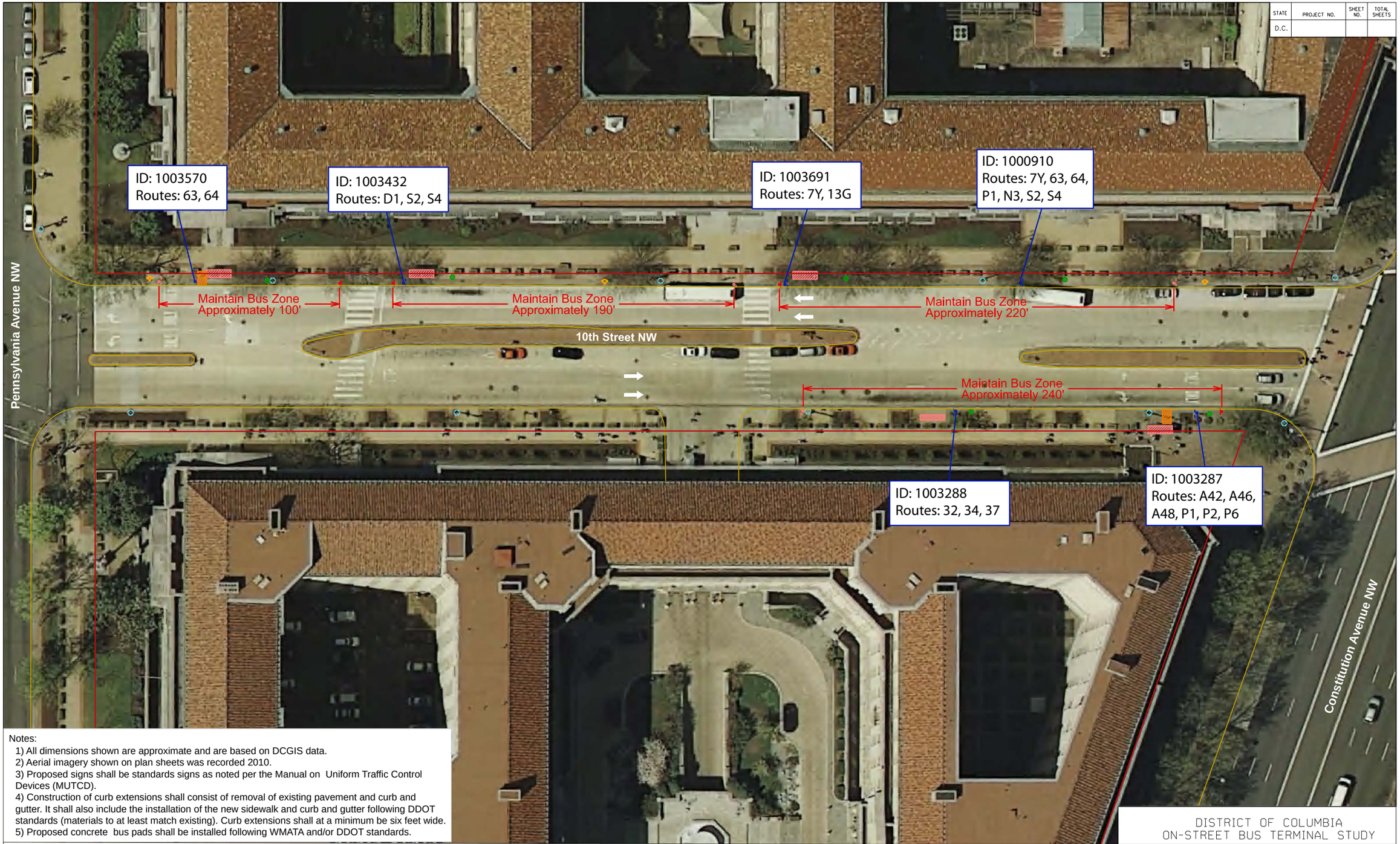
Figure 77: Foldout – Recommendations Plan View – 10th Street NW



Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

Date: 09/22/2012

PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

10th Street NW
Existing Conditions

0 25 50
SCALE IN FEET

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C Street SW

Stop 1000690 (located on the 12th Street SW end) provides approximately 56 feet of space for the bus zone, which is not enough to meet either the mid-block or far-side bus zone requirements. The study recommends the removal of this bus stop, as it is physically impossible to accommodate the required bus zone in the existing space. This curbside space could accommodate two to three additional parking spaces.

If this bus stop is to be maintained, the existing condition would be maintained with the addition of a sign post indicating the rear (east) end of the bus zone.

Table 57: Recommendations C Street SW

	1000690	1000692
Placement	Mid-block	Far-side
Bus Zone Requirement		M
Bus Zone Street Sign(s)	-1	+1
Stop Hierarchy	Basic	Basic
Bus Stop Sign(s)	-1	R
ADA Landing Area		M
Sidewalk Clearance		M
Lighting		S
Seating		S
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		+1
Trash Receptacle		+1
Information Case	-1	M
System Map		+1
Real-Time Display (LED DMS+Audio)		P
Interactive Phone System		
Concrete Bus Pad		+1
Curb Extensions		

= *Amenities Required*

= *Optional or Site Specific Amenities*

Bus Zone and Bus Signs

Stop 1000692 is technically a mid-block stop, but due to the fact that the bus zone (approximately 110 feet) is in between two driveways, it can be dealt as a near-side stop on the west end. The bus sign post will have to be relocated to approximately five feet from the edge of the driveway located on the west end of the bus zone. The existing sign indicating the west end of the stop 1000692 bus zone (mounted on the street light) would be maintained, while a new sign and sign post indicating the rear (east) end of the bus zone would be installed.

The main boarding and alighting activities would take place at the west end of the bus zone, which leaves enough space on the east end of the bus zone to accommodate a layover space.

Passenger Waiting Area

The existing passenger waiting area for stop 1000692 would be shifted west towards the proposed location of the new bus sign post. This proposed passenger waiting area would have a wider sidewalk space that would accommodate a new shelter, while providing the required four feet clear pathways around the shelter and the 8'x5' feet ADA-compliant landing area. In addition, the existing planter would be relocated further east, next to the location of the existing fire hydrant.

Bench and Shelters

The proposed passenger waiting area for stop 1000692 would accommodate a new bus shelter. The recommended shelter would be a standard three-panel shelter (Figure 78).

Passenger Information

The existing post mounted bus information case would be relocated with the bus stop sign. The bus route and schedule information in the case would be updated to reflect the actual routes serving the stop.

The proposed shelter at stop 1000692 would provide a system map and/or relevant maps for passenger use. Although the provision of real-time bus information (both DMS and audio systems) is optional at this stop, the study recommends the provision of necessary infrastructure (i.e., wirings, conduits, and power) to accommodate real-time passenger information displays in the future.

Lighting

Although stop 1000692 already has the required lighting in the proximity of the passenger waiting area, the proposed shelter illumination (as per the existing Clear Channel contract with DDOT) would provide additional lighting source.

Trash Receptacle and Vendor Boxes

The existing trash receptacle in the proximity of the east end of stop 1000692 would be maintained, but the study recommends an additional trash receptacle towards the west end where the proposed passenger waiting area would be located.

Although vendor boxes are not present at the C Street SW location, there is curbside space to locate them, if needed, within the bus zone of stop 1000692.

Figure 78: Proposed Shelter Configuration at Stop 1000692 on C Street SW

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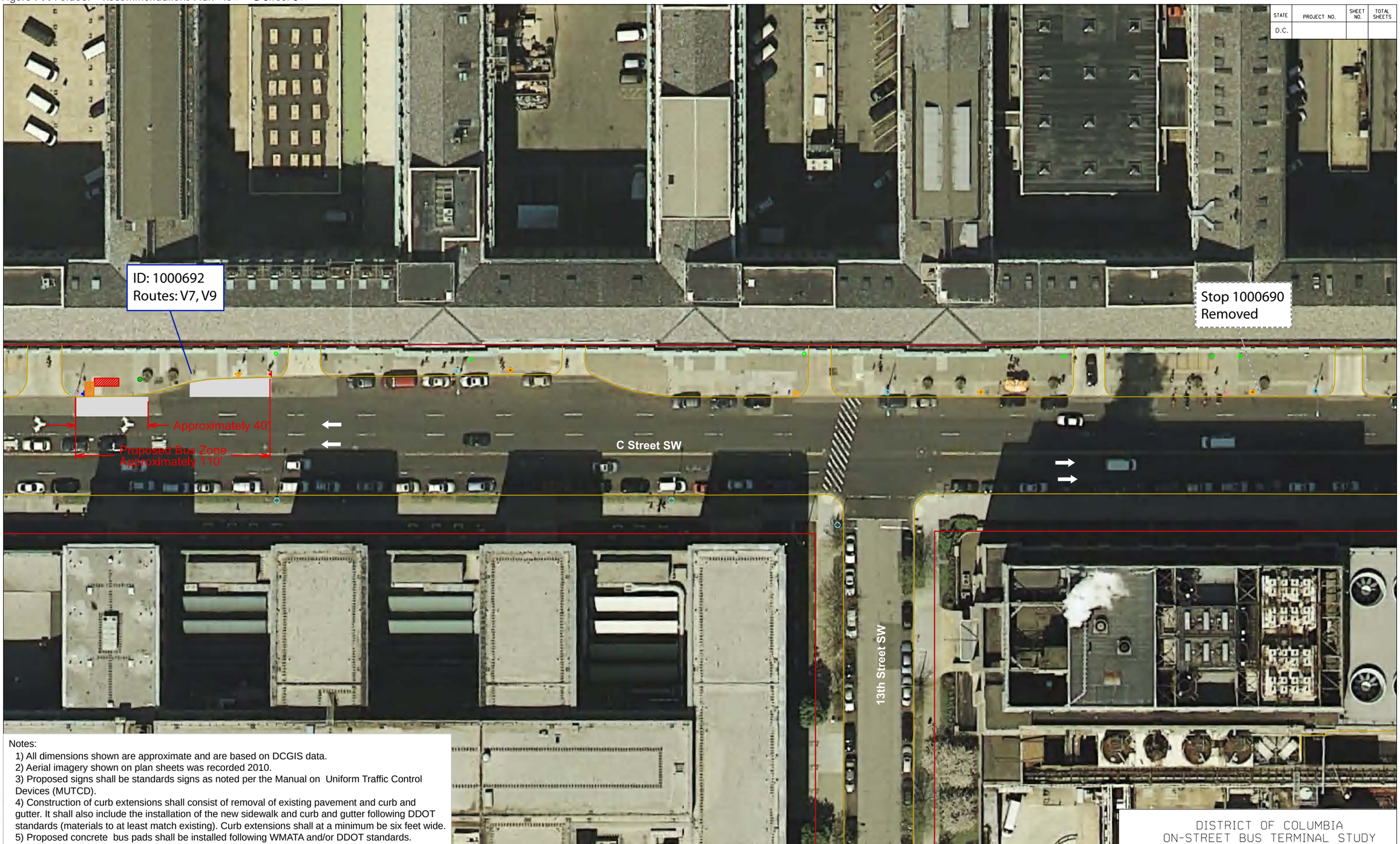
Figure 79: Foldout – Recommendations Plan View – C Street SW



Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Columbus Circle

No recommendations would be made for Columbus Circle as the new (permanent) stop locations have not been designated by WMATA.

