Appendix B1

DDOT Scoping Form

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

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for

GSA

October 2015

Project Name & Applicant Team: FBI Headquarters Site Evaluation: J. Edgar Hoover Building Parcel Redevelopment Scenarios – General Services Administration (GSA)

Case Type & No. (PUD, LTR, etc.)

Street Address: 935 Pennsylvania Avenue NW

Current Zoning and/or Overlay District: Proposed D6-B1, Current DD/C4

Date of Filing:

Estimated Date of Hearing:

Description of Project: The General Services Administration (GSA), in coordination with the Federal Bureau of Investigation (FBI), is seeking a new site for consolidation of the FBI Headquarters and leased offices within the National Capital Region. Once a new site is selected, the winning developer will build the FBI a new facility and in exchange will be awarded the J Edgar Hoover (JEH) parcel for redevelopment. As required by NEPA, GSA is preparing an environmental impact statement (EIS) for the FBI Headquarters Consolidation, which will include an evaluation of the indirect impacts of exchanging the JEH building. Included in the EIS will be a traffic impact analysis that will evaluate the indirect transportation impacts of the JEH exchange. Indirect impacts will be based on reasonable foreseeable development scenarios (RFDS), which are not representative of any developer's proposals. A RFDS is basically a "what-if" development scenario for future private redevelopment. It is GSA's estimate of what could be reasonably developed by a private developer on the parcel in the foreseeable future. The RFDS provides a tool for GSA to use in the analysis of potential indirect impacts that may occur from the proposed action. Indirect impacts are defined by NEPA regulations as:

impacts that are "caused by the action and are later in time… but are still reasonably foreseeable" (40 C.F.R. §1508.8)

Indirect impacts include the environmental impacts that may occur from changes in land use or population density as a result of the proposed action. The development scenarios are a tool that GSA will use to project a conservative estimate of the transportation impacts from the development of the JEH parcel, for inclusion in the Environmental Impact Statement.

1. Strategic Planning Elements (Planning Documents)	DDOT Comments/Action Items
Planning Guidelines: The CTR will address how the proposed development considers the primary city-wide planning documents, as well as localized studies. See Section 3.1 of the CTR guidelines for more information. **Proposed Documents:** Pennsylvania Avenue Plan, National Capital Planning Commission Comprehensive and Framework Plans, Old Post Office Redevelopment Transportation Study, and District of Columbia zoning regulations. There are no other GSA projects planned within the Pennsylvania Avenue corridor other than the Old Post Office Redevelopment, which has already completed DDOT review.	

2. Roadway Network, Capacity & Operations	DDOT Comments/Action Items

Vehicle Trip Generation Assumptions

Guidelines: Provide *preliminary* site-generated vehicle trips and mode split assumptions. In addition, provide the assumptions and supporting documentation behind the proposed mode split. See Section 3.2.1 of the CTR guidelines for further information.

The trip generation will be based on new trips generated by nearby developments (background trips) and the proposed JEH parcel redevelopment scenarios. It will also reflect the removal of the existing FBI trips from the existing JEH Building. The study will follow the assumptions provided by other traffic studies to determine the background trips generated by the nearby planned developments. The existing FBI trips will be determined by using inbound JEH Building turnstile counts obtained from the FBI covering three days (11/12/2013 - Tuesday, 12/4/2013 - Wednesday, and 1/9/2014 - Thursday). The outbound flows will be calculated using the Institute of Transportation (ITE) Engineers *Trip Generation Manual* Corporate Headquarters Land Use entering/exiting percentages (AM – 93 percent entering/7 percent exiting and PM – 11 percent entering/89 percent exiting) based on the peak AM hour between 6:30AM – 10:00AM and peak PM hour between 3:30PM – 7:00 PM).

The two redevelopment scenarios will include a combination of residential and office land uses along with ground floor retail. The generated trips will be based on the ITE *Trip Generation Manual* General Office, Shopping Center and Apartment Land Uses. The details of the FBI trips removed and redevelopment scenario generated trips are listed below. The first scenario provides a conservative estimate for office use and the second scenario a conservative estimate for residential use. Both redevelopment scenarios would include office and residential uses, plus ground floor retail.

Governmental HQ Office (JEH): Existing FBI person trips to be removed from the study area

Source	Independent Variable	Time Period	IN	OUT	TOTAL
FBI Turnstile Counts	2,800,000 square feet	**AM Peak**	1,320	99	1,419
		PM Peak	145	1,173	1,318

Redevelopment Scenario # 1: Proposed new person trips added to the study area

General Office: ITE Code #710	1,267,600 square feet	**AM Peak**	1,284	175	1,459
		PM Peak	255	1,243	1,498
Apartment: ITE Code #220	672 units	**AM Peak**	67	266	333
		PM Peak	252	136	388
Shopping Center ITE Code #820	161,800 square feet	**AM Peak**	130	79	209
		PM Peak	405	422	827
TOTAL		**AM Peak**	1,481	520	
		PM Peak	912	1,801	

Redevelopment Scenario # 2: Proposed new person trips added to the study area

General Office: ITE Code #710	451,000 square feet	**AM Peak**	562	77	639
		PM Peak	99	485	583
Apartment: ITE Code #220	1,000 units	**AM Peak**	99	395	494
		PM Peak	369	199	568
Shopping Center ITE Code #820	131,500 square feet	**AM Peak**	114	70	184
		PM Peak	353	367	720
TOTAL		**AM Peak**	775	542	
		PM Peak	821	1,051	

Proposed preliminary mode split and supporting documentation: The FBI mode split is based on the current number of FBI employee vanpools and carpools, as well as the number of employees signed up for the transit subsidy. The future office and residential were calculated based on referencing the following sources:

- 2005 WMATA Development Survey
- 2010 State of the Commute Report
- 2013 State of the Commute Report
- 2010 American Community Survey (Census at Tract Level)
- Recent Local Development Traffic Impact Study (TIS) Reports in DC (The Wharf Phase I (2012) and Heritage Foundation (2013))
    - Heritage Foundation TIS included a mode split survey of the Heritage Foundation and 236 Massachusetts Ave NW employees
- 2020 MWCOG Travel Demand Model
- District of Columbia Zoning Regulations
- U.S. Bureau of Labor Statistics
- 2013 1st Quarter Report by Commercial Real Estate Brokerage Association of Greater Washington, DC

The 2020 MWCOG Travel Demand Model mode split projections and 2005 WMATA Development Survey was used as a starting point and adjusted based on the projected future off-street parking supply and other sources.

Mode Share	FBI	Future Office	Future Residential/Retail
Vehicle	13.5%	17%	10%
Carpool	8.5%	11%	11%
Bicycle	2%	3%	8%
Walk	1%	2%	12%
Transit	75%	67%	59%

The modal split integrated with person trips are shown below:

FBI Governmental HQ Office (JEH): Existing FBI person trips to be removed from the study area

	AM IN	AM OUT	PM IN	PM OUT
Vehicle	178	13	20	158
Carpool	112	9	12	100
Bicycle	27	2	3	23
Walk	13	1	1	12
Transit	990	74	109	880
TOTAL	**1,320**	**99**	**145**	**1,173**

Redevelopment Scenario # 1: Proposed new person trips added to the study area (Emphases on office use)

Travel Mode	**AM IN**	**AM OUT**	**PM IN**	**PM OUT**
Vehicle	238	64	109	267
Carpool	163	57	100	198
Bicycle	54	33	60	82
Walk	49	45	84	92
Transit	977	321	558	1,162
TOTAL	**1,481**	**520**	**912**	**1,801**

Redevelopment Scenario # 2: Proposed new person trips added to the study area (Emphases on residential use)

Travel Mode	**AM IN**	**AM OUT**	**PM IN**	**PM OUT**
Vehicle	117	60	89	139
Carpool	85	60	90	116
Bicycle	34	39	61	60
Walk	37	57	89	78
Transit	502	326	492	658
TOTAL	**775**	**542**	**821**	**1,051**

Vehicle Site Access

Guidelines: If vehicle access is needed, at a minimum the CTR will provide locations of access point(s) and desired access controls (full, right-in/right-out, etc.). See Section 3.2.2 of the CTR guidelines for any further requirements.

Access Location(s): Along 10th Street NW between Pennsylvania Avenue and E Street NW. There might also be access at the 9th and D Streets NW intersection during off-peak hours. **Access Control:** Full access at the locations described above **Existing Curb cuts utilized:** 10th Street access to the underground garage **Existing curb cuts abandoned:** Two E Street NW underground garage access points and the 9th Street Mid-block underground garage access **Proposed curb cuts:** New driveway at 9th and D Streets NW **Curb cut width and radii:** N/A	
CTR Triggers for further vehicle analysis (for sections below) **Guidelines:** See Section 3.2.3 of the CTR guidelines to determine if a more comprehensive vehicle analysis is required. If so, completion of the remainder of the *Roadway Network, Capacity & Operation* section of the scoping form is required.	
Development Scenarios **Guidelines:** See Section 3.2.4 of the CTR guidelines for discussion of the required development scenarios. **Proposed Development Scenario:** The study will evaluate the existing, future conditions without exchange, and indirect impacts of future conditions with exchange using redevelopment scenarios. The future horizon year is 2025.	
Vehicle Study Area **Guidelines:** See Section 3.2.5 of the CTR guidelines for discussion of the study area. **Proposed Study Area intersections, including access points (attach Figure at end of Scoping Form as needed):** 4th Street NW to the east, 14th Street NW to the west, H Street NW to the north, Constitution Avenue to the south – see Figure 1.	
Data Collection and Hours of Analysis **Guidelines:** See Section 3.2.6 of the CTR guidelines for discussion of the required data collection and hours of analysis. **Proposed turning movement count intersections:** **Constitution Avenue @** 14th Street NW, 12thStreet NW, 10th Street NW, 9thStreet NW, 7th Street NW, and 6th Street NW (6 intersections) **Pennsylvania Avenue @** 14th Street NW, 13th Street NW, 12th Street NW, 11th Street NW, 10th Street NW, 9th Street NW, 7th Street NW, 6th Street NW, Constitution Avenue WB, 4th Street NW, Constitution Avenue EB (11	

intersections) **D Street NW @** 9th Street NW and 7th Street NW (2 intersections) **E Street NW @** 12th Street NW, 11th Street NW, 10th Street NW, 9th Street NW, 8th Street NW, and 7th Street NW (6 intersections) **F Street NW @** 10th Street NW and 9th Street NW (2 intersections) **G Street NW@** 10th Street NW and 9th Street NW (2 intersections) **H Street NW @** 10th Street NW and 9th Street NW (2 intersections) Project will use the Old Post Office Redevelopment traffic counts obtained on Thursday, April 26, 2012, (five intersections) plus the counts DDOT obtained July, 2013, at the H Street intersections as part of the Alternatives Analysis for Premium Transit from Union Station to Georgetown (2 intersections). The remaining 24 intersections will be counted this Spring. All counts will include vehicle, trucks, pedestrians, and bicycles. All counts will be obtained between 7AM – 10AM and 4PM – 7PM on a Tuesday, Wednesday, or Thursday on a week without a holiday when Congress and public schools are in session.	
Roadway Improvements **Guidelines:** The study will account for approved and funded roadway improvement projects within the study area that are expected to begin before the proposal's horizon year. See Section 3.2.7 of the CTR guidelines. **Proposed roadway improvements:** Will include all improvements provided by DDOT proposed by 2025.	
Background Developments **Guidelines:** The study will account for vehicle trips generated by developments in the study area that have an origin/destination within the study area. See Section 3.2.8 of the CTR guidelines. **Proposed background development:** Will include the remaining portion of CityCenter still under construction and the Old Post Office Redevelopment projects.	
Background Growth **Guidelines:** The study will account for annual growth or decrease in through traffic on minor and principal arterials that pass through the proposed study area. See Section 3.2.9 of the CTR guidelines. **Proposed annual background growth:** Will compare the 2010 and 2020 MWCOG models to determine a background growth rate by road segment by direction for the study area. GSA will provide the proposed background growth rates before analyzing the No Build condition.	

