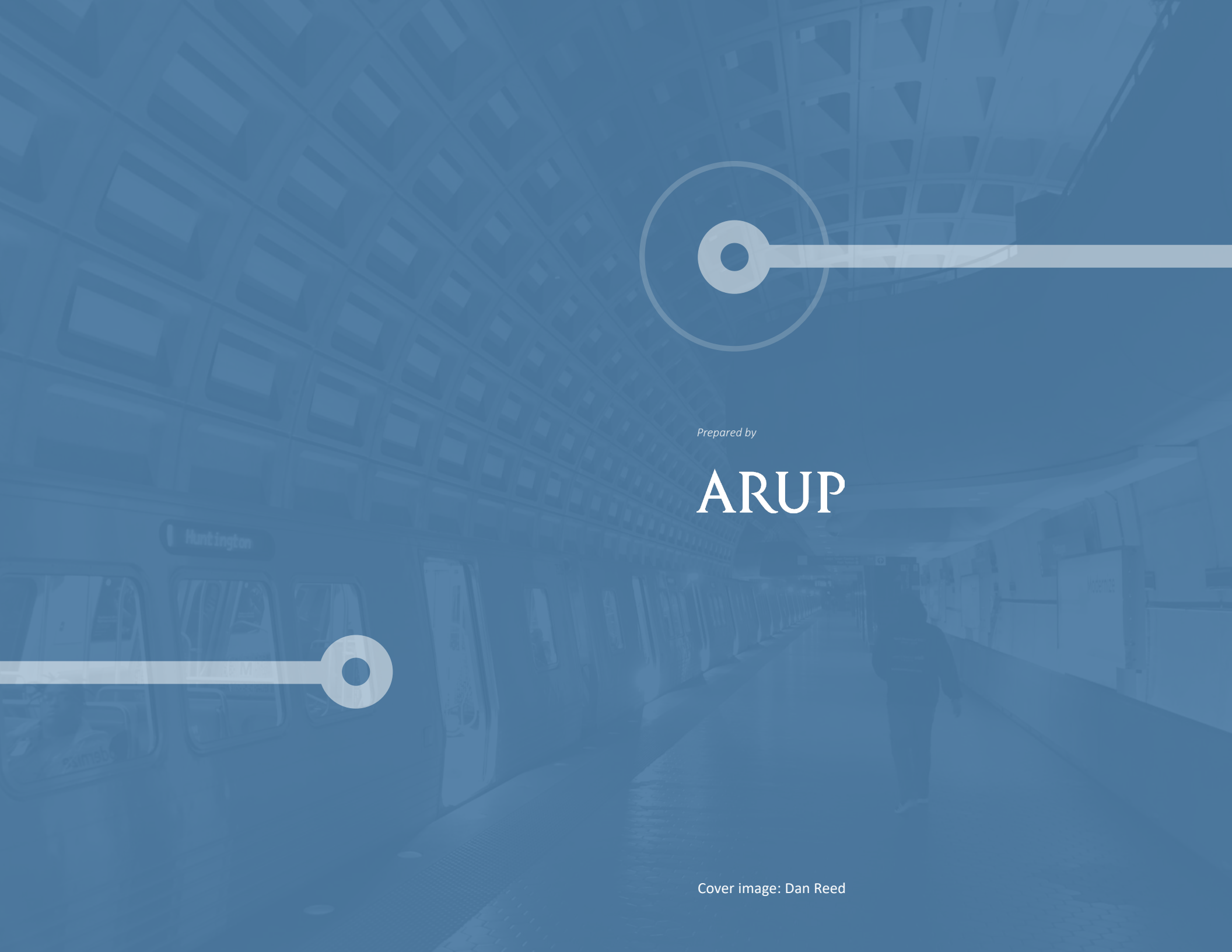
2019

METROBUS CUSTOMER EXPERIENCE PLAN

WAYFINDING GUIDE
FOR BUS/RAIL TRANSFERS

Washington Metropolitan
Area Transit Authority



Prepared by

ARUP

Cover image: Dan Reed

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EXECUTIVE SUMMARY

Why a Metrobus Wayfinding Guide?

Metrobus provides more than 400,000 trips each weekday to 11,500 bus stops in the District of Columbia, Maryland, and Virginia.[1] Operating a fleet of more than 1,500 buses on 245 routes, Metrobus is the sixth busiest bus authority in the U.S. Many of these routes provide direct connections to Metrorail stations, allowing for additional travel options and access for customers. In September 2018, over 700,000 Metrobus passengers transferred to Metrorail, with nearly as many passengers transferring from Metrorail to Metrobus during the same period.[2]

Rail to bus transfers play an important role in expanding access to regional destinations for many passengers, but these intermodal connections are made unnecessarily complicated by a lack of adequate wayfinding signage and useful passenger information. Signage directing passengers to the location of bus stops is scarce within Metrorail stations, particularly for bus stops located curbside, and the information that does exist is often placed in inconvenient or out-of-the-way places, making it difficult for passengers to locate.

Clear, consistent wayfinding cues are critically important to helping passengers successfully make their transfers, assisting passengers with a wide range of physical abilities, and contributing to an overall pleasant user experience. Wayfinding is especially important in the WMATA system given the large number of tourists using the system on a daily basis. Many of these people are not familiar with riding mass-transit and others are not able to read English. Additionally, the complexity of some stations, especially those in the core, makes having clear and obvious wayfinding from the platform to the surface so vital.

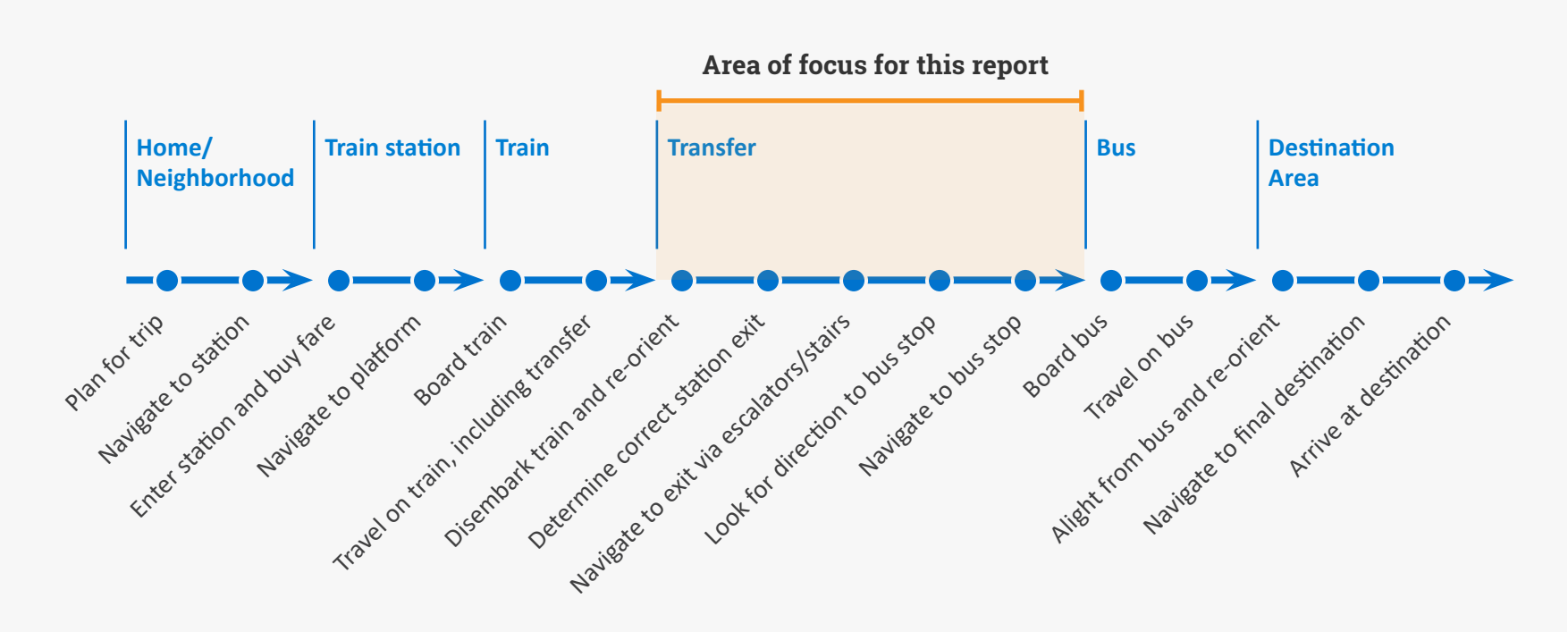
While WMATA is comprised of different departments like Metrorail, Metrobus, and MetroAccess, customers are not aware of these divisions and expect a seamless and coordinated experience from the fare-payment method they can use to the names of stops across modes. They are looking to get to their destination as quickly and easily as possible. They perceive their journey as a single trip and do not care if different entities are responsible for different properties or vehicles between their origin and destination. This speaks to the need for careful coordination between departments to develop wayfinding strategies that best meet the needs of their joint customers.

Elvert Barnes

In many locations within the Metrorail system, passengers seeking to connect to local surface transit provided by other transit authorities outside of WMATA. While this report focuses on transfers to Metrobus, the general same principles apply, though there were need to be additional coordination across authorities.

The recommendations provided in this guide are not meant to be final plans or designs, but rather intended to be used in the development of future signage improvements.

The Passenger Journey



As wayfinders and designers, we focus on the entire user journey. This report is focused on the section of the journey from the train to the bus.

Process for Creating This Guide

This report is an internal guide for aiding the coordination between Metrobus and Metrorail on using wayfinding and signage to improve the customer experience, particularly as it relates to transferring between bus and rail at Metrorail stations. The report represents the culmination of a planning process that included the following elements:

- Convening a series of meetings with WMATA staff to confirm project goals and discuss findings;
- Defining wayfinding principles that were used to inform the analysis summarized in this report;
- Developing four station typologies for all Metrorail stations based primarily on the passenger journey in transferring between bus and rail and the information needed at major decision points;
- Inventorying bus and other major wayfinding signage at 16 select Metrorail stations, where signs were documented with photos and geolocated using a mobile data collection app;
- Creating a detailed analysis of the user flow at one station for each of the four typologies; and
- Assessing existing signage at these representative stations and developing recommendations for improving signage and wayfinding.

The document references and makes suggestions for improving existing WMATA signage standards. It pulls primarily from the *WMATA Metrorail System Signage Manual* (Issued 3.2019), as well as from other parallel efforts to improve WMATA wayfinding and signage.

This report is being produced as part of the Metrobus Customer Experience Plan (MCEP). The MCEP consultant project team includes VHB, Rhodeside and Harwell, and Arup. The key components of this project include:

- *Metrobus Asset Inventory*
  Task goal: Document the condition of customer assets at bus loops and on-street and tee up capital improvements by station.

BeyondDC

- *Metrobus Bus Stop Guide*
  Task goal: Document guidelines and standards for bus stop amenities, with a focus on regional coordination.
- *Metrobus Wayfinding Strategy*
  Task goal: Develop wayfinding guidelines and standards within the WMATA design rubric to aid passengers transferring between rail and bus.

How to Use This Guide

Customers making a transfer between rail and bus will inherently make use of both Metrorail and Metrobus facilities, so there is a need for careful planning and coordination between these services to create signage and wayfinding systems that help direct people where they need to go.

This report provides details on the need and purpose for bus transfer wayfinding and presents the principles for a high-quality wayfinding system, the existing conditions within the WMATA system, and strategies to improve the current wayfinding system.

Chapter One establishes the need for a new wayfinding guide that focuses on the customer experience when transferring between Metrorail and Metrobus. The Seven C's of a good wayfinding system are identified and the principles behind their application presented.

Chapter Two defines four station typologies for the system, each with differing bus transfer wayfinding needs. This framework is then used to apply the recommended strategies and good wayfinding principles to simplify wayfinding messaging system-wide for each station typology. A conceptual implementation guide highlighting each decision point along the passenger journey in each station typology, including example applications in four stations, is provided. This guide details the specific sign and message types to deploy at key decisions points along the journey path from platform to bus.

Chapter Three includes details on proposed possible sign types that WMATA might consider to help address the issues identified in previous chapters.

Finally, the report includes two appendices. **Appendix A** provides a summary of findings from the MCEP wayfinding and signage survey of sixteen Metrorail stations. This section identifies seven key areas for improving the customer experience and recommends strategies to address these issues.

Appendix B shows sample passenger journeys for rail/bus transfers in the four example typology stations. These studies informed the recommendations found in Chapter Two.

A Metrobus shuttle sign.

Bus directional signage at Pentagon Station.

General Strategies

To help inform the MCEP, in March 2019 the project team visited 16 Metrorail stations to document existing bus-specific signage within the station, general wayfinding signage, and locations where bus-specific signage should be located but was missing. Information was collected using mobile devices.

After analyzing the results of the survey, the MCEP project team identified the following major themes around wayfinding at the stations surveyed. These themes are informed by the principles outlined in Chapter One. The project team identified key issues and developed strategies for addressing these issues.

Additional details on the project themes, key issues and strategies are included in Appendix A.

Location of Information

Information needs to be placed in such a way that users get the information they need in the right place and at the right time. The information must also be sufficiently visible under normal conditions to catch the user's eye and quickly point them in the right direction.

Quality of Information

Information should be user-friendly and easy to understand. Quick recognition and legibility are important. Information must also be consistent in terminology, design and placement, as well as accurate and up-to-date.

Maps

Customers use maps to locate where they currently are, identify where they are going, and locate landmarks in the surrounding neighborhood. Consistent map styles allow users to easily find the information they need.

Aesthetics

Wayfinding should be both eye catching and simple. The location and aesthetic of the information presented should be pleasing to the eye in order to create a positive user experience.

Metrobus Shuttle

Metrobus Shuttle stops are located adjacent to all Metrorail stations. Users need clear wayfinding to connect to these bus stops in case of an emergency.

Lighting and Placement

Wayfinding information should be adequately lit and have sufficient contrast with the surrounding background. There should be a buffer area between wayfinding and advertising to allow for an appropriate hierarchy and separation to be perceived by the user.

Digital Wayfinding

The WMATA digital platform should be an integrated, system-wide network that provides train and bus information in a single platform, allowing passengers to track the status of their next bus or train in real-time.

Theme		Strategy
Location of Information	**Placement of Bus Information: Station-wide**	Locate bus information along the user path in conspicuous places that are visible and accessible.
	Placement of Bus Information: Platforms and Mezzanines	Provide bus information in consistent and conspicuous locations on the platform and mezzanine levels.
Quality of Information	**Inclusion of Bus Information on Existing Signage**	Develop new and comprehensive sign types to include bus information on relevant signs (where feasible.)
	Bus Route Signage	Where bus routes are listed on signs, use digital or modular signage where possible to allow for regular updating of current information.
	Existing Digital Signage	Update digital signs to include Metrobus information with current, real-time bus arrivals and alerts (where feasible.)
Maps	**Inclusion of Metrobus Information**	Ensure that WMATA maps within Metrorail stations include comprehensive Metrobus information.
	Identity of Bus Stops and Facilities	Use a clear bus stop identifier, such as the name of the street intersection of the bus stop, on the bus map.
	Consistency of Graphic Communication	Employ a consistent graphic language for all station maps.
Aesthetics	**Visual Clutter**	Replace and consolidate information throughout a station complex with eye-catching and clear signage.

Metrobus Shuttle	**Location of Emergency Shuttle Information**	Expand the use of consistent Emergency Shuttle signage throughout the system. Supplement existing permanent Emergency Shuttle information with conspicuous temporary signage.
Lighting and Placement	**Sign Visibility and Legibility**	Work with sign fabrication shop and installation crews to ensure clear and compassionate legibility of signs.
	Separation of Wayfinding and Advertising Messages	Combine advertising and digital wayfinding signage on the same screen with proper separation for consistency. Separate advertising from wayfinding and apply a clear hierarchy of messaging.
Digital Wayfinding	**WMATA Website Trip Planner**	Include the option to push current updates and alert notifications to a customer's phone. Include the option to send a comprehensive trip itinerary to a customer's phone via SMS text message or email. Include clear directional points, such as proper station exit and bus stop intersection or bus bay number, within the directions.
	WMATA Metro and Bus App	Add a comprehensive trip-planning function to the DC Metro and Bus App.
	Digital Signage and Audio Announcements on Trains	Explore options for displaying the bus transfers available at that station in a clear and conspicuous manner.
	Digital Signage in Metrorail Stations and Metrobus Stops	Move bus service information to digital signs and kiosks to keep information current.

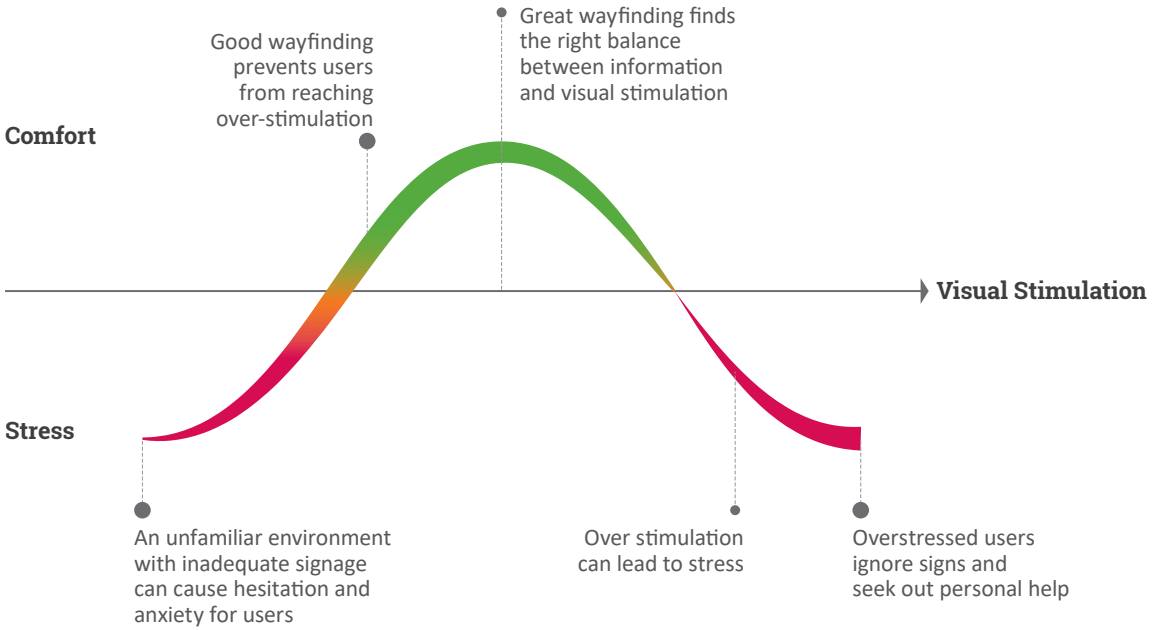
CHAPTER ONE
INTRODUCTION

Wayfinding Goals and Principles

WAYFINDING GOALS

Good wayfinding and information systems are attractive, easily understood and prominent. Signs are located at major decision points along a person's journey and display the same type of information (destination, distance, etc.) consistently. Additionally, employing the same graphic language of fonts, materials and colors helps users recognize signs as part of a single identifiable system.

A high-quality wayfinding system should facilitate a user's path to allow easy navigation between rail and bus facilities, provide for a safe environment, and reduce stress for users. The intent of a good wayfinding system is to inspire calm and ease by creating clarity, as well as to simplify information that is otherwise complex.



High quality wayfinding finds the balance between providing too little and too much information.

WAYFINDING PRINCIPLES

A good wayfinding system will have an information hierarchy, be distinctive and prominent, and be in the natural line-of-sight.

These key attributes can be summarized as the "Seven C's" of a good wayfinding system. In such a system, signage should be:

- **Comprehensive:** Users get the right amount of information they need, in the right place, at the right time;
- **Consistent:** The signs are consistent in the use of terminology, design and sign placement;
- **Clear:** The wayfinding is user-friendly and easy to understand. Easy recognition and legibility create "visual ease";
- **Conspicuous:** By placement and design, the wayfinding draws attention without being overbearing;
- **Catching:** The wayfinding design, messaging, and location is aesthetically pleasing;
- **Compassionate:** The design should be intended for a broad audience, with users of all types in mind; and
- **Current:** The information on all signs, maps, and displays should be as up to date as possible to remain useful and reduce confusion.

The application of these principles to station environments and surrounding areas has led to the development of several best practices for the design and implementation of information organization, arrow usage and arrangement, message arrangement on signs, use of pictograms, and consistent nomenclature. Based on these principles, the wayfinding elements at select Metrorail stations were evaluated and high-level recommendations identified to improve the existing wayfinding system.

An existing Metrorail station entrance sign at Shady Grove Station.

Coordination with Other Efforts

The MCEP project team has coordinated with other concurrent WMATA initiatives around improving wayfinding and signage.

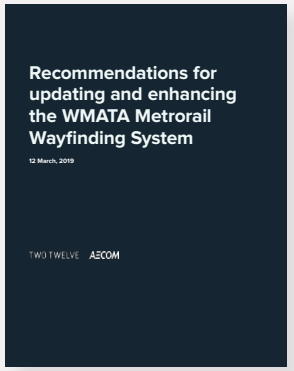
Most significantly, the project team spoke with the WMATA Real Estate and Station Area Planning team and reviewed a report done by Two Twelve and AECOM titled "Recommendations for updating and enhancing the WMATA Metrorail Wayfinding System."

Many of the major issues the MCEP project team observed during site visits and the signage inventory are discussed in this report, including:

- The scale of signs and legibility of information is not always appropriate;
- Inconsistencies in messaging and information placement system-wide;
- Visual clutter with redundant new and old signage;
- Advertisements overpower wayfinding information;
- Lack of connection to street/neighborhood and other transportation modes;
- Real-time information is not accessible to passengers at key points along their journey; and
- Incomplete ADA wayfinding signage system.

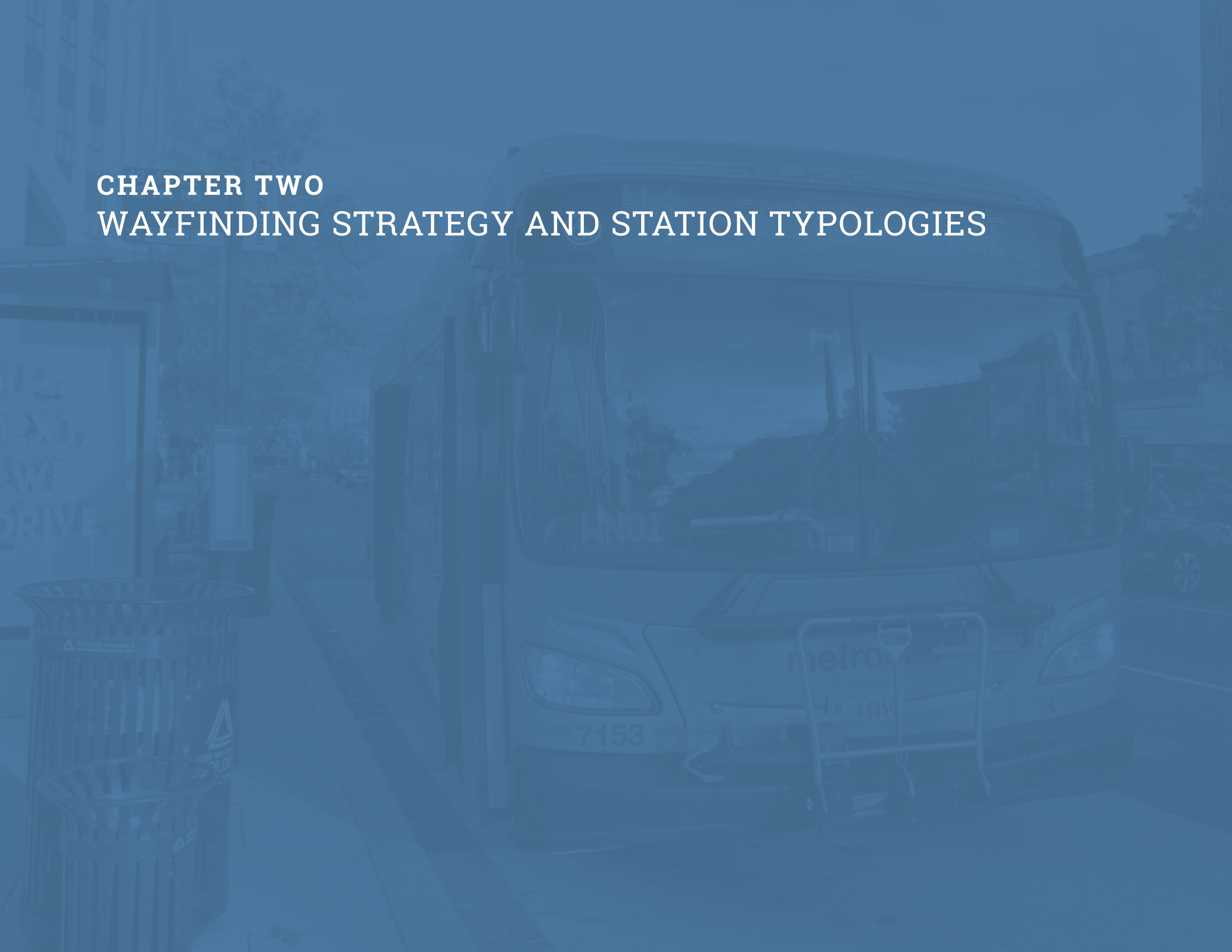
Similarly, the strategies in this study echo many of the recommendations from the Two Twelve and AECOM report, most significantly:

- Provide wayfinding information at key points where passengers need it;
- Make wayfinding information legible and clear;
- Make messaging and information simple and consistent throughout the system;
- Employ improved wayfinding to help improve the passenger experience where connecting between modes; and
- Provide for mobile app and digital systems that provide passenger real-time schedule / service status / transportation connection information.



Two Twelve / AECOM Metrorail Wayfinding Report, March 2019

The Two Twelve and AECOM report and the MCEP have many recommendations in common, but this document is focused on specific wayfinding strategies for rail to bus transfers.



CHAPTER TWO
WAYFINDING STRATEGY AND STATION TYPOLOGIES

CHAPTER TWO

WAYFINDING STRATEGY AND STATION TYPOLOGIES

The Passenger Journey

An effective wayfinding system will facilitate a passenger's path and navigation while enhancing their experience. Therefore, focusing on the human-scale from a passenger's point-of-view helps inform when information should be disclosed and where it should be placed to be most effective and useful.

The following sections detail the general passenger journey when making a rail to bus trip, as well as specific passenger journeys for each station typology in an actual Metrorail station setting. These sections identify issues, strategies, and potential solutions that can either be applied system-wide or to particular station typologies.

GENERAL PASSENGER JOURNEY

A journey for a customer transferring between Metrorail and Metrobus typically includes the following steps:

Disembark and re-orient
The passenger exits a Metrorail train at the appropriate station to continue their journey. They first need to confirm that they are at the right station, then understand where they are within the station and then decide which way to exit.

Determine the right train station exit
At stations with multiple exits, the passenger must determine which exit to take to make the quickest connection to their bus. The passenger may or may not be familiar with the station area or the bus route they are looking for, so providing simple and direct information at this point is key.

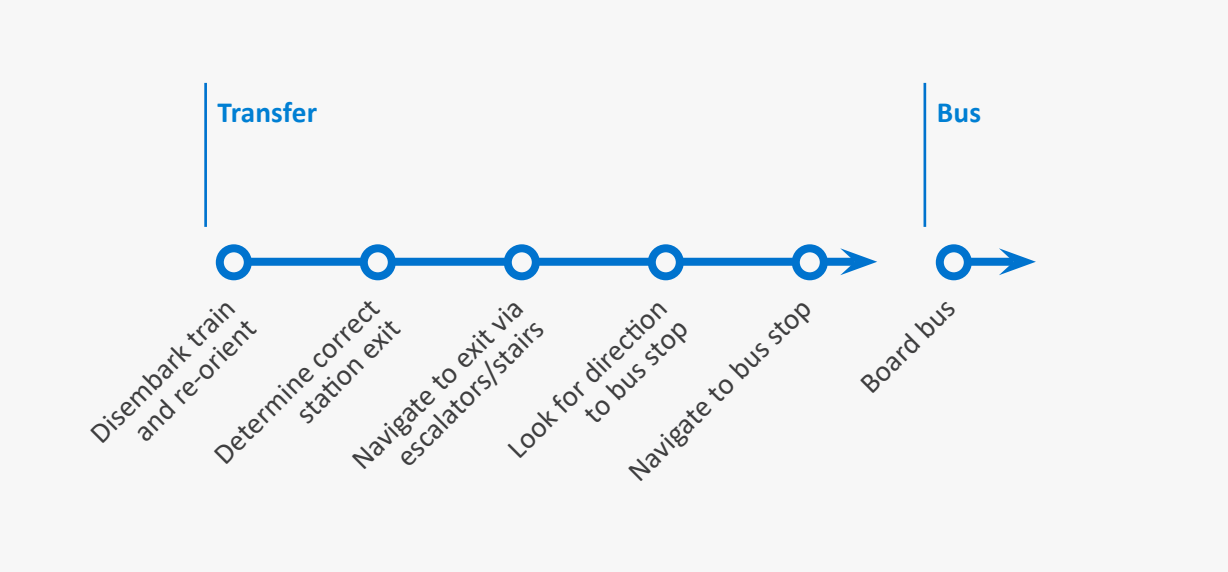
Follow signs to the exit
After determining the appropriate exit, the passenger will proceed to that exit. Confirmation along the way that the passenger is on the correct route reduces uncertainty for the passenger.