Assuming that the boarding activities at this stop would be similar or greater to the existing conditions, it would be safe to consider that the new stops would have all amenities required by a transit center, with each stop providing a minimum of two standard three-panel shelters.

Table 58: Recommendations Columbus Circle

	1001029	1001031
Placement	N/A	N/A
Bus Zone Requirement		
Bus Zone Street Sign(s)		
Stop Hierarchy	Transit Center	Transit Center
Bus Stop Sign(s)		
ADA Landing Area		
Sidewalk Clearance		
Lighting		
Seating		
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle		
Information Case		
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		
Concrete Bus Pad		
Curb Extensions		

= *Amenities Required*

= *Optional or Site Specific Amenities*

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Farragut Square

At Farragut Square, the study recommends the removal of stop 1001192 (located on 17th Street NW [east] at K Street NW) and stop 1001212 (located on 17th Street NW [west] at K Street NW). The curbside space at stop 1001212 could accommodate approximately three or four additional metered parking spaces. The space used by stop 1001192 would be replaced as a shuttle operating zone (during the peak hours) and would allow the maintenance of metered parking spaces during the non-peak hours. This conversion would help separate bus and shuttle operation, reducing operational conflicts, especially during peak hours.

Table 59: Recommendations Farragut Square

	10012112	1001183	1001192	1001193
Placement	Near-side	Far-side	Far-side	Near-side
Bus Zone Requirement		M		M
Bus Zone Street Sign(s)	-1	+2		+2
Stop Hierarchy	Basic	Transit Center	Basic	Transit Center
Bus Stop Sign(s)	-1	R	-1	R
ADA Landing Area		M		M
Sidewalk Clearance		M		M
Lighting		S		S
Seating		S		S
Expanded Boarding/Alighting		+1		+1
Bus Bay (Pull Off)				
Shelter(s)		+1		+2
Trash Receptacle		+2		M
Information Case	-1	M	-1	M
System Map		+1		+1
Real-Time Display (LED DMS+Audio)		+1		+1
Interactive Phone System				
Concrete Bus Pad		+1		+1
Curb Extensions				

= *Amenities Required*

= *Optional or Site Specific Amenities*

Bus Zone and Bus Signs

The existing bus stop sign for stop 1001193 would be shifted approximately 25 feet north and the bus zone itself would expand north by replacing approximately two metered parking spaces just south of the existing stop 1001192 bus zone (recommended shuttle zone). The new bus zone for stop 1001193 would be approximately 175 feet long and will be clearly indicated by street signs at both ends. The proposed shuttle/metered parking zone would be approximately 100 feet. Shuttles would only operate during peak periods.

The bus stop sign for stop 1001183 would be shifted west (approximately 20 feet) and street signs would indicate both ends of the bus zone. The proposed bus zone would start east of the metal grates located along the I Street NW sidewalk to prevent boarding and alighting activities to take place on the metal grates. The west end of the bus zone would be located approximately 20 feet from the intersection with 17th Street NW [west]. The proposed bus zone at stop 1001183 would be approximately 125 feet.

Passenger Waiting Area

The general location of the passenger waiting area for stops 1001193 and 1001183 would remain. Both passenger waiting areas would accommodate additional shelters, which would be placed while maintaining the required four feet clear pathways and 8'x5' feet ADA-compliant landing areas.

Bench and Shelters

Stop 1001193 would have at least two standard three-panel shelters or a custom-sized shelter that would accommodate similar capacity as two standard three-panel shelters (Figure 80).

Stop 1001183 would have an additional standard three-panel shelter, which would be located just east of the existing shelter (Figure 81).

Passenger Information

The existing post mounted bus information cases would be relocated with the bus stop signs at each stop. The bus route and schedule information in the cases would be updated to reflect the actual routes serving the stops.

The shelters at stops 1001183 and 1001193 would provide a system map and/or relevant maps for passenger use. As stops classified as transit centers, both stops would be required to provide real-time bus information (both DMS and audio systems).

Figure 80: Custom-Sized Shelter at Stop 1001193 on Farragut Square

Lighting

Under the existing conditions evaluation, it was determined that both stops do not have adequate lighting sources within the required proximity of the passenger waiting area. Under the existing Clear Channel contract with DDOT, the existing shelter (at stop 1001183) and the proposed shelters would provide a light source that would illuminate respective passenger waiting areas.

Trash Receptacle and Vendor Boxes

The existing trash receptacle at the corner of 17th Street NW [east] and I Street NW would be maintained for stop 1001193, but the study recommends installing at least one additional trash receptacle closer to the stop's passenger waiting area. The passenger waiting area for stop 1001183 would require the installation of at least one trash receptacle, most likely in between the two shelters.

Although vendor boxes are not present at the bus stops at the Farragut Square location, there is curbside space to locate them, if needed, in the proximity of the passenger waiting areas.

Figure 81: Proposed Shelter Configuration at Stop 1001183 on Farragut Square

Figure 82: Foldout – Recommendations Plan View – Farragut Square

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3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Federal Center SW

No recommendations has been provided for this location as all bus service has been suspended at this location.

Franklin Square

At Franklin Square, the most extensive recommended modifications would occur along I Street NW. A mid-block curb extension on I Street NW would accommodate transit center class passenger amenities. In addition, the existing five stops along I Street NW would be consolidated into three stops (1003653, 1003661, and 1003662).

Table 60: Recommendations Franklin Square

	1000910	1003691	1003287	1003288	1003432	1003691	1003691	1003570
Placement	Far-side	Near-side	Near-side	Near-side	Near-side	Mid-block	Mid-block	Mid-block
Bus Zone Requirement		+1		+1	M	+1	+1	+1
Bus Zone Street Sign(s)		R		+2	M	+1,R	+2,R	+1
Stop Hierarchy	Transit Center	Basic	Transit Center	Transit Center	Enhanced	Transit Center	Enhanced	Enhanced
Bus Stop Sign(s)	-1	M	-1	M	M	R	R	M
ADA Landing Area		M		M	M	M	M	M
Sidewalk Clearance		M		M	M	M	M	M
Lighting		S		S	S	M	S	S
Seating		S		S	S	S	S	S
Expanded Boarding/ Alighting				M	M	+1	M	+1
Bus Bay (Pull Off)								
Shelter(s)		+1		+1	M	M	+2	M
Trash Receptacle		M		+1	M	+3	+2	+1
Information Case	-1	+1	-1	M	M	M	M	M
System Map		+1		+2	+1	+1	+2	+1
Real-Time Display (LED DMS+Audio)		+1		+1	+1	+1	+1	+1
Interactive Phone System								
Concrete Bus Pad		+1		+1	M	M	+1	M
Curb Extensions							+1	

= *Amenities Required*

= *Optional or Site Specific Amenities*

Bus Zone and Bus Signs

Stop 1001190 (located at 13th and I Streets NW) would require some modifications of the existing bus zone. The existing bus zone is approximately 70 feet, which does not meet the required 100 feet for a near-side stop. The study recommends expanding the bus zone north, which would remove two metered parking spaces. The existing street sign indicating the rear (north) end of the bus zone would have to be relocated to indicate the new bus zone.

Stop 1001209 (located at 14th at K Streets NW) would require the extension of the bus zone to the south to provide a 150 feet bus zone. New street signs would be added to indicate the limits of the proposed bus zone.

Stop 1001220 (located at K and 13th Streets NW) provides adequate bus zone space and has street signs indicating the limits of the bus zone. No additional recommendations would be made in regards to the bus zone and corresponding street signs at this stop.

The entire block of the north side of I Street NW, between 13th and 14th Streets NW, would remain as a bus zone (approximately 520 feet). This bus zone would accommodate a proposed curb extension, and new stops 1003653 (located at I and 14th Streets NW), 1003661 (located mid-block of I Street NW), and 1003662 (located at I and 13th Streets NW).

Passenger Waiting Area

No major recommendations would be suggested for the passenger waiting areas for stops 1001190 and 1001220. The existing conditions at these stops provide the necessary space for four feet clear pedestrian pathways and ADA-compliant 8'x5' landing areas.

As a transit center, stop 1001209 would expand the existing passenger area with the addition of an extra shelter. The additional shelter would maintain the necessary space for four feet clear pedestrian pathways and an ADA-compliant 8'x5' landing area.

Along I Street NW, the study recommends the addition of a curb extension at the center of the block, which would serve stop 1003662. The curb extension would be approximately 140 feet long and it would accommodate shelter facilities, serving routes that would continue along I Street NW and do not use Franklin Square as a terminus (e.g., routes 42, 80, G8, P17, P19, S2, W13, and X2). The curb extension would require the relocation of the bus zone sign post and the existing fire hydrant.

West of the curb extension on I Street NW, the existing stops 1001191 and 1003653 would be consolidated into one stop 1003653, which would provide an approximately 190 feet bus zone serving routes that would turn on to 14th Street NW (e.g., routes 53, D4, and DC Circulator). Similarly, east of the curb extension, the existing stops 1001187 and 1003662 would be consolidated into one stop 1003662 with a bus zone that is approximately 190 feet. Stop 1003662 would serve routes that operate primarily in the peak hours and do not need to turn right on to 14th Street NW (e.g., routes 43, S4, and S9). Both stops adjacent to the curb extensions would need to provide passenger amenities required by a transit center.

Bench and Shelters

According to the *WMATA Design Guidelines* the boardings at stop 1001220, located on K Street NW (at 13th Street NW), requires the addition of a new standard three-panel shelter. Unfortunately, the limited sidewalk space and the existing park property line do not allow enough space to install a new shelter without obstructing the required minimum four feet clear pedestrian circulation path. As so, the study recommends maintaining the existing shelter configuration at stop 1001220 as it is.

Similarly, boardings at stop 1001190 would warrant for the installation of a new standard three-panel shelter. Under the existing sidewalk conditions (approximately 11 feet of width) it is possible to install a standard three-panel shelter while allowing the adequate four feet of clear pathway along the rest of the sidewalk. The study recommends the installation of a shelter at stop 1001190 (Figure 83).