Site Trip Distribution & Assignment **Guidelines:** Trips generated by the site will be distributed throughout the study area network. See Section 3.2.10 of the CTR guidelines for information in trip distribution and assignment. **Proposed site distribution and assignment (attach Figures, as needed, at end of Scoping Form):** The existing FBI trips will be removed based on the FBI zip code database providing the actual distribution of existing trips. The new trips added by the redevelopment scenarios will use the MWCOG trip tables to determine trip distribution for all three proposed land uses. Figure 2 shows the current FBI distribution patterns, Figures 3 shows the MWCOG office distribution patterns, and Figure 4 shows the residential distribution patterns.	
Analysis Methodology **Guidelines:** Capacity analyses are typically performed using Highway Capacity Manual (HCM) methodologies or a similar industry recognized software. See Section 3.2.11 of the CTR guidelines. **Proposed analysis methodology:** The study will use the Synchro™ method for analyzing each intersection to be consistent since the Highway Capacity Manual (HCM) 2010 method cannot be used for signalized intersections where a hold, exclusive pedestrian, or other special phase is included that does not support the National Electrical Manufacturers Association (NEMA) ring and barrier standards. The Synchro™ method for unsignalized intersections follows the HCM 2000 standards. As part of the Synchro™ method, the 50th and 95th percentile queues will be reported. While it is not the intention to alter the existing yellow and all red phases, if the need arises to propose changes to the signal timings, DDOT guidelines on vehicular and pedestrian intervals will be followed. The Synchro files will accompany the transportation study submittal to DDOT.	
Vehicle Trip Mitigation **Guidelines:** Proposed mitigation of vehicle impacts, if needed, must not add significant delay to other travel modes. Standard non-urban mitigation often includes geometric re-design which may not fit DDOT's practice of balancing safety and capacity across multiple transportation modes. See Section 3.2.12 of the CTR guidelines. **For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in the scoping form.** The study will only provide recommended mitigation for the redevelopment scenarios (build-out condition).	

3. Bicycle & Pedestrian Facilities	DDOT Comments/Action Items
CTR Triggers for bike and pedestrian mode share **Guidelines:** A CTR is required to include some level analysis of the bike and pedestrian network at a minimum, based on several potential factors. See Section 3.3.1 of the CTR guidelines to determine if a more comprehensive analysis is required. If so, complete the remainder of the *Bicycle & Pedestrian Facilities* section of this scoping form.	
CTR Bike and Pedestrian Study area **Guidelines:** See Section 3.3.2 of the CTR guidelines to determine bike and pedestrian study areas. **Proposed bike and pedestrian study areas:** The study will include a summary of the pedestrian and bicycle network for the same study area as the roadways. This will include identifying the existing ADA compliant versus non ADA compliant curbs at each intersection and identifying existing general sidewalk issues. Existing bicycle lanes will also be identified.	
Data Collection and Analysis of Bike Network and Facilities **Guidelines:** See Section 3.3.3 of the CTR guidelines for data collection requirements and analysis for bike and pedestrian modes. **Proposed Bike network and facilities analysis:** The study will prepare an existing condition bicycle map and describe the network. It is not anticipated that the redevelopment scenarios will impact the bicycle or pedestrian network, but the study will highlight those intersections immediately adjacent to the parcel that lack ADA compliance and any nearby gaps in the bicycle network.	
Mitigation for Bike network **Guidelines:** If deficiencies have been documented in the study area's pedestrian or bike facilities that would preclude the proposed mode split, then mitigation of these deficiencies is required. See Section 3.3.4 of the CTR guidelines for mitigation requirements of the bike network. **For Informational purposes only. Mitigation will be documented in the final CTR. No information required in scoping form.**	
4. Transit Service	**DDOT Comments/Action Items**
CTR Triggers for transit mode share **Guidelines:** A CTR is typically required to include some level analysis of the transit network, based on several potential factors. See Section 3.4.1 of the CTR guidelines to determine the minimum analysis requirements and if a more comprehensive transit analysis is required. If so, completion of the remainder of the *Transit Service* section of this scoping form is required. See Section 3.4.1 of the CTR guidelines	

CTR Transit study area **Guidelines:** If further analysis of the transit network is triggered, see Section 3.4.2 of the CTR guidelines for determining the requisite study area. **Proposed transit study area:** The study will provide a summary of the transit provided within the study area including Metro, Metrobus, and commuter bus.	
Analysis of Transit Network **Guidelines:** Analysis of the transit network will incorporate both a quantitative and qualitative review. See Section 3.4.3 of the CTR guidelines for further information. **Proposed transit analysis:** The study will evaluate the existing Metro stations, Metrobus, circulator, and commuter bus in terms of stop locations, peak hour headway, and peak hour use. Based on the number of future bus transit trips produced by the redevelopment scenarios, the study will evaluate if bus capacity will be an issue. Since a new north-south streetcar line is under study that would travel through the study area, this study will not evaluate that new streetcar line.	
Transit Trip Mitigation **Guidelines:** Proposed mitigation of transit impacts may be needed, given certain impacts to the network. See Section 3.4.4 of the CTR guidelines for more information. **For Informational purposes only. Mitigation will be documented in the final CTR. No information is required in scoping form.**	
5. Site Access and Loading	**DDOT Comments/Action Items**
Guidelines: At a minimum, the Applicant is required to show site access for vehicles, pedestrians and bicyclists. In addition, DDOT has additional policies for site access and loading as they relate to public space. See Section 3.5 of the CTR guidelines for additional information regarding these policies. ***Freight\Delivery*** The study will identify existing and proposed commercial vehicle access to the site. See Section 3.5.1 of the CTR guidelines. ***Motorcoach*** For developments that will generate significant tourist activity (hotels, museums, etc.) the study will discuss the site plan's accommodation of motorcoach access. See Section 3.5.2 of the CTR guidelines.	

Proposed Loading Analysis: Because this study is evaluating redevelopment scenarios rather than an actual planned development, the study will provide a brief qualitative discussion of the truck access area and guidelines for site access, but will stress that the TIA prepared for the actual development should cover this in more detail.	
6. Parking	**DDOT Comments/Action Items**
Guidelines: Minimum requirements exist for documenting parking needs and constraints, regardless of development size. Further requirements may be needed for larger developments. See Section 3.6 **Proposed Parking Analysis:** Because this study is evaluating a redevelopment scenarios rather than an actual planned development, the study will provide a summary of the existing number of off-street parking spaces as well as the maximum potential number of off-street parking spaces based on zoning regulations and existing conditions. The study will also describe the existing number of on-street spaces within the study area. The study will stress that the TIA prepared for the actual development should cover this in more detail.	
7. Transportation Demand Management	**DDOT Comments/Action Items**
Triggers for a TDM Plan **Guidelines:** All developments are encouraged to produce TDM plans, regardless of size. See Section 3.7 **Proposed TDM Plan:** Because this study is evaluating a redevelopment scenarios rather than an actual planned development, the study will provide an example of TDM measures and will stress that the TIA prepared for the actual development should cover this in more detail.	
8. Performance Monitoring & Measurement	**DDOT Comments/Action Items**
Guidelines: Developments of a certain size may need to incorporate a performance monitoring element as a condition of zoning approval. See Section 3.8 of the CTR guidelines for more information. **For informational purposes only. Requirements for performance monitoring will be coordinated with the DDOT case manager.**	
9. Safety	**DDOT Comments/Action Items**
Guidelines: The CTR will demonstrate that the site will not create or exacerbate existing safety issues for all modes of travel. See Section 3.9 of the CTR guidelines for further information. **Proposed Safety Analysis:** This study will provide crash rates per intersection and provide a breakout of crash types for intersections with high crash rates (rates over 1.0 per MEV). The study will include mitigation if the	

proposed redevelopment scenarios introduce or exacerbate the safety condition of all modes of travel.	
10. Streetscape/Public Realm	**DDOT Comments/Action Items**
Guidelines: DDOT expects new developments to rehabilitate streetscape infrastructure between the curb and property lines. The applicant must work closely with DDOT and OP to ensure that design of the public realm meets current standards. See Section 3.10 of the CTR guidelines for direction on streetscape rehabilitation. **These guidelines are provided to inform that public realm design standards may alter an Applicant's intended use of public space.**	

Information/Data Requests (List requested data from DDOT after each field below):

- District planning documents:
- Local planning documents, including small area plans:
- Information on programmed and/or funded roadway improvements in study area: Will need the list of Improvements within study area
- Studies for background developments in study area:
- Signal Timings: Will need all 31 intersections listed in the study area
- Crash Data: Will need all 31 intersections listed in study area

Proposed Schedule:

- DDOT comments on Scoping Document: 4/30/14
- Transportation Consultant/Applicant responses to comments: 5/2/14
- Phase I Completion: N/A
- Phase II Completion: N/A
- Submission of Report to DDOT: 11/1/14
- Zoning Commission or BZA Hearing Date: N/A