Look for direction to the correct bus stop
As they emerge from the Metrorail station, the passenger will seek additional guidance to their bus. Depending on the experience of the passenger, they may need to consult an area map and/or route map to confirm the bus stop that is in the correct direction of travel.

Follow direction to the bus stop
The passenger will proceed to the bus stop they have identified. Clear line-of-sight to the bus stop or additional confirmation may be necessary, depending on the distance and complexity of the walking path of travel between station exit and bus stop.

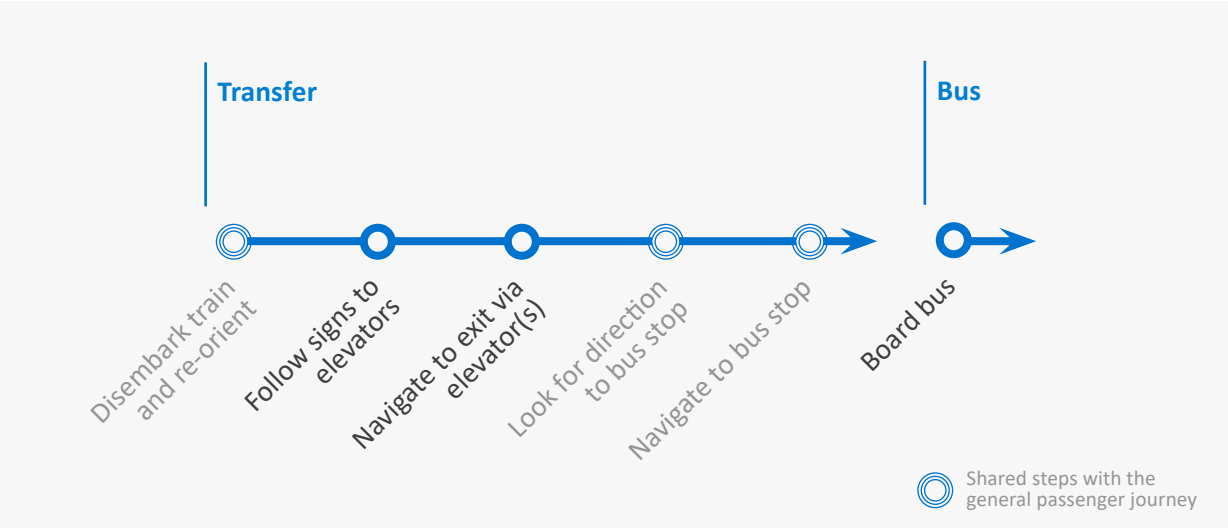
Arrive at bus stop
The passenger arrives at their bus stop. Confirmation that their bus will stop here is necessary, and additional travel information (such as schedules, routes, real-time arrival, transferring to other services, etc.) is preferable.

General Passenger Journey



For the purposes of this study, the focus is on the passenger journey from when they disembark from a train to when they board the bus they are transferring to. Wayfinding helps in this journey by providing the correct information along the way at each key decision points.

Journey for Passenger Needing to Use Elevators



The journey for passengers needing to use station elevators is similar to the general passenger journey, though these passengers need to follow specific directions to elevators

JOURNEY FOR PASSENGER NEEDING TO USE ELEVATORS

Customers who need to use Metrorail elevators such as persons in wheelchairs, families with strollers or tourists with luggage have more specific needs than other customers. Providing clear and simple wayfinding that addresses these customer-specific needs is an important to continuing in WMATA's long commitment to being a fully-accessible system.

Disembark/re-orient
The passenger exits the train at the appropriate station to continue their journey. They first need to understand where they are within the station and then which way to exit.

Follow signs to accessible exit
The passenger looks for the International Symbol of Accessibility to determine the accessible exit path from the station. This exit may or may not align with the appropriate exit for their Metrobus transfer.

Look for directions to correct bus stop
As they exit the Metrorail station, the passenger will seek additional guidance to their bus. Depending on the experience of the passenger, they may need to consult an area map and/or route map to confirm the bus stop that is in the correct direction of travel. The passenger will also need to understand whether the path to the bus stop will present any mobility obstacles for them, such as steps, steep grades, or long crosswalks.

Arrive
The passenger arrives at their bus stop. Confirmation that their bus will stop here is necessary, and next trip information is preferable.

Corridor within signage pointing to elevator at Gallery Pl-Chinatown station.

Typologies Approach

To aid in developing strategies for improving wayfinding at stations across the Metrorail system, the MCEP project team developed station typologies to frame the analysis and development of recommendations. This approach provides a consistent framework to be applied system-wide and will help simplify Metro's implementation strategy and unify customers' expectations and experience with Metrobus wayfinding.

To develop a station typology framework, the MCEP project team examined several different factors, including:

- **Intermodal transfers between rail and bus transfers**
  The MCEP team examined the number of transfers at each Metrorail station to and from Metrobus and other regional bus lines.
- **Ridership per station**
  The MCEP team also reviewed the overall ridership at each Metrorail station to understand the quantity of passengers that both the rail station and nearby bus facilities would need to accommodate.
- **Station layout**
  The MCEP team reviewed the physical layout of Metrorail stations. This included reviewing the number of platforms, mezzanines, exits, and the locations of bus facilities relative to the station.
- **User journey**
  Finally, the MCEP mapped out the user journey of transfer from rail to bus at multiple stations. These journeys vary, depending on the design of the station and the location of bus facilities. Example user journey analyses are included in the Appendix B.

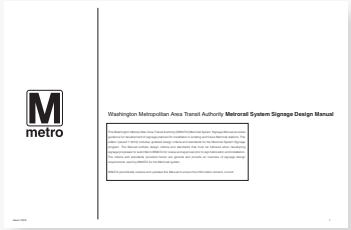
Signage at Huntington station.

OTHER TYPOLOGIES REVIEWED

The project team also reviewed other typologies previously defined in related WMATA documents, including:

WMATA Station Area Planning Guide (2017)

- **Core Stations:** Located in high-density employment areas and mixed-use destinations, these stations are accessible primarily by walking, bicycling and bus.
- **Mid-Line Stations:** Located in areas with low to medium density, these stations are usually accessed by Park & Ride, Kiss & Ride, bus, bicycling, and walking.
- **Terminus Stations:** Located at the ends of Metrorail lines, these stations are typically accessed through Park & Ride, bus, and Kiss & Ride rather than by walking and bicycling.



WMATA Metrorail System Signage Manual (2019)

- **Above-ground Side Platform:** Travelers access and exit the system at mezzanine level. Signs at mezzanine and platform levels provide service information and directions to train service locations and station exits.
- **Below-ground Side Platform:** Travelers access and exit the system at mezzanine level. Signs at mezzanine and platform levels provide service information and directions to train service locations and station exits.
- **Below-ground Center Platform:** Travelers access and exit the system at mezzanine level. Signs at mezzanine and platform levels provide service information and directions to train service locations and station exits.
- **Transfer Station:** Travelers board and alight trains on two platform levels within transfer stations. At transfer stations, travelers can transfer to train service on the upper or lower level, or travelers may exit the station at mezzanine level.

Typologies Development

The project team reviewed the precedent typologies and used these, along with the other inputs on ridership and transfers, to create a new framework for station typologies for this report.

The typologies shown here are focused on the physical location of buses in relation to station entrances and exits. Four station typologies were developed to frame the rail-to-bus transfer wayfinding experience, based on two primary characteristics: the type of bus facility ("curbside" or "facility") and the complexity of the user path from the rail platform to the bus facility ("simple" or "complex").

Curbside or Facility Stop

- **Curbside bus stops**
  These stops are located at the curb of a street along the public right-of-way.
- **Facility bus stops**
  These stops are located on WMATA property and include either bus bays, bus loops, or a combination thereof.

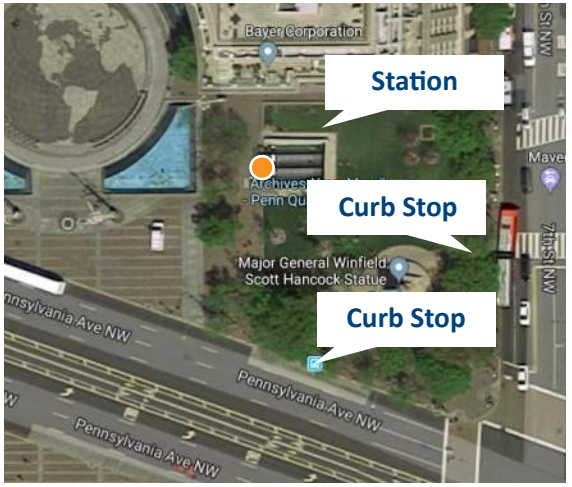
Simple or Complex User Path

- **Simple paths**
  These stations have no major decision points on the path from the train platform to the bus.
- **Complex paths**
  These stations have more decision points between the train platform and bus and the customer must make a decision about where to go to get the right bus.

Each station is assigned a type of bus stop and path of travel, creating the following four distinct station typologies.

Curbside Stations

● *Station Exit*



Curbside Simple *station example*
Archives-Navy Memorial-Penn Quarter

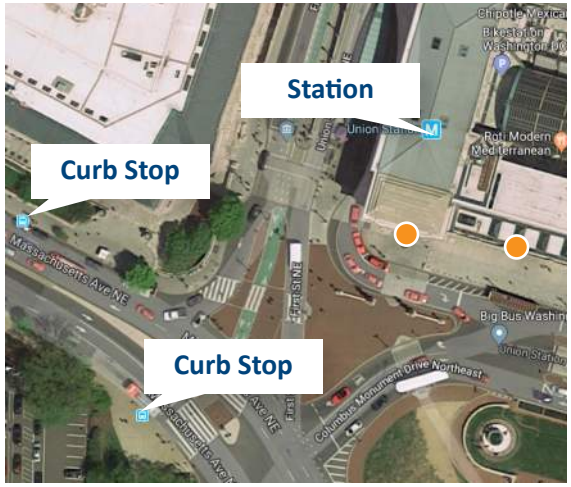
Curbside Simple Stations

Characterized by:

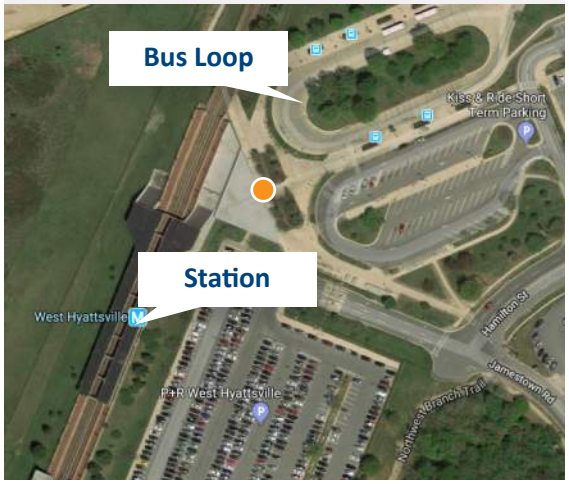
- bus stops are located curbside adjacent to, or within eyesight of, the station entrance
- path from the train to the bus is relatively straightforward; usually only one exit off the platform and one exit from the station
- passengers have limited decision points, only requires basic wayfinding

Facility Stations

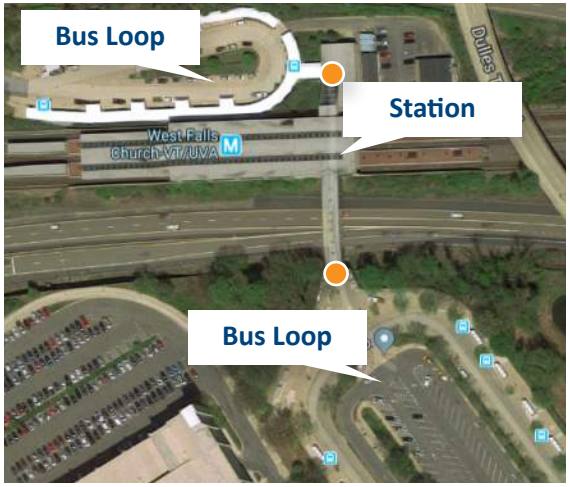
Station Exit



Curbside Complex *station example*
Union Station



Facility Simple *station example*
West Hyattsville



Facility Complex *station example*
West Falls Church-VT/UVA

Curbside Complex Stations

Characterized by:

- bus stops are located along the curb, but accessing the stop is not always clear
- multiple station exits, multiple bus stops, cluttered visual environment complicate connections
- path from the train to the bus involves multiple decision points; wrong turn would require backtracking; leading to diminished user experience
- additional wayfinding and signage required to ensure passengers have the information needed to safely and easily navigate to the correct bus

Facility Simple Stations

Characterized by:

- bus stops are located at bus bays, bus loops, curbside, or a combination of all
- path for passengers from the train to the bus is relatively straightforward; usually only one exit off the platform
- passengers have limited decision points, only requires basic wayfinding

Facility Complex Stations

Characterized by:

- bus stops are located at bus bays, bus loops, curbside, or a combination of all
- multiple station exits, bus bays or loops on more than one side of the station, pedestrian bridges complicate connections
- path from the train to the bus involves multiple decision points; wrong turn would require backtracking leading to a diminished user experience.
- additional wayfinding and signage required to ensure passengers have the information needed to safely and easily navigate to the correct bus

Sign Types Overview

Following the development of the different station typologies, the MCEP team developed a list of conceptual sign types that could aid in providing wayfinding information needed for rail/bus transfers during the passenger journey.

Rather than being focused on the design, materials, colors or font choices that are typically included in sign design, this list instead focuses on what information should be provided where (for example, platform versus street level), and how often that information should be updated, helping inform static versus digital wayfinding recommendations.

All references to the *Metrorail System Signage Design Manual* are to the version issued 3.2019.

These signs are shown only for illustrative purposes and are not intended to be used for production. The application of the sign types would vary by station and coordination with other departments may be necessary.

ACTION TYPES

The MCEP project team also developed four different action types for each recommended sign type. These are color-coded on the conceptual station plans and include the following:

Maintain Existing Metrorail Sign

For these signs, the guidelines outlined in the *Metrorail System Signage Design Manual* already provide the information the MCEP team identified as necessary at these locations. Any signage implemented here should follow the standards, and no further action is needed.

Modify Existing Sign

For these signs, the MCEP team recommends modifications to the existing standards as outlined in the *Metrorail System Signage Design Manual* to include additional information about bus information.

Create New Static Sign Type

These recommended sign types are static signs that are currently not included in the *Metrorail System Signage Design Manual.* The images shown for how these signs might work are conceptual. A full design process would be required to be able to fabricate and install these signs.

Digital Sign Opportunity

At numerous locations, digital wayfinding would be the ideal means of communicating information that needs to be frequently updated, making static signs less effective or more difficult to maintain. Because digital systems and technologies widely vary, no specific system is recommended here. Instead, these sign types should be coordinated with existing WMATA digital signage efforts currently underway, with the goal of including bus information in these sign types wherever possible.

Summary Sign Types List

Additional details on these sign types are found in Chapter 3: Wayfinding Sign Types Details.

SID **Station Identification Sign**

Located at the platform level, helps passengers confirm they've arrived at the right transfer station

SW1 **Station Wayfinding Sign**

Guides passengers from the platform to the single exit or mezzanine of the station

BM **Neighborhood Bus Map**

Informs passengers of nearby bus routes and bus stop locations

SW2 **Station Exit Wayfinding Sign**

Used in stations with multiple exits and/or mezzanines to guide passengers to the correct exit

AEW **Accessible Wayfinding Sign**

Guides passengers to the elevator exit

BSM **Bus Route Map and Schedule**

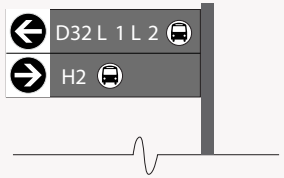
Shows passengers the bus destination, stops and schedule for each bus line

BS Real-time Bus Schedule

Informs passengers the wait time for the next two or three bus arrivals

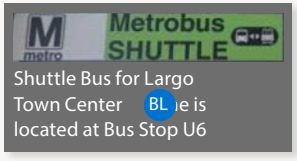
BID Bus Stop Identification

Helps passengers confirm their arrival at the right bus stop



STW Street Wayfinding Sign

Guides passengers to either their bus stop or the station entrance



SB Shuttle Bus

Helps passengers find the emergency shuttle bus stops

SB Potential Digital Sign

Shows a few digital sign examples that could be used in transportation wayfinding.

Key Considerations and Recommendations

The MCEP team has developed sign type plan examples for the four station typologies. These are conceptual and meant to provide Metrorail and Metrobus staff key elements to consider when developing wayfinding plans for various stations. The wayfinding strategy was applied to the area of focus, the portion of the passenger journey from the disembarking the train on the platform to boarding the bus at the stop.

Within this section are example plans for the various areas of a station, including platform, mezzanine, passageway, station exit, street, bus loop/bus bay, and bus stop. For each of these, the team has provided key considerations and recommendations aimed at helping provide passengers connecting from trains to buses with the most important information at each stage of their journey, informed by the wayfinding principles outlined in Chapter 1.

These diagrams show potential sign locations where rail/bus transfer wayfinding information is needed along the passenger journey. The actual sign position location and orientation would vary by station.

KEY CONSIDERATIONS

For each typology and location, Key Considerations are provided. These are important elements to consider if this approach is to be applied at other stations. While these recommendations aren't able to prescribe the exact sign and location for all stations, they are important factors that should be weighed during future station wayfinding signage updates.

Key considerations are marked with a rightward-facing arrow

EXAMPLE TYPOLOGY STATIONS

Example conceptual sign type plans were developed for the four stations, details of which are included in the analysis in this chapter:

Curbside Simple | Van Ness-UDC

Curbside Complex | Gallery Pl-Chinatown

Facility Simple | Greenbelt

Facility Complex | Shady Grove

The complete list of stations categorized by typology is included on the following page.

Typology List - All Stations

Curbside Simple Stations

- Archives-Navy Memorial-Penn Quarter*
- Arlington Cemetery
- Capitol South
- Court House
- Federal Center SW
- Greensboro
- Judiciary Square
- Mt Vernon Sq - 7th St Convention Center
- NoMa-Gallaudet U
- Smithsonian
- Van Ness-UDC*●
- Virginia Square-GMU
- Waterfront

Curbside Complex Stations

- Benning Road*
- Clarendon
- Cleveland Park
- Columbia Heights
- Dupont Circle
- Eastern Market
- Farragut North
- Farragut West
- Federal Triangle
- Foggy Bottom-GWU
- Gallery Pl-Chinatown*●
- Georgia Ave-Petworth*
- L'Enfant Plaza
- McPherson Square
- Metro Center
- Navy Yard-Ballpark
- Pentagon City
- Potomac Ave
- Ronald Reagan Washington National Airport
- Shaw-Howard University
- Tenleytown-AU
- U St/African-Amer Civil War Memorial/Cardozo
- Union Station*
- White Flint*
- Woodley Park-Zoo Adams Morgan

Facility Simple Stations

- Addison Road Seat Pleasant*
- Braddock Road
- Branch Ave
- Brookland-CUA*
- Capitol Heights
- Cheverly
- Crystal City
- Deanwood
- Dunn Loring Merrifield
- Glenmont
- Greenbelt*●
- Landover
- Largo Town Center
- Morgan Boulevard
- Naylor Road
- Suitland*
- Van Dorn Street
- West Hyattsville

Facility Complex Stations

- Anacostia*
- Ballston-MU
- Bethesda
- College Park-U of Md
- Congress Heights
- East Falls Church
- Eisenhower Avenue
- Forest Glen
- Fort Totten
- Franconia-Springfield
- Friendship Heights
- Grosvenor-Strathmore
- Huntington*
- King St-Old Town
- McLean
- Medical Center
- Minnesota Ave
- New Carrollton
- Pentagon
- Prince George's Plaza
- Rhode Island Ave-Brentwood
- Rockville
- Rosslyn
- Shady Grove*
- Silver Spring
- Southern Avenue*
- Spring Hill
- Stadium-Armory
- Takoma
- Twinbrook
- Tysons Corner
- Vienna/Fairfax-GMU*●
- West Falls Church-VT/UVA
- Wheaton
- Wiehle-Reston East

** Station included as part of signage inventory task*
● Station featuring conceptual sign type plan

Curbside Simple

Platform

Curbside Simple stations do not present any major wayfinding issues on the platform level. At these stations, there is only one platform and typically all passengers leave the platform in one direction to one mezzanine.

Key Considerations

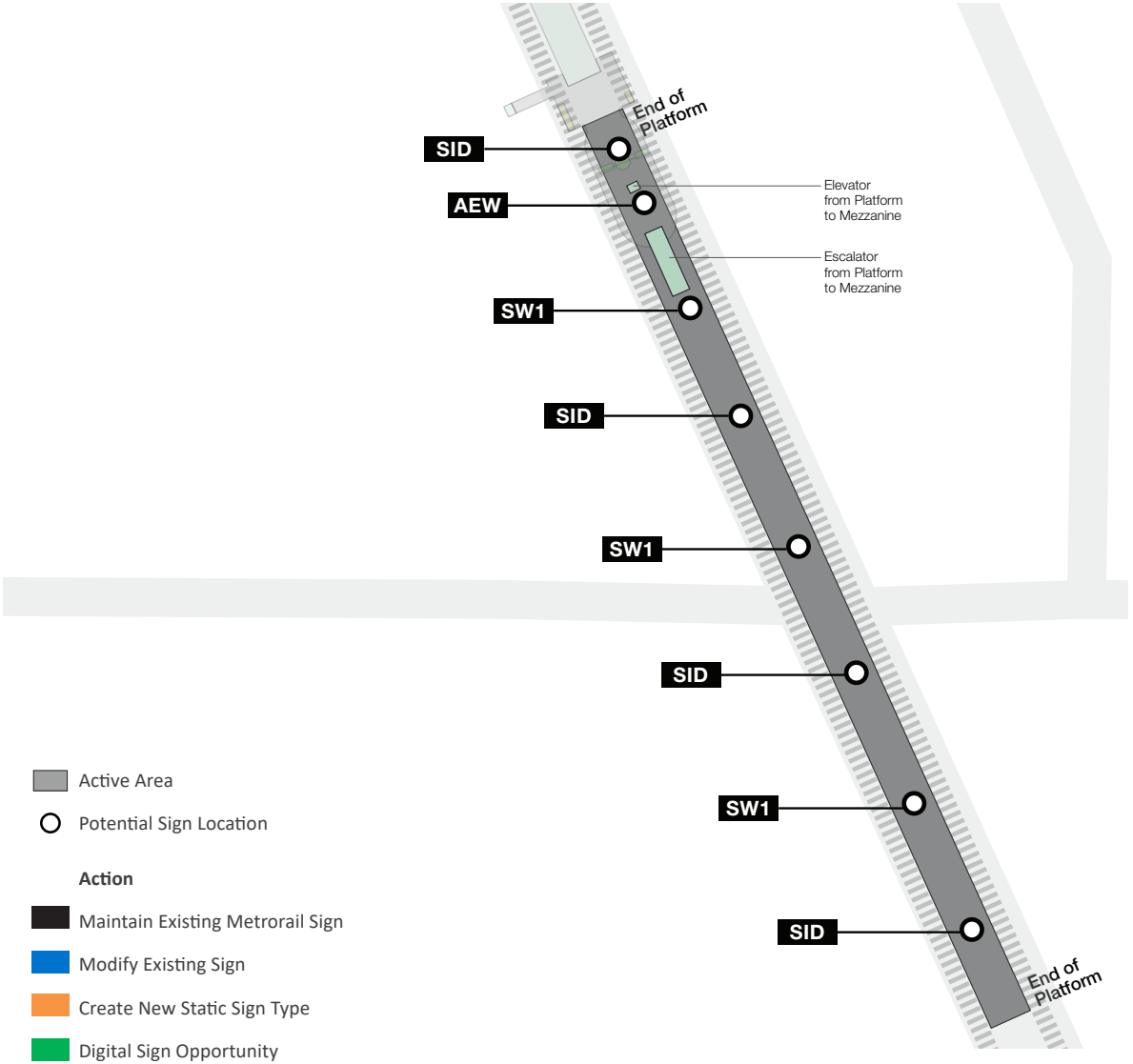
- Help passengers know the name of the station
- Provide wayfinding to the exits, including the elevator.

Reference Sign Types

AEW	Accessible Wayfinding Sign
SID	Station Name Identification
SW1	Station Wayfinding Sign

Example Conceptual Sign Type Plan

VAN NESS - UDC



Example Conceptual Sign Type Plan
VAN NESS - UDC

Mezzanine

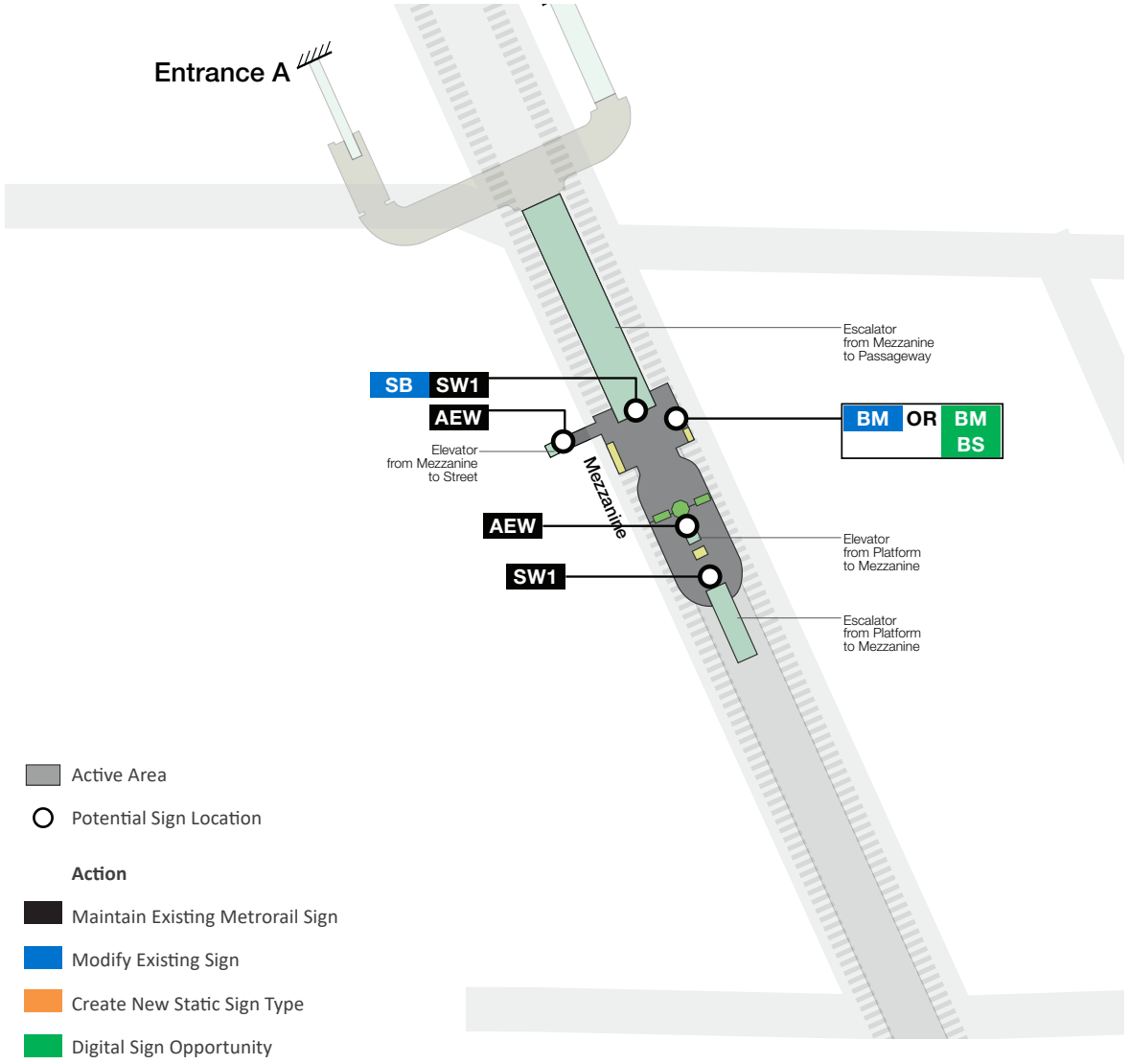
The mezzanine is the major wayfinding decision point for *Curbside Simple* stations. With only exit from the platform, passengers begin to look for the exit and directions to the right bus stop at the mezzanine level.

Key Considerations

- Help passengers identify the bus stop they need and provide orientation by placing a Neighborhood Bus Map.
- Consider including a Real-time Bus Schedule display to help passengers understand how much time they have to make the transfer.
- Provide shuttle bus information in the unpaid area, either integrated into the neighborhood bus map or placed on an individual sign panel.