As a transit center, stop 1001209 requires at least two standard three-panel shelters in the passenger waiting area. Taking into consideration the presence of an existing shelter, stop 1001209 would require at least another shelter, which would be best located approximately 40 feet south of the existing shelter (Figure 84).

On I Street NW, two custom-sized expanded shelters would be installed on the proposed mid-block curb extensions. The two shelters would be installed on both sides of the existing fire hydrant (Figure 85).

Figure 83: Proposed Shelter at Stop 1001190 Along 13th Street NW on Franklin Square

All stops along I Street NW on Franklin Square would be classified as transit centers. This would mean the each of the stops on I Street NW would require transit center class passenger amenities, including at least two standard three-panel shelters. Due to physical constraints set by the existing property lines and available space, the shelter requirements for the proposed stops 1003653, 1003661, and 1003662 would need to be accommodated with the existing two shelters along I Street NW and the proposed shelters on the mid-block curb extension.

Passenger Information

The existing post mounted bus information cases for stops 1001190, 1001209, and 1001220 would be maintained. Some of the post mounted bus information cases would be removed from I Street NW with the consolidation of the stops. In all cases, the bus route and schedule information in the cases would be updated to accurately reflect any service change at each stop.

All existing and proposed shelters at Franklin Square would provide a system map and/or relevant maps for passenger use. Similarly, the study recommends that all stops with shelter(s) require the provision of real-time bus information (both DMS and audio systems).

Figure 84: Proposed Additional Shelter at Stop 1001209 Along 14th Street NW on Franklin Square

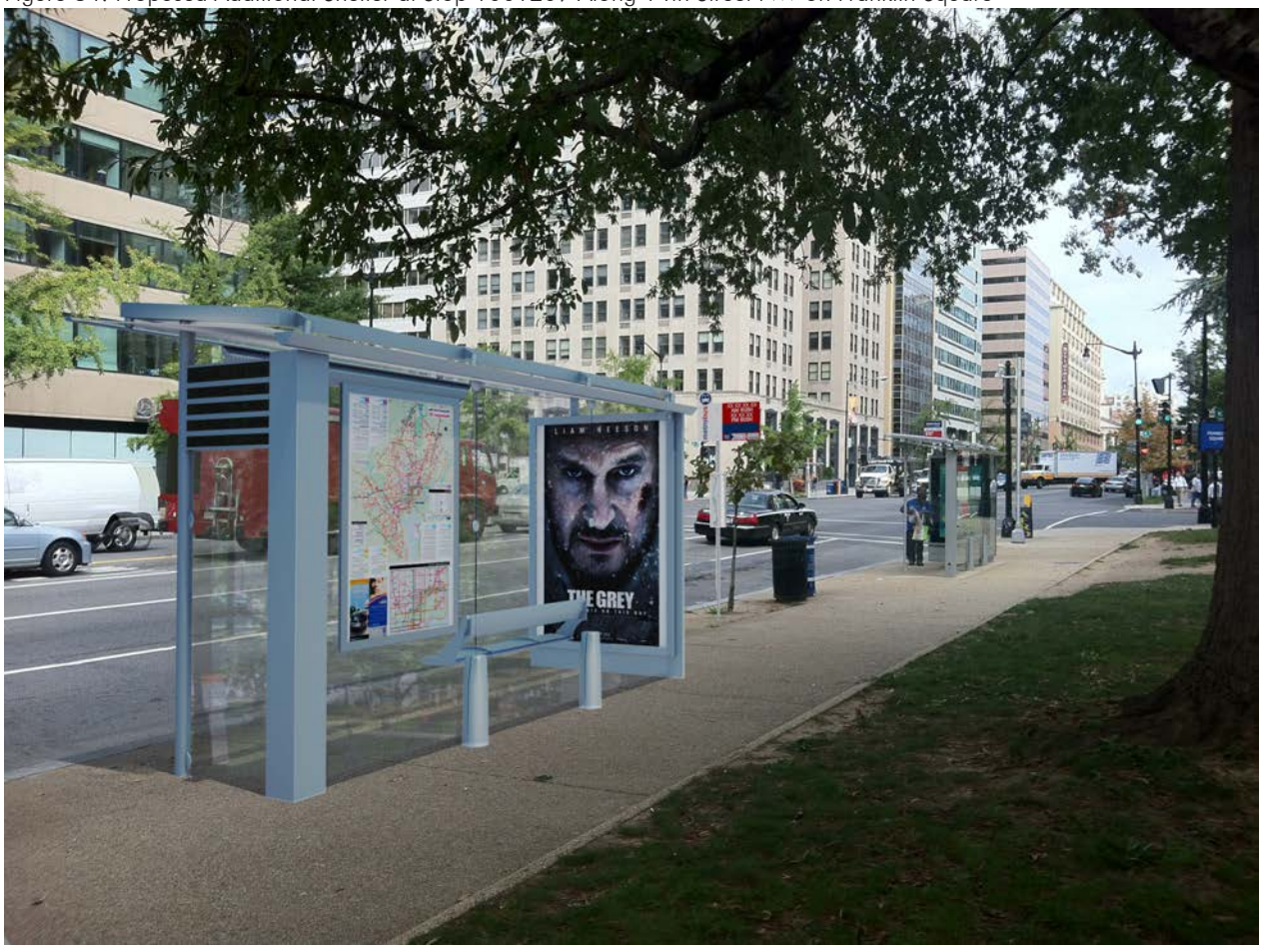

Figure 85: Proposed Curb Extension and Shelter Configuration on I Street NW

Lighting

The passenger waiting areas around Franklin Square are not well lit under the existing conditions. The addition of shelter illumination (for both existing and proposed shelters) through the existing Clear Channel and DDOT contract would provide additional lighting at the passenger waiting areas.

Trash Receptacle and Vendor Boxes

The existing trash receptacles would be maintained. New trash receptacles would need to be provided at stops 1003653, 1003662, and 1003661, which are missing trash receptacles under existing conditions. An additional trash receptacle would also be recommended at stop 1001209 to complement the proposed new shelter.

The existing vendor boxes would be maintained at the existing locations, with the exception of those at stop 1001209. At stop 1001209, the vendor boxes would need to be relocated to the space between the existing and proposed shelters to maintain space for pedestrian circulation around the passenger waiting area.

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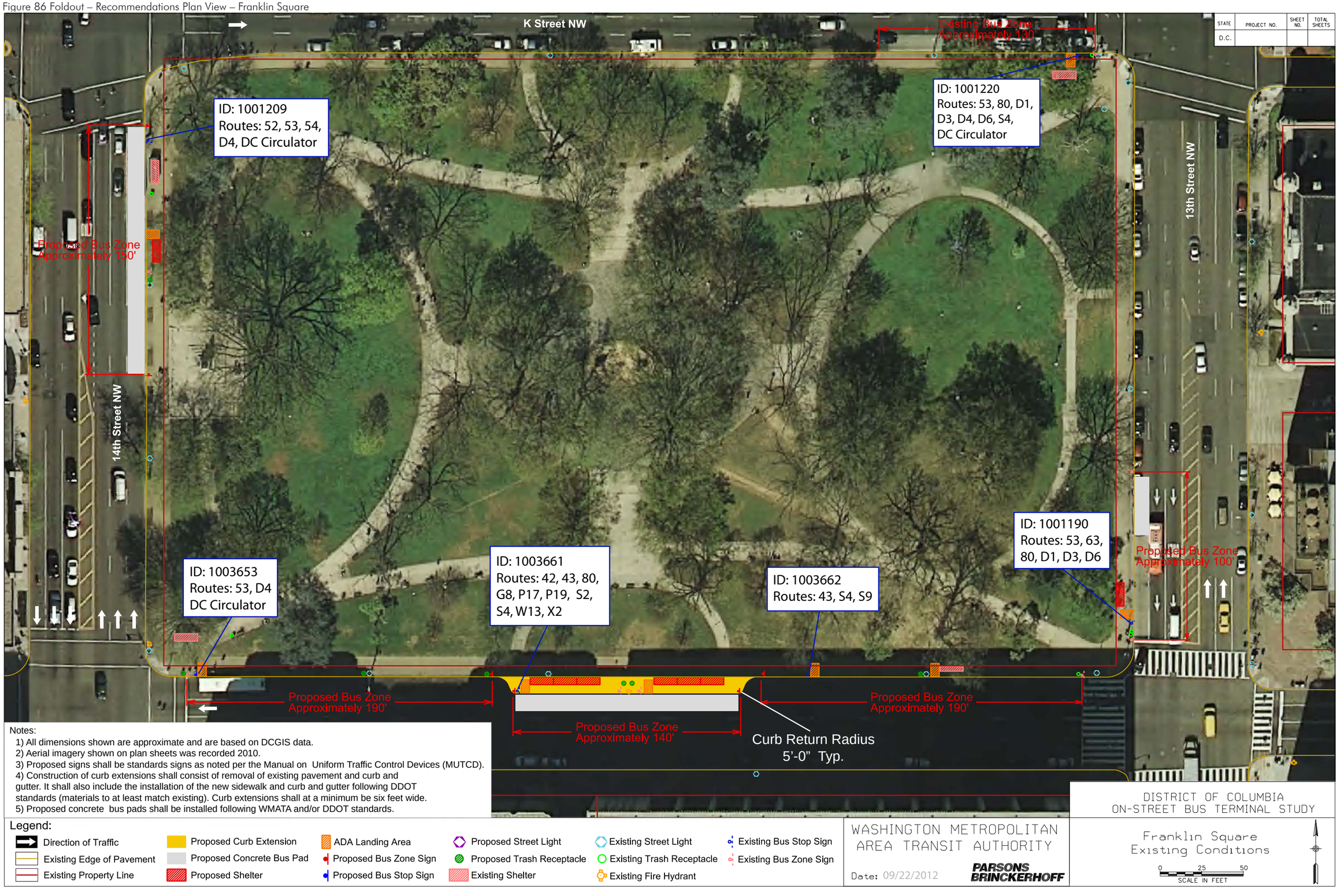
Figure 86 Foldout – Recommendations Plan View – Franklin Square



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Notes:
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4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Lafayette Square

Assuming the existing route service remains at Lafayette Square, the location would require transit center and enhanced service class passenger amenities, including at least three standard three-panel shelter(s). As presented in Section 3 of this report, the limited space and the presence of large tree boxes along the curb side limit the opportunity to install large amenities at this location. In addition, the location of the stops, next to a historic park in the proximity of the White House, may raise additional constraints on what recommendations would be possible at Lafayette Square.