Figure 1: Proposed Transportation Study Area

Figure 2: Proposed Trip Distribution for Existing FBI Trips

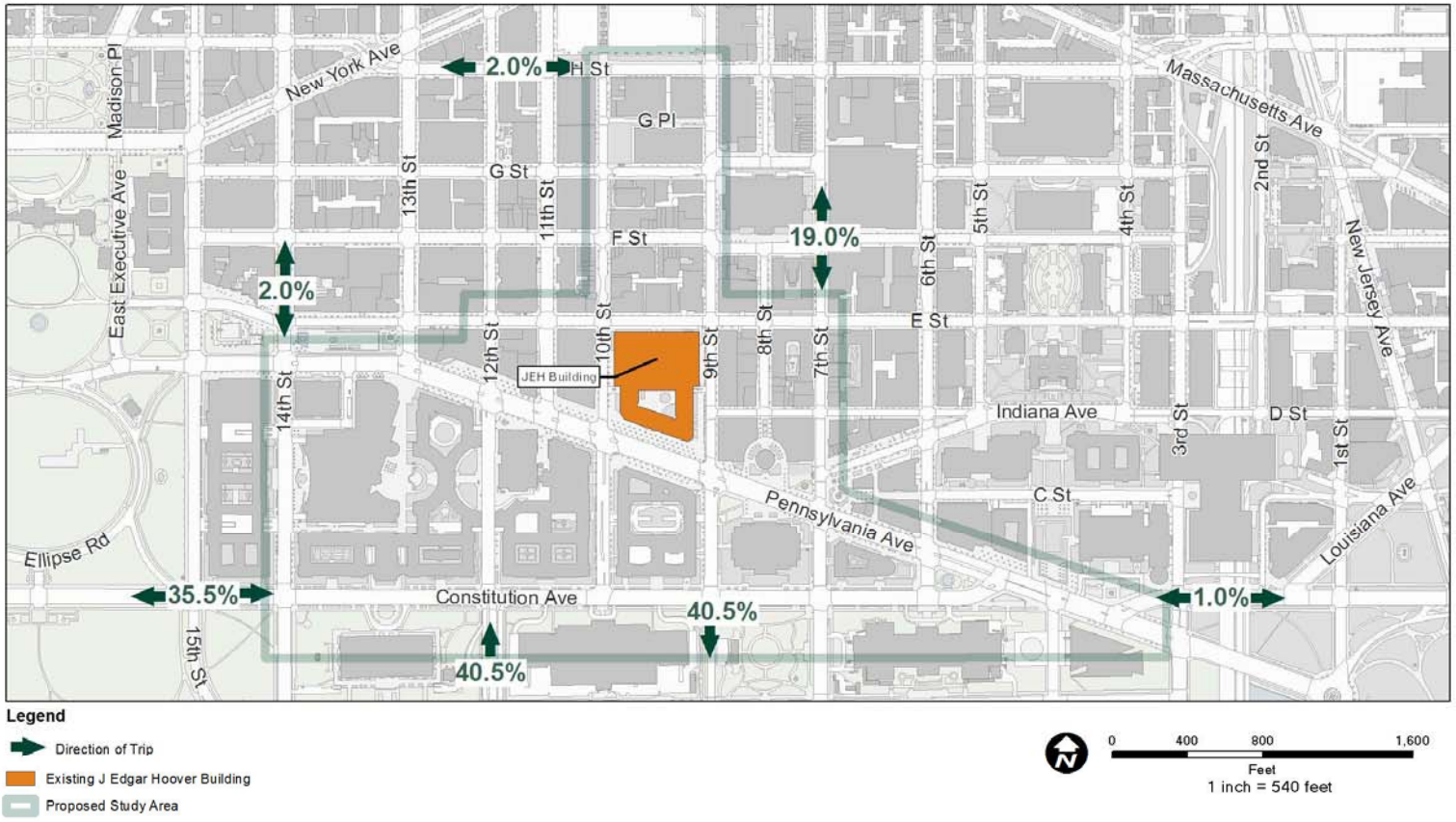


Figure 3: Proposed Trip Distribution for Future Office Trips

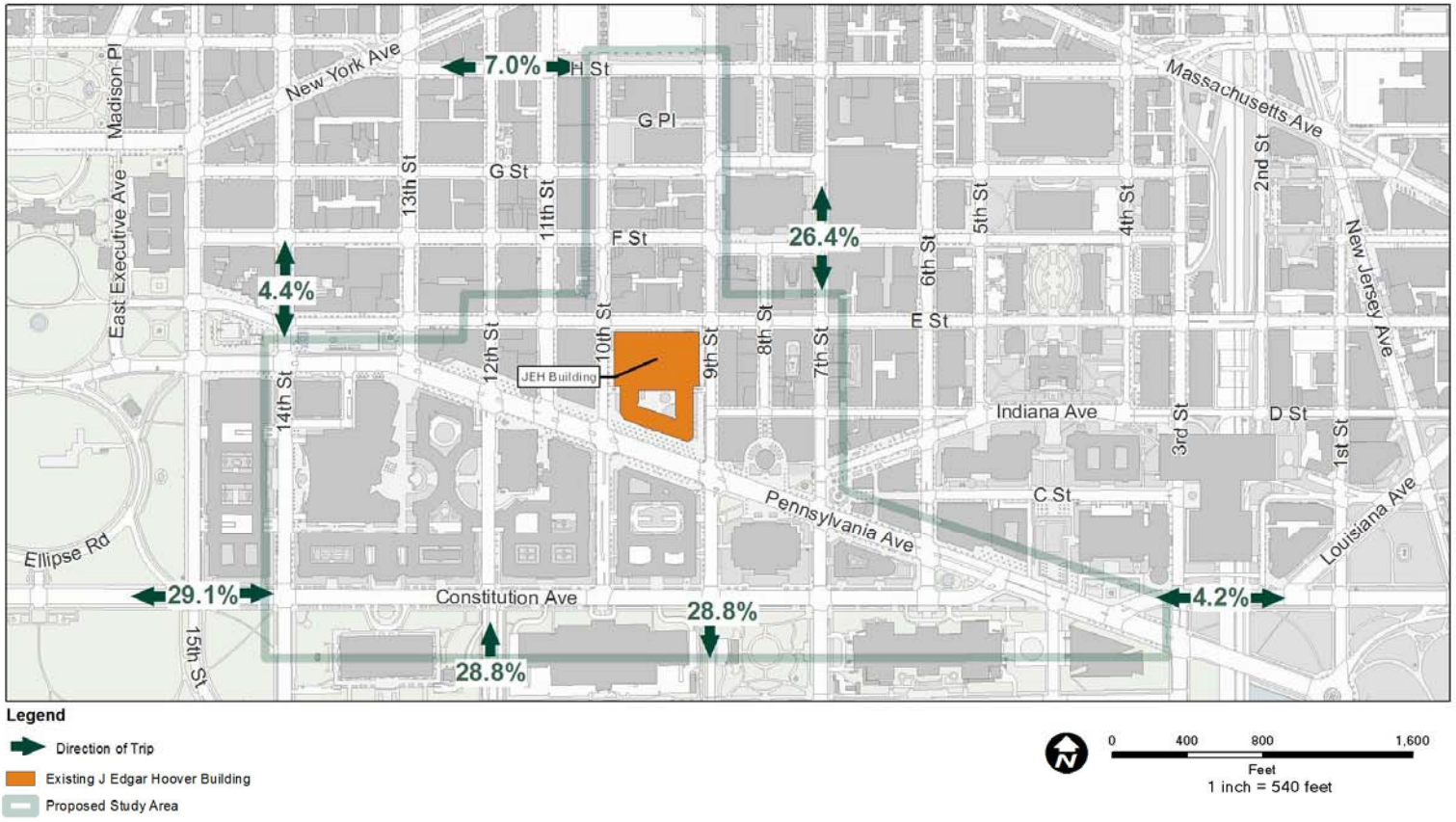
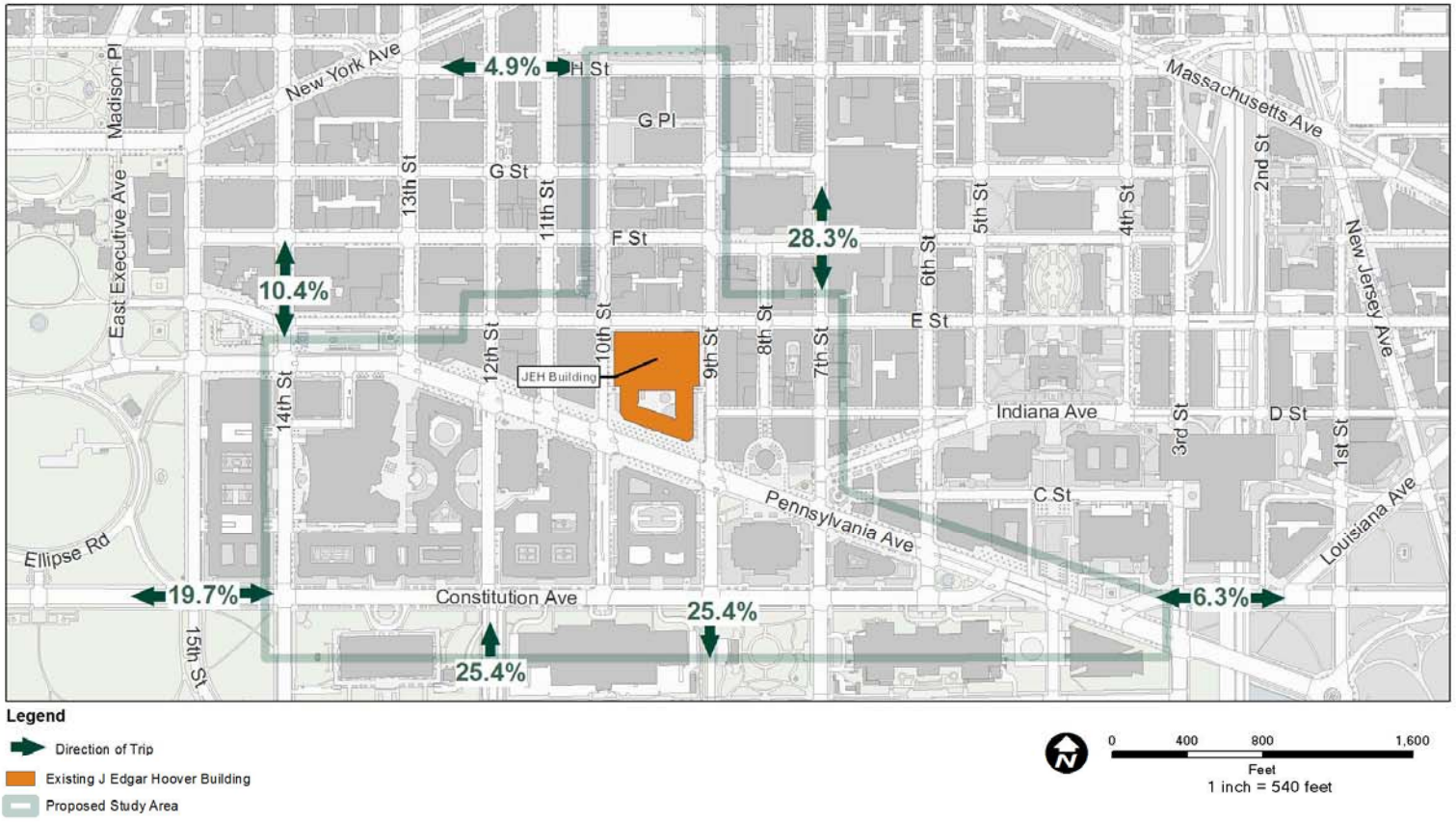