Reference Sign Types

BM	Neighborhood Bus Map
BS	Real-time Bus Schedule (Optional)
SB	Shuttle Bus
SW1	Station Wayfinding Sign



Curbside Simple

Example Conceptual Sign Type Plan

VAN NESS - UDC

Passageway

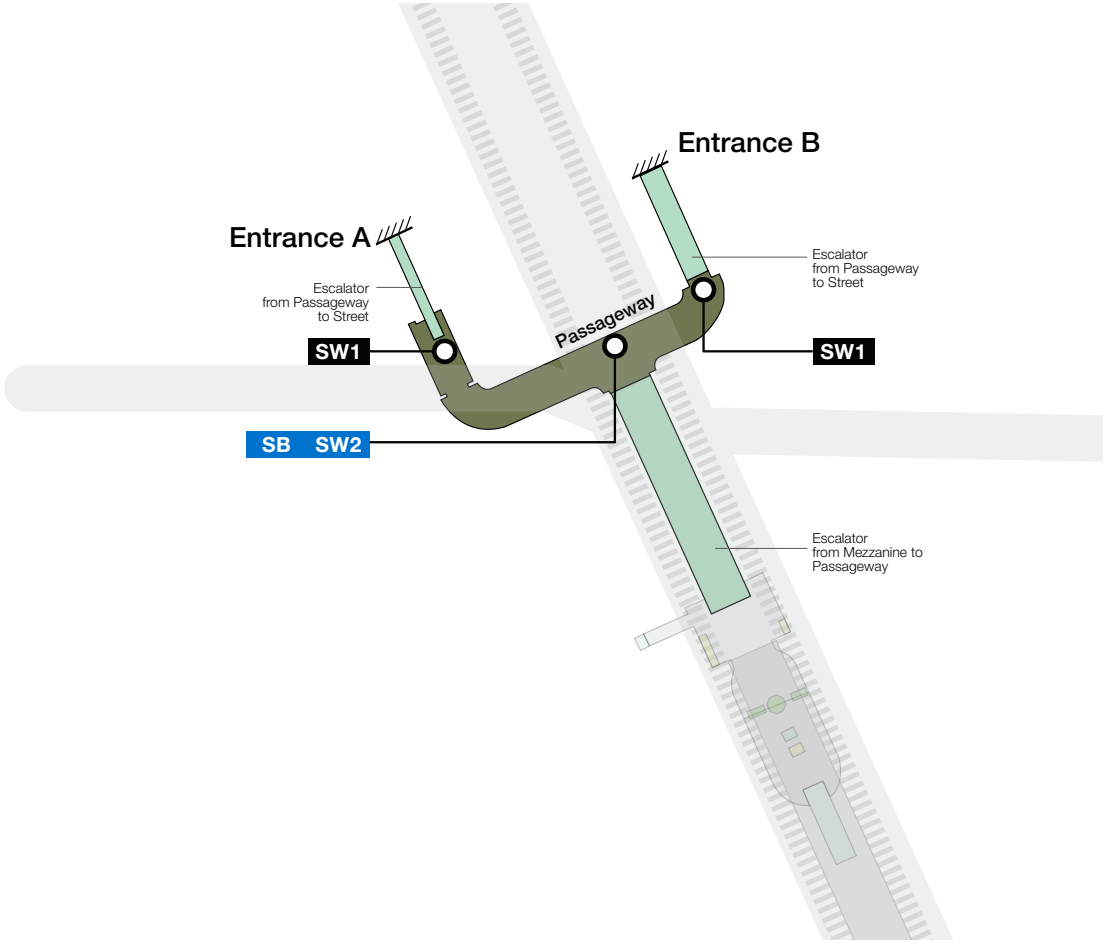
In *Curbside Simple* stations, the passageway is one of the main decision points for passengers transferring to a bus.

Key Considerations

- Add wayfinding signage that directs passengers to the correct exit and to the correct side of the street.
- Provide information about temporary shuttle bus locations.

Reference Sign Types

SB	Shuttle Bus
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign



Action

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity
- Active Area
- Potential Sign Location

Curbside Simple

Example Conceptual Sign Type Plan

VAN NESS - UDC

Street and Bus Stop

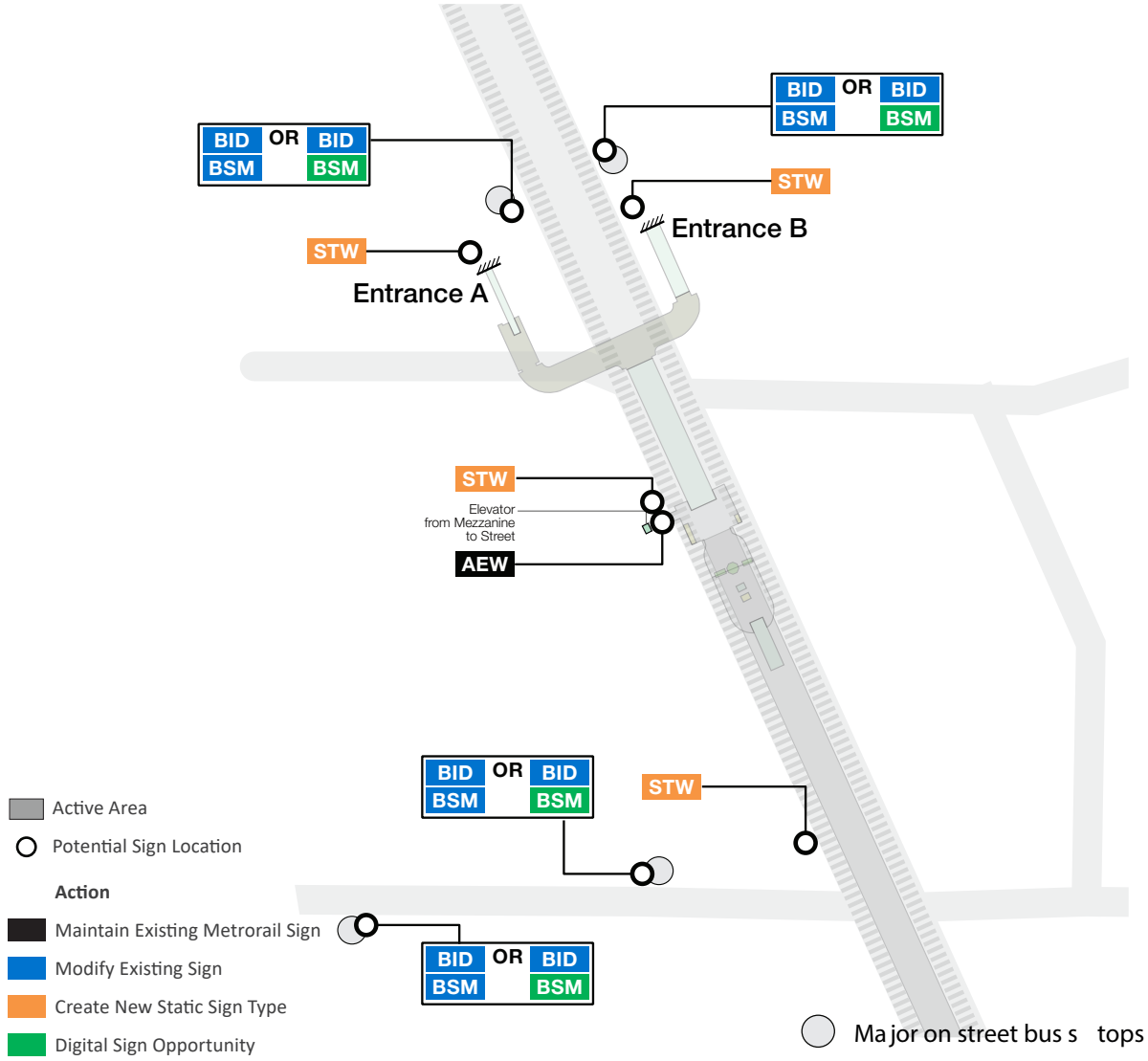
While at *Curbside Simple* stations bus stops should be clearly visible once a passenger exits a station, there are still opportunities to improve the user experience, especially for passengers who using the elevator.

Key Considerations

- Upon exiting the station, passengers should be able to identify the bus stop quickly; provide directional wayfinding signs if it the location is not immediately clearly visible.
- Passengers need to be sure they've arrived at the right location, so stop identification is key.
- Additional information about their journey would also be helpful, such as a schedule, larger system map, and real-time arrival information, where feasible.

Reference Sign Types

STW	Street Wayfinding Sign
BID	Bus Stop Identification
BSM	Bus Line Map and Schedule
BS	Real-time Bus Schedule (Optional)



Example Conceptual Sign Type Plan

GALLERY PL - CHINATOWN

Lower Platform

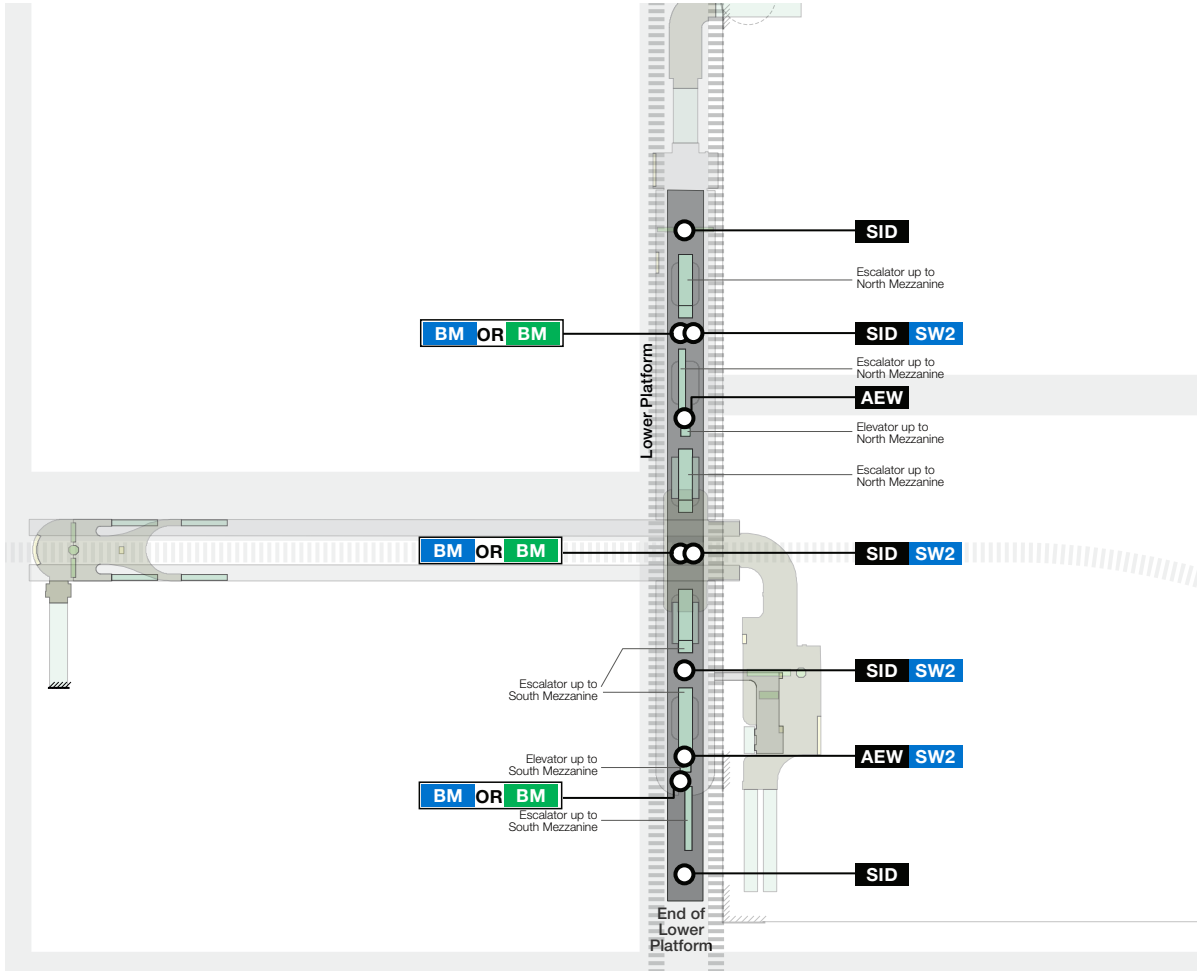
Curbside Complex stations require passengers to make a quick decision about which direction to go after disembarking a train. Information on the platform level can help guide them follow to the mezzanine for further direction.

Key Considerations

- Passengers will want to know which station exit will bring them closest to their bus stop; this starts with choosing which way to exit the platform. Signage should be provided to convey this information.
- Signs with bus information should be placed close to the access points of escalators/elevators on the platform
- If the mezzanines are located at two ends of a long platform, bus information could also be placed at the middle of the platform.

Reference Sign Types

BM	Neighborhood Bus Map
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign



Example Conceptual Sign Type Plan

GALLERY PL - CHINATOWN

Upper Platform

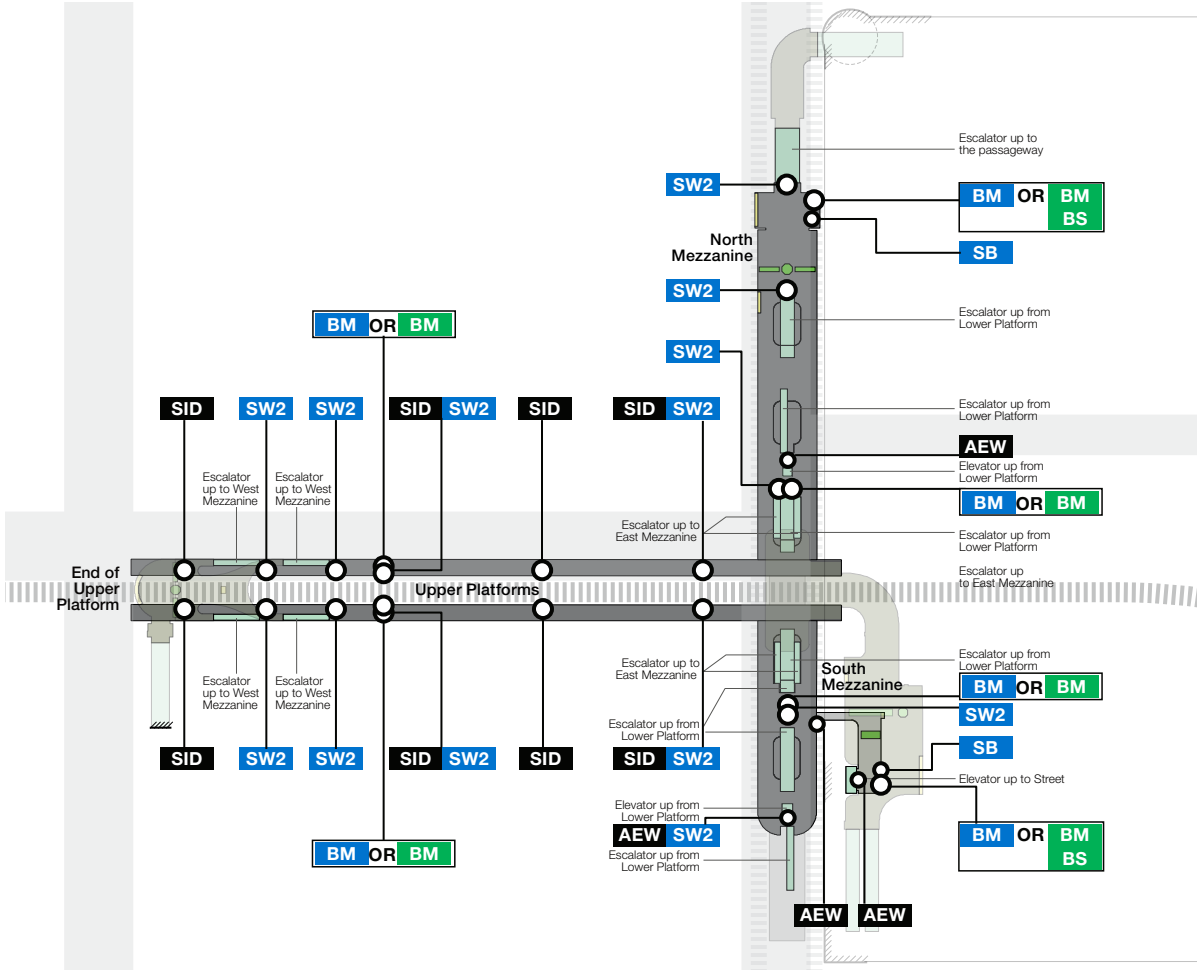
Crossing stations with multiples lines that cross and have two platforms can be complicated, and are often the busiest.

Key Considerations

- The upper platform presents an opportunity for reinforcing for users that they are heading in the correct direction to reach their bus. Relevant information should be placed close to the escalators/ elevators access points.
- For passengers who require the elevator, the upper platform might be the first change to see wayfinding that leads them to the station exit closest to their bus.

Reference Sign Types

BM	Neighborhood Bus Map
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign



Action

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity
- Active Area
- Potential Sign Location

Mezzanine

The mezzanine levels of *Curbside Complex* stations presents an opportunity for confirmation signage for passengers who have found their directions on the platform and want to confirm their path.

Key Considerations

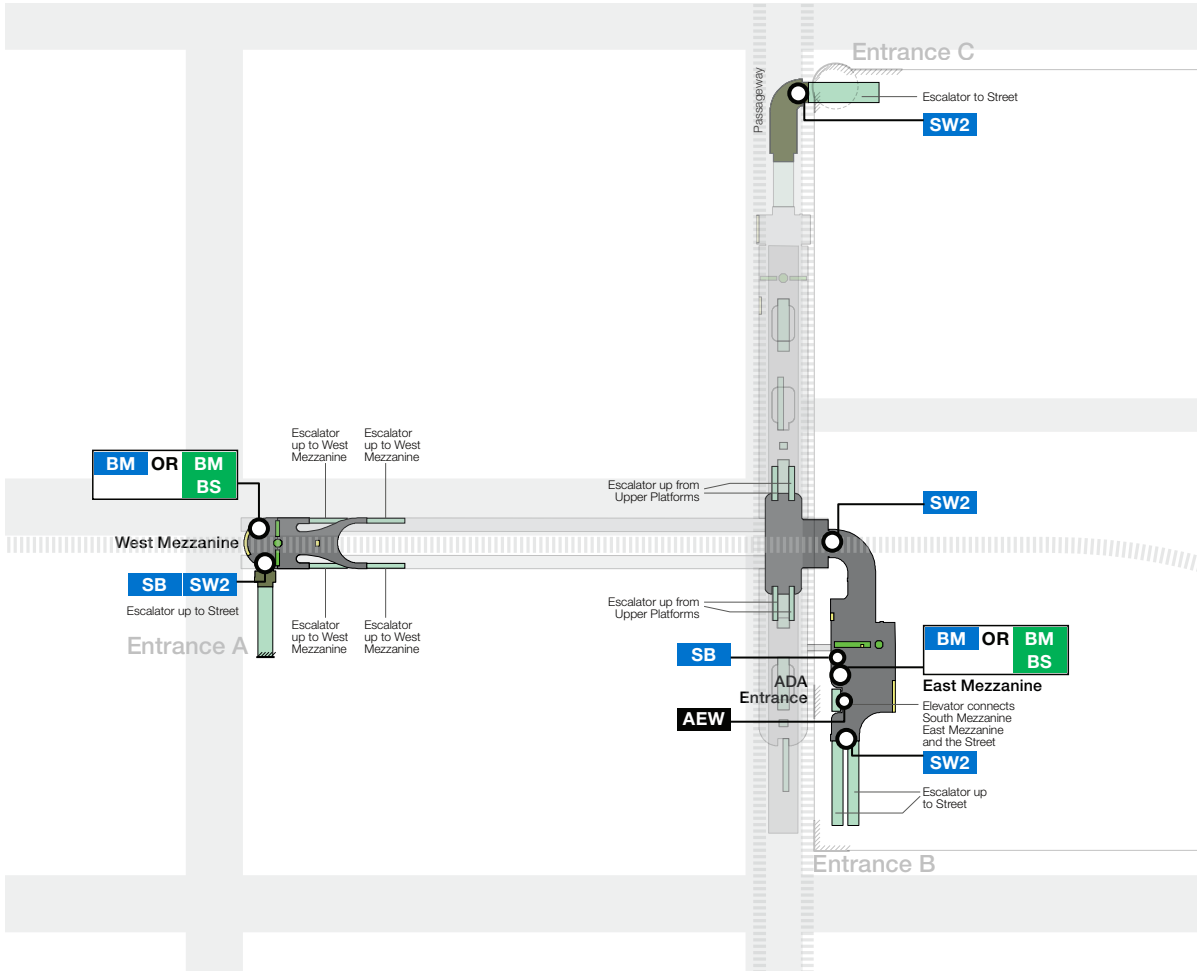
- A Neighborhood Bus Map at this level could help passengers identify the stop they need and re-orient themselves as they move out of the station.
- Real-time bus arrival information could provide passengers with a better understanding of their travel time.
- Shuttle bus information should also be provided in the unpaid area of the mezzanine, either integrated into the neighborhood bus map or placed on an individual panel.

Reference Sign Types

BM	Neighborhood Bus Map
BS	Real-time Bus Schedule (Optional)
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign

Example Conceptual Sign Type Plan

GALLERY PL - CHINATOWN



Action

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity
- Active Area
- Potential Sign Location

Curbside Complex

Street and Bus Stop

Curbside Complex stations have multiple exits and multiple bus stops and are often in places with high pedestrian volumes.

Key Considerations

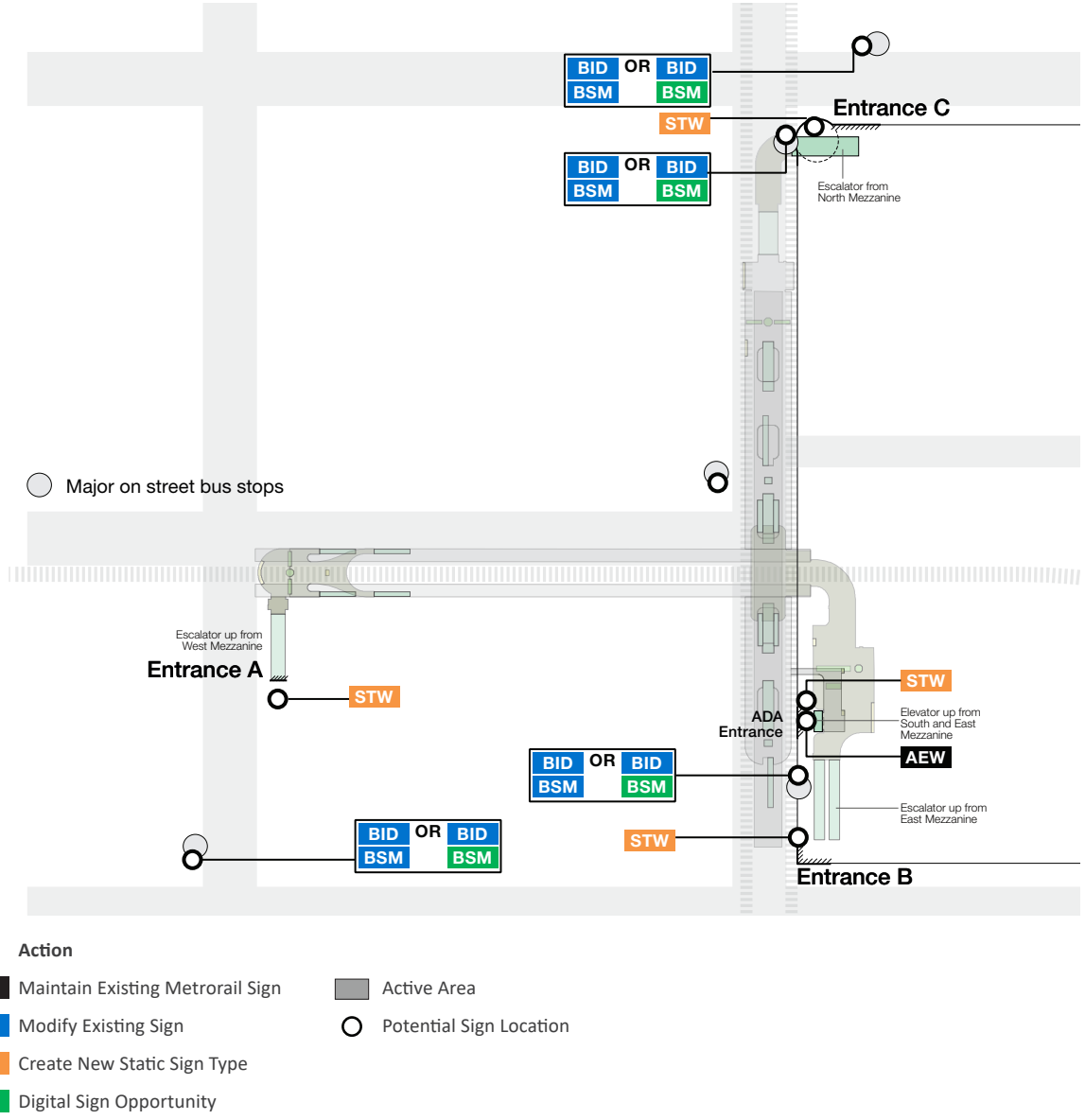
- Detailed information about where to access the right bus should be clearly located upon exiting the station. Additional directional wayfinding might also be needed to reinforce what is shown on the Neighborhood Bus Map.
- A standardized Bus Stop Identification sign will help passengers confirm their arrival at the right bus stop.
- Real-time bus arrival information or system maps, could also be helpful here.

Reference Sign Types

BID	Bus Stop Identification
BSM	Bus Line Map and Schedule
BS	Real-time Bus Schedule (Optional)
BM	Neighborhood Bus Map
STW	Street Wayfinding Sign

Example Conceptual Sign Type Plan

GALLERY PL - CHINATOWN



Facility Simple

Example Conceptual Sign Type Plan

GREENBELT

Platform

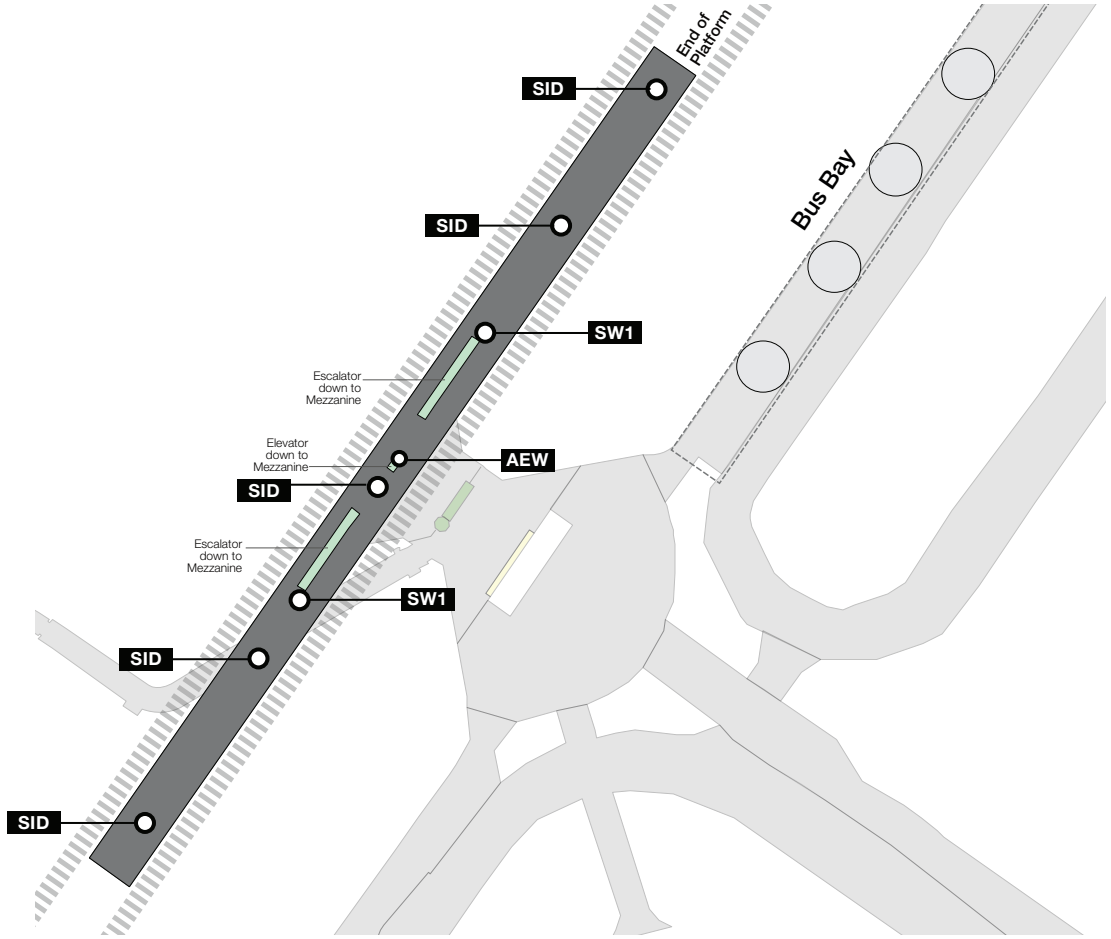
Facility Simple stations do not present any major wayfinding issues on the platform level. At these stations, all passengers typically exit in one direction to a mezzanine which leads to one station exit.

Key Considerations

- Signage at this level should help passengers know which station they are at and provide wayfinding to the exits, including the elevator.