WMATA is continuously searching to relocate the X2 terminus from Lafayette Square. One of the locations that have been considered is on 15th Street NW [west] of McPherson Square, but there is still no official confirmation on the relocation of the route. If the X2 terminus is relocated, the study recommends the removal of stop 1003702 from Lafayette Square.

Table 61: Recommendations Lafayette Square

	1003702	1001141
Placement	Mid-block	Near-side
Bus Zone Requirement	+1	M
Bus Zone Street Sign(s)	R	R
Stop Hierarchy	Transit Center	Enhanced
Bus Stop Sign(s)	R	M
ADA Landing Area	M	M
Sidewalk Clearance	M	M
Lighting		
Seating		
Expanded Boarding/Alighting		
Bus Bay (Pull Off)		
Shelter(s)		
Trash Receptacle	+2	+2
Information Case	M	M
System Map		
Real-Time Display (LED DMS+Audio)		
Interactive Phone System		
Concrete Bus Pad	M	M
Curb Extensions		

= *Amenities Required*

= *Optional or Site Specific Amenities*

Bus Zone and Bus Signs

Although the bus zone for stop 1003702 would need to be expanded to meet the requirement for a mid-block stop, there is not enough space to expand the bus zone westward due to the presence of pedestrian crosswalks. If the X2 does maintain operation at Lafayette Square, the service would have to be accommodated within the existing limited bus zone or the bus zone for stop 1003702 would be expanded in exchange for the reduction of the bus zone for stop 1001141.

If the X2 is relocated from Lafayette Square, the study recommends the removal of stop 1003702 and the consolidation of the bus zones for stops 1003702 and 1001141.

In both cases, the study recommends reducing the clutter of street signs (Figure 87) located along the block to help users clearly identify the extent of the bus zone.

Passenger Waiting Area

As presented under Section 3, the existing passenger waiting area at Lafayette Square provides the necessary four feet clear pathways and ADA-compliant 8'x5' landing areas. Nonetheless, the sidewalk spaces available for possible expansion or modification in the passenger waiting areas are very limited due to the presence of large tree boxes. From a passenger waiting area perspective, the study recommends avoiding the installation of large bus stop amenities that may obstruct pedestrian circulation and accessibility.

Figure 87: Cluttered Street Signage at Lafayette Square Bus Zone

The existing sidewalk and passenger waiting area are paved with brick pavers. Brick pavers are not the most pedestrian friendly materials to be used on sidewalks. The uneven surface and openings in the joints caused by the unmaintained bricks create an uncomfortable (sometimes unsafe) walking environment for pedestrians (especially vulnerable users). Although changing the paving materials would be typically recommended around the passenger waiting areas, the study would not recommend changing the brick pavers to preserve the historic nature of Lafayette Square.

Bench and Shelters

Although boardings at both stops would warrant for bus shelters, the limitations in the existing sidewalk space would make it very difficult to find an adequate placement that would maintain the accessibility requirements. In addition, stakeholders have indicated that historically the installation of significant infrastructure at Lafayette Square has suffered major push back due to the historic nature of the park and its proximity to the White House.

As a result, the study would not recommend the installation of bus shelters at the stop(s) on Lafayette Square.

Passenger Information

The lack of shelters at Lafayette Square would limit the passenger information that could be provided. The existing post mounted information cases would be maintained (one of them may be removed if the X2 terminus is relocated) and updated bus route and schedule information would be provided.

A possible way to provide real-time bus information without having a shelter is to install a facility similar to the illuminated panel with DMS system presented earlier in Section 2 (Figure 88).

Figure 88: Sample DMS Panel Structure for Lafayette Square

Lighting

The passenger waiting area at Lafayette Square is not well lit due to the limited number of available street lights. The installation of the illuminated panel with the DMS system may provide additional lighting for the passenger waiting areas.

Trash Receptacle and Vendor Boxes

The existing trash receptacles at Farragut Square are small plastic canisters chained to the bus stop sign post (Figure 89). The study recommends replacing the existing trash receptacles with the standard trash receptacle typically used in the streets of Washington DC.

Although vendor boxes are not present at the bus stops at the Lafayette Square location, there is curbside space to locate them, if needed, in the proximity of the passenger waiting areas.

Figure 89: Existing Trash Receptacle at Lafayette Square

Figure 90 Foldout – Recommendations Plan View – Lafayette Square

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4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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L'Enfant Plaza

Bus Zone and Bus Signs

Both stops 1003599 and 1003665 would maintain the existing bus zone space, the street signs indicating both ends of the bus zone, and the bus stop sign location.

Passenger Waiting Area

The existing passenger waiting area for stops 1003599 and 1003665 provide the required four feet clear pathways and the 8'x5' feet ADA-compliant landing areas. For stop 1003665, the location of proposed shelters would not obstruct any of the accessibility requirements.

Bench and Shelters

According to the analysis stop 1003559 would not require shelters, but stop 1003669 would require multiple shelters as it is classified as a transit center.

Table 62: Recommendations L'Enfant Plaza

	1003599	1003665
Placement	Mid-block	Near-side
Bus Zone Requirement	M	M
Bus Zone Street Sign(s)	M	M
Stop Hierarchy	Basic	Transit Center
Bus Stop Sign(s)	M	M
ADA Landing Area	M	M
Sidewalk Clearance	M	M
Lighting	+1	M
Seating		M
Expanded Boarding/Alighting		M
Bus Bay (Pull Off)		
Shelter(s)		+2
Trash Receptacle	+1	+2
Information Case	M	M
System Map		+2
Real-Time Display (LED DMS+Audio)		+1
Interactive Phone System		
Concrete Bus Pad	+1	+1
Curb Extensions		

= *Amenities Required*

= *Optional or Site Specific Amenities*

At stop 1003665, two standard three-panel shelters would be placed in the space between the tree boxes, replacing the existing benches (Figure 91).

Passenger Information

The existing post mounted bus information case would be maintained and the bus information would be updated to reflect the actual routes serving the stops.

Each of the proposed shelters at stop 1003665 would provide a system map and/or relevant maps for passenger use. Similarly, the study recommends all shelters to provide real-time bus information (both DMS and audio systems) for the passengers.

Lighting

Although stop 1003665 already has the required lighting in the proximity of the passenger waiting area, the proposed shelter illumination (as per the existing Clear Channel contract with DDOT) would provide additional lighting for the passenger waiting area.

On the other hand stop 1003559 does not have a light source within the required proximity nor does it provide a bus shelter with illumination. But as a stop with heavy alighting activity, the study recommends the installation of additional transit related or street lighting facility at this stop.

Trash Receptacle and Vendor Boxes

The study recommends the addition of two trash receptacles within the proximity of stop 1000692's passenger waiting area and one for stop 1003559.

Although vendor boxes are not present at the L'Enfant Plaza location, there is curbside space to locate them, if needed, within the bus zone of both stops.

Figure 91: Proposed Shelter Configuration at L'Enfant Plaza

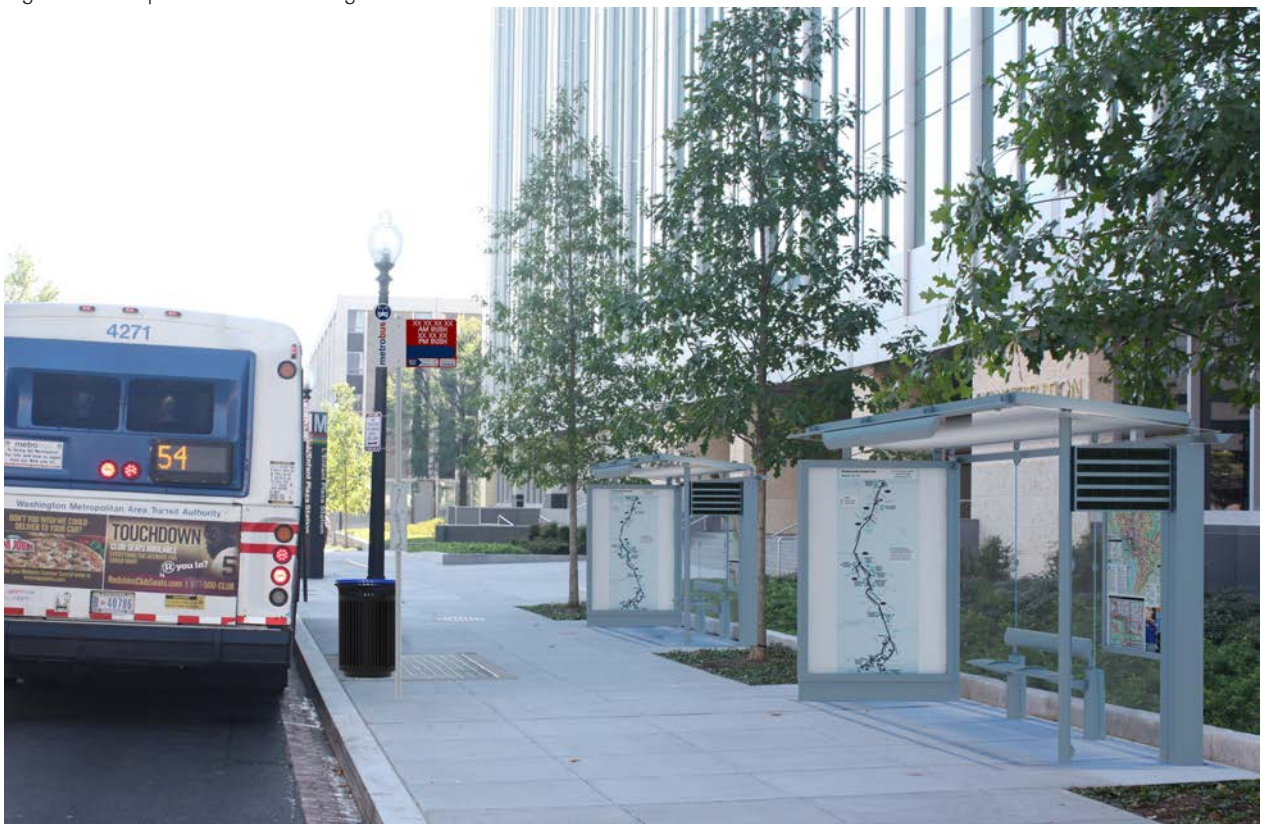
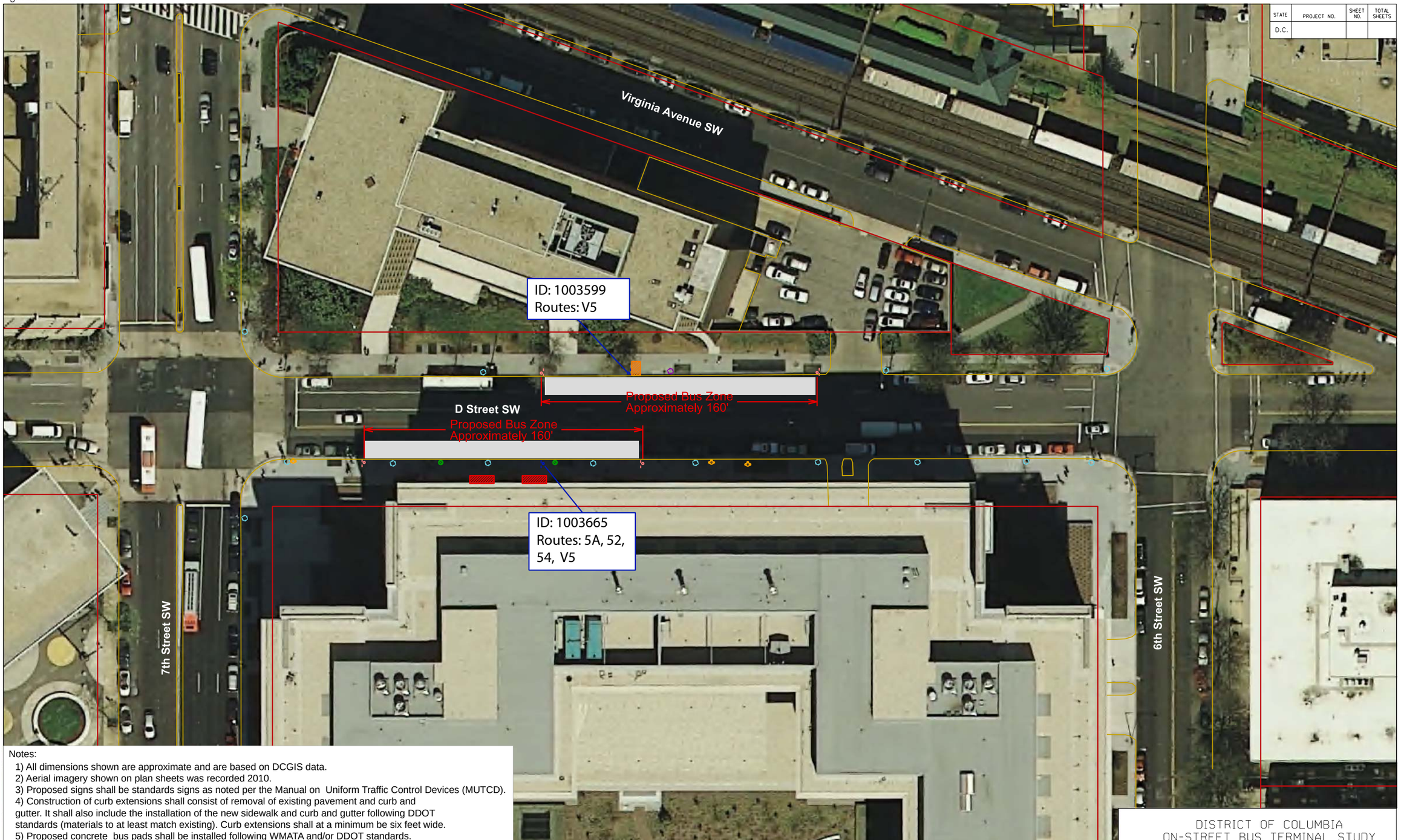