Figure 4: Proposed Trip Distribution for Future Residential Trips



Appendix B2

Traffic Counts

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, June 17, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th Street**				**H Street**				**One Way**				**H Street**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM to 6:45 AM	4	5	3	0	2	32	5	0	0	0	0	0	25	66	1	0
6:45 AM to 7:00 AM	4	14	4	0	3	41	3	0	0	0	0	0	21	95	2	0
7:00 AM to 7:15 AM	4	17	9	0	7	55	16	0	0	0	0	0	29	95	2	0
7:15 AM to 7:30 AM	5	10	2	0	3	46	4	0	0	0	0	0	28	103	4	0
7:30 AM to 7:45 AM	4	19	6	0	4	72	8	0	0	0	0	0	36	124	3	0
7:45 AM to 8:00 AM	5	52	4	0	5	79	14	0	0	0	0	0	47	124	3	0
8:00 AM to 8:15 AM	5	54	2	0	7	91	7	0	0	0	0	0	36	117	4	0
8:15 AM to 8:30 AM	6	30	5	0	1	79	13	0	0	0	0	0	52	97	2	0
8:30 AM to 8:45 AM	12	42	5	0	5	106	10	0	0	0	0	0	60	111	1	0
8:45 AM to 9:00 AM	9	52	2	0	6	94	13	0	0	0	0	0	68	87	2	0
9:00 AM to 9:15 AM	9	52	5	0	2	86	10	0	0	0	0	0	67	111	2	0
9:15 AM to 9:30 AM	7	46	6	0	1	88	5	0	1	0	0	0	53	94	1	0
PM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th Street**				**H Street**				**One Way**				**H Street**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM to 4:15 PM	7	40	4	0	7	51	8	0	0	0	0	0	37	148	3	0
4:15 PM to 4:30 PM	4	49	7	0	9	49	4	0	0	0	0	0	23	134	2	0
4:30 PM to 4:45 PM	4	53	7	0	6	55	8	0	0	0	0	0	17	129	3	0
4:45 PM to 5:00 PM	3	64	4	0	3	66	9	0	0	0	0	0	41	144	2	0
5:00 PM to 5:15 PM	3	57	5	0	7	61	11	0	0	0	0	0	37	148	1	0
5:15 PM to 5:30 PM	5	65	11	0	9	56	14	0	0	0	0	0	32	152	7	0
5:30 PM to 5:45 PM	5	53	10	0	14	56	17	0	0	0	0	0	31	177	6	0
5:45 PM to 6:00 PM	11	73	9	0	8	38	8	0	0	0	0	0	24	171	6	0
6:00 PM to 6:15 PM	3	59	12	0	5	66	12	0	0	0	0	0	28	161	5	0
6:15 PM to 6:30 PM	5	55	9	0	4	53	14	0	0	0	0	0	27	161	4	0
6:30 PM to 6:45 PM	3	51	10	0	3	37	5	0	0	0	0	0	25	150	7	0
6:45 PM to 7:00 PM	1	32	7	0	1	37	5	0	0	0	0	0	17	131	6	0
PEAK HOURS																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th Street**				**H Street**				**One Way**				**H Street**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																
8:30 AM to 9:30 AM	37	192	18	186	14	374	38	216	1	0	0	229	248	403	6	376
PM INTERSECTION PEAK HOUR																
5:15 PM to 6:15 PM	24	250	42	293	36	216	51	382	0	0	0	225	115	661	24	611
AM SYSTEM PEAK HOUR																
8:15 AM to 9:15 AM	36	176	17	186	14	365	46	216	0	0	0	229	247	406	7	376
PM SYSTEM PEAK HOUR																
5:15 PM to 6:15 PM	24	250	42	293	36	216	51	382	0	0	0	225	115	661	24	611
PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	10th Street				**H Street**				**One Way**				**H Street**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.75	0.85	0.85	**0.87**	0.58	0.86	0.88	**0.88**	0.00	0.00	0.00	**#DIV/0!**	0.91	0.91	0.88	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.55	0.86	0.88	**0.85**	0.64	0.82	0.75	**0.87**	0.00	0.00	0.00	**#DIV/0!**	0.90	0.93	0.86	**0.93**

Overall AM PEAK HOUR FACTOR = **0.93** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 3317 **PM Period Intersection Volume:** 3813

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, March 13, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**H Street**				**One Way**				**H Street**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	to	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	to	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	to	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	to	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	to	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	to	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	to	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	to	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	to	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	to	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	to	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**H Street**				**One Way**				**H Street**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	to	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	to	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	to	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	to	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	to	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	to	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	to	6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	to	6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	to	6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	to	6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	to	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**H Street**				**One Way**				**H Street**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
6:30 AM	to	7:30 AM	88	721	35	0	0	352	39	0	0	0	0	0	89	294	0	0
PM INTERSECTION PEAK HOUR																		
4:00 PM	to	5:00 PM	60	857	42	0	0	161	46	0	0	0	0	0	100	721	0	0
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	88	721	35	0	0	352	39	0	0	0	0	0	89	294	0	0
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	60	857	42	0	0	161	46	0	0	0	0	0	100	721	0	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**H Street**				**One Way**				**H Street**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **#DIV/0!** **Overall PM PEAK HOUR FACTOR** = **#DIV/0!**

AM Period Intersection Volume: 0 **PM Period Intersection Volume:** 0

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th Street**				**G Street**				**No Approach**				**G Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	6	97	6	38	0	26	5	11	0	0	0	31	10	16	0	19
6:45 AM	to 7:00 AM	5	131	8	36	0	36	3	19	0	0	0	16	9	26	0	25
7:00 AM	to 7:15 AM	5	153	4	38	0	44	16	20	0	0	0	29	13	28	0	20
7:15 AM	to 7:30 AM	4	169	11	64	0	37	4	28	0	0	0	46	14	38	0	28
7:30 AM	to 7:45 AM	7	186	6	66	0	45	8	38	0	0	0	41	19	49	0	36
7:45 AM	to 8:00 AM	9	213	13	52	0	53	14	49	0	0	0	42	16	45	0	42
8:00 AM	to 8:15 AM	8	182	19	70	0	49	7	58	0	0	0	55	13	57	0	38
8:15 AM	to 8:30 AM	12	196	19	76	0	55	13	76	0	0	0	92	27	52	0	49
8:30 AM	to 8:45 AM	6	215	27	63	0	65	10	69	0	0	0	81	22	44	0	51
8:45 AM	to 9:00 AM	14	179	14	60	0	68	13	74	0	0	0	113	17	57	0	42
9:00 AM	to 9:15 AM	14	209	21	83	0	64	10	95	0	0	0	78	15	57	0	53
9:15 AM	to 9:30 AM	18	204	30	54	0	62	5	99	1	0	0	97	17	50	0	45

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th Street**				**G Street**				**No Approach**				**G Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	12	251	12	76	0	45	11	67	0	0	0	104	36	54	0	66
4:15 PM	to 4:30 PM	12	289	15	48	0	67	22	73	0	0	0	93	24	57	0	79
4:30 PM	to 4:45 PM	6	303	18	62	0	94	28	77	0	0	0	89	35	49	0	58
4:45 PM	to 5:00 PM	8	297	10	49	0	78	35	77	0	0	0	127	25	51	0	59
5:00 PM	to 5:15 PM	6	280	13	55	0	86	39	84	0	0	0	106	33	45	0	54
5:15 PM	to 5:30 PM	6	316	12	73	0	100	35	80	0	0	0	183	36	57	0	69
5:30 PM	to 5:45 PM	5	280	12	107	0	88	29	128	0	0	0	188	31	79	0	99
5:45 PM	to 6:00 PM	6	323	11	117	0	104	29	275	0	0	0	179	25	50	0	144
6:00 PM	to 6:15 PM	9	327	13	57	0	97	24	144	0	0	0	186	43	65	0	94
6:15 PM	to 6:30 PM	9	311	10	56	2	67	22	106	0	0	0	194	46	83	0	61
6:30 PM	to 6:45 PM	7	276	12	58	0	64	10	71	0	0	0	99	36	52	0	68
6:45 PM	to 7:00 PM	5	266	19	63	0	57	13	79	0	0	0	79	30	62	0	48

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th Street**				**G Street**				**No Approach**				**G Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:30 AM	to 9:30 AM	52	807	92	260	0	259	38	337	1	0	0	369	71	208	0	191
PM INTERSECTION PEAK HOUR																	
5:15 PM	to 6:15 PM	26	1246	48	354	0	389	117	627	0	0	0	736	135	251	0	406
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	46	799	81	282	0	252	46	314	0	0	0	364	81	210	0	195
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	26	1246	48	354	0	389	117	627	0	0	0	736	135	251	0	406

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	10th Street				**G Street**				**No Approach**				**G Street**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.82	0.93	0.75	**0.93**	0.00	0.93	0.88	**0.92**	0.00	0.00	0.00	**#DIV/0!**	0.75	0.92	0.00	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.72	0.95	0.92	**0.95**	0.00	0.94	0.84	**0.94**	0.00	0.00	0.00	**#DIV/0!**	0.78	0.79	0.00	**0.88**

Overall AM PEAK HOUR FACTOR = **0.97** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 3844 **PM Period Intersection Volume:** 6117