Reference Sign Types

AEW	Accessible Wayfinding Sign
SID	Station Name Identification
SW1	Station Wayfinding Sign



Action

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity
- Active Area
- Potential Sign Location

Example Conceptual Sign Type Plan

GREENBELT

Mezzanine and Station Exit

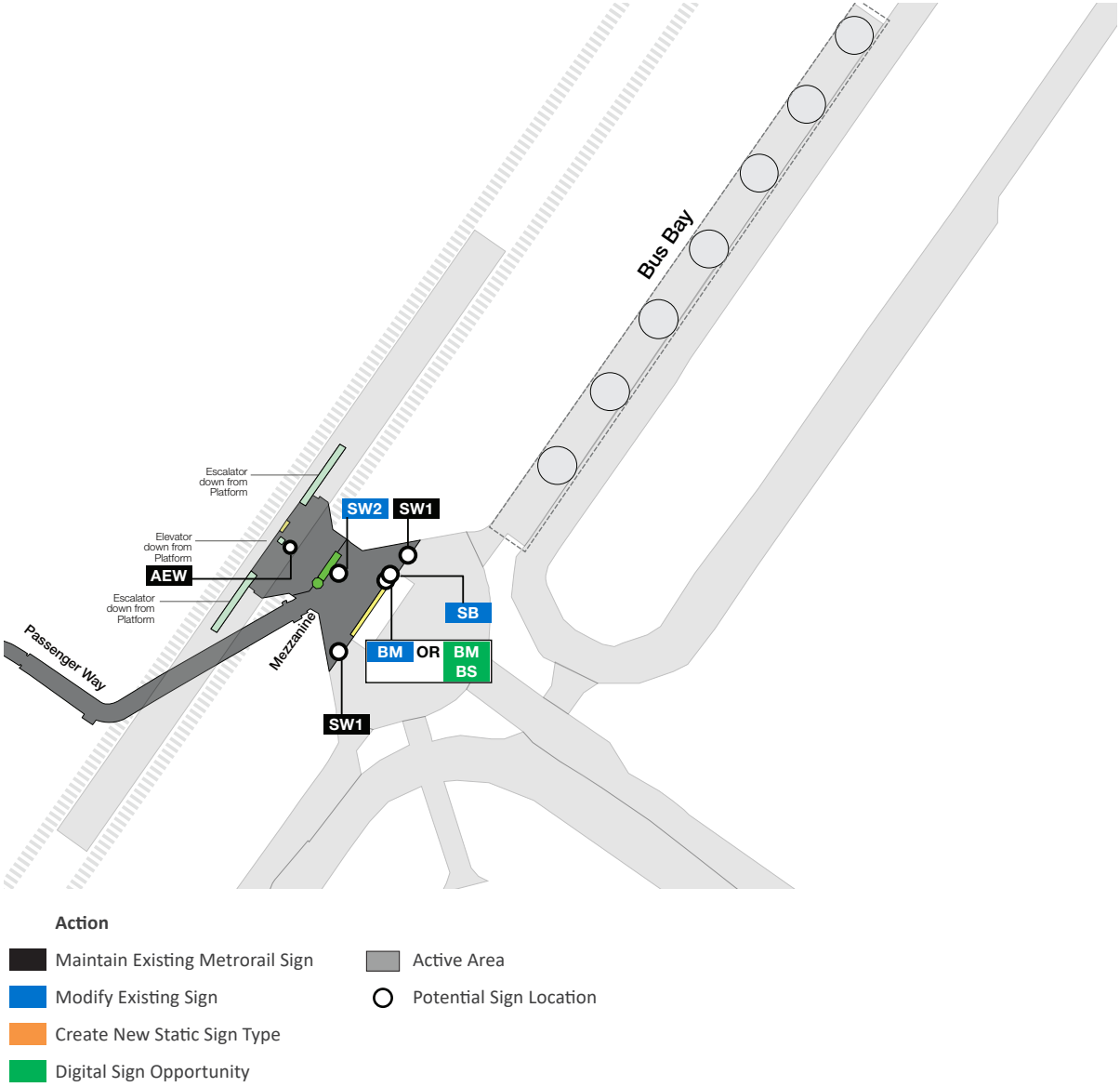
For most passengers, *Facility Simple* stations should be straightforward to navigate. With only one station exit and only one area to connect to buses, there are limited decision points between the platform and the bus loop / bus bays.

Key Considerations

- The most important information is wayfinding signs directing passengers to the bus loop/bus bays. This should be directly outside the station in the unpaid area.
- Locating shuttle bus information, with the specific bus bay number and location, would also be helpful here.

Reference Sign Types

BM	Neighborhood Bus Map (Optional)
BS	Real-time Bus Schedule (Optional)
SB	Shuttle Bus
STW	Street Wayfinding Sign
SW1	Station Wayfinding Sign
SW1	Station Exit Wayfinding Sign



Example Conceptual Sign Type Plan

GREENBELT

Bus Bay / Bus Loop

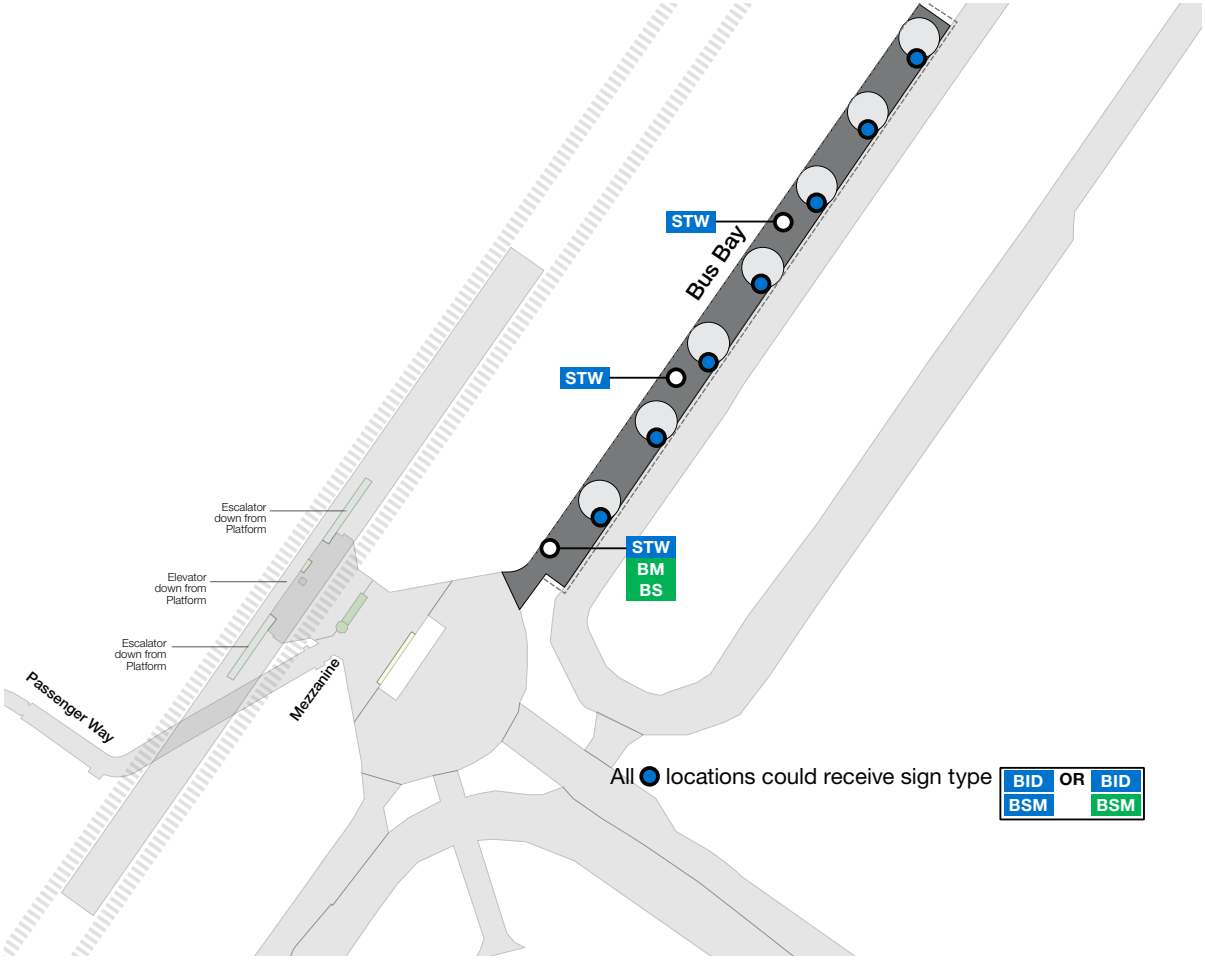
At *Facility Simple* stations, the area to connect to buses is typically easy to find from the station exit, but identifying the correct bus bay or bus stop might be more challenging.

Key Considerations

- A map of the bus loop with detailed information on which buses serve which bus bays can help passengers find the right bus stop. Bus information should be consolidated in one place located between the station exit and the bus loop.
- Consider placing additional directional wayfinding signs every three bus bays to inform passengers of the bus bay numbers ahead.
- At the bus bay, stop identification signs help passengers confirm their arrival at the right bus stop. Other information on bus routes and maps, as well as bus arrival times, can also be helpful at the bus stops.

Reference Sign Types

BID	Bus Stop Identification
BSM	Bus Line Map and Schedule
STW	Street Wayfinding Sign



Example Conceptual Sign Type Plan

VIENNA/FAIRFAX - GMU

Platform

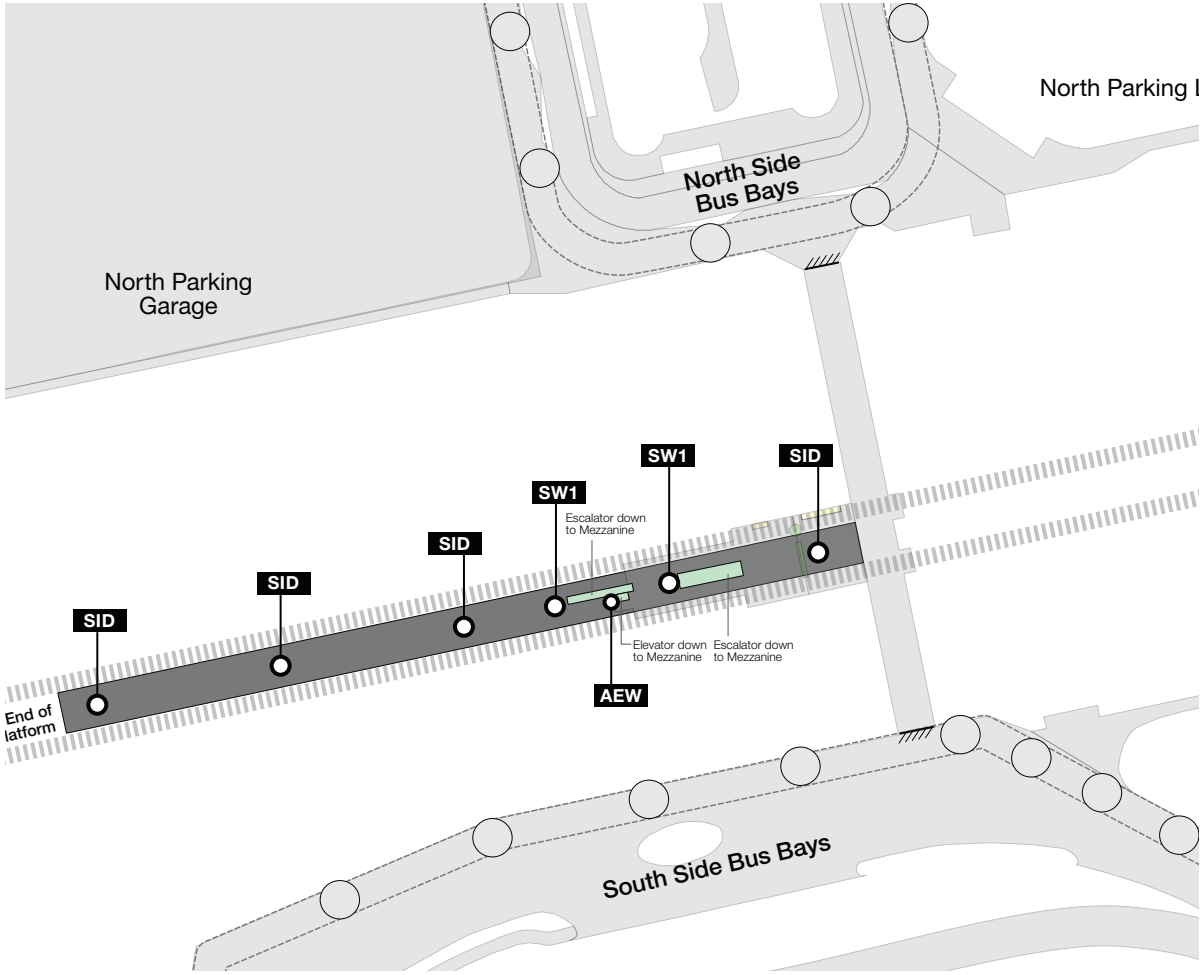
Facility Complex stations include multiple decisions points on the passenger's journey from platform to bus.

Key Considerations

- At this level, the primary piece of information a passenger needs is which exit leads to the bus loop/bus bay where their bus is located is. Providing the bus loop/bus bay information on the platform would help address this problem. This information should be placed close to the access points of escalators/elevators.
- If the mezzanines are located at two ends of a long platform, the bus loop/bay information could also be placed at the middle of the platform, either as a bus loop/bay map or a bus loop/bay directory.

Reference Sign Types

BM	Neighborhood Bus Map
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign
AEW	Accessible Wayfinding Sign



Facility Complex

Mezzanine, Exit and Passageway

The mezzanine is the most important wayfinding decision point for *Facility Complex* stations, where these areas often lead in different directions that terminate on opposite sides of the station.

Key Considerations

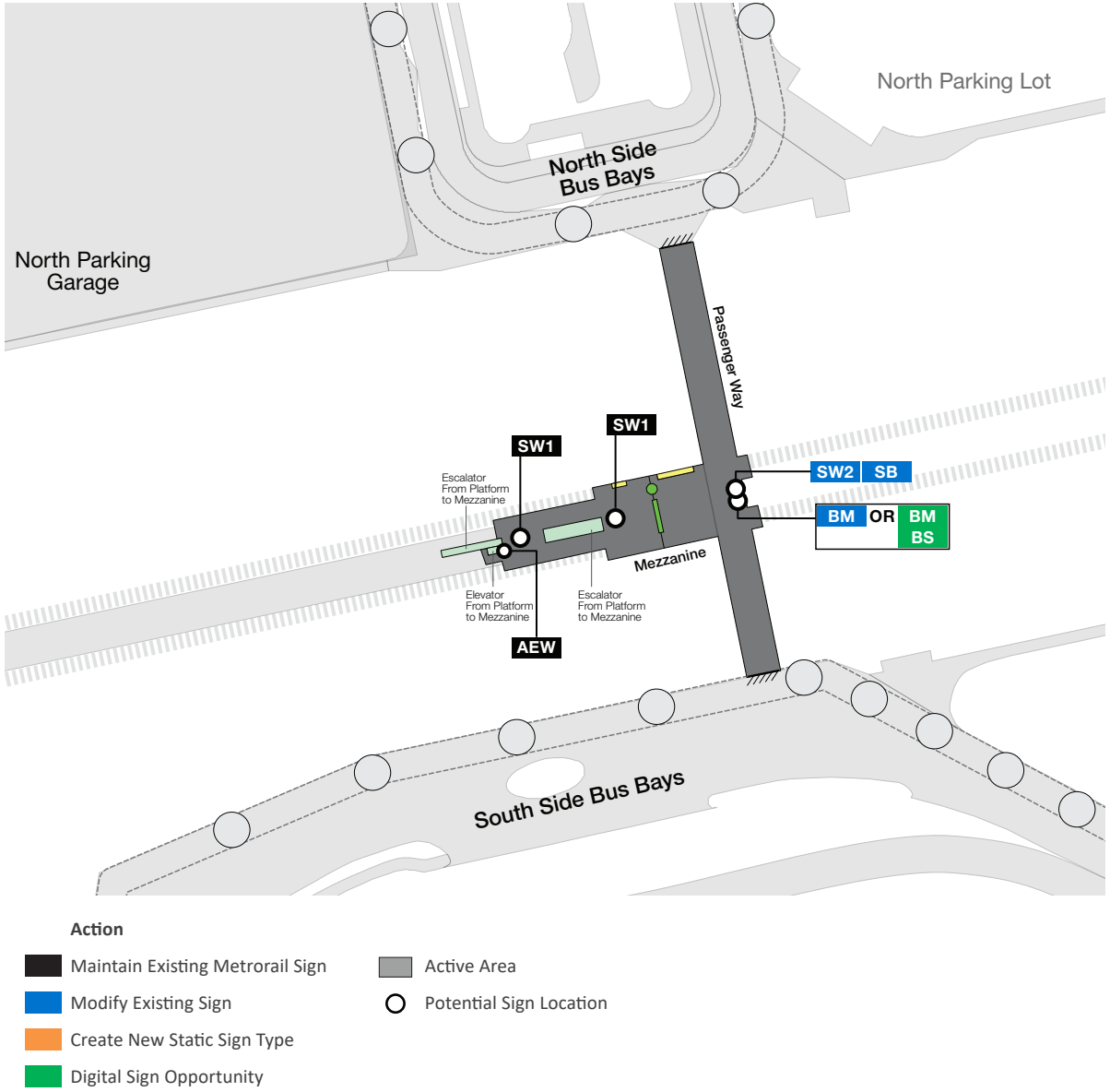
- Once at the mezzanine, passengers need to find the exit that leads to the bus loop where their bus stop. A map with detailed information of the bus routes serving the different bus loops and the specific bus bays would be helpful, along with an optional Real-time Bus Schedule display. Station Exit Wayfinding will also be important.
- Shuttle bus information, with the specific bus bay number and location, would also be helpful here.

Reference Sign Types

BM	Neighborhood Bus Map
BS	Real-time Bus Schedule (Optional)
SB	Shuttle Bus
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign

Example Conceptual Sign Type Plan

VIENNA/FAIRFAX - GMU



Example Conceptual Sign Type Plan

VIENNA/FAIRFAX - GMU

Bus Loop and Bus Stops

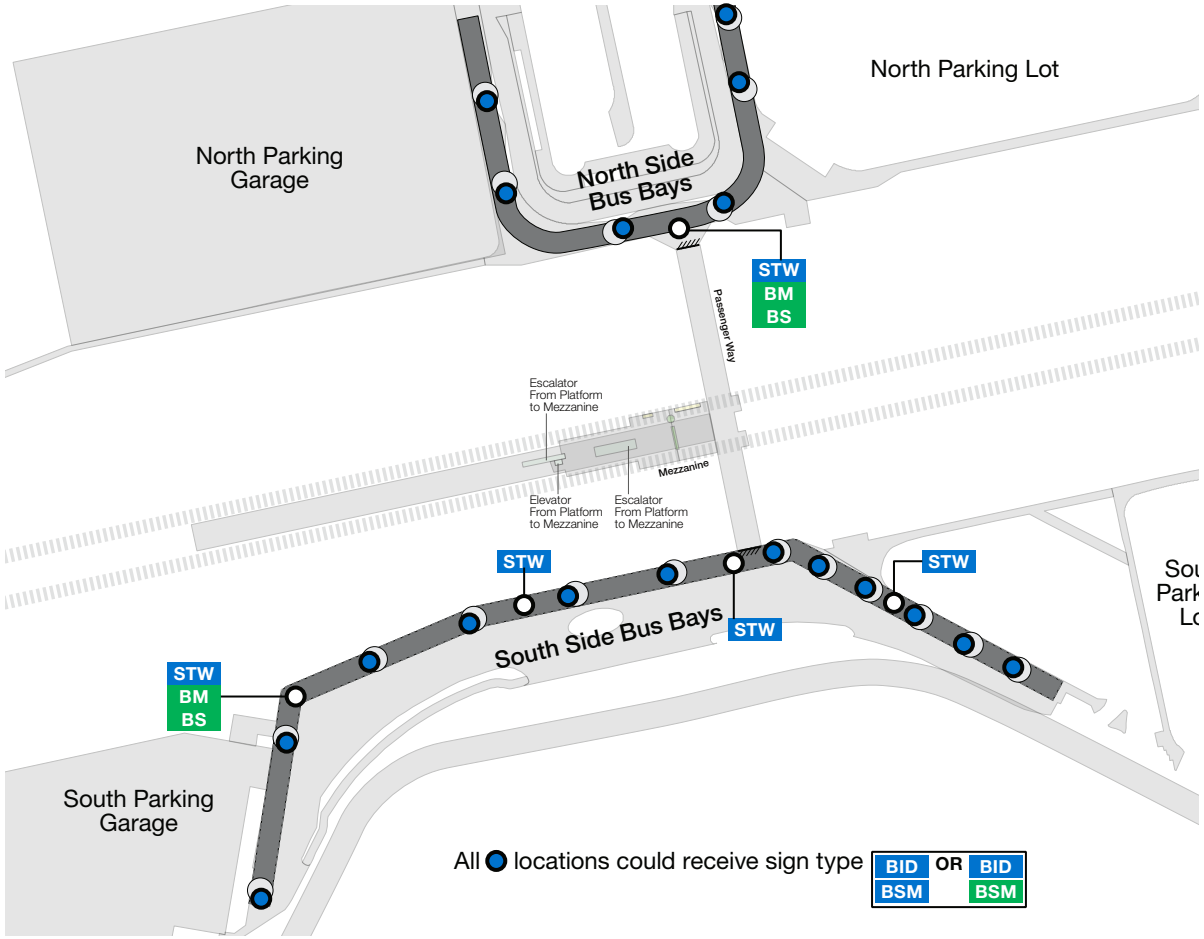
Facility Complex stations have multiple bus loops/bays, each with multiple bus routes, creating decision points between exiting the station and boarding the bus.

Key Considerations

- Passengers need to confirm which bus bay they need to go to. A bus loop map with information on which routes serve each bus bay would be helpful here and should be placed at the bus loop/bay entry point.
- Some passengers will want information for planning further legs of their trip. Bus information should be consolidated in one place for better legibility. Signs could be placed every two to three bus bays to inform passengers of bus bays ahead.
- At bus bays, passengers need to confirm they have the right stop. Real-time bus arrival information is also helpful.

Reference Sign Type

BID	Bus Stop Identification
BSM	Bus Line Map and Schedule
BS	Real-time Bus Schedule (Optional)
STW	Street Wayfinding Sign



Action

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity
- Active Area
- Potential Sign Location

CHAPTER THREE
WAYFINDING SIGN TYPES DETAILS

CHAPTER THREE

WAYFINDING SIGN TYPES DETAILS

Overview

This chapter provides additional information on the sign types listed in Chapter Two. This sign type list provides different types of possible wayfinding information needed for rail/bus transfers during the passenger journey. These are only for illustrative purposes and are not intended to be used for production. The application of the sign types would vary by station and coordination with other departments may be necessary.

Action Type

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity

Metrorail Sign

SID	Station Name Identification
SW1	Station Wayfinding Sign
SW2	Station Exit Wayfinding Sign
AEW	Accessible Wayfinding Sign

Metrobus Sign

BM	Neighborhood Bus Map
BS	Real-time Bus Schedule
BID	Bus Stop Identification
BSM	Bus Route Map and Schedule
SB	Shuttle Bus

Potential Static Sign

STW	Street Wayfinding Sign

Potential Digital Sign

DK	Digital Sign (Multiple Types)

SID Station Identification Sign

SIGN TYPE

Description

Located at the platform level, the Station Identification Sign helps passengers confirm they've arrived at the right transfer station.

Application

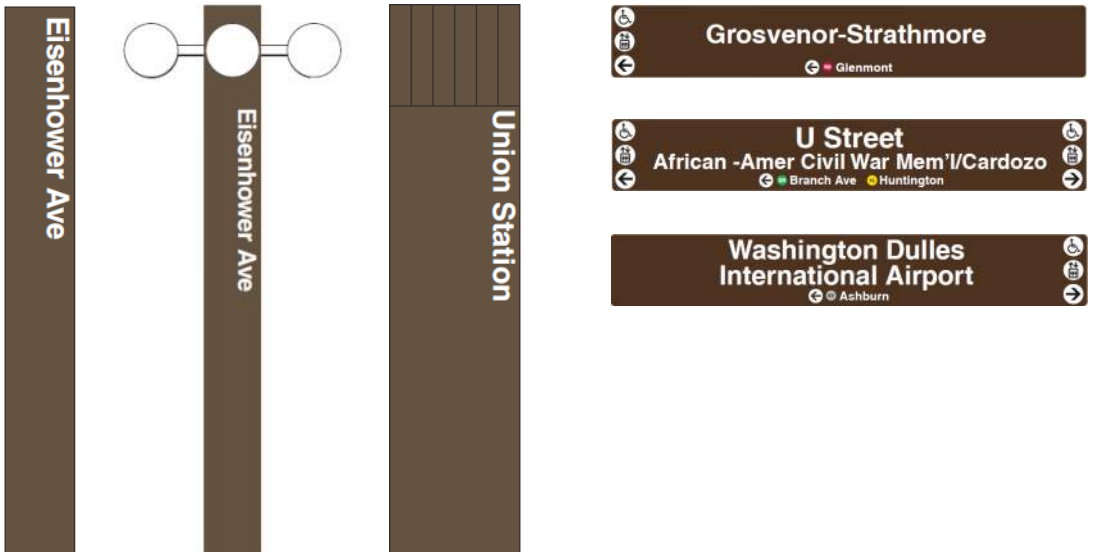
Follow the *Metrorail System Signage Design Manual* as referenced in section 2.27 to 2.33.

Locations

- At platforms of all station types.

Action Type

Maintain Existing Metrorail Sign



Sample from Metrorail System Signage Design Manual page 2.27 to 2.33.

An example from Gallery Pl-Chinatown Station of a Platform Station Name Identification.

SW1 Station Wayfinding Sign

SIGN TYPE

Description

The Station Wayfinding Sign guides passengers from the platform to the single exit or mezzanine of the station. This sign type shows directions to exits without specifying the exit street name. Station Wayfinding Signs should also show the direction to accessible elevator locations.

Application

Follow the *Metrorail System Signage Design Manual* as referenced in section 2.40 and 2.41.

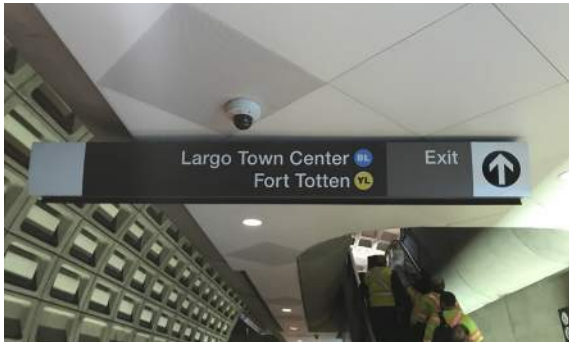
Locations

- At platforms and mezzanines in *Curbside Simple* and *Facility Simple* stations.
- At platform that connect to a single mezzanine in *Curbside Complex* and *Facility Complex* stations.

Action Type

Maintain Existing Metrorail Sign

Sample from Metrorail System Signage Design Manual page 2.40 to 2.41.



Example at Pentagon Station, Lower Level where bus information could be integrated into directional signage on the platform.

SW2 Station Exit Wayfinding Sign

SIGN TYPE

Description

The Station Exit Wayfinding Sign is used in stations with multiple exits and/or mezzanines to provide wayfinding information to passengers. After finding the correct station exit, passengers can follow this sign to the appropriate mezzanine and exit to the street. Station Exit Wayfinding Signs should show the direction to accessible elevator locations.

Application

Follow the *Metrorail System Signage Design Manual* (with some minor modifications necessary) as referenced in section 2.35.

Locations

- In *Curbside Complex* and *Facility Complex* stations at platforms and mezzanines with multiple exits.

Action Type

Maintain Existing Metrorail Sign

Modify Existing Sign

Sample from Manual page 2.35.

An example at Union Station where bus information is integrated into directional signage on the platform.

AEW Accessible Wayfinding Sign

SIGN TYPE

Description

The Accessible Wayfinding Sign helps passengers find an accessible path with elevators entering and exiting stations. This sign type includes the Accessible Elevator sign and Elevator Location Wayfinding Sign.

Application

Follow the *Metrorail System Signage Design Manual* (with some minor modifications necessary) as referenced in section 2.35, 2.10, 2.13, and 2.19.

Locations

- In all stations, above the station. elevators in station or at street level.
- At station entrances with elevator access.
- Where the elevator is not visible from the main path and no other wayfinding signs are installed around the area, an Elevator Location Wayfinding sign should be placed.

Action Type

Maintain Existing Metrorail Sign

Sample from Manual page 2.10 to 2.19.

An example at Georgia Ave-Petworth Station where an accessible wayfinding sign is located above an elevator within the station.

BM Neighborhood Bus Map

SIGN TYPE

Description

The Neighborhood Bus Map informs passengers of nearby bus routes and bus stop locations. Maps should be designed consistently and should include the following:

Curbside Stations
Bus route numbers at each bus stop, street names, station entrances/exits, and the location of elevators.

Facility Stations
Bus bays/loops locations, bus route numbers available at each bus bay/loop, station entrances/exits, and the location of elevators.

Where possible, maps should include a "You Are Here" identifier to help passengers orient themselves.

Application

Maps can be shown in a number of ways. Static Backlit signs help enhance legibility, and should follow the *Metrorail System Signage Design Manual* (with some minor modifications necessary) as referenced in section 2.16.

Digital Display to provide the most flexibility, allowing for the easy updating of bus routes, schedules, and service alert updates. Follow the *Metrorail System Signage Design Manual* as referenced in section 2.37.