Figure 92 Foldout – Recommendations Plan View – L'Enfant Plaza



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2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

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PARSONS BRINCKERHOFF

DISTRICT OF COLUMBIA
ON-STREET BUS TERMINAL STUDY

L'Enfant Plaza
Existing Conditions

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McPherson Square

Bus Zone and Bus Signs

The existing 95 feet bus zone and the relevant street signs for stop 1001185 would be maintained. Similarly, the existing three metered parking spaces located east of the bus zone would be maintained, while extending the peak hour parking restrictions from 6:30 to 9:30 AM and 4:00 to 7:00 PM. In addition, it would be recommended that the street signs clearly reflect that the three metered parking spaces would operate as a bus zone during the peak periods.

For stop 1001199, the existing bus zone would be extended approximately 20 feet north, taking away one metered parking space. In exchange, the study recommends the bus service at stop 1003476 to be discontinued, which would remove the peak hour parking restrictions on the remaining three metered parking spaces. The proposed bus zone at stop 1001199 would be approximately 170 feet long and the extent of the proposed bus zone would be clearly indicated by street signs.

Table 63: Recommendations L'Enfant Plaza

	1003476	1001199	1001185
Placement	Near-side	Mid-block	Near-side
Bus Zone Requirement		+1	M
Bus Zone Street Sign(s)	-1	+3, R	M
Stop Hierarchy	Basic	Basic	Transit Center
Bus Stop Sign(s)	-1	R	M
ADA Landing Area		+1	M
Sidewalk Clearance		M	M
Lighting		S	S
Seating		S	S
Expanded Boarding/Alighting			M
Bus Bay (Pull Off)			
Shelter(s)		+1	+1
Trash Receptacle		+2	+1
Information Case	-1	M	M
System Map		+1	+1
Real-Time Display (LED DMS+Audio)		+1	+1
Interactive Phone System			
Concrete Bus Pad		+1	+1
Curb Extensions		+1	

= *Amenities Required*

= *Optional or Site Specific Amenities*

Passenger Waiting Area

The passenger waiting area for stop 1001185 provides the required four feet clear pathways and ADA-compliant 8'x5' landing areas. As this stop is classified as a transit center, the study would also recommend an additional shelter to be installed just east of the existing shelter. The new shelter would not inhibit pedestrian circulation and accessibility requirements.

Stop 1001199 is located on a sidewalk that is approximately seven feet wide. The existing sidewalk provides enough clear space for a four feet pathway, but does not allow for an 8'x5' ADA-compliant landing area nor does it provide enough space to accommodate a standard three-panel shelter.

Taking into consideration that stop 1001199 would require a shelter and would have to accommodate the possible relocation of the X2 terminus, the study recommends the installation of a standard 40 feet long curb extension on the north end of the 170 feet bus zone. This curb extension would provide an expanded passenger waiting area that would not only accommodate shelter(s), but it would also provide capacity to accommodate any ridership growth that the X2

relocation may cause. In addition, the curb extension would help protect the parking spaces north of the bus zone and allow space for buses to layover in the southern section of the bus zone.

Bench and Shelters

The proposed shelter at stop 1001185 would be located approximately 30 feet east of the existing shelter. The new shelter would be a standard three-panel shelter (Figure 93).

According to the future conditions analysis, a standard three-panel shelter would be required at stop 1001199. The study recommends the installation of a custom-size expanded shelter on the proposed curb extension to provide additional capacity that may be able to accommodate change in ridership due to service changes (Figure 94).

Passenger Information

The existing post mounted bus information case would be maintained and the bus information would be updated to reflect the actual routes serving the stops.

Figure 93: Proposed Shelter Configuration at I Street NW on McPherson Square

Figure 94: Proposed Shelter and Curb Extension Configuration at 15th Street NW [west] on McPherson Square

All the shelters (existing and proposed) at the McPherson Square location would provide a system map and/or relevant maps for passenger use. Similarly, the study recommends that all shelters provide real-time bus information (both DMS and audio systems) for the passengers.

Lighting

Although stop 1001185 already has the required lighting in the proximity of the passenger waiting area, the proposed shelter illumination (as per the existing Clear Channel contract with DDOT) would provide additional lighting for the passenger waiting area.

On the other hand stop 1001199 does not have a light source within the required proximity and the proposed bus shelter would provide the required illumination at the passenger waiting area.

Trash Receptacle and Vendor Boxes

Although there are some trash receptacles on the corner of 15th Street NW [east] and I Street NW, the study recommends the provision of trash receptacles closer to the passenger waiting areas of both stops on McPherson Square.

Although vendor boxes are not present at the McPherson Square location, there is curbside space to locate them, if needed, within the bus zone of both stops.

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Figure 95 Foldout – Recommendations Plan View – McPherson Square

Notes:

1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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McPherson Square
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Potomac Park

Bus Zone and Bus Signs

The bus zones of both stops 1000983 and 1001021 are currently signed as non-peak hour parking spaces, and observations indicate the buses have been alighting passengers at this location from the through lane during non-peak hours when the spaces are filled. The study recommends the removal of parking spaces at the bus zones of both stops, which would convert them into all day service stops. As both locations are classified as near-side stops, the conversion would require the removal of at least five parking spaces at each stop to allow for the required minimum of 100 feet bus zones to accommodate a standard 40-foot bus. The extent of the new bus zones would be clearly marked with street signs.

Table 64: Recommendations Potomac Park

	1003537	1000983	1001021	1003131
Placement	Near-side	Near-side	Near-side	Far-side
Bus Zone Requirement	M	+1	+1	+1
Bus Zone Street Sign(s)	M	+2	+2	+1
Stop Hierarchy	Enhanced	Basic	Basic	Basic
Bus Stop Sign(s)	M	R	M	M
ADA Landing Area	M	M	M	M
Sidewalk Clearance	+1	M	M	M
Lighting	M	M	M	M
Seating	M			
Expanded Boarding/ Alighting	M			
Bus Bay (Pull Off)				
Shelter(s)	R			
Trash Receptacle	+2	M	+1	M
Information Case	M	+1	+1	M
System Map	+1			
Real-Time Display (LED DMS+Audio)	+1			
Interactive Phone System				
Concrete Bus Pad	+1	M	M	M
Curb Extensions				

= *Amenities Required*

= *Optional or Site Specific Amenities*

Stop 1003131 operates only in the peak periods and the bus zone is used as metered parking during the non-peak hours. There is enough curbside space (approximately 90 feet) to accommodate the required bus zone for a far-side stop, but clear street signage is required to indicate that parking is not allowed during the peak periods. The study recommends the installation of street signs indicating the extent of the bus zone.

Stop 1003537 would maintain the existing street signs that indicate that the whole north side block of Virginia Avenue NW between 21st and E Streets NW is the bus zone for the stop.

Passenger Waiting Area

With the exception of stop 1003537, all the stops evaluated along Virginia Avenue NW provides the required four feet clear pathways and ADA-compliant 8'x5' landing areas at the passenger waiting areas.