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**G St.**				**One Way**				**G St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	6	129	6	11	0	8	8	16	0	0	0	36	8	6	0	12
6:45 AM	to 7:00 AM	5	136	3	19	0	10	4	25	0	0	0	37	10	8	0	16
7:00 AM	to 7:15 AM	11	175	7	19	0	7	3	28	0	0	0	66	13	7	0	14
7:15 AM	to 7:30 AM	8	187	5	22	0	9	9	21	0	0	0	58	17	11	0	13
7:30 AM	to 7:45 AM	6	222	5	29	0	11	5	40	0	0	0	96	10	12	0	22
7:45 AM	to 8:00 AM	10	215	10	23	0	10	9	30	0	0	0	103	9	10	0	33
8:00 AM	to 8:15 AM	9	163	3	28	0	19	7	46	0	0	0	124	11	10	0	22
8:15 AM	to 8:30 AM	10	254	5	28	0	11	10	56	0	0	0	145	11	15	0	30
8:30 AM	to 8:45 AM	14	231	7	39	0	15	9	62	0	0	0	120	15	12	0	36
8:45 AM	to 9:00 AM	9	233	5	70	0	22	8	82	0	0	0	141	17	11	0	58
9:00 AM	to 9:15 AM	13	232	6	60	0	15	7	67	0	0	0	131	14	13	0	62
9:15 AM	to 9:30 AM	13	247	3	43	0	19	10	93	0	0	0	108	7	18	0	41

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**G St.**				**One Way**				**G St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	21	188	17	47	0	9	20	140	0	0	0	159	19	21	0	23
4:15 PM	to 4:30 PM	13	222	15	33	0	21	21	116	0	0	0	133	20	28	0	17
4:30 PM	to 4:45 PM	23	253	21	63	0	31	10	147	0	0	0	180	22	13	0	38
4:45 PM	to 5:00 PM	24	211	22	51	0	16	29	136	0	0	0	134	20	23	0	34
5:00 PM	to 5:15 PM	25	183	24	78	0	21	25	179	0	0	0	211	31	21	0	62
5:15 PM	to 5:30 PM	36	224	23	63	0	25	26	155	0	0	0	185	19	38	0	55
5:30 PM	to 5:45 PM	29	187	29	64	0	29	27	212	0	0	0	216	15	24	0	71
5:45 PM	to 6:00 PM	23	181	24	51	0	16	18	170	0	0	0	214	23	33	0	64
6:00 PM	to 6:15 PM	32	219	26	53	0	26	17	167	0	0	0	172	23	24	0	71
6:15 PM	to 6:30 PM	35	234	27	49	0	11	19	156	0	0	0	185	25	34	0	64
6:30 PM	to 6:45 PM	29	228	23	63	0	20	21	170	0	0	0	164	26	37	0	72
6:45 PM	to 7:00 PM	30	217	29	66	0	23	26	170	0	0	0	161	36	38	0	63

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**G St.**				**One Way**				**G St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:30 AM	to 9:30 AM	49	943	21	212	0	71	34	304	0	0	0	500	53	54	0	197
PM INTERSECTION PEAK HOUR																	
6:00 PM	to 7:00 PM	119	862	100	216	0	73	75	663	0	0	0	735	97	128	0	271
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	46	950	23	197	0	63	34	267	0	0	0	537	57	51	0	186
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	120	811	102	231	0	96	88	704	0	0	0	787	80	119	0	261

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**G St.**				**One Way**				**G St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.82	0.94	0.82	**0.95**	0.00	0.72	0.85	**0.81**	0.00	0.00	0.00	**#DIV/0!**	0.84	0.85	0.00	**0.96**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.83	0.91	0.88	**0.91**	0.00	0.83	0.81	**0.82**	0.00	0.00	0.00	**#DIV/0!**	0.87	0.78	0.00	**0.87**

Overall AM PEAK HOUR FACTOR = **0.97** **Overall PM PEAK HOUR FACTOR** = **0.91**

AM Period Intersection Volume: 3123 **PM Period Intersection Volume:** 4267

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th St.**				**F St.**				**One Way**				**F St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	3	8	4	17	0	16	1	18	0	0	0	8	4	15	1	17
6:45 AM	to 7:00 AM	3	14	2	21	0	13	3	23	0	0	0	7	3	25	0	26
7:00 AM	to 7:15 AM	2	13	7	28	0	21	1	25	0	0	0	7	9	29	0	20
7:15 AM	to 7:30 AM	1	17	4	25	0	27	3	20	0	0	0	10	4	22	0	30
7:30 AM	to 7:45 AM	2	27	1	34	0	37	3	40	0	0	0	22	13	28	0	41
7:45 AM	to 8:00 AM	5	36	5	32	0	33	2	54	0	0	0	19	15	36	0	40
8:00 AM	to 8:15 AM	5	36	3	49	0	45	2	82	0	0	0	52	17	37	0	63
8:15 AM	to 8:30 AM	2	43	8	49	0	48	2	61	0	0	0	35	19	39	0	83
8:30 AM	to 8:45 AM	4	33	4	53	0	54	6	78	0	0	0	40	12	37	0	78
8:45 AM	to 9:00 AM	9	38	8	63	0	43	4	66	0	0	0	41	16	38	0	131
9:00 AM	to 9:15 AM	3	37	7	40	0	55	4	84	0	0	0	66	18	40	0	89
9:15 AM	to 9:30 AM	9	50	7	79	0	40	10	97	0	0	0	33	28	46	0	84

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th St.**				**F St.**				**One Way**				**F St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	15	74	13	112	0	58	7	136	0	0	0	117	13	85	0	180
4:15 PM	to 4:30 PM	10	83	19	150	0	40	7	151	0	0	0	50	11	84	0	131
4:30 PM	to 4:45 PM	15	82	19	204	0	46	3	156	0	0	0	72	26	73	0	142
4:45 PM	to 5:00 PM	24	71	24	163	0	48	9	125	0	0	0	60	16	79	0	110
5:00 PM	to 5:15 PM	23	91	51	138	0	61	1	182	0	0	0	64	24	63	0	170
5:15 PM	to 5:30 PM	15	92	24	126	0	48	5	205	0	0	0	53	22	96	1	168
5:30 PM	to 5:45 PM	13	114	31	164	0	56	8	181	0	0	0	70	29	105	0	179
5:45 PM	to 6:00 PM	17	96	24	135	0	60	4	222	0	0	0	84	19	83	0	164
6:00 PM	to 6:15 PM	10	93	13	163	0	56	7	208	0	0	0	63	28	78	0	153
6:15 PM	to 6:30 PM	16	91	16	89	0	61	2	168	0	0	0	55	15	80	1	166
6:30 PM	to 6:45 PM	10	68	24	154	0	58	2	165	0	0	0	57	17	105	0	131
6:45 PM	to 7:00 PM	20	52	27	152	0	52	3	143	0	0	0	60	26	95	0	200

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**10th St.**				**F St.**				**One Way**				**F St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:30 AM	to 9:30 AM	25	158	26	235	0	192	24	325	0	0	0	180	74	161	0	382
PM INTERSECTION PEAK HOUR																	
5:00 PM	to 6:00 PM	68	393	130	563	0	225	18	790	0	0	0	271	94	347	1	681
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	18	151	27	205	0	200	16	289	0	0	0	182	65	154	0	381
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	55	395	92	588	0	220	24	816	0	0	0	270	98	362	1	664

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	10th St.				**F St.**				**One Way**				**F St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.50	0.88	0.84	**0.89**	0.00	0.91	0.67	**0.90**	0.00	0.00	0.00	**#DIV/0!**	0.86	0.96	0.00	**0.94**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.81	0.87	0.74	**0.86**	0.00	0.92	0.75	**0.95**	0.00	0.00	0.00	**#DIV/0!**	0.84	0.86	0.25	**0.86**

Overall AM PEAK HOUR FACTOR = **0.96** **Overall PM PEAK HOUR FACTOR** = **0.88**

AM Period Intersection Volume: 1484 **PM Period Intersection Volume:** 3456

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**F St.**				**One Way**				**F St.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	7	116	4	34	0	14	6	24	0	0	0	12	6	12	0	8
6:45 AM	to	7:00 AM	6	120	9	24	0	12	7	26	0	0	0	11	4	21	0	17
7:00 AM	to	7:15 AM	7	169	9	39	0	20	6	28	0	0	0	32	12	26	0	13
7:15 AM	to	7:30 AM	10	184	7	29	0	18	4	45	0	0	0	36	8	19	0	22
7:30 AM	to	7:45 AM	7	210	9	43	0	34	10	43	0	0	0	29	7	21	0	23
7:45 AM	to	8:00 AM	11	212	7	61	0	23	5	71	0	0	0	46	17	22	0	28
8:00 AM	to	8:15 AM	10	153	8	58	0	30	8	78	0	0	0	53	15	26	0	51
8:15 AM	to	8:30 AM	11	235	10	72	0	41	4	76	0	0	0	62	15	29	0	57
8:30 AM	to	8:45 AM	14	215	10	53	0	49	5	78	0	0	0	74	15	23	0	46
8:45 AM	to	9:00 AM	10	212	10	78	0	40	4	95	0	0	0	100	16	38	0	103
9:00 AM	to	9:15 AM	17	210	15	63	0	44	9	94	0	0	0	84	19	31	0	65
9:15 AM	to	9:30 AM	13	218	12	49	0	33	9	80	0	0	0	59	20	30	0	74

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**F St.**				**One Way**				**F St.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	17	209	13	64	0	42	13	132	0	0	0	111	37	50	2	104
4:15 PM	to	4:30 PM	6	240	8	76	0	38	15	144	0	0	0	118	50	65	0	130
4:30 PM	to	4:45 PM	9	257	17	75	0	42	8	119	0	0	0	145	36	49	0	99
4:45 PM	to	5:00 PM	13	218	15	95	0	50	13	122	0	0	0	133	47	59	1	109
5:00 PM	to	5:15 PM	14	258	15	131	0	48	9	193	0	0	0	152	58	63	0	127
5:15 PM	to	5:30 PM	23	217	18	124	0	36	20	193	0	0	0	144	48	71	0	147
5:30 PM	to	5:45 PM	10	190	10	139	0	48	14	194	0	0	0	148	68	56	2	127
5:45 PM	to	6:00 PM	11	174	14	96	0	43	16	168	0	0	0	203	45	64	2	240
6:00 PM	to	6:15 PM	10	207	18	100	0	48	6	211	0	0	0	121	33	48	1	181
6:15 PM	to	6:30 PM	19	224	21	96	0	41	13	213	0	0	0	119	40	51	0	158
6:30 PM	to	6:45 PM	13	235	20	76	0	49	14	147	0	0	0	113	49	79	3	115
6:45 PM	to	7:00 PM	12	209	36	98	0	40	18	155	0	0	0	127	43	70	0	145

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**F St.**				**One Way**				**F St.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:15 AM	to	9:15 AM	52	872	45	266	0	174	22	343	0	0	0	320	65	121	0	271
PM INTERSECTION PEAK HOUR																		
4:30 PM	to	5:30 PM	59	950	65	425	0	176	50	627	0	0	0	574	189	242	1	482
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	52	872	45	266	0	174	22	343	0	0	0	320	65	121	0	271
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	54	788	60	459	0	175	56	766	0	0	0	616	194	239	5	695