Locations

- In all stations, bus maps should be located at the mezzanine level.
- At *Curbside Complex* and *Facility Complex* stations with multiple mezzanines, bus maps should be located at the mezzanine and platform levels near escalator/elevator access points.
- At bus bays/loops that connect to *Facility Simple/Complex* stations, bus maps should be placed at the bus bay/loop entry point and added at intermediate locations in large bay/loop areas as needed.
- Bus maps should be co-located with other station maps and service information dashboards where possible.

Action Type

- Maintain Existing Metrorail Sign
- Modify Existing Sign
- Create New Static Sign Type
- Digital Sign Opportunity

An example neighborhood map from New York MTA's 72 St Station mezzanine digital dashboard.

Sample from Manual page 2.16 to 2.37.

An example of a new digital display with a backlit map, installed in a New York City subway station as part of the MTA's Enhanced Stations Initiative.

BS Real-time Bus Schedule

SIGN TYPE

Description

The Real-time Bus Schedule is an optional digital service to help passengers track their trip status. The schedule could show the wait time for the upcoming bus arrivals for each bus line and active Metrobus alerts.

Application

The Real-time Bus Schedule information could be co-located with other station maps and service information dashboards, or a single digital display.

The Real-time Bus Schedule sign at bus stops should be coordinated with the Dynamic Information Signage design in the MCEP Project *Bus Stop Amenity Reference Guide*.

Locations

- At mezzanine level for all station types.
- At exit of *Curbside Simple* and *Facility Simple* stations if space is not available for real-time bus schedule placement within the station.
- At Metrobus stops.
- At the entry point to the bus bay/loop area at *Facility Simple/Complex* Stations.

Action Type

Digital Sign Opportunity

An example from Fulton Station in New York City of a real-time bus schedule dashboard.

An example of E-ink real-time bus schedule sign at a bus stop.

BID Bus Stop Identification

SIGN TYPE

Description

The Bus Stop Identification helps passengers confirm their arrival at the right bus stop. It should be designed and placed in a consistent manner system-wide, with regards to the font, letter height, color code, material, bus stop naming system, and the sign positioning at the bus stop.

The Bus Stop Identification should include the bus stop name, available bus lines and destinations, and hours of operation. The bus stop name should match the names shown on the neighborhood bus map.

Coordinate with the Bus Stop Flag design in the MCEP Project Bus Stop Amenity Reference Guide Section Bus Stop Amenities.

Application

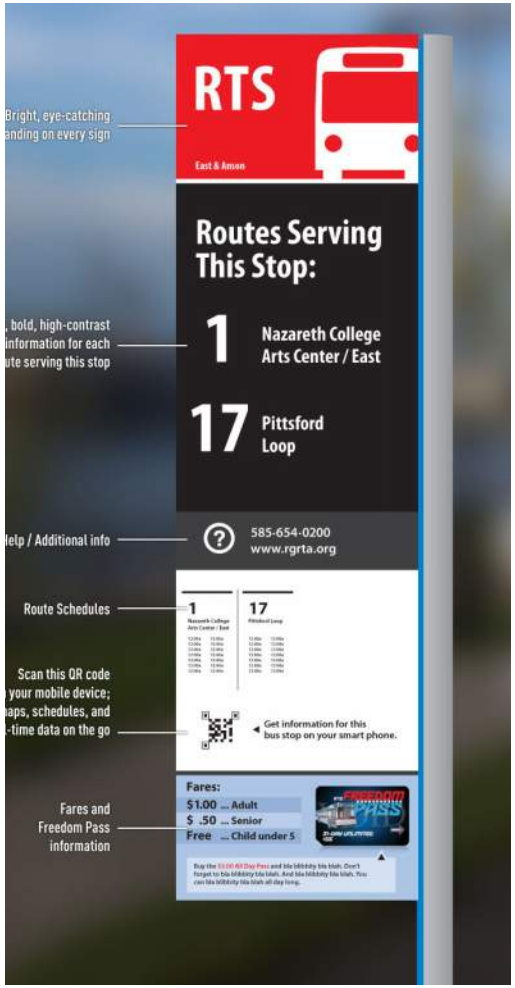
Static pole mounted sign or static freestanding kiosk

Locations

- At Metrobus stops.

Action Type

Existing Sign Coordination



An example from Rochester, NY RTS of a freestanding bus stop indicator.

BMS Bus Route Map and Schedule

SIGN TYPE

Description

The Bus Route Map and Schedule provides passengers with basic bus service information for each line, including the final destination, stops along the route and scheduled bus arrival times. It should be designed and placed in a consistent manner system-wide in regards to fonts, letter height, color code, graphic style, material and mounting method. The sign type should coordinate with Route Maps and Schedules design in the MCEP Project *Bus Stop Amenity Reference Guide*.

Application

Static sign panel or small digital display

Locations

- At Metrobus stops.
- Integrated with the pole mounted Bus Stop Identification sign.
- Mounted individually in Metrobus booth.

Action Type

Existing Sign Coordination

Digital Sign Opportunity

An example of a current static bus route map and schedule at the Pentagon bus bay area.

An example of digital bus route map employing e-ink technology.

SB Shuttle Bus

SIGN TYPE

Description

The Shuttle Bus sign directs passengers from the Metrorail station to the emergency shuttle bus stop on the street or at the bus bay/loop area when Metrorail service is changed temporarily.

At the mezzanine area of *Curbside Simple* or *Curbside Complex* stations, the location of the Shuttle Bus stop should be provided with the street name reference. At *Facility Simple* or *Facility Complex* stations, bus bay stop number should be included.

Application

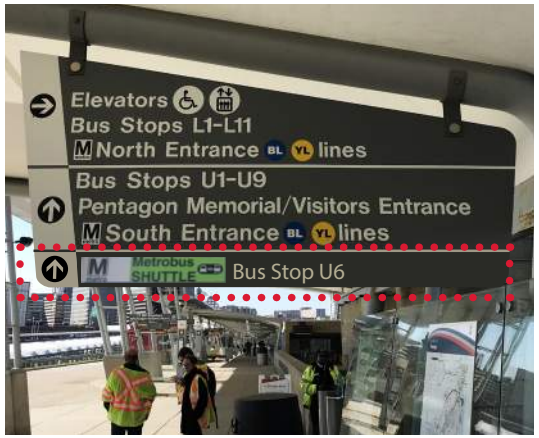
The information can be displayed on an individual sign panel or integrated with station wayfinding signs. It can also be consolidated with a static or digital service change alert notice.

Locations

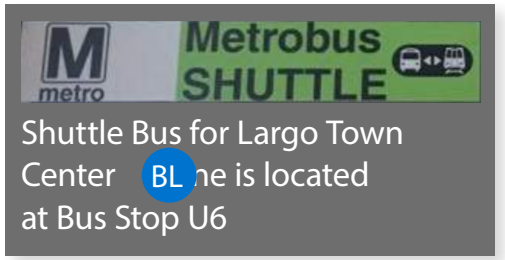
- Shuttle bus stop information should be located at the mezzanine, close to the station exit without any visual obstacles, and along the user path to the bus stop.
- On the street or at the bus bay/loop area, wayfinding signs with shuttle bus stop directions should be installed at key decision points.
- At the shuttle bus stops, a shuttle bus identification sign should be placed at each stop individually or, consolidated with the Metrobus stop identification sign if they share the bus stop space.

Action Type

Existing Sign Coordination



Conceptual modification of an existing directional sign at the Pentagon bus bay area.



Conceptual individual Shuttle bus information panel at mezzanine area.

STW Street Wayfinding Sign

SIGN TYPE

Description

The Street Wayfinding Sign informs passengers of the direction to either their bus stop or the station entrance.

At *Curbside Simple* or *Curbside Complex* stations, Street Wayfinding Signs should be placed at the Metrorail station exit and at key turning points on the street between the train station exit and bus stops.

At *Facility Simple* or *Facility Complex* stations, Street Wayfinding Signs should be placed at station exits, bus bay/loop entrances or along the bus bay/loop where further direction is needed to nearby bus stops. The sign design should follow the *Metrorail System Signage Design Manual* for guideline regarding design and mounting methods.

Application

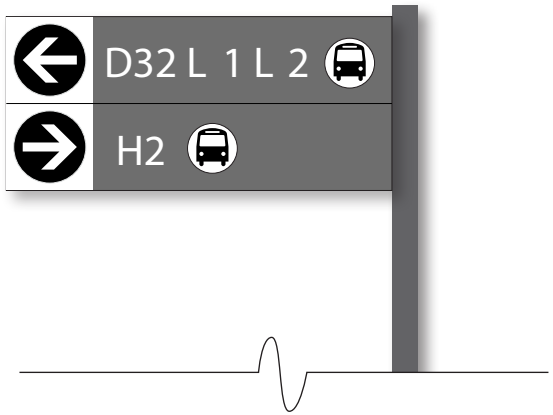
Static sign panel

Sign Locations

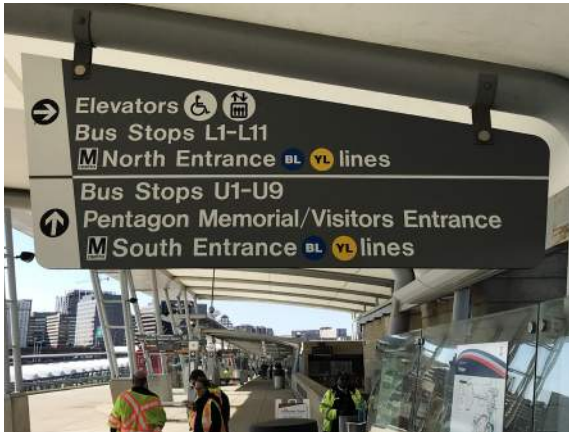
- On street and at bus bay/loop walkway

Action Type

- Modify Existing Sign
- Create New Static Sign Type



Conceptual directional sign on street for curbside stations.



An example of current directional sign at Pentagon Station bus bay.

DK Potential Digital Sign

SIGN TYPE

Description

Digital sign systems allow for consistency and easy updating of Metrobus information system-wide, and provides the flexibility for updates to the bus route, bus schedule, or service change alert.

The digital sign system would require coordination among the digital master planning team (digital infrastructure), digital design team (content management system software) and the hardware vendors (digital displays and cables).

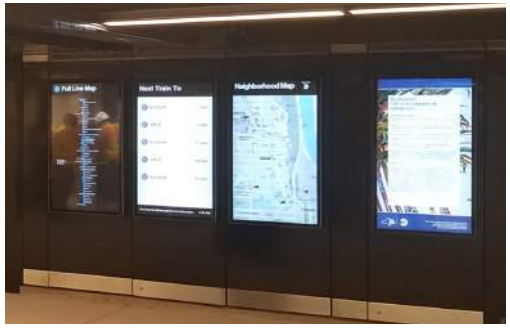
Digital signs could be used for sign types:

BM Neighborhood Bus Map

BS Real-time Bus Schedule

BMS Bus Route Map and Schedule

These sign types could be installed as separated digital signs or, consolidated as one digital dashboard, depending on the information needed and the condition of the physical space. The following are four examples of digital sign applications at rail/ bus stations.



NYC MTA 163 Street Subway Station mezzanine dashboards. Customized product design with 55" standard LCD screen. Subway Route Map, schedule, neighborhood bus map, and service alerts are all integrated into the digital dashboard wall at mezzanine to reduce visual clutter.

Example

LCD dashboard wall

LCD dashboard wall signs allow for the consolidation of information at a single location, reducing visual clutter. They also allows for a broad range of information to be displayed. Implementing them requires electrical and data connections, as well as careful coordination across WMATA teams.

Possible WMATA Luminator Type C Sign.[3]

Example

Overhead real-time schedule digital display

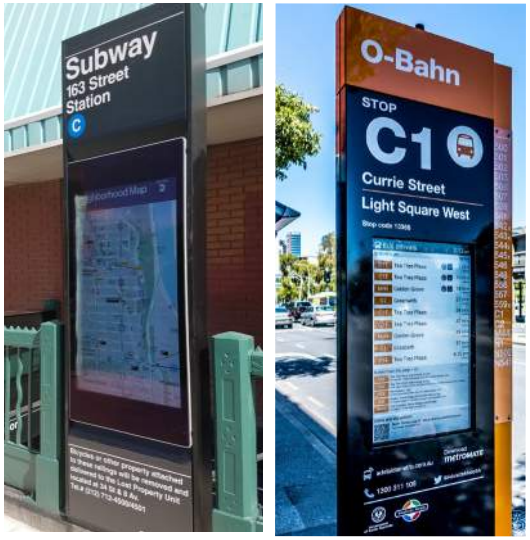
These signs are standard, off-the-shelf product that should allow for relatively easy procurement and installation. However, they only allow a limited amount of information to be displayed due to their size.

NJ/NY PATH station with overhead real-time bus schedule.

Example

LCD digital totems

These signs allow for customized outdoor LCD display, with the flexibility to provide a wide range of information to be displayed. Additional utility infrastructure likely would may be required, and these price consideration for customized product design.



Left, a NYC MTA 163 Street Subway Station street level entrance totem. Right, LCD Digital Bus Stop Totem by Metrospec.

Example

E-Ink technology

These sign types have a black and white display with low power requirements that still be updated remotely. The display type currently doesn't allow color or interactive content, but can be deployed without extensive infrastructure needs.

Prototype of E-Ink bus schedule signs from WMATA.

Metrorail System Signage Design Manual References

The following signtypes from the *Metrorail System Signage Design Manual* (issued 3.2019) could be used to provide the information recommended for the following respective wayfinding signs referenced in this chapter.

SID **Station Name Identification**

- 2.27 Platform Level Pylons, Pylon Type A
- 2.28 Platform Level Pylons, Pylon Type A-1
- 2.29 Platform Level, Pylon C
- 2.30 Platform Level Pylons, Pylon C-1
- 2.31 Station Name Sign Layouts
- 2.32 Vault Wall Mounted Station Name Signs at Belowground Stations
- 2.33 Post-Mounted Station Name Signs at Aboveground Stations

SW1 **Station Wayfinding Sign**

- 2.40 Double Post Mounted Overhead Signs
- 2.41 Pendant-Mounted Signs at Aboveground Stations

SW2 **Station Exit Wayfinding Sign**

- 2.35 Station Exit Wayfinding Sign

AEW **Accessible Wayfinding Sign**

- 2.10 Station Name Portal Signs Leading to Elevators
- 2.13 Street Level Elevator Head House Signs-Typical
- 2.19 Elevator Location Wayfinding Signs

BM **Neighborhood Bus Map**

- 2.16 Freestanding Information Cases
- 2.37 Digital customer Information Display

The following signtypes do not include direct references to the *Metrorail System Signage Design Manual*, though other WMATA standards may apply.

BS **Real-time Bus Schedule**

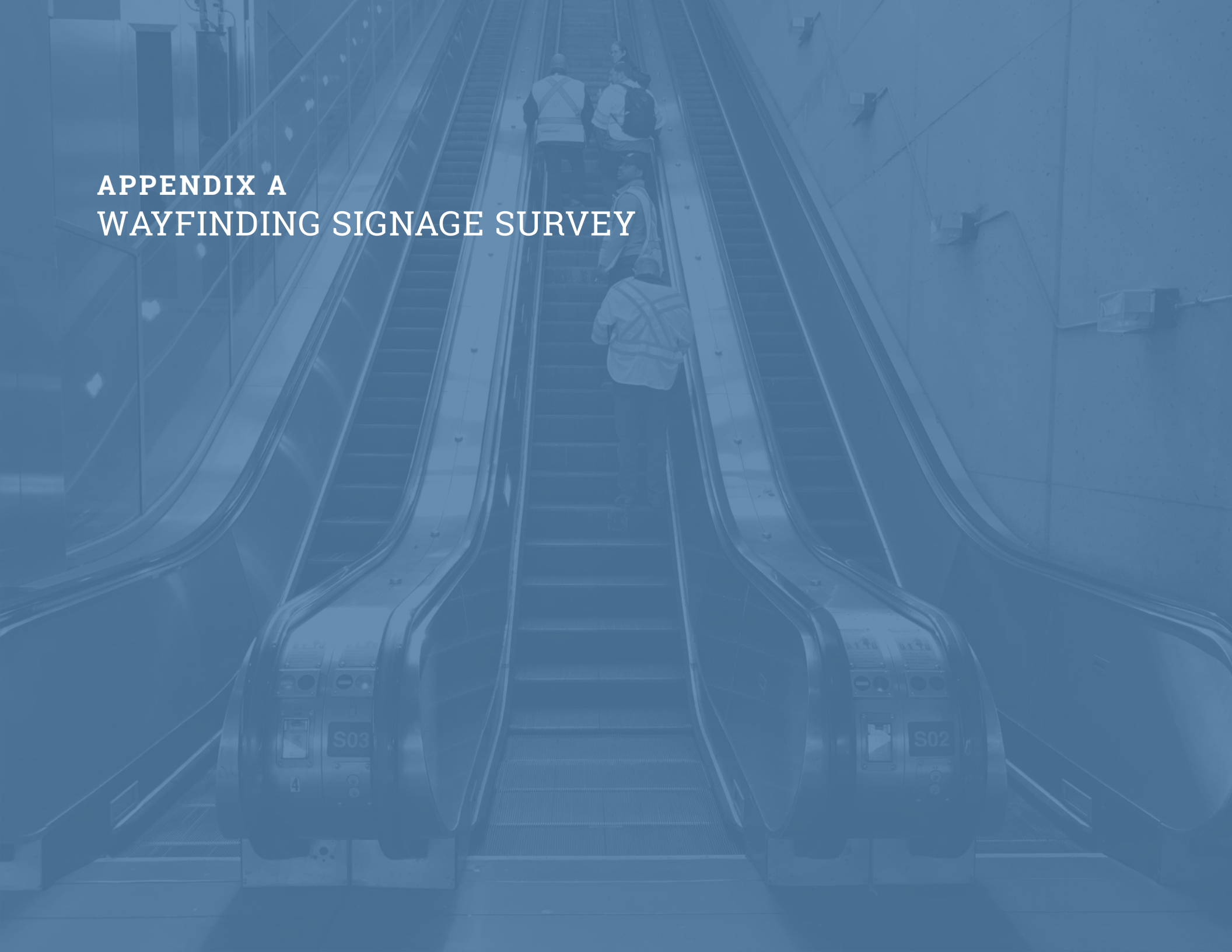
BID **Bus Stop Identification**

BSM **Bus Route Map and Schedule**

SB **Shuttle Bus**

STW **Street Wayfinding Sign**

DK **Digital Sign**



APPENDIX A
WAYFINDING SIGNAGE SURVEY

APPENDIX A
WAYFINDING SIGNAGE SURVEY

Overview

To help inform the MCEP, in March 2019 the project team visited 16 Metrorail stations to document existing bus-specific signage within the station, general wayfinding signage, and locations where bus-specific signage should be located but was missing. Information was collected using mobile devices, allowing sign types to be named and georeferenced.

SIGNS SURVEYED

To simplify the surveying process, the MCEP team pre-populated a survey app with defined sign categories. The sign types listed in the figure below are simplified categories based on the Metrorail Sign Design Manual. Also listed is how the signs were prioritized as part of the survey.

INFORMATION SHARING

The results of survey were shared with the project team and WMATA through an online web map. Over 1,000 records were included in the signage inventory.

Sign types and prioritization for signage inventory.

A	B	C	D	E	F	G
Pylon	**Metrorail Station Name Sign**	**Mounted Sign**	**Emergency and Ancillary Sign**	**Map**	**Digital Display**	**Advertising**
High Priority	Medium Priority	High Priority	Low Priority	High Priority	High Priority	Low Priority

STATIONS SURVEYED

The wayfinding and signage survey looked at these stations:

Curbside Simple

- Archives-Navy Memorial-Penn Quarter
- Van Ness-UDC

Curbside Complex

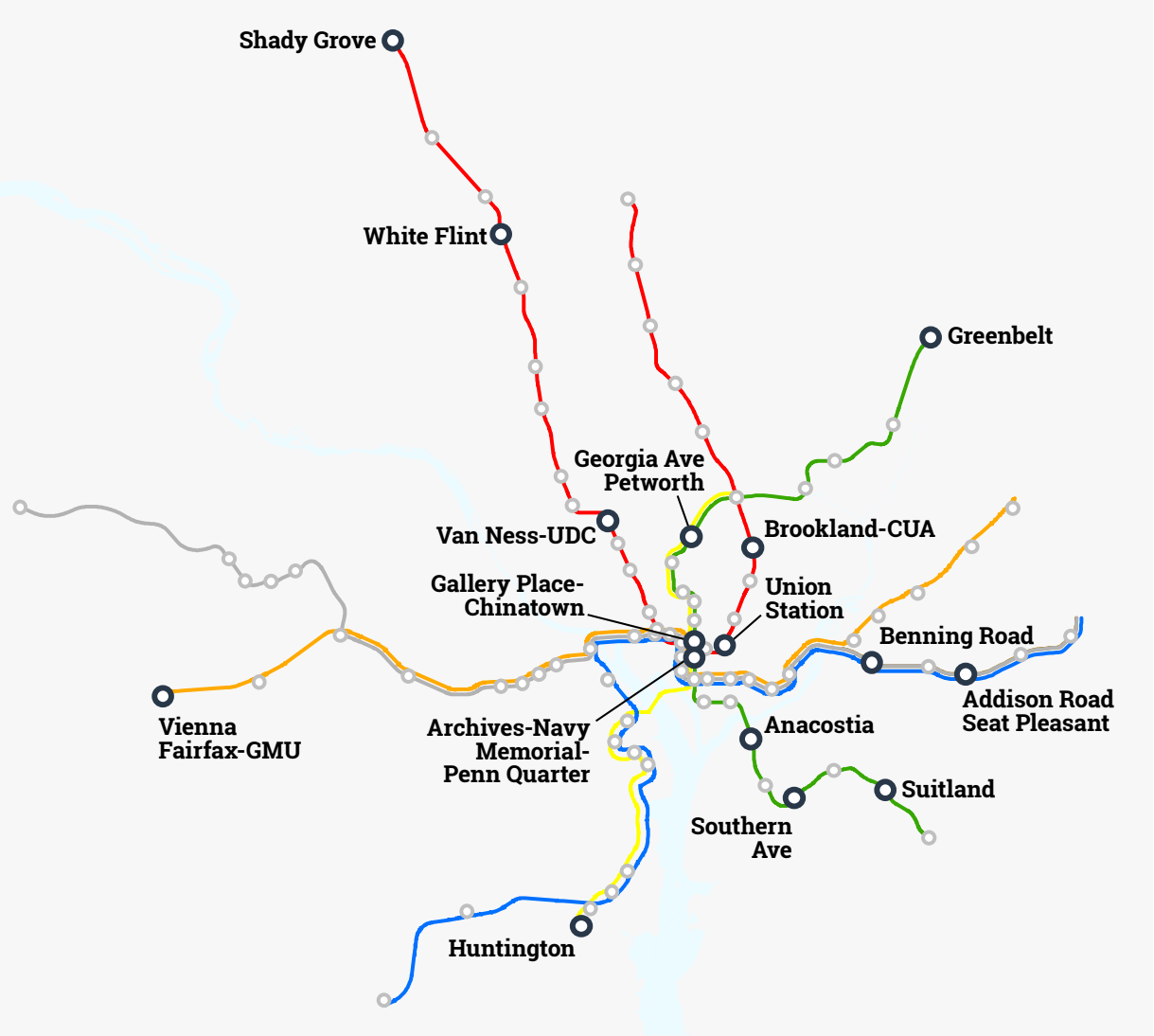
- Benning Road
- Gallery Pl-Chinatown
- Georgia Ave-Petworth
- Union Station
- White Flint

Facility Simple

- Addison Road-Seat Pleasant
- Brookland-CUA
- Glenmont
- Greenbelt

Facility Complex

- Anacostia
- Huntington
- Shady Grove
- Southern Avenue
- Vienna/Fairfax-GMU



Stations included in the wayfinding and signage survey.

Location of Information

The following section identifies major issues around signage and wayfinding for rail-to-bus transfers found during the wayfinding and signage surveys. Also presented are high-level strategies aimed at addressing these challenges.

Key

Wayfinding and Signage Issue

Wayfinding and Signage Strategy

Information needs to be placed in such a way that users get the information they need in the right place and at the right time. The information must also be sufficiently visible under normal conditions to catch the user's eye and quickly point them in the right direction. This is achieved through both placement and design.

A bus information sign is blocked by maintenance equipment at Dunn Loring Station.

PLACEMENT OF BUS INFORMATION: STATION-WIDE

Issue: **Bus information is located inconveniently, often in places that are difficult for passengers to find or access.** Metrobus signage was in a variety of locations: dark areas near the exit, behind glossy surfaces with high glare, and at varying levels of hierarchy on similar signs within the same station.

Strategy: **Locate bus information along the user path in conspicuous places that are visible and accessible.** Bus information can be incorporated with existing wayfinding systems (e.g., exit signs, area maps) depending on the location and level of detail needed at each decision point. Bus information should be given a consistent hierarchy level system-wide.

An example at Union Station where bus information is integrated into directional signage on the platform.

An example at Pentagon Station where bus information could be integrated into directional signage on the platform.

PLACEMENT OF BUS INFORMATION: PLATFORM AND MEZZANINE LEVELS

Issue: **Adequate bus information is not located on the platform.** This leads to passengers who may have to make costly choices about which exit to use, which may result in confusion, missed connections, and an overall sub-optimal passenger experience.

Strategy: **Provide bus information in consistent and conspicuous locations on the platform and mezzanine levels.** Placing information in the right place at both the platform and mezzanine levels allows users to easily navigate the appropriate route to their desired bus.

Quality of Information

Information should be user-friendly and easy to understand. Quick recognition and legibility are important. Information must also be consistent in terminology, design, and placement throughout the system, as well as accurate and up-to-date.

INCLUSION OF BUS INFORMATION ON EXISTING SIGNAGE

Issue: **Directional, pylon and other sign types generally do not include information about the location of bus facilities.** While some stations do include bus information on these sign types, many do not. For complex stations, this can lead to passengers making the wrong choices about which direction to exit to catch their bus.

Strategy: **Develop new and comprehensive sign types to include bus information on relevant signs, where feasible.** Bus information could be added on existing signage or incorporated into new signage as older signs are replaced. Either approach requires the development of new sign types in the *Metrorail System Signage Manual*.

A platform pylon at Gallery Place-Chinatown Station lacks wayfinding information.

A mezzanine pylon at Pentagon Station provides ambiguous bus information.

BUS ROUTE SIGNAGE

Issue: **Signs list bus routes in permanent, static format, while bus routes change with a high degree of frequency.** In some locations, bus routes are listed on permanent signs using materials that are not readily updated. However, these routes can regularly be changed, renamed, or rerouted, and any related signage needs to be manually updated.

Strategy: **Where bus routes are listed on signs, use digital or modular signage where possible to allow for regular updating of current information.** Digital signage generally comes with higher installation costs due to the need for utility connections. However, if installed and maintained correctly, they can be instantly updated to reflect route changes. Where costs or other restrictions limit the application of digital signage, modular systems that are intended to be regularly updated could be explored.

A sign at Huntington Station with static bus information.

An existing interactive digital screen at Gallery Place-Chinatown Station does not currently include bus information.

EXISTING DIGITAL SIGNAGE

Issue: **Existing digital signs do not include vital Metrobus information, such as arrivals and departures.** While there are some digital signs that include real-time bus information, many existing digital signs do not.

Strategy: **Update digital signs to include Metrobus information with current, real-time bus arrivals and alerts, where feasible.** Assuming these signs already have data connections, it should be a matter of reprogramming signage rather than adding new infrastructure. While real-time information would always be preferable for passengers, even the addition of existing static bus maps would be a useful change.

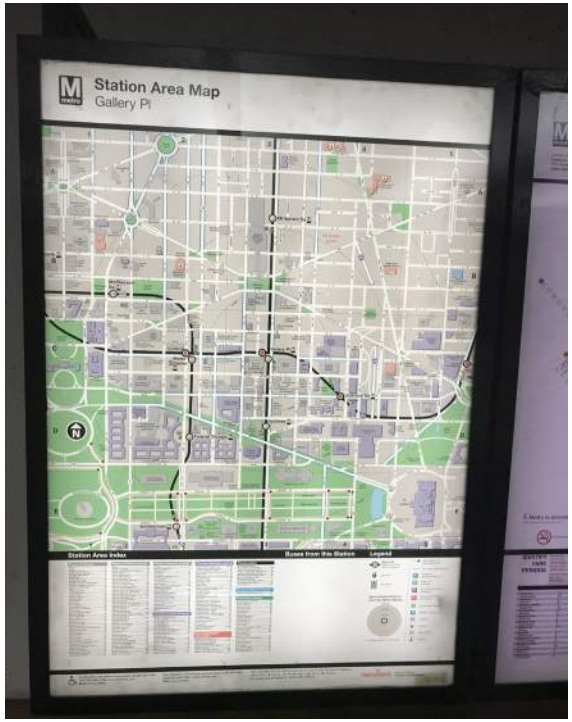
Maps

Maps are a vital piece of wayfinding. Users use maps to locate where they currently are, identify where they are going, and locate landmarks in the surrounding neighborhood. Consistent map styles allow users to easily read information without having to re-learn how to read the map and find the information they need.

INCLUSION OF METROBUS INFORMATION

Issue: **Existing WMATA maps found in certain Metrorail stations do not include bus information.** The Wayfinding and Signage Survey found numerous examples of Metrorail maps where there was no information included about bus routes at that station, even though there were multiple active bus lines.