As presented in earlier sections, the sidewalk for the western approach to stop 1003537 does not provide the four feet clear pathway due to an obstruction caused by a large tree root growing in the adjacent tree box (Figure 96). The study recommends shifting the existing shelter several feet to the north and/or to the east to allow the expansion of the existing sidewalk to meet the required four feet minimum width (under the assumption that the relocation of the mature tree would not be a feasible alternative).

Bench and Shelters

The existing bus shelter at stop 1003537 would be shifted several feet to improve the pedestrian accessibility around the passenger waiting area. No other stops evaluated at the Potomac Park terminal location would require a bus shelter.

Passenger Information

The study recommends the installation of post mounted bus information cases at stops 1000983 and 1001021, and maintain the existing cases at stops 1003537 and 1003131. The bus information at both the existing and proposed cases would be updated to reflect the actual routes serving the stops.

The shelter at stop 1003537 would provide a system map and/or relevant maps for passenger use and would provide real-time bus information (both DMS and audio systems) for the passengers.

Lighting

All stops evaluated at the Potomac Park terminal location are placed within the required proximity of a light source. For stop 1003537, the addition of shelter illumination (as per the existing Clear Channel contract with DDOT) would provide additional lighting for the passenger waiting area.

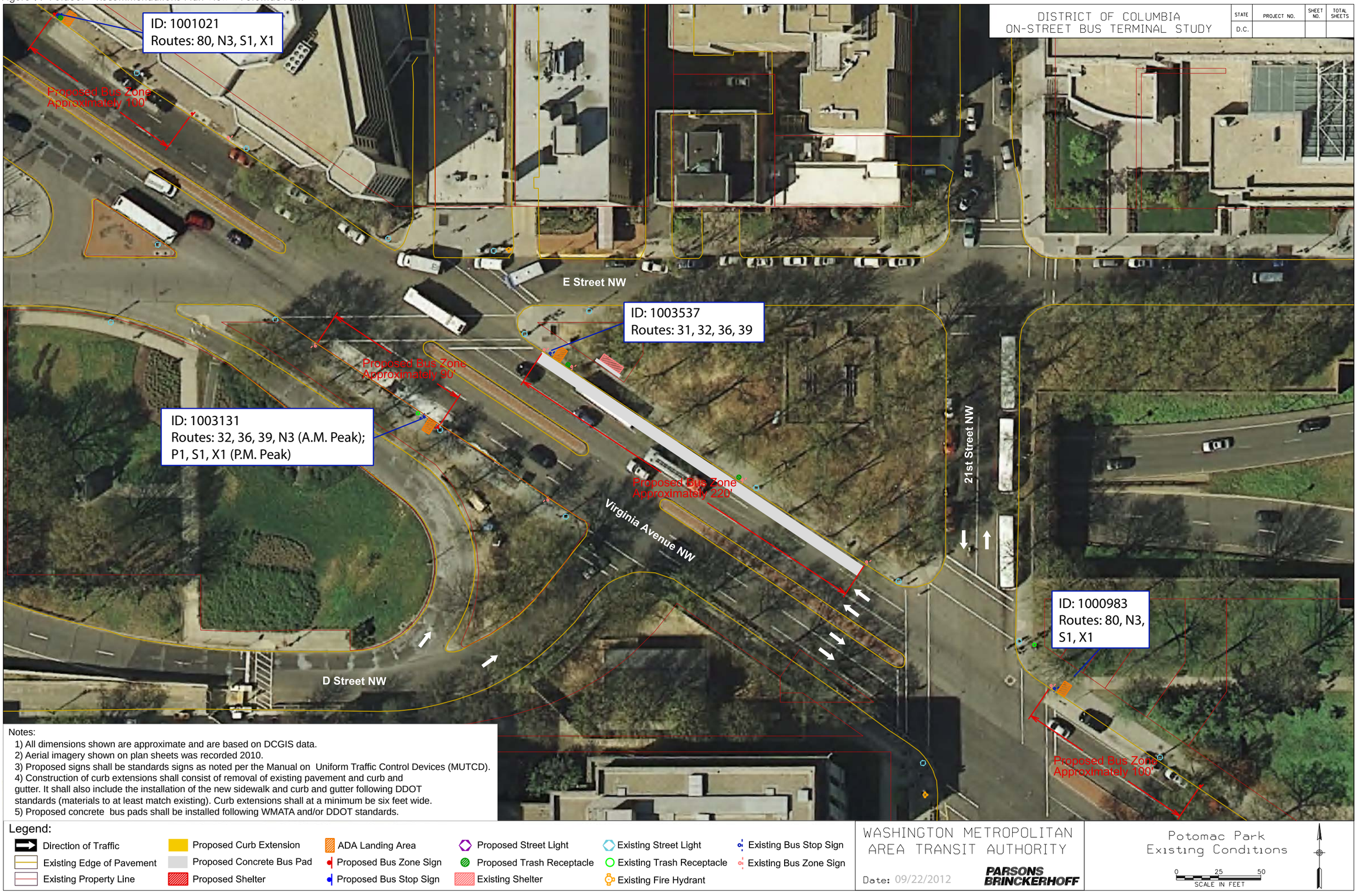
Trash Receptacle and Vendor Boxes

With the exception of stop 1000983, the study recommends the installation of trash receptacles within the proximity of the passenger area at all stops evaluated at the Potomac Park terminal location.

Although vendor boxes are not present along Virginia Avenue NW, there is curbside space to locate them, if needed, within the bus zone of all stops.

Figure 96: Sidewalk Connecting to Stop 1003537 at Potomac Park

Figure 97 Foldout – Recommendations Plan View – Potomac Park



Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Washington Street at King Street

Due to the limited space available to implement bus zones and passenger waiting areas that comply with the *WMATA Design Guidelines*, the study recommends the reassignment of bus routes at each stop by assigning the routes with higher boarding activities to the stops with greater available space. The suggested route reassignments would be:

- In the northbound direction, assign 29K and 29N to the stop north of King Street (stop 4000028) and assign routes 10A, 10B, 9A, and 11Y to service at the stop south of King Street (stop 4000025).
- In the southbound direction, assign 29K, 29N, and 9A to the stop south of King Street (stop 4000026) and routes 10A, 10B, and 11Y to the stop north of King Street (stop 4000027).

Bus Zone and Bus Signs

Stop 4000025 is a mid-block stop located between a tour bus operation zone to the north and a parking garage driveway to the south. Under existing conditions, the current 80 feet bus zone cannot be expanded to the south (physically restrained by the curb cut) or to the north as existing policy would not allow relocation of the tour bus zone. The study recommends the operation of stop 4000025 as a far-side stop, assuming the parking garage driveway is another street. Under the new classification, stop 4000025 would meet the minimum 70 feet to 90 feet bus zone requirement for a far-side stop. The study would also recommend the installation of a street sign to clearly indicate the limits of the bus zone for this stop.

Table 65: Recommendations Washington Street at King Street

	4000025	4000026	4000027	4000028
Placement	Far-side	Far-side	Near-side	Far-side
Bus Zone Requirement	M			M
Bus Zone Street Sign(s)	+1	+1	+2	+2
Stop Hierarchy	Basic	Basic	Basic	Basic
Bus Stop Sign(s)	+1	+1	M	+1
ADA Landing Area	M	M	M	M
Sidewalk Clearance	M	M	M	M
Lighting	M	M	M	M
Seating		M	M	
Expanded Boarding/ Alighting				
Bus Bay (Pull Off)				
Shelter(s)				
Trash Receptacle	M	M	M	M
Information Case	+1	+1	M	+1
System Map				
Real-Time Display (LED DMS+Audio)				
Interactive Phone System				
Concrete Bus Pad	+1	+1	+1	+1
Curb Extensions				

= *Amenities Required*

= *Optional or Site Specific Amenities*

Figure 98: Stop 4000025 on Washington Street at King Street

The bus zone for stop 4000026 is limited to the existing 65 feet as it is physically constrained by King Street to the north and an alley driveway to the south. Due to physical restrictions in expanding the bus zone, stop 4000026 would have to continue operation at this non-standard far-side stop. The study recommends the installation of street signs that would explicitly indicate the bus zone, in addition to the existing no-parking street signs.

The location of stop 4000027 does not have enough space to accommodate the minimum 100 feet bus zone required for a near-side stop. The only way to maintain the 100 feet curbside space for bus operation would be to extend the bus zone beyond the existing curb cut to the alley located north of the bus stop. But the study does not recommend including the access path to the alley as part of the bus zone as it could create both pedestrian and vehicular conflicts with the bus operation. The study recommends allowing bus stop 4000027 to operate as a non-standard near-side stop within the available bus zone space of approximately 80 feet.

Stop 4000028 has an approximately 85 feet long bus zone, which meets the 70 feet to 90 feet requirement set for a far-side stop bus zone. Similar to stop 4000028, the study recommends the installation of street signs that explicitly indicate the bus zone (in addition to the no parking sign) to prevent other users from occupying the curbside space.

Passenger Waiting Area

Limited sidewalk space and the historic character of Washington Street (including the strict zoning requirements tied to historic preservation) limits the extent to which a traditional passenger waiting area for transit could be implemented at these stops.

Under the existing conditions, the sidewalk space does provide the required four feet clear pathways and ADA-compliant 8'x5' landing areas at the passenger waiting areas of each stop. But it would be very difficult to install additional passenger amenity while maintaining the pedestrian accessibility requirements.

Additionally, changing the brick pavers to more vulnerable user friendly paving materials would be typically recommended around the passenger waiting areas, but the study does not recommend changing sidewalk pavers in order to preserve the historic nature of Washington Street.

Bench and Shelters

Although the passenger boarding activities at stops 4000025 and 4000026 warrant for shelters, the limitations set by the space and zoning requirement would make it extremely difficult to implement bus shelters at these locations.

A possible way to provide similar passenger amenities without installing shelters is to evaluate the possibility of installing benches and a canopy structure attached to the adjacent building wall. Stop 4000026 has a bench located in the proximity of the bus stop and does provide a covered area (albeit very limited) created by the canopies of the adjacent retail building.

A similar set up could be implemented at stop 4000025, where there is enough sidewalk space to install a bench and possible canopy attached to the adjacent building. But once again, the recommendation to implement a bench and/or canopy would only move forward after further evaluation and approval by the stakeholder agencies and local zoning authorities.

Passenger Information

With the exception of stop 4000027, the study recommends the installation of bus information cases at all other stops evaluated at Washington Street. As most of the existing bus stop signs along Washington Street are attached to light poles, either new street sign posts to accommodate the information case or a custom bus information case that can be mounted on the street light poles would need to be installed. All bus information cases to be installed would need to follow and meet any guidelines set by the local stakeholder agencies.