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**F St.**				**One Way**				**F St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.76	0.93	0.75	**0.95**	0.00	0.89	0.61	**0.91**	0.00	0.00	0.00	**#DIV/0!**	0.86	0.80	0.00	**0.86**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.59	0.91	0.83	**0.87**	0.00	0.91	0.70	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.71	0.84	0.63	**0.87**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.91**

AM Period Intersection Volume: 3374 **PM Period Intersection Volume:** 4974

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**One Way**				**E St.**				**12th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	0	0	0	32	6	27	0	16	58	180	9	22	0	19	7	9
6:45 AM	to 7:00 AM	0	0	0	24	4	22	0	16	49	233	6	17	0	8	11	12
7:00 AM	to 7:15 AM	0	0	0	20	11	31	0	35	53	257	14	35	0	23	14	9
7:15 AM	to 7:30 AM	0	0	0	20	22	35	0	13	60	273	10	35	0	16	13	26
7:30 AM	to 7:45 AM	0	0	0	40	20	39	0	35	55	295	10	33	0	20	19	27
7:45 AM	to 8:00 AM	0	0	0	48	33	35	0	34	75	323	8	36	0	25	23	24
8:00 AM	to 8:15 AM	0	0	0	59	30	47	0	57	64	351	14	51	0	20	33	35
8:15 AM	to 8:30 AM	0	0	0	75	43	38	0	56	67	359	19	68	0	29	21	47
8:30 AM	to 8:45 AM	0	0	0	85	28	42	0	60	59	363	15	54	0	28	14	42
8:45 AM	to 9:00 AM	0	0	0	96	25	43	0	58	54	362	17	52	0	25	23	47
9:00 AM	to 9:15 AM	0	0	0	94	36	55	0	72	66	350	19	58	0	33	22	60
9:15 AM	to 9:30 AM	0	0	0	75	22	42	0	66	51	386	15	50	0	31	22	44
PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**One Way**				**E St.**				**12th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	0	0	0	92	33	59	0	64	40	231	7	80	0	22	8	60
4:15 PM	to 4:30 PM	0	0	0	100	34	64	0	62	23	230	10	68	0	19	4	51
4:30 PM	to 4:45 PM	0	0	0	106	22	52	0	82	26	234	16	68	0	27	5	58
4:45 PM	to 5:00 PM	0	0	0	124	26	52	0	94	21	243	5	70	0	31	3	73
5:00 PM	to 5:15 PM	0	0	0	109	29	72	0	70	36	249	17	71	0	31	3	61
5:15 PM	to 5:30 PM	0	0	0	114	37	68	0	68	23	241	10	86	0	29	8	89
5:30 PM	to 5:45 PM	0	0	0	122	43	65	0	92	30	226	9	72	0	31	7	64
5:45 PM	to 6:00 PM	0	0	0	123	37	67	0	89	32	258	12	81	0	17	9	74
6:00 PM	to 6:15 PM	0	0	0	126	35	67	0	84	41	260	9	103	0	23	7	97
6:15 PM	to 6:30 PM	0	0	0	115	32	57	0	95	49	250	3	60	0	25	15	90
6:30 PM	to 6:45 PM	0	0	0	96	38	67	0	93	47	248	10	59	0	31	8	47
6:45 PM	to 7:00 PM	0	0	0	74	34	57	0	101	27	231	12	79	0	25	9	56
PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**One Way**				**E St.**				**12th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	0	0	0	350	132	178	0	246	246	1434	70	232	0	115	80	196
PM INTERSECTION PEAK HOUR																	
5:45 PM	to 6:45 PM	0	0	0	460	142	258	0	361	169	1016	34	303	0	96	39	308
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	0	0	0	350	132	178	0	246	246	1434	70	232	0	115	80	196
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	0	0	0	485	152	267	0	333	126	985	40	342	0	100	31	324

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	One Way				**E St.**				**12th Street**				**E St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.77	0.81	0.00	**0.85**	0.92	0.99	0.92	**0.98**	0.00	0.87	0.87	**0.89**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.88	0.98	0.00	**0.97**	0.77	0.95	0.83	**0.93**	0.00	0.81	0.86	**0.86**

Overall AM PEAK HOUR FACTOR = **0.97** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 5834 **PM Period Intersection Volume:** 4960

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

Direction:						Westbound				Northbound				Eastbound			
Roadway:			**11th St.**				**E St.**				**11th St**				**E St.**		
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	9	27	6	10	3	21	1	16	9	27	1	24	4	61	9	20
6:45 AM	to	7:00 AM	2	19	6	13	7	18	1	18	8	30	3	41	5	49	4	31
7:00 AM	to	7:15 AM	9	32	12	16	9	33	5	26	21	21	1	54	5	63	7	34
7:15 AM	to	7:30 AM	14	29	7	19	11	45	2	36	21	32	1	54	5	53	12	35
7:30 AM	to	7:45 AM	13	47	20	29	8	50	3	51	15	43	1	68	1	60	12	43
7:45 AM	to	8:00 AM	12	40	15	25	21	50	1	27	18	51	6	43	5	82	6	41
8:00 AM	to	8:15 AM	31	38	17	41	12	43	1	54	27	71	3	70	10	66	11	86
8:15 AM	to	8:30 AM	17	31	18	39	15	63	6	60	22	60	8	84	8	76	11	66
8:30 AM	to	8:45 AM	11	53	23	47	17	58	3	69	29	69	2	104	6	67	8	80
8:45 AM	to	9:00 AM	17	58	10	34	28	45	2	55	39	80	1	99	8	59	10	65
9:00 AM	to	9:15 AM	24	51	23	26	27	53	8	75	18	77	5	96	10	88	8	77
9:15 AM	to	9:30 AM	16	43	11	21	15	44	2	45	25	72	1	112	9	65	5	46

PM PEAK

Direction:				Southbound				Westbound				Northbound				Eastbound	
Roadway:			**11th St.**				**E St.**				**11th St**				**E St.**		
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	21	115	31	55	20	58	2	71	13	41	4	129	6	52	4	71
4:15 PM	to	4:30 PM	29	109	42	68	25	72	2	85	18	49	1	102	5	38	7	52
4:30 PM	to	4:45 PM	15	122	47	50	19	59	9	101	18	34	3	126	6	40	7	63
4:45 PM	to	5:00 PM	23	130	39	59	24	58	5	95	18	46	1	62	10	38	4	76
5:00 PM	to	5:15 PM	26	127	44	59	31	67	4	108	15	41	3	118	6	57	2	66
5:15 PM	to	5:30 PM	37	136	38	70	24	63	7	87	13	47	3	124	3	44	6	89
5:30 PM	to	5:45 PM	44	145	34	131	26	62	10	128	9	32	2	132	2	50	6	91
5:45 PM	to	6:00 PM	41	109	39	96	20	57	7	109	11	34	2	101	10	40	3	84
6:00 PM	to	6:15 PM	34	115	39	94	18	61	7	85	21	62	5	92	7	46	7	70
6:15 PM	to	6:30 PM	31	115	38	102	26	52	1	177	13	51	2	105	10	63	3	164
6:30 PM	to	6:45 PM	43	106	36	114	30	59	4	89	14	48	3	116	13	65	2	72
6:45 PM	to	7:00 PM	29	88	46	85	42	54	7	116	14	46	2	84	9	41	3	85

PEAK HOURS

Direction:				Southbound				Westbound				Northbound				Eastbound	
Roadway:			**11th St.**				**E St.**				**11th St**				**E St.**		
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to	9:15 AM	69	193	74	146	87	219	19	259	108	286	16	383	32	290	37	288
PM INTERSECTION PEAK HOUR																	
4:45 PM	to	5:45 PM	130	538	155	319	105	250	26	418	55	166	9	1203	21	189	18	322
AM SYSTEM PEAK HOUR																	
8:15 AM	to	9:15 AM	69	193	74	146	87	219	19	259	108	286	16	383	32	290	37	288
PM SYSTEM PEAK HOUR																	
5:15 PM	to	6:15 PM	156	505	150	391	88	243	31	409	54	175	12	449	22	180	22	334

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	11th St.				**E St.**				**11th St**				**E St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.72	0.83	0.80	**0.86**	0.78	0.87	0.59	**0.92**	0.69	0.89	0.50	**0.85**	0.80	0.82	0.84	**0.85**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.89	0.87	0.96	**0.91**	0.85	0.96	0.78	**0.92**	0.64	0.71	0.60	**0.68**	0.55	0.90	0.79	**0.93**

Overall AM PEAK HOUR FACTOR = **0.91** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 3428 **PM Period Intersection Volume:** 4809

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, May 20, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th St.**				**E St.**				**One Way**				**E St.**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM to 6:45 AM	1	4	1	11	0	26	6	16	0	0	0	25	33	31	0	17
6:45 AM to 7:00 AM	2	8	1	18	0	32	8	11	0	0	0	31	34	39	0	25
7:00 AM to 7:15 AM	1	5	2	24	0	35	6	29	0	0	0	40	23	38	0	25
7:15 AM to 7:30 AM	0	8	4	27	0	40	9	24	0	0	0	34	20	19	0	11
7:30 AM to 7:45 AM	4	18	4	20	0	44	4	50	0	0	0	36	38	54	1	43
7:45 AM to 8:00 AM	3	16	4	24	0	59	7	38	0	0	0	32	37	51	0	33
8:00 AM to 8:15 AM	4	18	6	33	0	52	8	54	0	0	0	51	28	56	0	43
8:15 AM to 8:30 AM	3	32	8	52	0	55	9	67	0	0	0	57	41	70	0	51
8:30 AM to 8:45 AM	6	22	8	36	0	72	13	70	0	0	0	65	44	53	2	51
8:45 AM to 9:00 AM	5	15	10	33	0	59	9	89	0	0	0	57	53	49	0	48
9:00 AM to 9:15 AM	7	30	12	40	0	57	19	93	0	0	0	56	42	53	0	51
9:15 AM to 9:30 AM	14	25	2	42	0	56	12	45	0	0	0	52	37	41	0	58