Strategy: **Ensure that WMATA maps within Metrorail stations include comprehensive Metrobus information.** As new maps are created to replace existing maps, Metrorail and Metrobus should coordinate to ensure the most up-to-date bus information is included.



Bus information is missing from a map at Gallery Place-Chinatown Station.

A bus boarding map at Gallery Place-Chinatown Station identifies on-street bus stops by letters.

IDENTITY OF BUS STOPS AND FACILITIES

Issue: **On-street bus facilities are not labeled with the same information used on bus maps in Metrorail stations.** For both on-street and bus loops, bus shelters on maps are typically labeled with lettered identifiers. At bus loops this information is reflected on the bus shelter at the corresponding bus bay, but this information does not appear at curbside bus stops.

Strategy: **Use a clear bus stop identifier, such as the name of the street intersection of the bus stop, on the bus map.** The new standard curbside bus stop includes the street intersection name for the stop location. If this information is included on the bus map, it provides another piece of wayfinding information that can help the passenger.

A Metro-styled bus map at West Hyattsville Station.

CONSISTENCY OF GRAPHIC COMMUNICATION

Issue: **The graphic language of the maps is inconsistent for different stations.** Some maps are street-grid layouts without clear hierarchy, and others are bus system maps that use a combination of diagrammatic and geographic styles without showing local context. Maps are sometimes provided by multiple transit operators.

Strategy: **Employ a consistent graphic language for all station maps.** The map style should incorporate the other strategies recommended here. Where feasible, only Metro-produced maps should appear in Metrorail stations.

Aesthetics

To be most effective, wayfinding and other information signage should be both catching and simple. The location and aesthetic of the information should be pleasing to the eye to create a positive user experience.

VISUAL CLUTTER

Issue: **Stations are visually cluttered with signs that have been added over time, making it difficult for users to find the information they're looking for**. Clutter leads to confusion, and forces wayfinding information to compete with regulatory signage, advertising, and other information for customer attention.

Strategy: **Replace and consolidate information throughout a station complex with catching and clear signage.** To the extent possible, priority should be placed on reducing or maintaining the overall number of signs, rather than adding new information.

The booth at Huntington Station has many layers of signs added over time. To the degree possible, information should be consolidated while limiting the overall number of signs.

Metrobus Shuttle

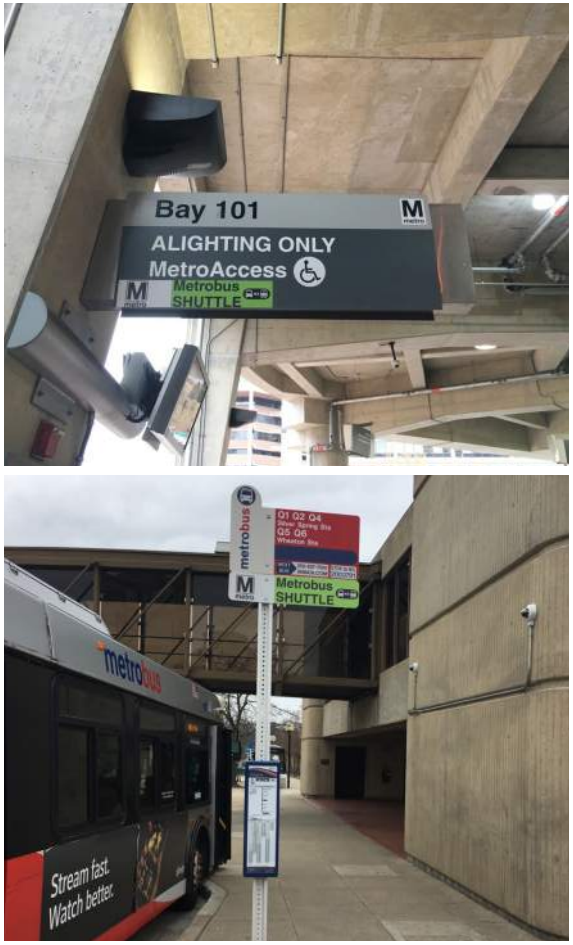
Metrobus Shuttle stops are located adjacent to all Metrorail stations. These are bus stops that have been identified for use by shuttles in case of an emergency.

LOCATION OF EMERGENCY SHUTTLE INFORMATION

Issue: **The existing signage for the WMATA Emergency Shuttle information isn't prominent and would be hard to find in an actual emergency.** Emergency Shuttle locations are identified on the Station Area Map within each station and are identified at the actual bus stop or shelter. However, at most stations there is limited directional or confirmation signage that could be used to help guide passengers to the shuttle during an emergency.

Strategy: **Expand the use of consistent Emergency Shuttle signage throughout the system.** Metrorail stations should have additional directional, confirmation, and other signage types that define what a Metrobus Shuttle is, reinforce the existing graphic identity, and direct passengers to the appropriate stop.

Strategy: **Supplement existing permanent Emergency Shuttle information with conspicuous temporary signage.** These could include setting up A-frame signs or digital takeovers, to be deployed during emergencies. WMATA can also explore options for additional training for staff on how to implement operational changes to better direct passengers to Metrobus Shuttle locations.



Above, two examples of existing Metrobus Shuttle signage. While the distinct green color of the signs helps them stand out, the interior of stations lack additional directional signage.

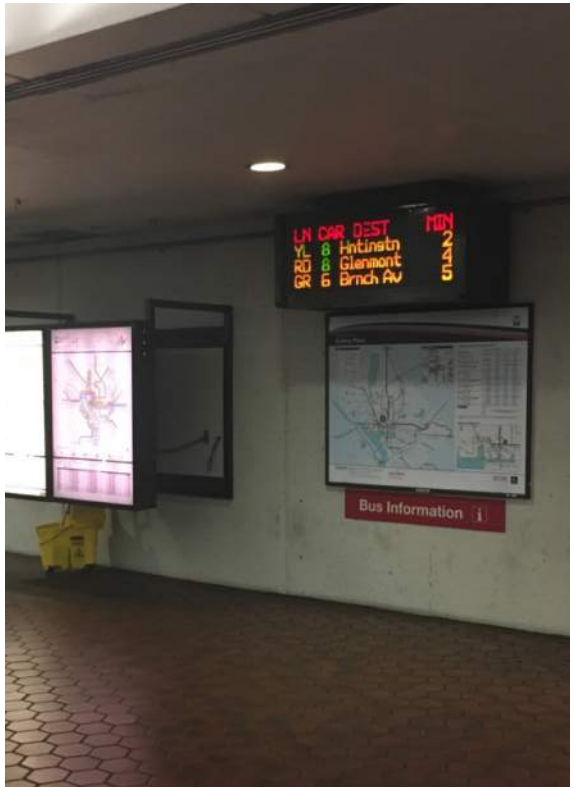
Lighting and Placement

Wayfinding information should be adequately lit to meet ADA requirements under normal conditions and have sufficient contrast with the surrounding background. There should be a buffer area between wayfinding and advertising to allow for an appropriate hierarchy and separation to be perceived by the user.

SIGN VISIBILITY AND LEGIBILITY

Issue: **Inadequate illumination or glare can make signs difficult to read.** A dimly lit sign may not be noticed or may be ignored by passengers, leading to confusion or costly misdirection. Glare can have a similar effect, obscuring a sign's message.

Strategy: **Work with sign fabrication shop and installation crews to ensure clear and compassionate legibility of signs.** Both sign material and the illumination source factor into a sign's legibility, so a holistic approach should be taken when considering materials, placement, and lighting.



A bus information sign is placed in the shadow of another sign at Gallery Place-Chinatown Station.

A pylon sign is dimly lit and obscured by glare and shadows from the escalator at Pentagon Station.

SEPARATION OF WAYFINDING AND ADVERTISING MESSAGES

- *Issue:* **Backlighting from advertisements blocks visibility of nearby mounted signage.** Dynamic advertisements will also draw passengers' attention away from wayfinding information.
- *Strategy:* **Combine advertising and digital wayfinding signage on the same screen with proper separation for consistency.** Adding wayfinding to digital screens will ensure its visibility so long as care is taken to keep the messages separate. This would also provide added flexibility for variable messaging when needed.
- *Strategy:* **Separate advertising from wayfinding and apply a clear hierarchy of messaging.** Separating wayfinding information and advertising in distinct visual zones with an appropriate buffer area will help passengers locate and distinguish informational signs.

Prominent digital advertising at the Gallery Place-Chinatown Station. This location would also helpful to use for locating wayfinding signage.

Digital Wayfinding

The WMATA digital platform should be an integrated, system-wide network that provides train and bus information in a single platform, improving the WMATA passengers' travel experience.

Passengers can use the digital platform to plan their trip in advance and track real-time train and bus status. This system would be integrated with the in-station digital displays to provide seamless, real-time information.

WMATA WEBSITE TRIP PLANNER

Issue: **The trip planner on the website does not support real-time updates during a trip and is missing key transfer directions.** Customers are not given service updates that may affect their trip and are not given directions to navigate between the train station and bus stop.

Strategy: **Include the option to push current updates and alert notifications to a customer's phone.** This feature can also provide alternate routing options when major disruptions occur.

Strategy: **Include the option to send a comprehensive trip itinerary to a customer's phone via SMS text message or email.** This will provide the customer with readily available offline notes to consult during their trip.

Strategy: **Include clear directional points, such as proper station exit and bus stop intersection or bus bay number, within the directions.** Adding simple-to-understand directions, such as which exit to use at a station, will remove uncertainty and give the passenger something to look for in the station when they disembark the train. When transferring from bus to train, provide the location of the nearest station entrance as well as the ADA entrance.

WMATA METRO AND BUS APP

Issue: **A trip-planning function is not currently provided on the DC Metro and Bus app.** Mobile users must use the WMATA website for this function.

Strategy: **Add a comprehensive trip-planning function to the DC Metro and Bus App.** Sync the trip planner on the app with the revised trip planner on the website to provide the same new functions and create a seamless customer experience.

DIGITAL SIGNAGE AND AUDIO ANNOUNCEMENTS ON TRAINS

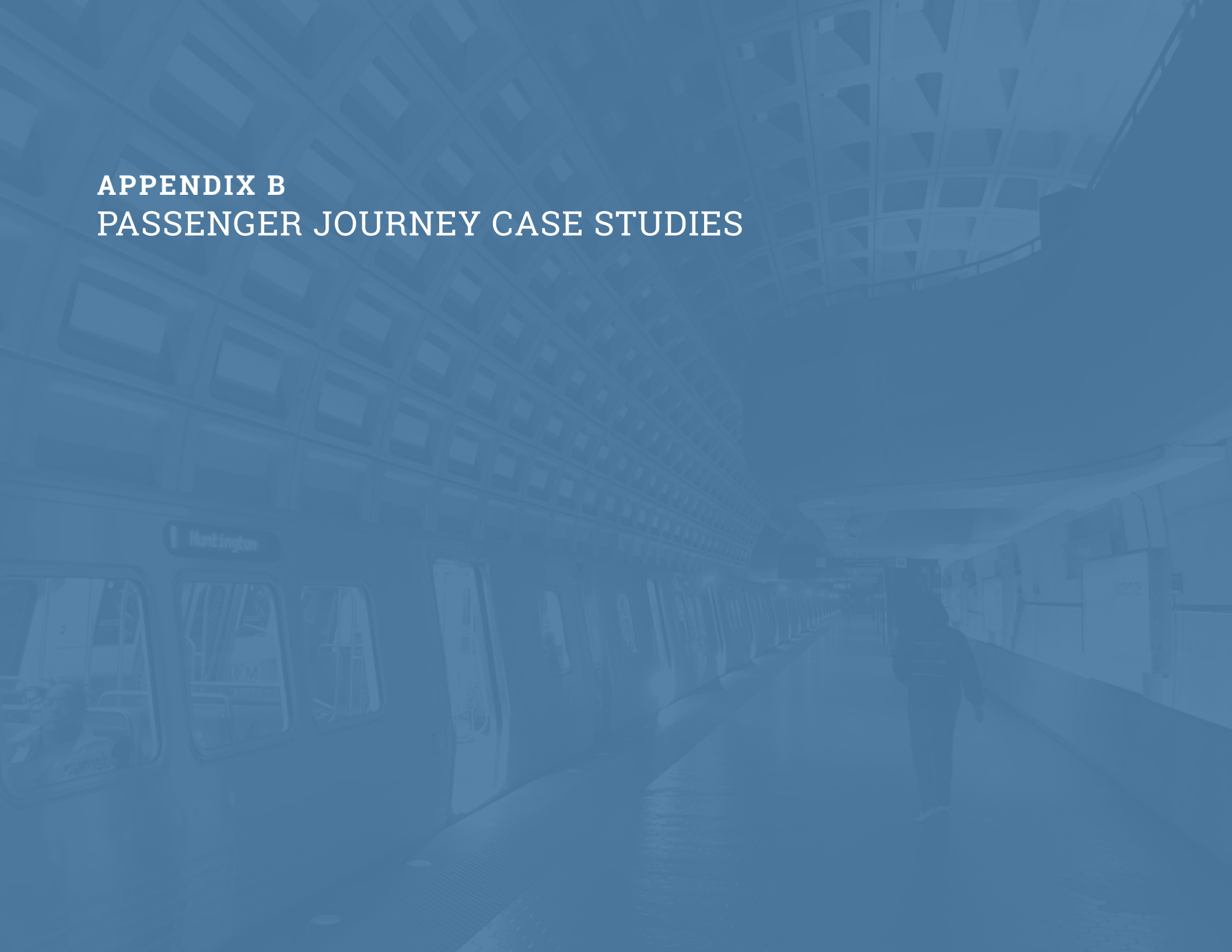
Issue: **There is no bus connection information provided on trains.**

Strategy: **Explore options for displaying the bus transfers available at that station in a clear and conspicuous manner.** Link the information to provide real-time bus service changes or alerts, when necessary.

DIGITAL SIGNAGE IN METRORAIL STATIONS AND METROBUS STOPS

Issue: **Due to the high frequency of bus service changes, static bus information does not meet the operational needs of the system.** This results in passengers receiving out-of-date service information and leads to a poor customer experience.

Strategy: **Move bus service information to digital signs and kiosks to keep information current.** Bus information can be updated and maintained in a central database and pushed regularly to digital signs and kiosks throughout the system.

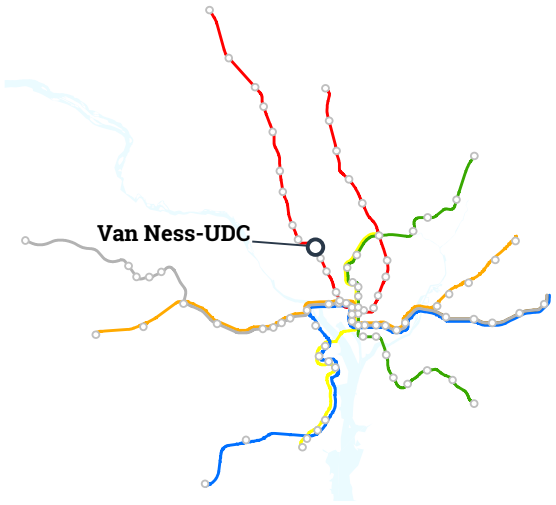


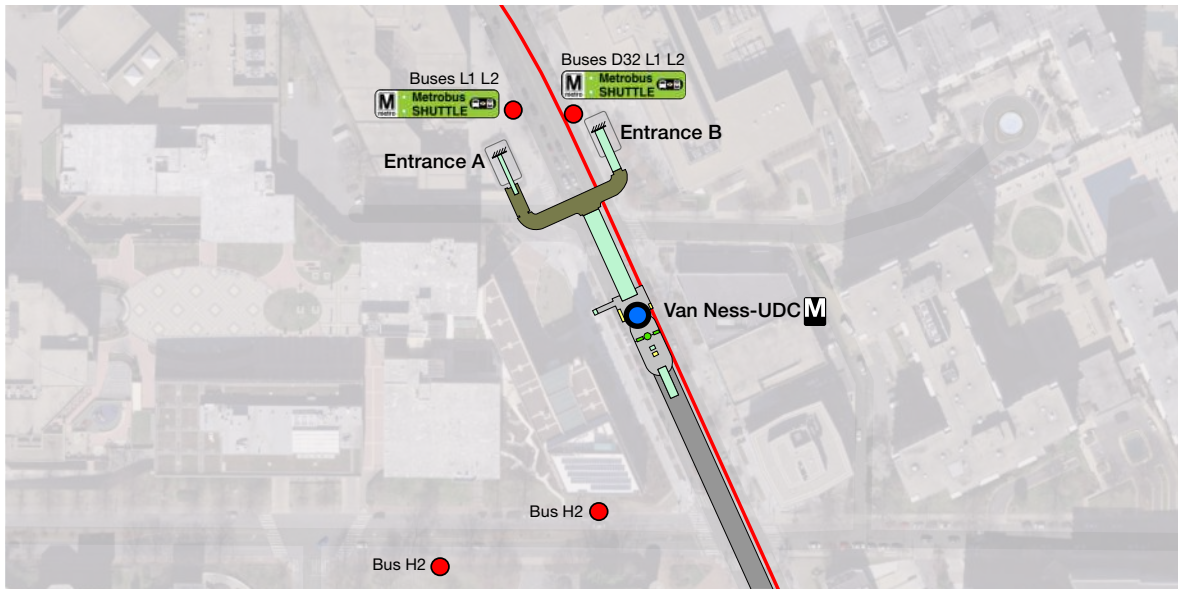
APPENDIX B

PASSENGER JOURNEY CASE STUDIES

PASSENGER JOURNEY CASE STUDIES

Curbside Simple Station
Van Ness-UDC





Station information

The Van Ness-UDC Station provides access to the University of the District of Columbia (UDC), Howard University School of Law and the Edmund Burke School.

Lines served

Red

Bus Facilities

The station offers connections to 4 bus lines at 4 boarding locations within 1 block of the station exit. All bus facilities are curbside stops.

Emergency Shuttle Location

The emergency shuttle is located at bus boarding locations directly outside of station entrances A and B.

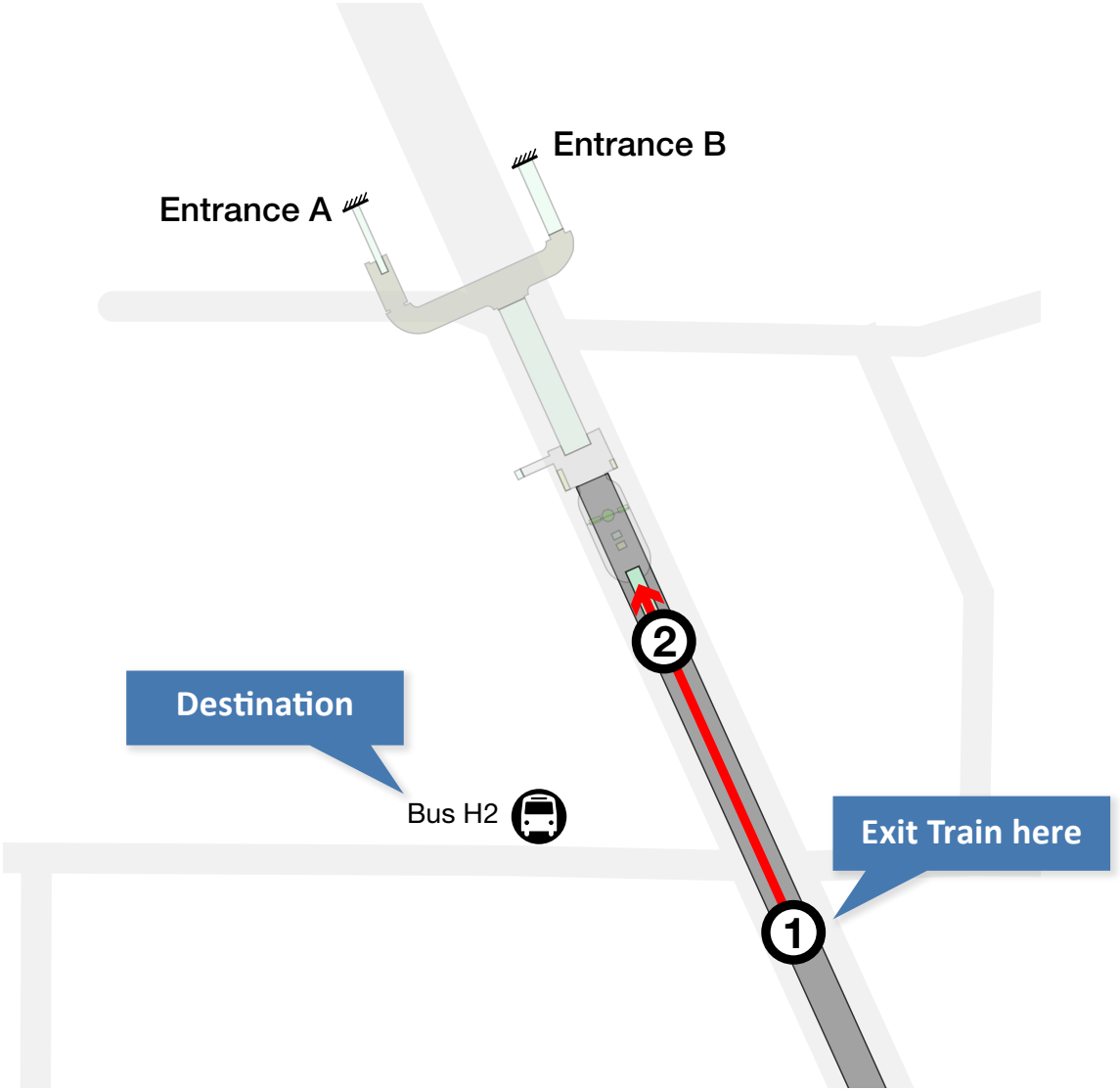
Example Passenger Journey

Passenger exits the train at the middle of the platform and looks for the H2 bus route.

1. **Exit train and reorient**
   Follow directional signs on the platform to the exit to street level.

2. **Take escalator to the mezzanine Level**

Platform



Mezzanine

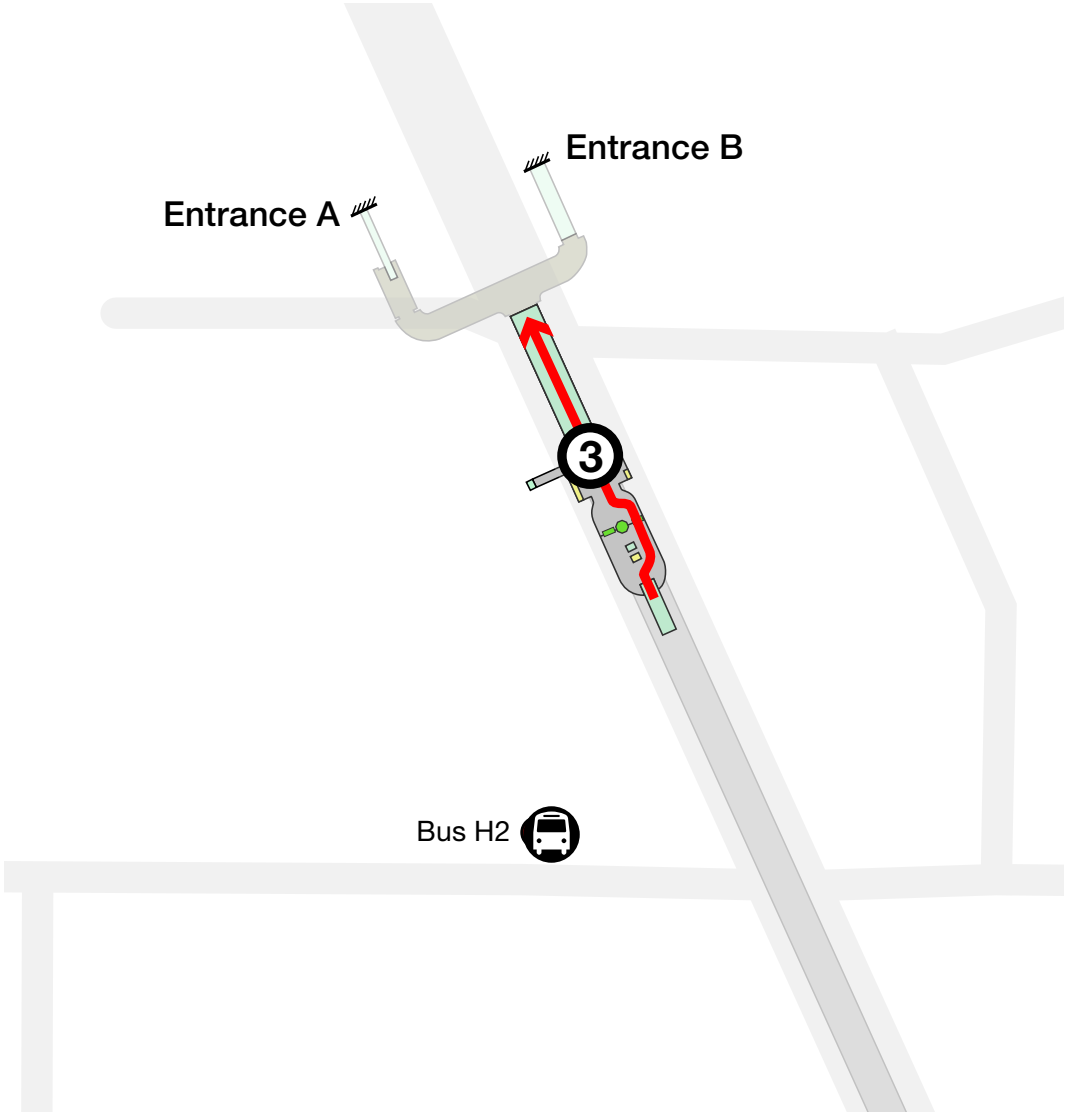
③ **Check the neighborhood bus map and find the correct bus stop location**
Follow directional signs and take the escalator to the exit corridor.

Example: NYC MTA Fulton Center

Potential sign type:
Digital screen at mezzanine showing real-time next bus schedule.

Conceptual Rendering

Potential sign type:
Static backlit Exit directional sign.

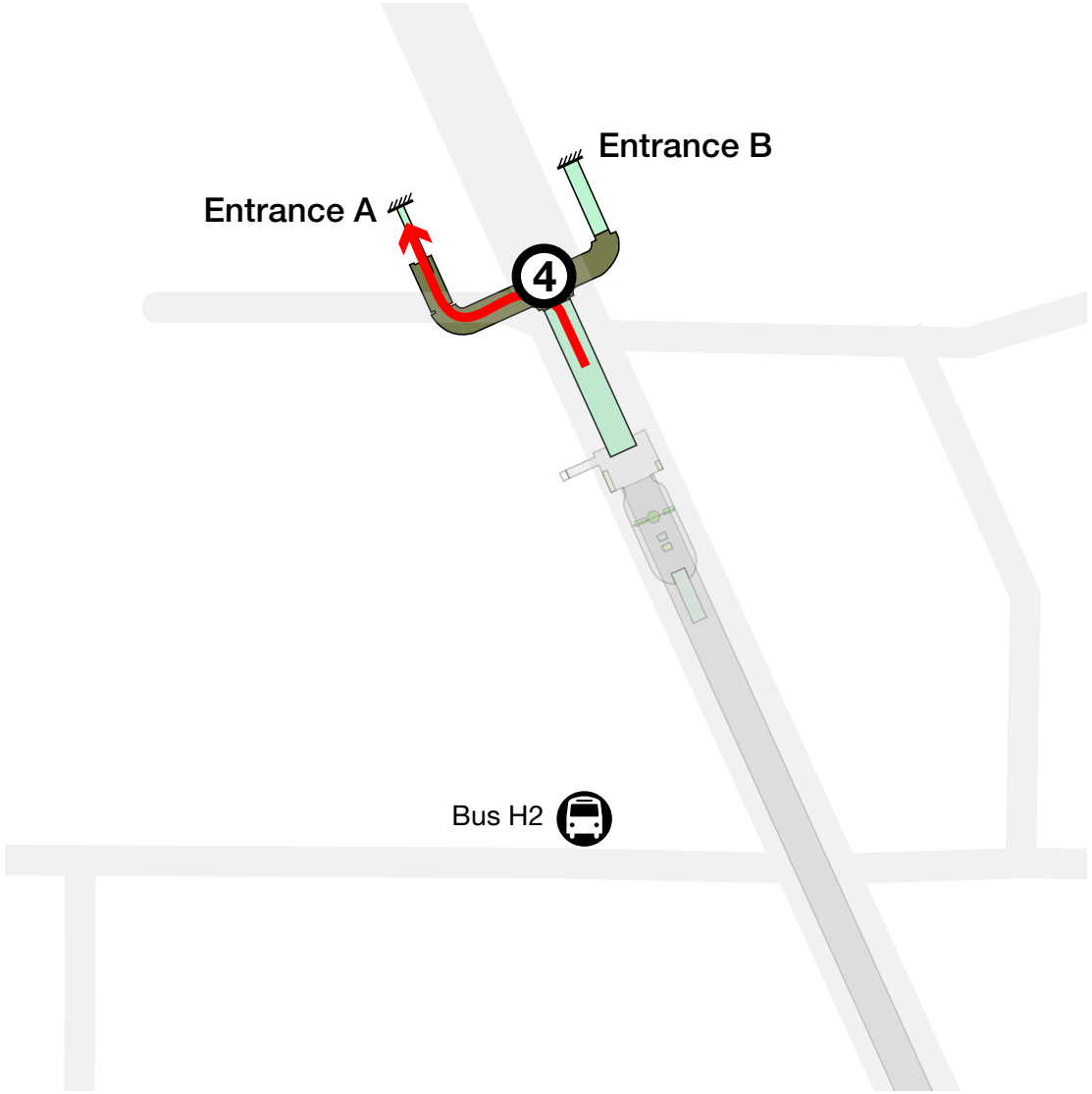


Mezzanine

④ Check the directional sign and find the correct exit

Take the escalator to street level.