In addition, both the existing and proposed bus information cases would be updated to reflect changes in routes serving each stop.

Lighting

No additional lighting recommendations would be made as all stops are located within the required proximity of a lighting source.

Trash Receptacle and Vendor Boxes

No additional trash receptacle recommendations would be made as all stops have a trash receptacle within the required proximity from the passenger waiting area.

There are vendor boxes present at all the evaluated stops. The study recommends the consolidation and relocation (if needed) of the vendor boxes to provide clear space that allow unobstructed passenger boarding and alighting activities.

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Figure 99 Foldout – Recommendations Plan View – Washington Street and King Street

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
D.C.			

Notes:
1) All dimensions shown are approximate and are based on DCGIS data.
2) Aerial imagery shown on plan sheets was recorded 2010.
3) Proposed signs shall be standards signs as noted per the Manual on Uniform Traffic Control Devices (MUTCD).
4) Construction of curb extensions shall consist of removal of existing pavement and curb and gutter. It shall also include the installation of the new sidewalk and curb and gutter following DDOT standards (materials to at least match existing). Curb extensions shall at a minimum be six feet wide.
5) Proposed concrete bus pads shall be installed following WMATA and/or DDOT standards.

Legend:

- Direction of Traffic
- Existing Edge of Pavement
- Existing Property Line
- Proposed Curb Extension
- Proposed Concrete Bus Pad
- Proposed Shelter
- ADA Landing Area
- Proposed Bus Zone Sign
- Proposed Bus Stop Sign
- Proposed Street Light
- Proposed Trash Receptacle
- Existing Shelter
- Existing Street Light
- Existing Trash Receptacle
- Existing Fire Hydrant
- Existing Bus Stop Sign
- Existing Bus Zone Sign

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Section 6: Study Cost Estimate

A planning-level, order-of-magnitude cost estimate was developed for the proposed recommendations. The costs reflect the conceptual nature of the work to date. These numbers could help WMATA prioritize and phase implementation of the recommendations. In future work, WMATA should conduct a design-level cost estimate when more detailed design is performed, before implementing parts of the study. The study's estimated cost for the entire suite of *On-Street Bus Terminal Study* improvements is approximately USD $430,000.

Costs were compiled using unit costs from various sources and include the following allowances:

- 5 percent for drainage and utility relocation
- 2.5 percent for maintenance of traffic during construction
- 20 percent project management and other contingency, to reflect the conceptual nature of the design

The costs do not include other projects costs such as additional planning and engineering, overhead, profit and fees, contractor's contingency, or escalation beyond 2012 dollars.

The majority of the cost data was taken from several state departments of transportation (i.e. DDOT, VDOT) and previous WMATA studies. Unit costs estimates that were not in 2012 were escalated utilizing the consumer price index (CPI) escalation rate from the year 2011 to 2012 (approximately 1.7 percent).

Detailed breakdown of the cost estimate items are provided under Appendix A.

Table 66: Concept Level Project Cost Estimate Summary

Location	Cost (2012 USD)
10th Street NW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	17,200
C Street SW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	12,500
Bus Amenities and Facilities	3,600
Columbus Circle	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	unknown
Bus Amenities and Facilities	unknown
Farragut Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	14,400
Bus Amenities and Facilities	7,900
Federal Center SW	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	-
Franklin Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	54,700
Bus Amenities and Facilities	29,400
Lafayette Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	-
Bus Amenities and Facilities	9,400
L'Enfant Plaza	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	40,500
Bus Amenities and Facilities	28,200
McPherson Square	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	27,000
Bus Amenities and Facilities	12,600
Potomac Park	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	23,700
Bus Amenities and Facilities	12,400
Washington Street at King Street	
Major Infrastructure Work (e.g. curb extension, concrete bus pad)	39,500
Bus Amenities and Facilities	5,600
ALL LOCATIONS	
Major Infrastructure Work	212,300
Drainage, Utility, MOT	15,900
Bus Amenities and Facilities	126,300
Contingency	70,900
TOTAL (Subtotal + Contingency)	**425,400**

Appendices

Appendix 1: References

ADAAG, American Disabilities Act Accessibility Guidelines for Buildings and Facilities (2002)

WMATA, Guidelines for the Design and Placement of Transit Stops (2009)

Appendix 2: Concept Level Cost Estimates

The summary of the concept level cost estimates have been provided as Table 66 under Section 6 of this study. The tables presented under Appendix 2 provides additional details of the cost estimates.

Table A-1: Concept Level Cost Estimates - Inputs

Inputs	Unit Cost	Units	Source
Escalation (CPI) Based			
Cost Inflation Rate Estimate (constant)	0.02	% Annually	Consumer Price Index [CPI] (2012)
Base Year of Cost Estimates	2012	Year	Consumer Price Index [CPI] (2012)
Amenity Unit Costs			
Bus Stop Sign	260	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Bus Zone Sign	260	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Sign Removal	188	2011 $s/Each	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Sign Relocation	250	2011 $s/Each	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Bus Information Case	1,041	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Shelter	-	2011 $s/Each	DDOT, Assume no unit cost as per Clear Channel agreement
System Map	260	2011 $s/Each	WMATA, Service Evaluation Study (2011)
NextBus LED Dynamic Messaging System (DMS)	1,913	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Seating	875	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Trash Receptacle	2,115	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Street Light	20,897	2011 $s/Each	WMATA, Service Evaluation Study (2011)
Infrastructure for Future NextBus DMS Provision (each shelter)	-	2011 $s/Each	DDOT, Assume no unit cost as per Clear Channel agreement
Shelter Lighting	-	2011 $s/Each	DDOT, Assume no unit cost as per Clear Channel agreement
Construction Unit Costs			
Removal of Existing Curb and Gutter	4.01	2012 $s/LF	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Hard Surface Pavement Excavation	4.37	2012 $s/ SY	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Removal of Existing Fire Hydrant	14.00	2012 $s/SY	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Relocate Existing Fire Hydrant	1,173.33	2012 $s/Each	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Sidewalk	38.72	2012 $s/SY	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Standard Curb and Gutter	18.44	2012 $s/LF	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Radial Curb and Gutter	19.26	2012 $s/LF	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Pavement Restoration	146.49	2012 $s/Ton	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Concrete Bus Pad	94.50	2012 $s/SY	VDOT, Northern Virginia District Average Unit Cost (2010-2012)
Other Cost Estimate Factors			
Design Cost (Drainage)*	0.05	Factor	
Maintenance of Traffic*	0.025	Factor	
Project Management and Contingency**	0.20	Factor	
Factor to Account for Granite Material for Curb***	2.00	Factor	
Factor to Account for Brick Material for Gutter***	2.00	Factor	

**Applies to curb extension and concrete bus pad work(s) only*

***Applies to all total cost(s)*

****Applies to all curb and gutter works within the Central Business District (CBD) area of Washington, DC*

Table A-2: Concept Level Cost Estimates - Inputs

Items	Unit Quantities by Stop*					
Amenity Unit Costs	**1000910**	**1003691**	**1003287**	**1003288**	**1003432**	**1003570**
Bus Stop Sign	-	-	-	-	-	
Bus Zone Sign	1	-	-	-	1	1
Sign Removal	-	-	-	-	-	-
Sign Relocation	-	-	-	-	-	-
Bus Information Case	-	1	-	-	-	-
Shelter	-	-	-	-	-	-
System Map	1	-	-	-	1	-
NextBus LED Dynamic Messaging System (DMS)	-	-	-	1	-	-
Seating	-	-	-	-	-	-
Trash Receptacle	1	1	1	1	1	1
Street Light	-	-	-	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	1	-	1	-	1	1
Shelter Lighting	1	-	-	-	-	-
Construction Unit Costs						
Removal of Existing Curb and Gutter	-	-	-	-	-	-
Hard Surface Pavement Excavation	-	-	-	-	-	-
Removal of Existing Fire Hydrant	-	-	-	-	-	-
Relocate Existing Fire Hydrant	-	-	-	-	-	-
Sidewalk	-	-	-	-	-	-
Standard Curb and Gutter	-	-	-	-	-	-
Radial Curb and Gutter	-	-	-	-	-	-
Pavement Restoration	-	-	-	-	-	-
Concrete Bus Pad	-	-	-	-	-	-
Subtotal Per Stop (2012 USD)						
Infrastructure Cost Subtotal	-	-	-	-	-	-
Bus Amenities and Facilities Costs Subtotal	2,680	3,210	2,151	4,096	2,680	2,415

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-3: Concept Level Cost Estimates - C Street SW

Items	Unit Quantities by Stop*	
Amenity Unit Costs	**1000690**	**1000692**
Bus Stop Sign	-	-
Bus Zone Sign	-	1
Sign Removal	2	-
Sign Relocation	-	2
Bus Information Case	-	-
Shelter	-	1
System Map	-	1
NextBus LED Dynamic Messaging System (DMS)	-	-
Seating	-	-
Trash Receptacle	-	1
Street Light	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	1
Shelter Lighting	-	1
Construction Unit Costs		
Removal of Existing Curb and Gutter	-	-
Hard Surface Pavement Excavation	-	-
Removal of Existing Fire Hydrant	-	-
Relocate Existing Fire Hydrant	-	-
Sidewalk	-	-
Standard Curb and Gutter	-	-
Radial Curb and Gutter	-	-
Pavement Restoration	-	18
Concrete Bus Pad	-	104
Subtotal Per Stop (2012 USD)		
Infrastructure Cost Subtotal	-	12,448
Bus Amenities and Facilities Costs Subtotal	383	3,188

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-4: Concept Level Cost Estimates - Columbus Circle

Items	Unit Quantities by Stop*	
Amenity Unit Costs	**1001209**	**1001031**
Bus Stop Sign	-	-
Bus Zone Sign	-	-
Sign Removal	-	-
Sign Relocation	-	-
Bus Information Case	-	-
Shelter	-	-
System Map	-	-
NextBus LED Dynamic Messaging System (DMS)	-	-
Seating	-	-
Trash Receptacle	-	-
Street Light	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-
Shelter Lighting	-	-
Construction Unit Costs		
Removal of Existing Curb and Gutter	-	-
Hard Surface Pavement Excavation	-	-
Removal of Existing Fire Hydrant	-	-
Relocate Existing Fire Hydrant	-	-
Sidewalk	-	-
Standard Curb and Gutter	-	-
Radial Curb and Gutter	-	-
Pavement Restoration	-	-
Concrete Bus Pad	-	-
Subtotal Per Stop (2012 USD)		
Infrastructure Cost Subtotal	-	-
Bus Amenities and Facilities Costs Subtotal	-	-

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-5: Concept Level Cost Estimates - Farragut Square