PM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th St.**				**E St.**				**One Way**				**E St.**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM to 4:15 PM	12	71	14	43	0	26	6	16	0	0	0	25	13	45	0	42
4:15 PM to 4:30 PM	8	66	11	74	0	32	8	11	0	0	0	31	20	55	0	41
4:30 PM to 4:45 PM	18	74	7	24	0	35	6	29	0	0	0	40	15	55	0	37
4:45 PM to 5:00 PM	11	77	7	38	0	40	9	24	0	0	0	34	13	35	0	42
5:00 PM to 5:15 PM	20	71	9	47	0	44	4	50	0	0	0	36	13	30	0	60
5:15 PM to 5:30 PM	17	102	12	29	0	59	7	38	0	0	0	32	11	56	0	70
5:30 PM to 5:45 PM	11	89	30	36	0	52	8	54	0	0	0	51	12	52	0	60
5:45 PM to 6:00 PM	9	91	11	24	0	55	9	67	0	0	0	57	25	45	0	92
6:00 PM to 6:15 PM	16	96	29	44	0	72	13	70	0	0	0	65	18	62	0	48
6:15 PM to 6:30 PM	23	92	45	47	0	59	9	89	0	0	0	57	27	59	0	58
6:30 PM to 6:45 PM	5	93	17	62	0	57	19	93	0	0	0	56	11	39	0	33
6:45 PM to 7:00 PM	5	63	20	34	0	56	12	45	0	0	0	52	6	40	0	36

PEAK HOURS																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**10th St.**				**E St.**				**One Way**				**E St.**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																
8:15 AM to 9:15 AM	21	99	38	161	0	243	50	319	0	0	0	235	180	225	2	201
PM INTERSECTION PEAK HOUR																
5:30 PM to 6:30 PM	59	368	115	151	0	238	39	280	0	0	0	230	82	218	0	258
AM SYSTEM PEAK HOUR																
8:15 AM to 9:15 AM	21	99	38	161	0	243	50	319	0	0	0	235	180	225	2	201
PM SYSTEM PEAK HOUR																
5:15 PM to 6:15 PM	53	378	82	133	0	238	37	229	0	0	0	205	66	215	0	270
Approach Total		513				275				0				281		

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	10th St.				**E St.**				**One Way**				**E St.**			
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.75	0.77	0.79	**0.81**	0.00	0.84	0.66	**0.86**	0.00	0.00	0.00	**#DIV/0!**	0.85	0.80	0.25	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.78	0.93	0.68	**0.91**	0.00	0.83	0.71	**0.81**	0.00	0.00	0.00	**#DIV/0!**	0.66	0.87	0.00	**0.88**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.87**

AM Period Intersection Volume: 1997 **PM Period Intersection Volume:** 2806

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, May 20, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**E St.**				**One Way**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	13	107	2	16	3	105	16	8	0	0	0	4	5	184	5	4
6:45 AM	to 7:00 AM	14	126	1	13	5	115	19	17	0	0	0	4	9	240	3	12
7:00 AM	to 7:15 AM	13	174	4	18	3	117	26	13	0	0	0	4	18	199	6	9
7:15 AM	to 7:30 AM	21	186	4	21	4	167	26	15	0	0	0	4	18	249	1	9
7:30 AM	to 7:45 AM	29	178	11	31	6	151	27	7	0	0	0	8	11	239	6	13
7:45 AM	to 8:00 AM	29	201	8	35	3	170	33	23	0	0	0	5	19	232	3	5
8:00 AM	to 8:15 AM	22	181	8	22	7	179	42	13	0	0	0	5	20	248	4	4
8:15 AM	to 8:30 AM	34	234	7	22	1	181	41	22	0	0	0	6	33	242	7	4
8:30 AM	to 8:45 AM	24	179	8	27	6	180	61	43	0	0	0	8	13	254	10	6
8:45 AM	to 9:00 AM	28	189	12	54	11	182	24	17	0	0	0	15	17	225	5	11
9:00 AM	to 9:15 AM	30	180	8	57	10	182	27	46	0	0	0	10	14	264	9	11
9:15 AM	to 9:30 AM	26	166	11	31	5	197	46	26	0	0	0	11	21	251	10	11

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**E St.**				**One Way**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	12	251	12	76	0	45	11	67	0	0	0	104	36	54	0	66
4:15 PM	to 4:30 PM	12	289	15	48	0	67	22	73	0	0	0	93	24	57	0	79
4:30 PM	to 4:45 PM	6	303	18	62	0	94	28	77	0	0	0	89	35	49	0	58
4:45 PM	to 5:00 PM	8	297	10	49	0	78	35	77	0	0	0	127	25	51	0	59
5:00 PM	to 5:15 PM	6	280	13	55	0	86	39	84	0	0	0	106	33	45	0	54
5:15 PM	to 5:30 PM	6	316	12	73	0	100	35	80	0	0	0	183	36	57	0	69
5:30 PM	to 5:45 PM	5	280	12	107	0	88	29	128	0	0	0	188	31	79	0	99
5:45 PM	to 6:00 PM	6	323	11	117	0	104	29	275	0	0	0	179	25	50	0	144
6:00 PM	to 6:15 PM	9	327	13	57	0	97	24	144	0	0	0	186	43	65	0	94
6:15 PM	to 6:30 PM	9	311	10	56	2	67	22	106	0	0	0	194	46	83	0	61
6:30 PM	to 6:45 PM	7	276	12	58	0	64	10	71	0	0	0	99	36	52	0	68
6:45 PM	to 7:00 PM	5	266	19	63	0	57	13	79	0	0	0	79	30	62	0	48

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th St.**				**E St.**				**One Way**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	116	782	35	160	28	725	153	128	0	0	0	39	77	985	31	32
PM INTERSECTION PEAK HOUR																	
5:15 PM	to 6:15 PM	26	1246	48	354	0	389	117	627	0	0	0	736	135	251	0	406
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	116	782	35	160	28	725	153	128	0	0	0	39	77	985	31	32
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	26	1246	48	354	0	389	117	627	0	0	0	736	135	251	0	406

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**E St.**				**One Way**				**E St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.85	0.84	0.73	**0.85**	0.64	1.00	0.63	**0.92**	0.00	0.00	0.00	**#DIV/0!**	0.58	0.93	0.78	**0.95**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.72	0.95	0.92	**0.95**	0.00	0.94	0.84	**0.94**	0.00	0.00	0.00	**#DIV/0!**	0.78	0.79	0.00	**0.88**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 7940 **PM Period Intersection Volume:** 6117

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**8th Street**				**E St.**				**8th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	0	1	2	10	6	28	5	6	1	1	0	7	4	25	0	12
6:45 AM	to 7:00 AM	0	2	2	8	1	34	3	17	5	0	1	5	8	28	1	21
7:00 AM	to 7:15 AM	5	4	3	20	3	45	7	23	3	4	5	10	13	35	2	19
7:15 AM	to 7:30 AM	1	2	1	14	3	52	13	15	5	2	5	16	3	29	2	32
7:30 AM	to 7:45 AM	1	7	1	18	2	53	12	34	3	4	8	26	4	43	9	22
7:45 AM	to 8:00 AM	5	7	4	25	4	68	14	21	4	8	6	12	15	50	6	40
8:00 AM	to 8:15 AM	0	9	0	39	5	51	15	38	12	12	6	21	8	34	7	46
8:15 AM	to 8:30 AM	2	12	1	19	8	83	22	42	12	13	15	28	27	46	7	61
8:30 AM	to 8:45 AM	1	4	2	35	5	65	11	42	7	6	15	27	12	50	3	45
8:45 AM	to 9:00 AM	4	8	2	25	9	79	1	44	2	9	8	25	7	48	8	53
9:00 AM	to 9:15 AM	2	3	2	43	7	72	11	37	8	3	6	24	4	39	8	45
9:15 AM	to 9:30 AM	1	1	1	22	6	48	6	37	6	6	8	21	9	51	3	48

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**8th Street**				**E St.**				**8th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	20	0	21	73	14	97	1	77	0	0	0	67	0	71	8	213
4:15 PM	to 4:30 PM	13	0	13	58	11	97	0	39	0	0	0	51	0	64	8	166
4:30 PM	to 4:45 PM	12	0	6	83	16	104	0	65	0	0	0	48	0	79	6	216
4:45 PM	to 5:00 PM	6	0	13	46	12	94	0	66	0	0	0	48	0	77	4	182
5:00 PM	to 5:15 PM	8	0	30	86	14	105	0	82	0	0	0	64	0	81	9	182
5:15 PM	to 5:30 PM	19	0	21	71	7	107	0	82	0	0	0	69	0	74	3	146
5:30 PM	to 5:45 PM	18	0	24	78	13	94	0	101	0	0	0	92	0	76	4	140
5:45 PM	to 6:00 PM	19	0	27	73	16	93	0	80	0	0	0	57	0	76	12	146
6:00 PM	to 6:15 PM	14	0	19	102	15	104	0	94	0	0	0	81	0	93	5	147
6:15 PM	to 6:30 PM	10	0	18	82	19	86	0	106	0	0	0	60	0	85	14	137
6:30 PM	to 6:45 PM	16	0	16	69	14	90	0	160	0	0	0	59	0	81	11	138
6:45 PM	to 7:00 PM	18	0	14	98	11	86	0	87	0	0	0	55	0	81	14	149

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**8th Street**				**E St.**				**8th Street**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
7:45 AM	to 8:45 AM	8	32	7	118	22	267	62	143	35	39	42	88	62	180	23	192
PM INTERSECTION PEAK HOUR																	
5:30 PM	to 6:30 PM	61	0	88	335	63	377	0	381	0	0	0	290	0	330	35	570
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	9	27	7	122	29	299	45	165	29	31	44	104	50	183	26	204
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	70	0	91	324	51	398	0	357	0	0	0	299	0	319	24	579

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	8th Street				**E St.**				**8th Street**				**E St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.56	0.56	0.88	**0.72**	0.81	0.90	0.51	**0.83**	0.60	0.60	0.73	**0.65**	0.46	0.92	0.81	**0.81**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.92	0.00	0.84	**0.88**	0.80	0.93	0.00	**0.94**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.86	0.50	**0.88**

Overall AM PEAK HOUR FACTOR = **0.79** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 1827 **PM Period Intersection Volume:** 2751

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th St.**				**E St.**				**7th St.**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	4	34	1	18	12	31	3	4	12	65	6	29	1	20	7	15
6:45 AM	to 7:00 AM	2	45	8	17	3	36	2	8	8	71	3	59	4	29	2	25
7:00 AM	to 7:15 AM	9	44	1	14	9	43	2	13	15	83	2	67	5	35	1	20
7:15 AM	to 7:30 AM	4	46	1	15	5	66	2	11	23	74	3	74	0	35	2	34
7:30 AM	to 7:45 AM	3	61	2	21	12	64	3	21	14	97	3	76	2	40	2	23
7:45 AM	to 8:00 AM	6	48	0	24	10	73	2	31	18	95	4	97	9	48	1	44
8:00 AM	to 8:15 AM	3	48	4	45	7	65	3	35	24	139	4	98	5	40	1	48
8:15 AM	to 8:30 AM	6	59	2	50	6	98	2	32	25	122	5	110	10	45	2	49
8:30 AM	to 8:45 AM	6	48	5	42	14	77	3	41	27	111	5	145	9	47	5	67
8:45 AM	to 9:00 AM	7	56	3	43	9	80	1	26	19	119	5	140	2	51	5	57
9:00 AM	to 9:15 AM	4	58	3	47	11	80	10	36	16	114	8	158	4	39	6	49
9:15 AM	to 9:30 AM	4	52	3	32	8	54	4	29	32	102	4	154	6	47	2	54