Example: Existing directional sign



Street Level

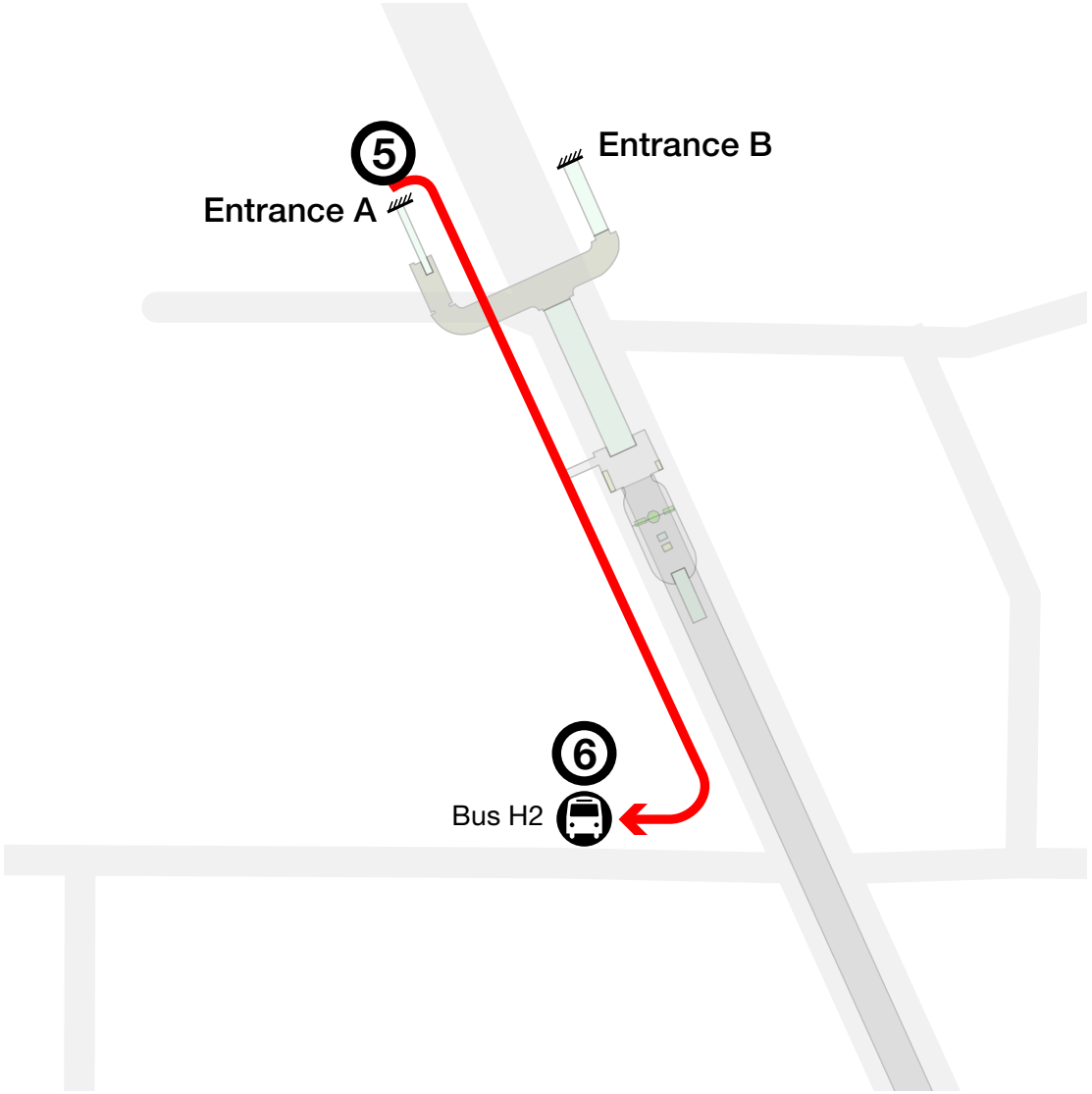
⑤ **Check street directional sign**
pointing to the correct bus stop

Conceptual Rendering

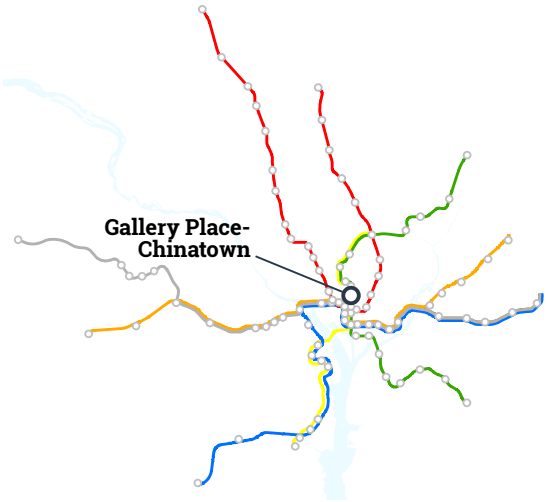
Potential sign type:
Street directionals sign.

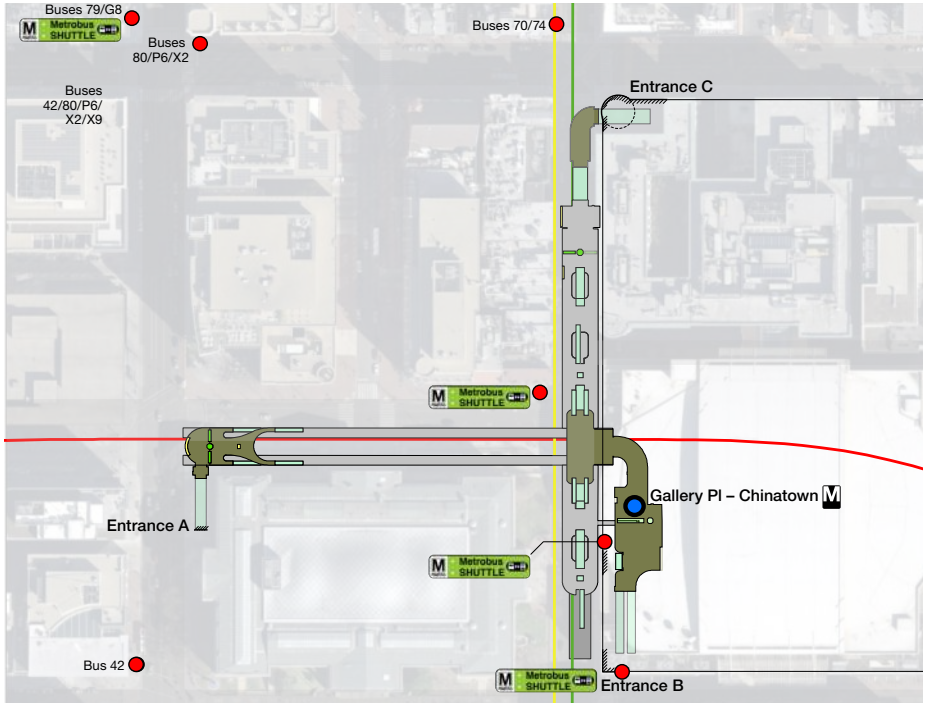
⑥ Check the bus stop ID to confirm arrival

Potential sign type:
Digital information kiosks with real-time bus information.



Curbside Complex Station
Gallery Pl – Chinatown





Station information

In the heart of Chinatown, this station is a major transfer hub, providing access to the Capital One Arena, the National Galleries, and other area dining, retail, and cultural attractions.

Major Lines served

Red, Green, Yellow

Bus Facilities

The station offers connections to 9 bus lines at 13 boarding locations within 2 blocks of the station exits. All bus facilities are curbside stops.

Emergency Shuttle Location

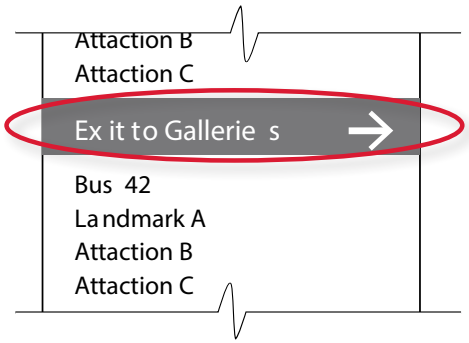
The emergency shuttle is located at four different boarding locations along the H St NW and 7th St NW to provide the shuttle service to four directions.

Example Passenger Journey

Passenger takes the Green line arrives at Gallery Pl – Chinatown station, exits the train at the lower level platform and transfers to the southbound bus route 42.

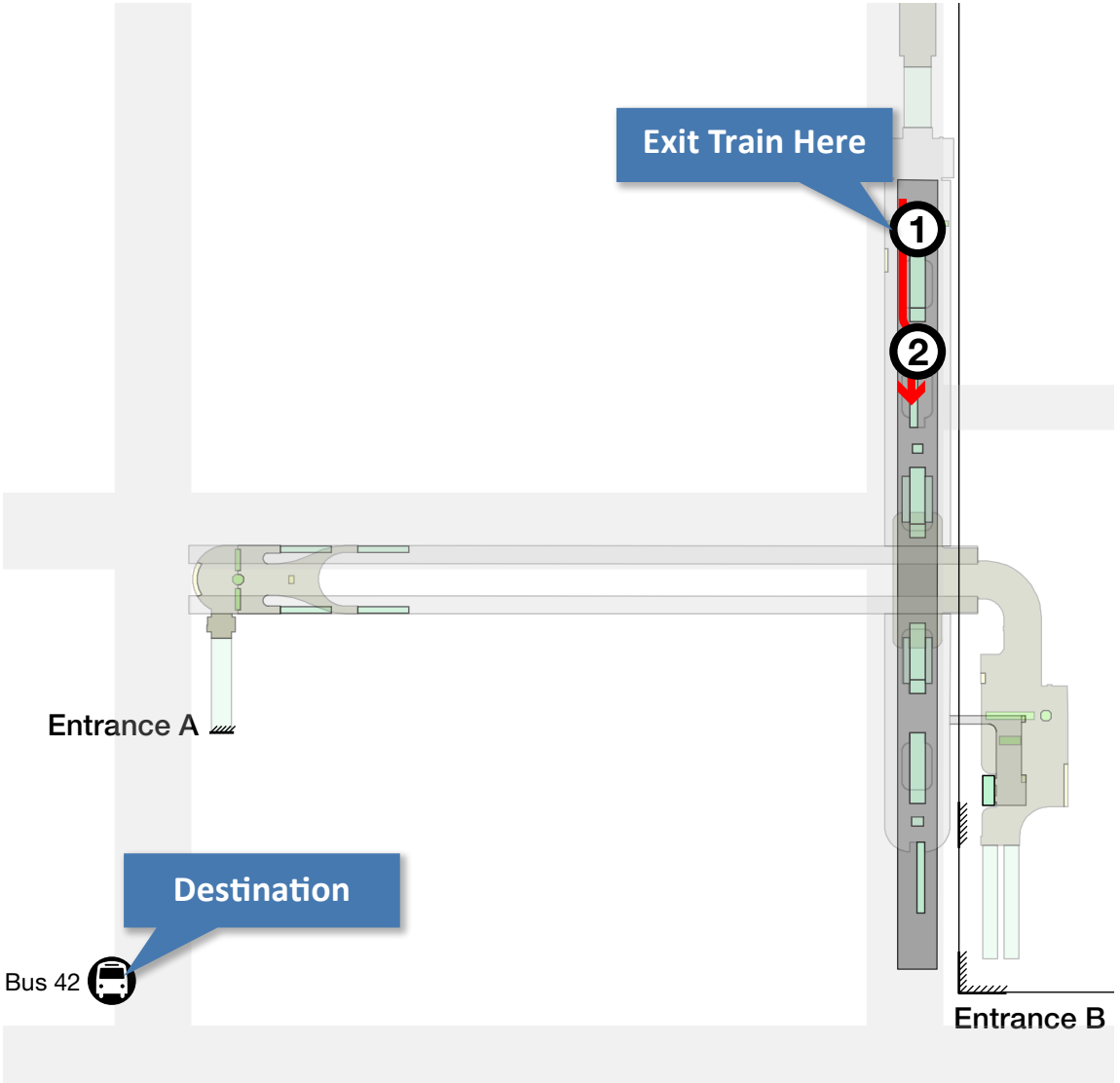
① **Exit train and reorient**
Use exit and bus connection information sign to identify the correct exit. Local landmarks or attractions could also be shown on the same sign panel.

② **Follow the directional sign at the platform to the correct exit**



Potential sign type:
Directional sign with bus information, along with local landmarks.

Lower Level Platform

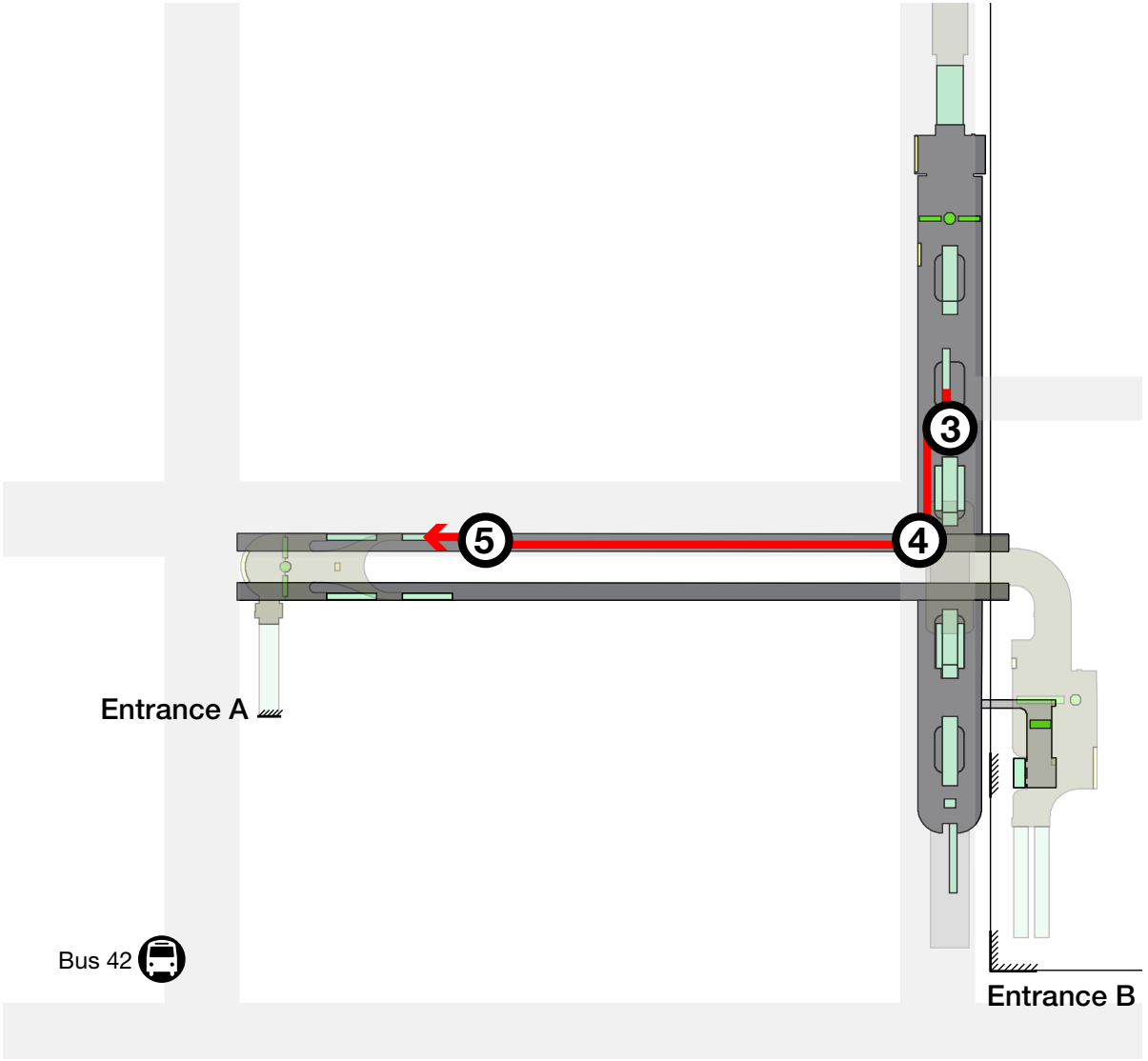


Upper Level Platform

At each decision point, continue to follow directional signs on the platform and mezzanine levels to the correct exit.

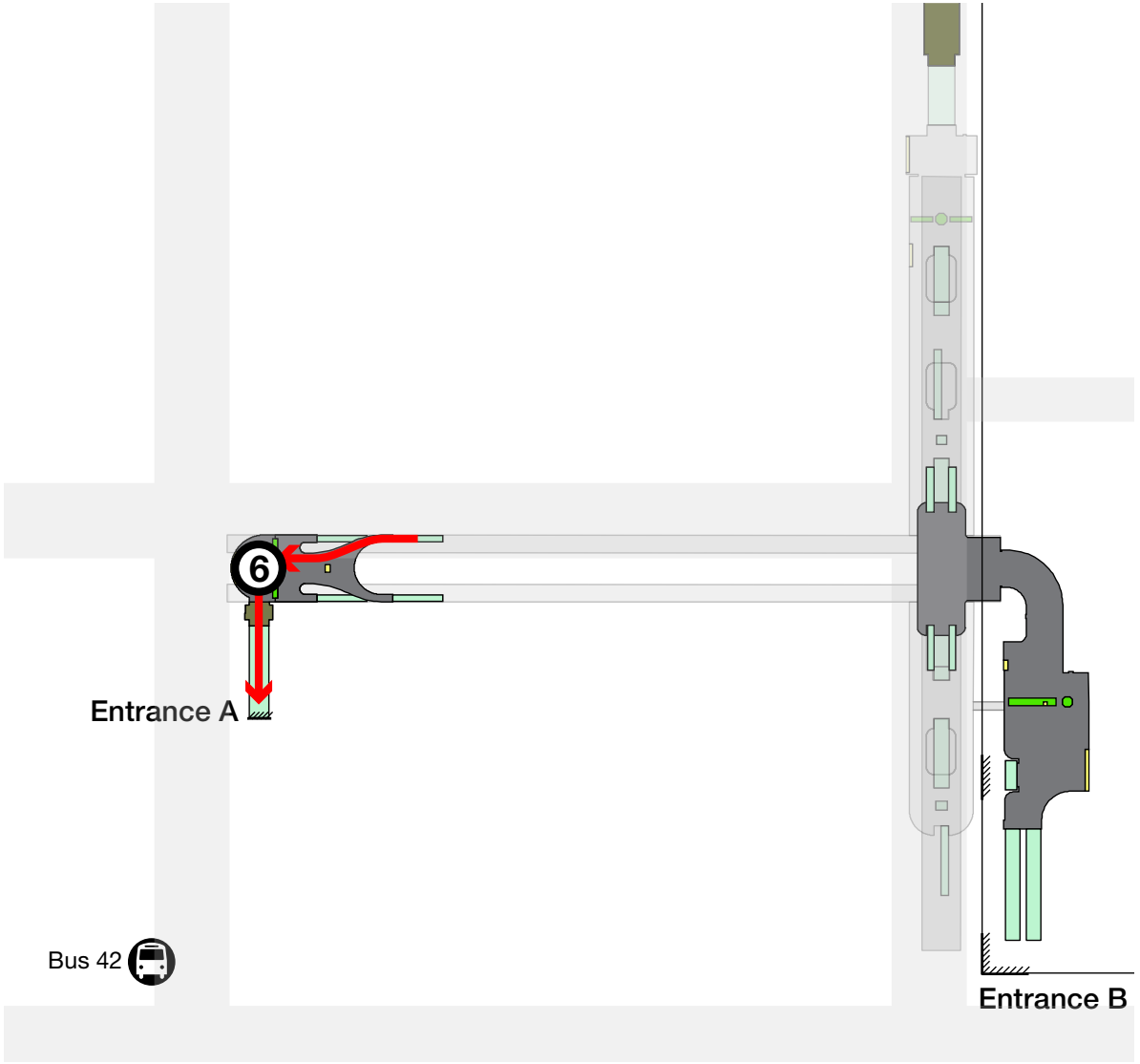
3. **Check directional sign at top of escalator from platform**
4. **Confirm direction towards exit**
5. **Confirm direction at escalator**

Existing station directional signs pointing towards exits.



Mezzanine

⑥ **Check the neighborhood bus map and find the correct bus stop location.**
Check the exit directional sign to confirm the correct exit.

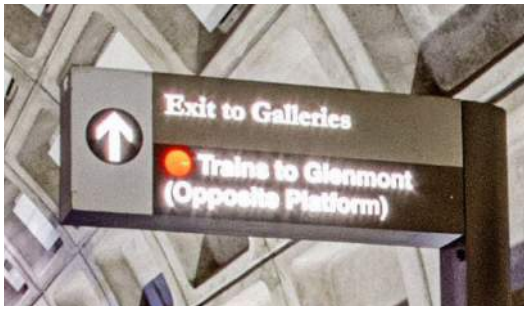


Potential sign type:
High resolution digital screen at mezzanine showing real-time next bus schedule.
Refer to the Van Ness-UDC Station case study for signage example.

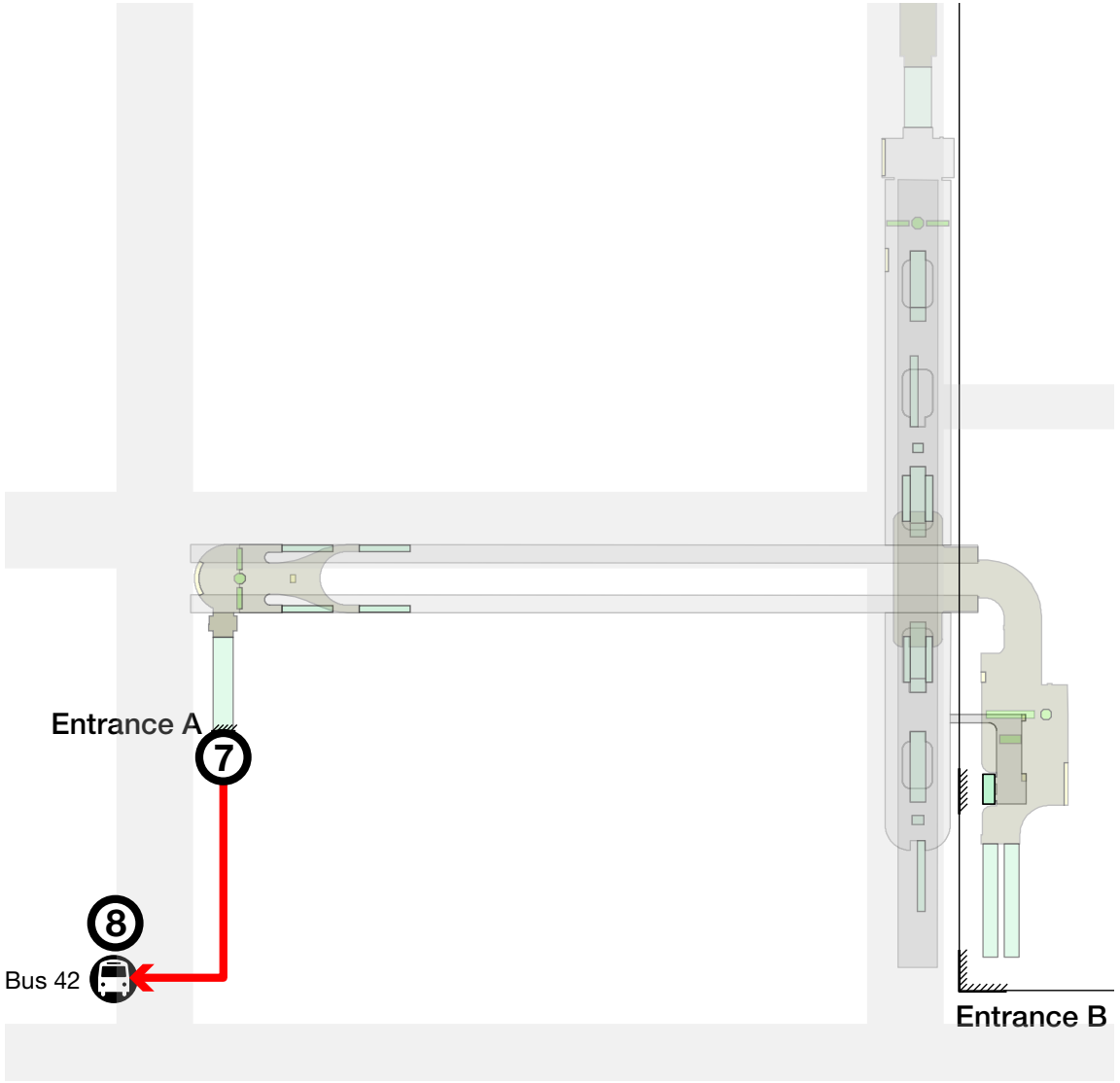
Street Level

⑦ **Check street directional sign** pointing to the closest bus stop to identify the best path.

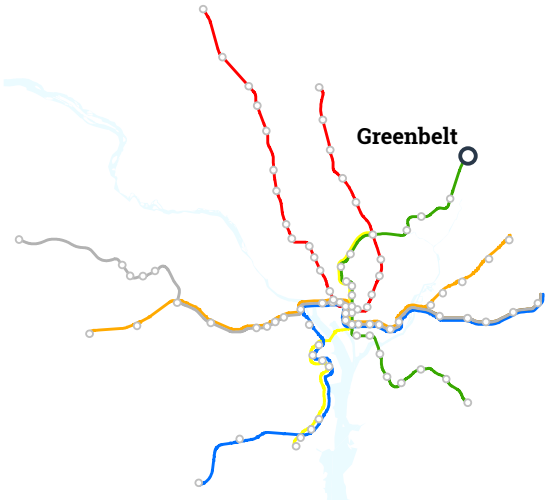
⑧ **Check the bus stop ID to confirm arrival**

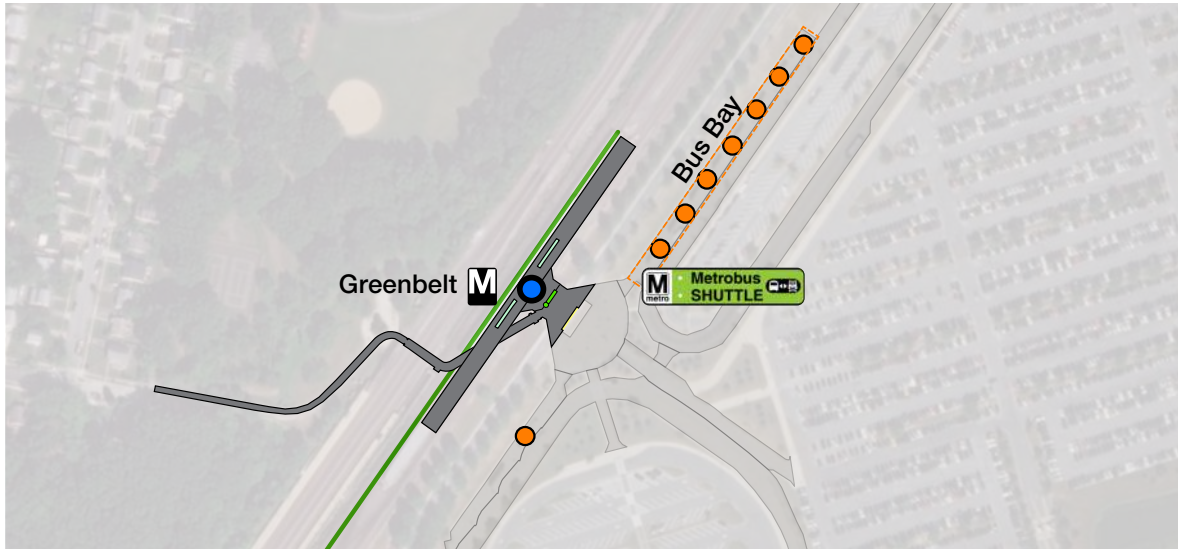


Potential sign type:
Digital information kiosks with real-time bus schedule.



Facility Simple Station
Greenbelt





Station information

Metrobus Route B30 to Baltimore-Washington Thurgood Marshall Airport connects to this station. The service is available Monday through Friday only with no weekend service. The station offers commuters direct access from I-95, and connects customers to MARC Commuter Rail (Camden Line), the bus, and the University of Maryland shuttle.

Major Lines served

Green

Bus Facilities

The station includes one major facility near the northern Kiss & Ride lot with seven bus bays (labeled A through G on the station bus boarding map). Additionally, there is one stop (labeled H) located off of the southern Kiss & Ride lot.

Emergency Shuttle Location

The emergency shuttle stop is located at bay G.