Items	Unit Quantities by Stop*			
Amenity Unit Costs	**10012112**	**1001183**	**1001192**	**1001193**
Bus Stop Sign	-	-	-	-
Bus Zone Sign	-	2	-	2
Sign Removal	2	-	1	-
Sign Relocation	-	1	-	1
Bus Information Case	-	-	-	-
Shelter	-	1	-	2
System Map	-	1	-	1
NextBus LED Dynamic Messaging System (DMS)	-	1	-	1
Seating	-	-	-	-
Trash Receptacle	-	2	-	-
Street Light	-	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-	-	-
Shelter Lighting	-	1	-	-
Construction Unit Costs				
Removal of Existing Curb and Gutter	-	-	-	-
Hard Surface Pavement Excavation	-	-	-	-
Removal of Existing Fire Hydrant	-	-	-	-
Relocate Existing Fire Hydrant	-	-	-	-
Sidewalk	-	-	-	-
Standard Curb and Gutter	-	-	-	-
Radial Curb and Gutter	-	-	-	-
Pavement Restoration	-	19	-	18
Concrete Bus Pad	-	122	-	103
Subtotal Per Stop (2012 USD)				
Infrastructure Cost Subtotal	-	14,363	-	12,460
Bus Amenities and Facilities Costs Subtotal	383	7,295	192	2,993

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-6: Concept Level Cost Estimates - Federal Center SW

Items	Unit Quantities by Stop*	
Amenity Unit Costs	N/A	N/A
Bus Stop Sign	-	-
Bus Zone Sign	-	-
Sign Removal	-	-
Sign Relocation	-	-
Bus Information Case	-	-
Shelter	-	-
System Map	-	-
NextBus LED Dynamic Messaging System (DMS)	-	-
Seating	-	-
Trash Receptacle	-	-
Street Light	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-
Shelter Lighting	-	-
Construction Unit Costs		
Removal of Existing Curb and Gutter	-	-
Hard Surface Pavement Excavation	-	-
Removal of Existing Fire Hydrant	-	-
Relocate Existing Fire Hydrant	-	-
Sidewalk	-	-
Standard Curb and Gutter	-	-
Radial Curb and Gutter	-	-
Pavement Restoration	-	-
Concrete Bus Pad	-	-
Subtotal Per Stop (2012 USD)		
Infrastructure Cost Subtotal	-	-
Bus Amenities and Facilities Costs Subtotal	-	-

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-7: Concept Level Cost Estimates - Franklin Square

Items	Unit Quantities by Stop*							
Amenity Unit Costs	**1001187**	**1001190**	**1001191**	**1001209**	**1001220**	**1003653**	**1003661**	**1003662**
Bus Stop Sign	-	-	-	-	-	-	-	-
Bus Zone Sign	-	-	-	2	-	1	2	1
Sign Removal	1	-	1	-	-	-	-	-
Sign Relocation	-	1	-	-	-	2	3	-
Bus Information Case	-	1	-	-	-	-	-	-
Shelter	-	1	-	1	-	-	2	-
System Map	-	1	-	2	1	1	2	-
NextBus LED Dynamic Messaging System (DMS)	-	1	-	1	1	1	1	1
Seating	-	-	-	-	-	-	-	-
Trash Receptacle	-	-	-	1	-	3	2	1
Street Light	-	-	-	-	-	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-	-	-	-	-	-	-
Shelter Lighting	-	1	-	2	-	-	-	-
Construction Unit Costs								
Removal of Existing Curb and Gutter	-	-	-	-	-	-	165	-
Hard Surface Pavement Excavation	-	-	-	-	-	-	167	-
Removal of Existing Fire Hydrant	-	-	-	-	-	-	167	-
Relocate Existing Fire Hydrant	-	-	-	-	-	-	1	-
Sidewalk	-	-	-	-	-	-	167	-
Standard Curb and Gutter	-	-	-	-	-	-	150	-
Radial Curb and Gutter	-	-	-	-	-	-	40	-
Pavement Restoration	-	7	-	25	-	-	23	-
Concrete Bus Pad	-	35	-	164	-	-	144	-
Subtotal Per Stop (2012 USD)								
Infrastructure Cost Subtotal	-	4,339	-	19,232	-	-	35,471	-
Bus Amenities and Facilities Costs Subtotal	192	3,523	192	5,154	2,210	9,436	8,068	4,361

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-8: Concept Level Cost Estimates - Lafayette Square

Items	Unit Quantities by Stop*	
Amenity Unit Costs	**1003702**	**1001141**
Bus Stop Sign	-	-
Bus Zone Sign	-	-
Sign Removal	-	-
Sign Relocation	2	1
Bus Information Case	-	-
Shelter	-	-
System Map	-	-
NextBus LED Dynamic Messaging System (DMS)	-	-
Seating	-	-
Trash Receptacle	2	2
Street Light	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-
Shelter Lighting	-	-
Construction Unit Costs		
Removal of Existing Curb and Gutter	-	-
Hard Surface Pavement Excavation	-	-
Removal of Existing Fire Hydrant	-	-
Relocate Existing Fire Hydrant	-	-
Sidewalk	-	-
Standard Curb and Gutter	-	-
Radial Curb and Gutter	-	-
Pavement Restoration	-	-
Concrete Bus Pad	-	-
Subtotal Per Stop (2012 USD)		
Infrastructure Cost Subtotal	-	-
Bus Amenities and Facilities Costs Subtotal	4,810	4,556

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-9: Concept Level Cost Estimates - L'Enfant Plaza

Items	Unit Quantities by Stop*	
Amenity Unit Costs	**1003559**	**1003665**
Bus Stop Sign	-	-
Bus Zone Sign	-	-
Sign Removal	-	-
Sign Relocation	-	-
Bus Information Case	-	-
Shelter	-	2
System Map	-	2
NextBus LED Dynamic Messaging System (DMS)	-	-
Seating	-	-
Trash Receptacle	1	2
Street Light	1	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	1
Shelter Lighting	-	2
Construction Unit Costs		
Removal of Existing Curb and Gutter	-	-
Hard Surface Pavement Excavation	-	-
Removal of Existing Fire Hydrant	-	-
Relocate Existing Fire Hydrant	-	-
Sidewalk	-	-
Standard Curb and Gutter	-	-
Radial Curb and Gutter	-	-
Pavement Restoration	26	26
Concrete Bus Pad	172	174
Subtotal Per Stop (2012 USD)		
Infrastructure Cost Subtotal	20,142	20,352
Bus Amenities and Facilities Costs Subtotal	23,403	4,831

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-10: Concept Level Cost Estimates - McPherson Square

Items	Unit Quantities by Stop*		
Amenity Unit Costs	**1003476**	**1001199**	**1001185**
Bus Stop Sign	-	-	-
Bus Zone Sign	-	-	3
Sign Removal	2	-	-
Sign Relocation	-	-	2
Bus Information Case	-	-	-
Shelter	-	1	1
System Map	-	1	1
NextBus LED Dynamic Messaging System (DMS)	-	1	1
Seating	-	-	-
Trash Receptacle	-	1	2
Street Light	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-	-
Shelter Lighting	-	1	1
Construction Unit Costs			
Removal of Existing Curb and Gutter	-	-	50
Hard Surface Pavement Excavation	-	-	33
Removal of Existing Fire Hydrant	-	-	38
Relocate Existing Fire Hydrant	-	-	-
Sidewalk	-	-	38
Standard Curb and Gutter	-	-	30
Radial Curb and Gutter	-	-	30
Pavement Restoration	-	16	16
Concrete Bus Pad	-	104	83
Subtotal Per Stop (2012 USD)			
Infrastructure Cost Subtotal	-	12,214	14,760
Bus Amenities and Facilities Costs Subtotal	383	4,361	7,814

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-11: Concept Level Cost Estimates - Potomac Park

Items	Unit Quantities by Stop*			
Amenity Unit Costs	**1003537**	**1000983**	**1001021**	**1003131**
Bus Stop Sign	-	-	-	-
Bus Zone Sign	-	2	2	1
Sign Removal	-	-	-	-
Sign Relocation	-	1	-	-
Bus Information Case	-	1	1	-
Shelter	1	-	-	-
System Map	1	-	-	-
NextBus LED Dynamic Messaging System (DMS)	1	-	-	-
Seating	-	-	-	-
Trash Receptacle	2	-	1	-
Street Light	-	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-	-	-
Shelter Lighting	1	-	-	-
Construction Unit Costs				
Removal of Existing Curb and Gutter	-	-	-	-
Hard Surface Pavement Excavation	-	-	-	-
Removal of Existing Fire Hydrant	-	-	-	-
Relocate Existing Fire Hydrant	-	-	-	-
Sidewalk	60	-	-	-
Standard Curb and Gutter	-	-	-	-
Radial Curb and Gutter	-	-	-	-
Pavement Restoration	34	-	-	-
Concrete Bus Pad	174	-	-	-
Subtotal Per Stop (2012 USD)				
Infrastructure Cost Subtotal	23,730	-	-	-
Bus Amenities and Facilities Costs Subtotal	6,512	1,842	3,738	264

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

Table A-12: Concept Level Cost Estimates - Washington Street at King Street

Items	Unit Quantities by Stop*			
Amenity Unit Costs	**4000025**	**4000026**	**4000027**	**4000028**
Bus Stop Sign	1	1	-	1
Bus Zone Sign	1	1	2	2
Sign Removal	-	-	-	-
Sign Relocation	-	-	-	-
Bus Information Case	1	1	-	1
Shelter	-	-	-	-
System Map	-	-	-	-
NextBus LED Dynamic Messaging System (DMS)	-	-	-	-
Seating	-	-	-	-
Trash Receptacle	-	-	-	-
Street Light	-	-	-	-
Infrastructure for Future NextBus DMS Provision (each shelter)	-	-	-	-
Shelter Lighting	-	-	-	-
Construction Unit Costs				
Removal of Existing Curb and Gutter	-	-	-	-
Hard Surface Pavement Excavation	-	-	-	-
Removal of Existing Fire Hydrant	-	-	-	-
Relocate Existing Fire Hydrant	-	-	-	-
Sidewalk	-	-	-	-
Standard Curb and Gutter	-	-	-	-
Radial Curb and Gutter	-	-	-	-
Pavement Restoration	13	12	14	14
Concrete Bus Pad	81	72	91	91
Subtotal Per Stop (2012 USD)				
Infrastructure Cost Subtotal	9,599	8,583	10,667	10,667
Bus Amenities and Facilities Costs Subtotal	1,588	1,588	529	1,852

**For information on units for each item, please see the units/unit cost information presented in Table 66.*

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