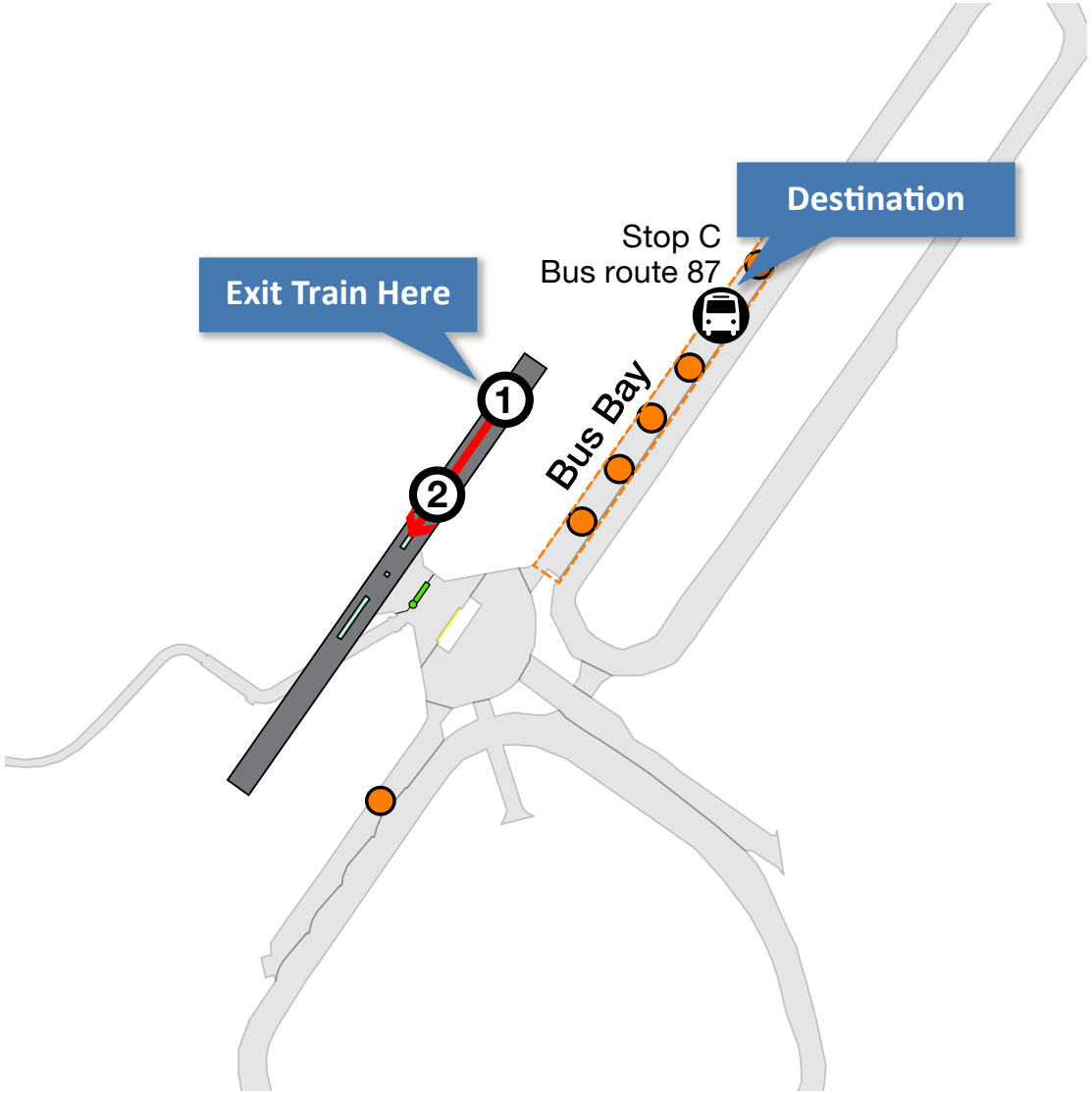
Example Passenger Journey

Passenger takes the Green Line, arrives at the Greenbelt Station and transfers to the 87 express bus.

① **Exit train and reorient**
Follow directional signs on the platform to street level.

② **Take escalator to the Street Level**

Platform

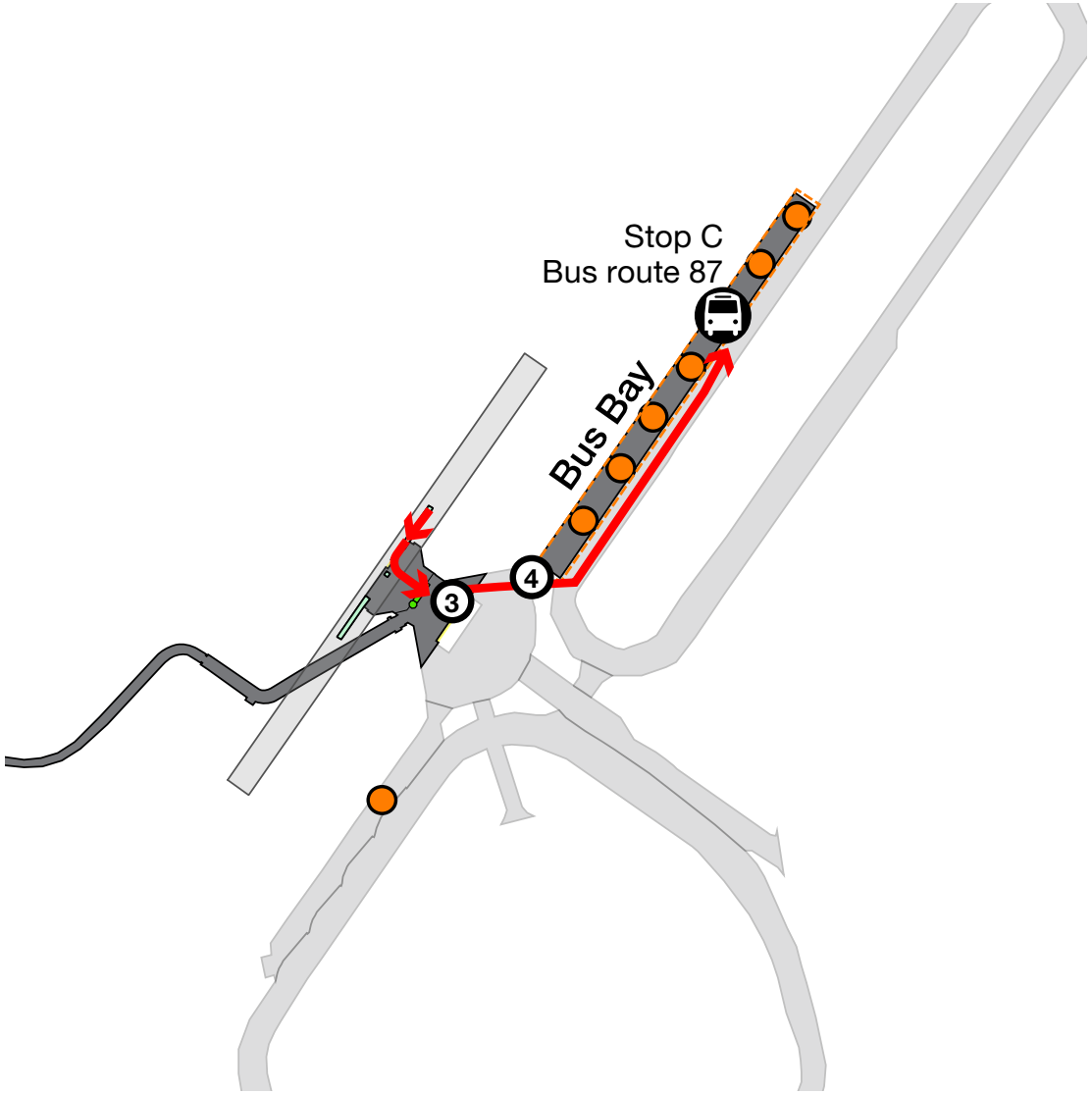


Street Level

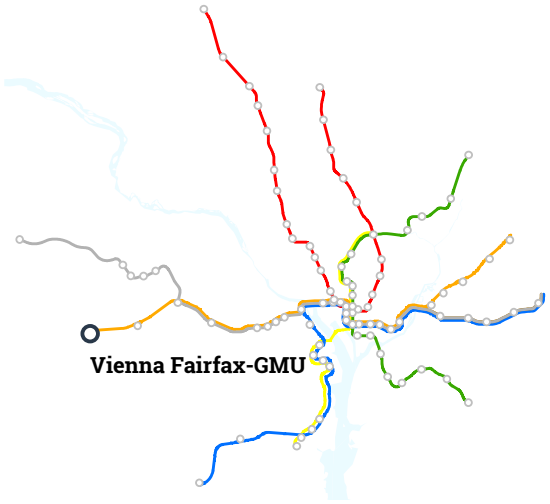
③ **Exit station**
Follow directional signs on the platform to street level.

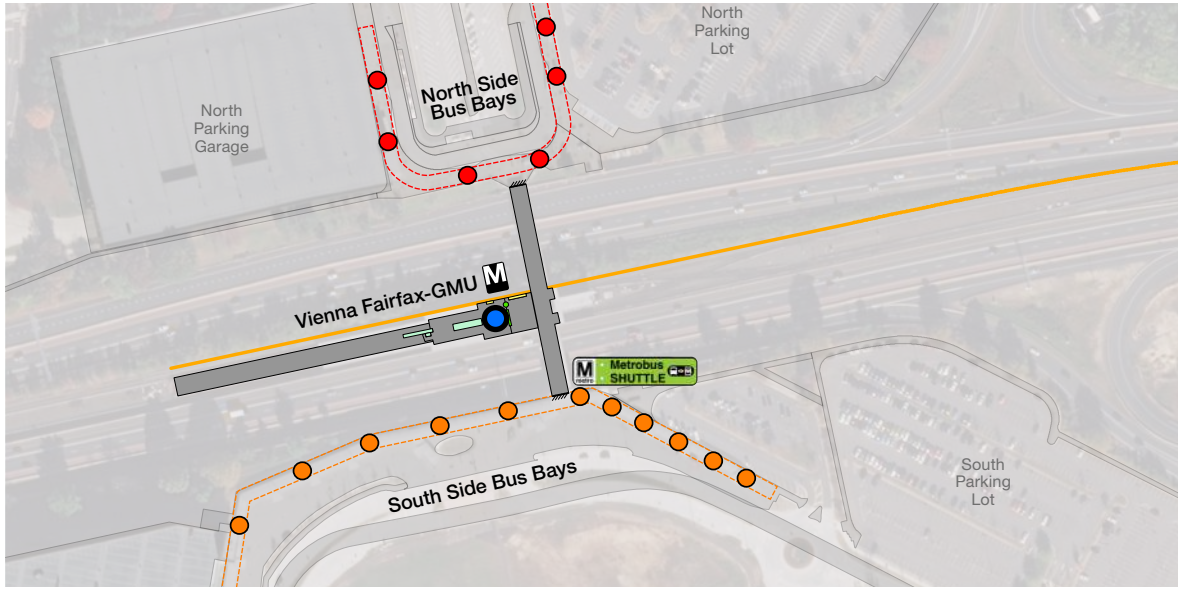
Photo from Chicago-L.org

④ **Check bus bay info kiosk and bus stop ID to find the right bus stop**



Facility Complex Station
Vienna Fairfax GMU





Station information

Located in Oakton, Virginia, Vienna/ Fairfax-GMU is the final stop on the Orange Line. The station allows commuters an intermodal connection to I-66 as well as travel connections to events at Wolf Trap and George Mason's Patriot Center.

Lines served

Orange

Bus Facilities

The station includes two bus bays to the north and south of the station. Buses access the north side via Virginia Center Boulevard, and the location includes six bus bays, labeled A through F on the station bus boarding map. Buses access the south side bus bay via Saintsbury Drive includes twelve bus bays (G through T).

Emergency Shuttle Location

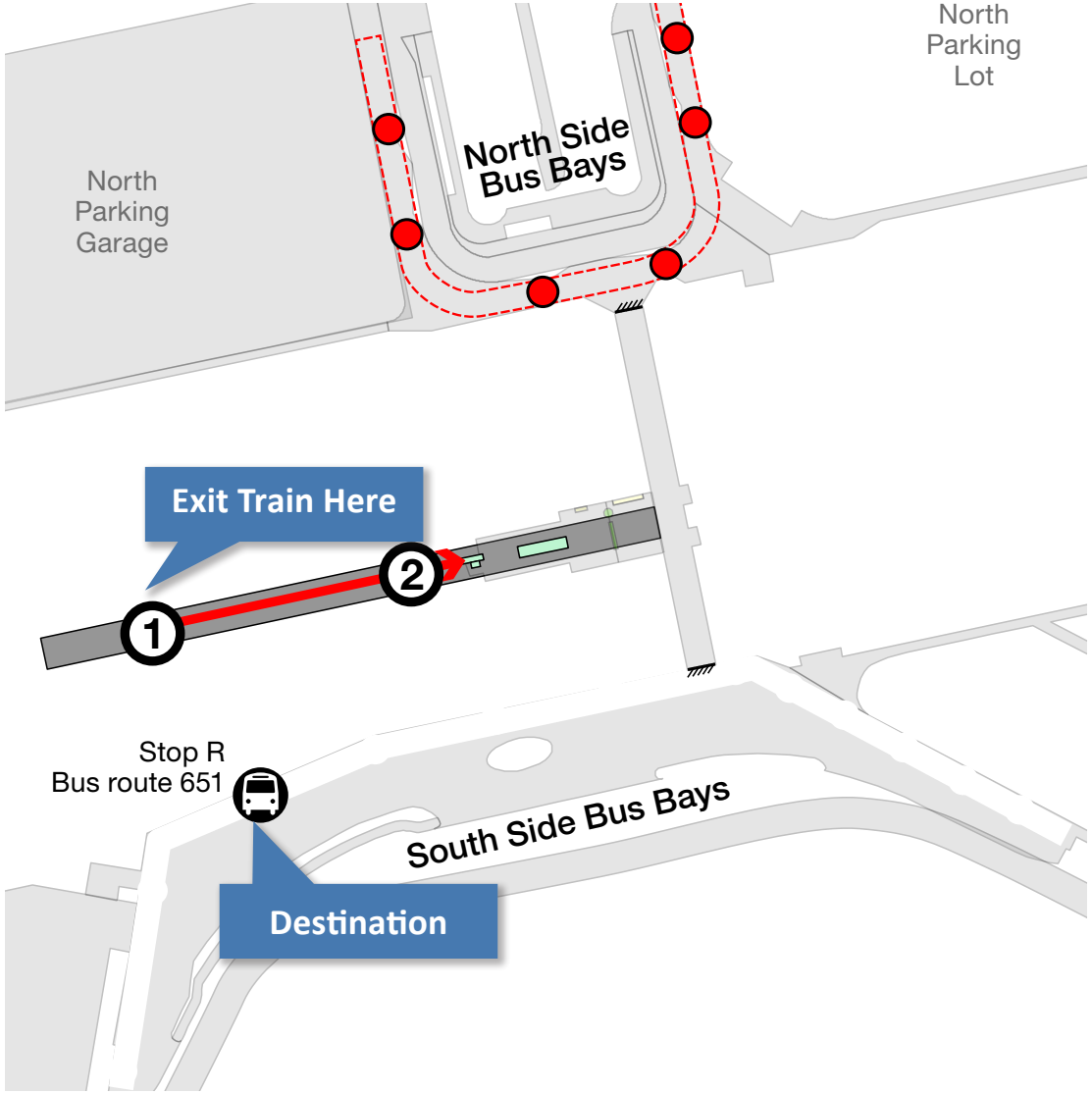
The emergency shuttle stop is located at bay M.

Example Passenger Journey

Passenger takes the Orange Line and arrives at the Vienna/Fairfax-GMU Station, exits train at the end of platform and transfers to the 651 bus.

① **Exit train and reorient**
Follow directional signs on the platform to the mezzanine level.

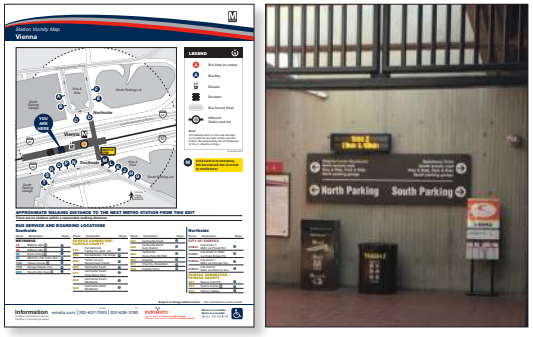
② **Take escalator to the mezzanine Level**



Street Level

③ **Check station bus map and find the correct bus bay**

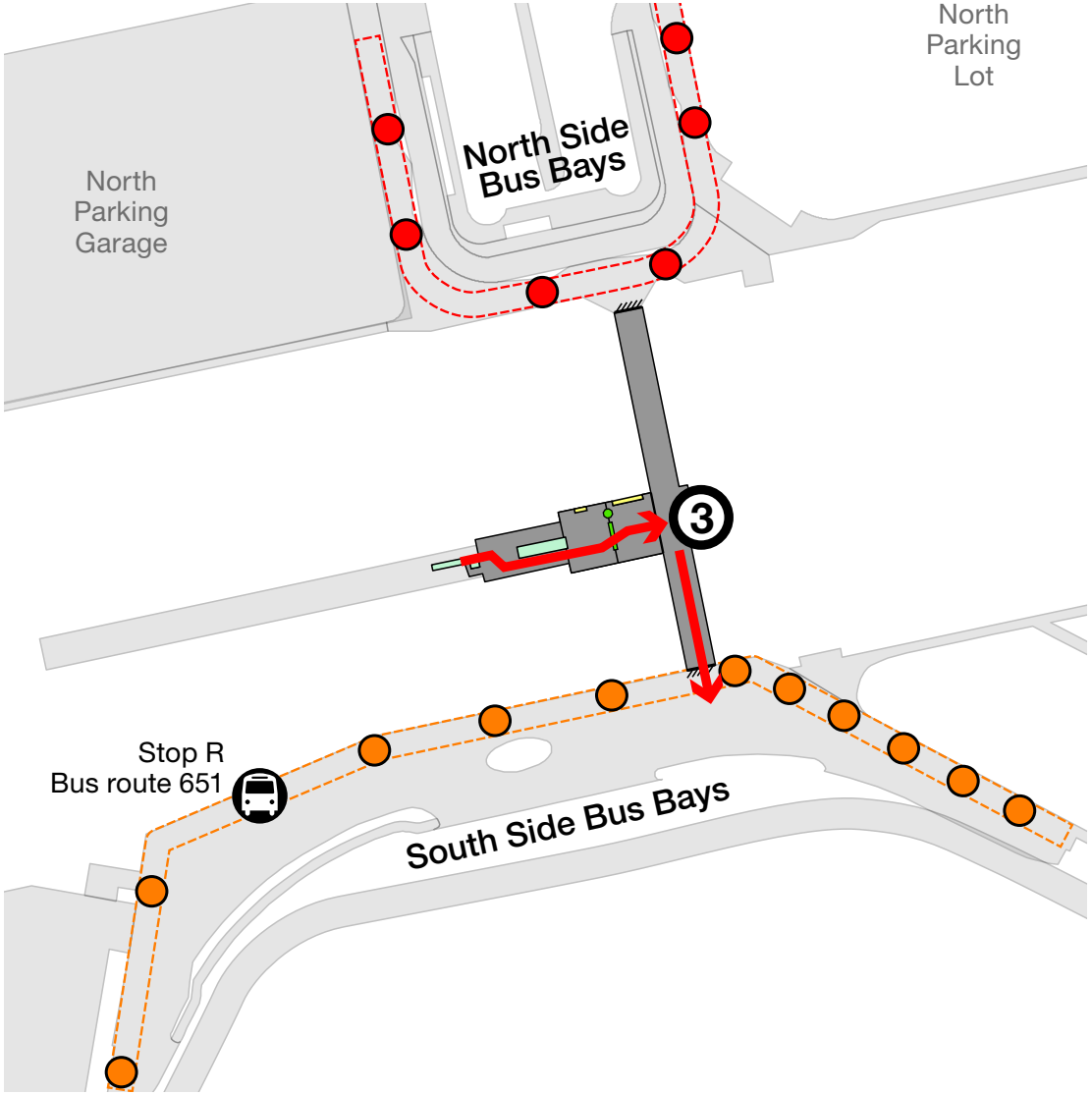
Follow directional signs to the correct station exit.



Existing station bus map and directional sign.

Example: NYC MTA 163 Street Station mezzanine

Potential sign type:
Digital screen at corridor showing station bus map and real-time next bus schedule, consolidated with static directional sign at the top

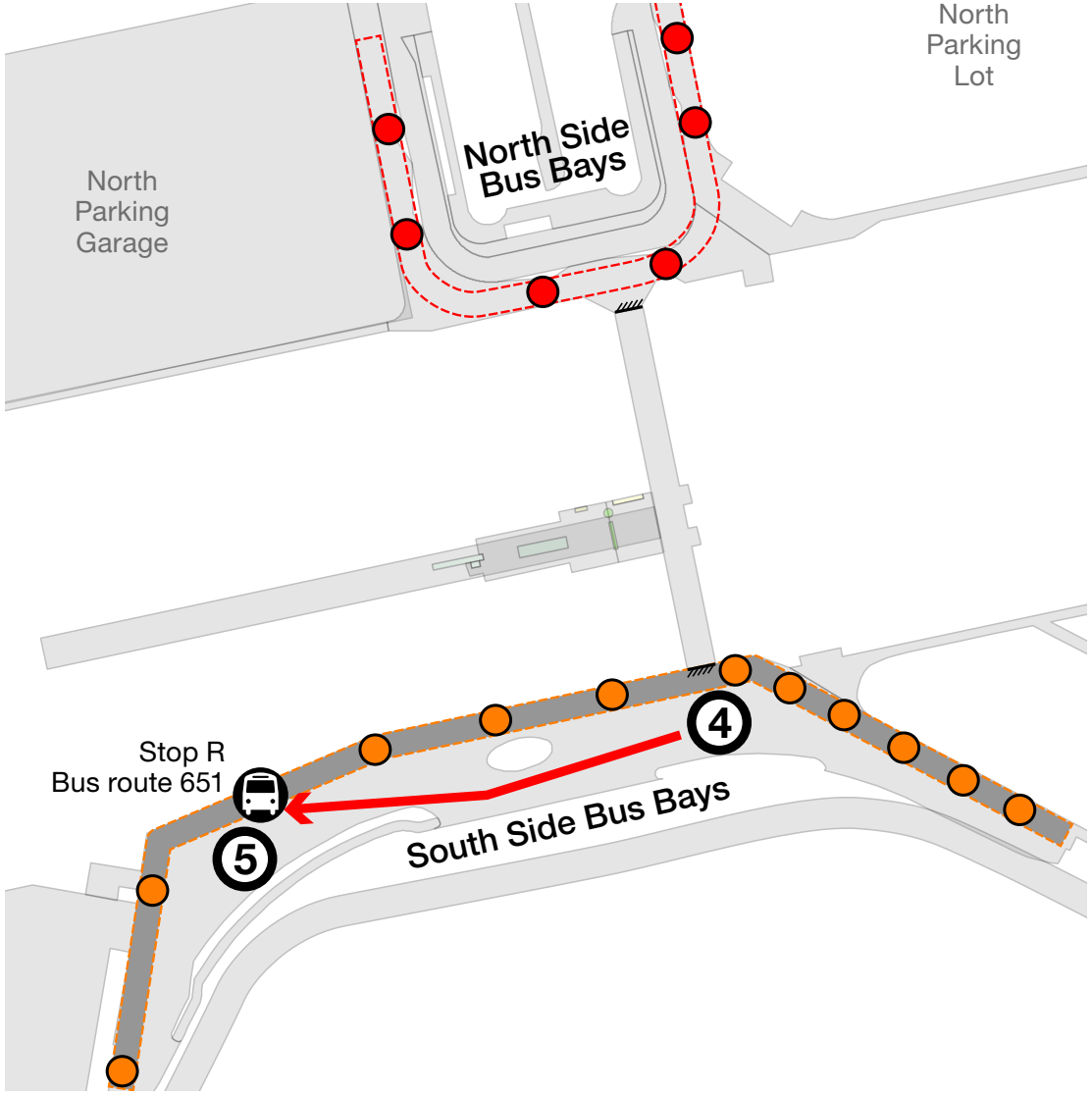


South Side Bus Bay

④ **Check the directional sign and the Bus Stop ID** to find the correct bus stop.

Example: existing sign from other stations.

Potential sign type:
High resolution digital screen at bus stop showing real-time next bus schedule. Refer to the Van Ness-UDC Station case study for signage example.



Notes

1. WMATA Services: Bus. https://www.wmata.com/service/bus/. Accessed May 2019.

2. Sourced from ridership data provided by WMATA.

3. Sourced from Luminator Type C Sign Design Specifications, Electronic Directory. Sent by WMATA, April 3, 2019.

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Page 4: "Metrobus with "GO CAPS" during the Stanley Cup finals" by Beyond DC, licensed under CC BY-NC 2.0. https://www.flickr.com/photos/beyonddc/42839191014/.

Page 9: WMATA. https://www.wmata.com/initiatives/plans/king-street-bus-loop-8-11-16.cfm.

Pages 22 and 46: Metropolitan Transportation Authority. http://web.mta.info/nyct/service/2ndAve_Q/images/Neighborhood%20map_72%20St.jpg.

Pages 23, 55 and 77: "LCD LCD Digital Bus Stop Totem." Metrospec. https://www.digitalsignagetoday.com/companies/showcases/metrospec/products/lcd-digital-bus-stop-totem/.

Pages 48 and 77: Connectpoint. "SMART Makes Biggest Digital Investment Along Main Corridors." https://www.connectpointdigital.com/press-release/2019/01-07-SMART-digital-bus-stops.html.

Pages 49 and 77: "A Better Bus Stop Sign for Rochester." April 25, 2011. http://www.rochestersubway.com/topics/2011/04/a-better-bus-stop-sign-for-rochester/.

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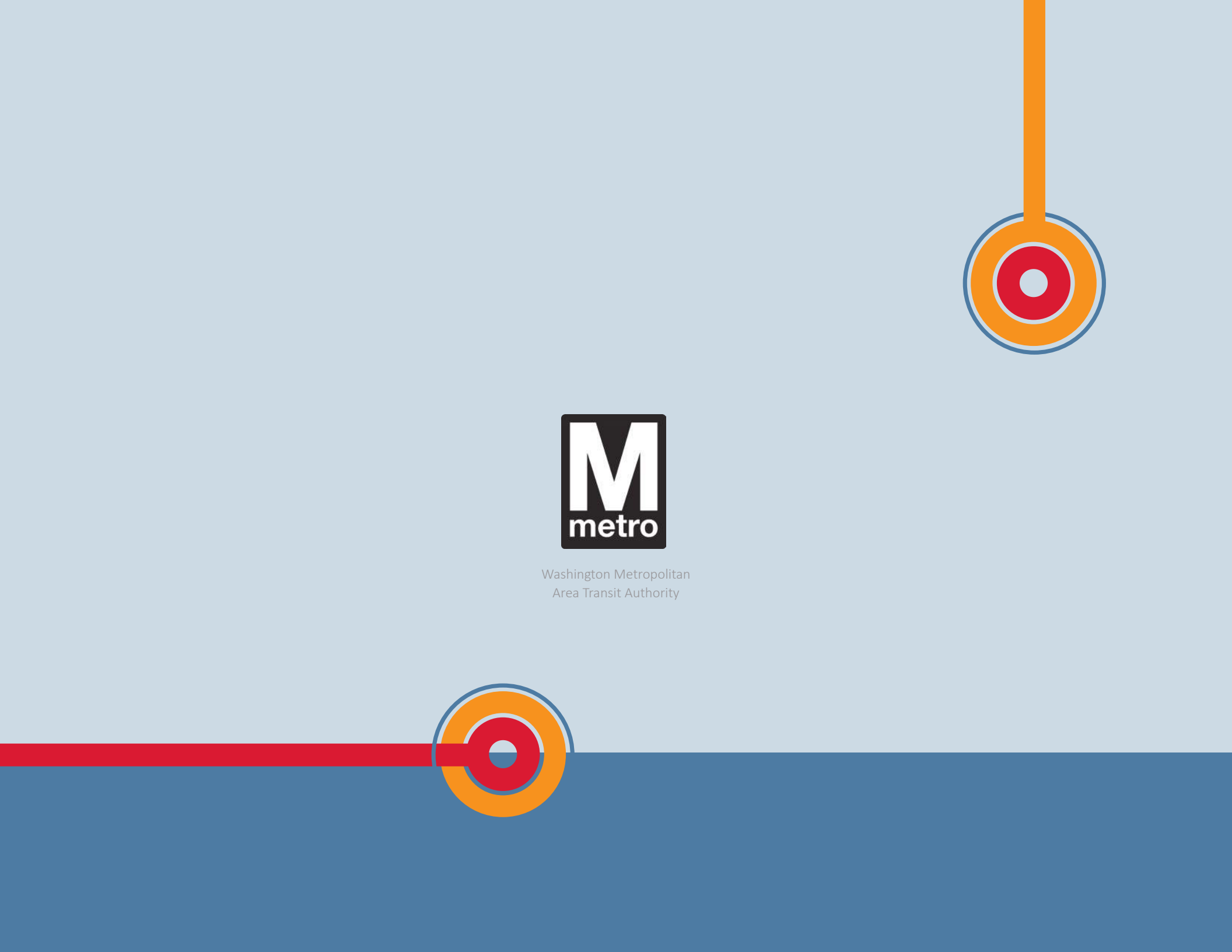

Washington Metropolitan
Area Transit Authority