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th St.**				**E St.**				**7th St.**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	16	87	11	130	11	89	10	48	11	102	6	158	20	61	15	109
4:15 PM	to 4:30 PM	10	80	5	143	24	94	17	30	28	101	6	158	18	59	3	84
4:30 PM	to 4:45 PM	9	91	4	61	16	98	13	163	16	107	13	102	14	62	8	85
4:45 PM	to 5:00 PM	12	67	7	60	20	90	8	185	15	102	3	89	19	53	5	99
5:00 PM	to 5:15 PM	7	98	10	71	27	102	11	189	16	102	6	88	24	77	5	87
5:15 PM	to 5:30 PM	12	99	7	56	17	96	12	207	17	125	4	106	21	62	7	137
5:30 PM	to 5:45 PM	13	98	5	63	28	96	15	211	15	132	4	110	23	72	4	177
5:45 PM	to 6:00 PM	12	69	11	79	13	84	16	232	23	109	7	110	41	55	9	226
6:00 PM	to 6:15 PM	14	87	5	77	14	103	10	224	20	132	5	104	30	73	6	183
6:15 PM	to 6:30 PM	13	64	3	58	18	88	11	235	12	112	5	78	24	69	18	128
6:30 PM	to 6:45 PM	15	65	6	81	15	78	12	273	14	111	11	103	19	60	21	197
6:45 PM	to 7:00 PM	8	43	21	81	28	69	23	285	24	112	21	103	27	56	15	181

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th St.**				**E St.**				**7th St.**				**E St.**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	23	221	13	182	40	335	16	135	87	466	23	553	25	182	18	222
PM INTERSECTION PEAK HOUR																	
5:15 PM	to 6:15 PM	51	353	28	275	72	379	53	874	75	498	20	430	115	262	26	723
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	23	221	13	182	40	335	16	135	87	466	23	553	25	182	18	222
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	51	353	28	275	72	379	53	874	75	498	20	430	115	262	26	723

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	7th St.				**E St.**				**7th St.**				**E St.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.82	0.94	0.65	**0.96**	0.71	0.85	0.40	**0.92**	0.81	0.95	0.72	**0.95**	0.63	0.89	0.75	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.91	0.89	0.64	**0.92**	0.64	0.92	0.83	**0.91**	0.82	0.94	0.71	**0.94**	0.70	0.90	0.72	**0.92**

Overall AM PEAK HOUR FACTOR = **0.95** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 3646 **PM Period Intersection Volume:** 5464

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, May 20, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**D St.**				**One Way**				**No Approach**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	108	12	8	0	0	5	50	0	0	0	9	0	0	0	0
6:45 AM	to	7:00 AM	0	133	10	19	0	0	6	54	0	0	0	11	0	0	0	1
7:00 AM	to	7:15 AM	0	185	13	20	0	0	11	64	0	0	0	18	0	0	0	0
7:15 AM	to	7:30 AM	0	168	14	20	0	0	17	83	0	0	0	21	0	0	0	1
7:30 AM	to	7:45 AM	0	194	16	49	0	7	17	103	0	0	0	15	0	0	0	2
7:45 AM	to	8:00 AM	0	215	22	23	0	0	12	124	0	0	0	22	0	0	0	6
8:00 AM	to	8:15 AM	0	224	16	23	0	2	27	101	0	0	0	19	0	0	0	3
8:15 AM	to	8:30 AM	0	200	21	19	0	0	38	100	0	0	0	30	0	0	0	1
8:30 AM	to	8:45 AM	0	216	25	18	0	0	19	92	0	0	0	27	0	0	0	0
8:45 AM	to	9:00 AM	0	210	24	25	1	0	17	92	0	0	0	39	0	0	0	6
9:00 AM	to	9:15 AM	0	206	21	38	0	0	9	68	0	0	0	28	0	0	0	0
9:15 AM	to	9:30 AM	0	198	23	24	0	0	12	46	0	0	0	19	0	0	0	2

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**D St.**				**One Way**				**No Approach**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	1	366	10	55	0	0	67	88	0	0	0	103	0	0	0	0
4:15 PM	to	4:30 PM	0	322	35	36	0	0	38	82	0	0	0	88	0	0	0	2
4:30 PM	to	4:45 PM	0	332	6	40	0	0	56	105	0	0	0	90	0	0	0	0
4:45 PM	to	5:00 PM	0	373	6	38	0	0	44	59	0	0	0	65	0	0	0	0
5:00 PM	to	5:15 PM	0	316	5	30	0	0	83	96	0	0	0	92	0	0	0	1
5:15 PM	to	5:30 PM	0	322	3	44	0	0	57	93	0	0	0	109	0	0	0	1
5:30 PM	to	5:45 PM	0	330	3	80	0	0	61	94	0	0	0	73	0	0	0	1
5:45 PM	to	6:00 PM	0	317	8	80	0	0	56	78	0	0	0	74	0	0	0	0
6:00 PM	to	6:15 PM	0	381	10	29	0	0	41	19	0	0	0	55	0	0	0	0
6:15 PM	to	6:30 PM	0	340	5	37	0	0	59	18	0	0	0	46	0	0	0	1
6:30 PM	to	6:45 PM	0	317	13	26	0	0	38	12	0	0	0	37	0	0	0	0
6:45 PM	to	7:00 PM	0	291	13	51	0	0	56	13	0	0	0	33	0	0	0	0

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**D St.**				**One Way**				**No Approach**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	0	850	86	85	1	2	101	385	0	0	0	115	0	0	0	10
PM INTERSECTION PEAK HOUR																		
4:00 PM	to	5:00 PM	1	1393	57	169	0	0	205	334	0	0	0	346	0	0	0	2
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	0	832	91	100	1	0	83	352	0	0	0	124	0	0	0	7
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	0	1350	24	233	0	0	215	284	0	0	0	311	0	0	0	2

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**D St.**				**One Way**				**No Approach**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.96	0.91	**0.96**	0.25	0.00	0.55	**0.55**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.89	0.60	**0.88**	0.00	0.00	0.88	**0.88**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = 0.97 **Overall PM PEAK HOUR FACTOR = 0.92**

AM Period Intersection Volume: 2674 **PM Period Intersection Volume:** 4781

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**D Street**				**7th Street**				**D Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	2	34	1	21	6	4	4	8	3	81	7	21	3	2	0	3
6:45 AM	to 7:00 AM	3	44	4	20	4	5	4	7	5	77	14	30	2	4	0	16
7:00 AM	to 7:15 AM	2	45	1	28	4	13	7	22	4	94	23	31	0	3	1	10
7:15 AM	to 7:30 AM	2	46	1	39	4	15	6	20	2	91	27	51	2	5	2	13
7:30 AM	to 7:45 AM	3	60	1	37	4	18	4	31	2	99	21	50	5	10	8	17
7:45 AM	to 8:00 AM	1	54	4	34	1	11	4	29	6	116	35	61	8	6	5	30
8:00 AM	to 8:15 AM	5	46	3	53	10	21	5	31	8	157	35	57	6	8	2	20
8:15 AM	to 8:30 AM	1	65	4	46	6	27	5	43	9	132	39	73	8	16	4	31
8:30 AM	to 8:45 AM	5	46	3	48	7	12	8	48	9	130	34	78	8	10	4	27
8:45 AM	to 9:00 AM	6	55	2	69	11	18	7	83	12	127	33	98	4	5	2	29
9:00 AM	to 9:15 AM	5	64	6	66	6	11	9	57	11	131	30	81	2	10	2	42
9:15 AM	to 9:30 AM	10	40	4	69	14	14	7	50	6	113	34	85	4	4	1	52

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**D Street**				**7th Street**				**D Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	14	92	16	120	10	20	12	75	3	95	13	114	7	18	14	64
4:15 PM	to 4:30 PM	10	96	4	135	18	11	20	69	8	102	12	126	4	19	10	57
4:30 PM	to 4:45 PM	15	101	9	85	16	15	20	81	5	105	12	157	9	15	14	47
4:45 PM	to 5:00 PM	11	81	5	115	13	20	7	79	1	93	12	174	8	11	11	57
5:00 PM	to 5:15 PM	10	111	11	136	11	21	9	85	7	91	12	213	15	16	15	80
5:15 PM	to 5:30 PM	14	107	15	129	13	29	9	80	9	122	13	185	13	17	14	62
5:30 PM	to 5:45 PM	11	108	10	188	5	21	11	96	6	130	6	248	11	19	15	75
5:45 PM	to 6:00 PM	18	104	11	179	16	16	9	118	3	112	17	178	9	18	15	90
6:00 PM	to 6:15 PM	24	102	9	161	16	20	10	165	12	131	17	158	11	12	18	59
6:15 PM	to 6:30 PM	14	69	10	94	11	20	15	89	10	112	15	171	14	19	14	59
6:30 PM	to 6:45 PM	14	72	2	124	11	14	11	80	23	114	19	122	10	21	12	36
6:45 PM	to 7:00 PM	19	66	8	141	12	15	13	63	22	129	19	179	12	20	12	53

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**D Street**				**7th Street**				**D Street**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:00 AM	to 9:00 AM	17	212	12	216	34	78	25	205	38	546	141	306	26	39	12	107
PM INTERSECTION PEAK HOUR																	
5:15 PM	to 6:15 PM	67	421	45	657	50	86	39	459	30	495	53	769	44	66	62	286
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	17	230	15	229	30	68	29	231	41	520	136	330	22	41	12	129
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	67	421	45	657	50	86	39	459	30	495	53	769	44	66	62	286

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	7th Street				**D Street**				**7th Street**				**D Street**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.71	0.88	0.63	**0.87**	0.68	0.63	0.81	**0.84**	0.85	0.98	0.87	**0.97**	0.69	0.64	0.75	**0.67**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.70	0.97	0.75	**0.98**	0.78	0.74	0.89	**0.86**	0.63	0.94	0.78	**0.90**	0.85	0.87	0.86	**0.96**

Overall AM PEAK HOUR FACTOR = **0.92** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 2917 **PM Period Intersection Volume:** 4017

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, May 20, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**14th Street**				**Pennsylvania Avenue**				**14th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	110	0	15	4	21	1	11	25	273	2	27	3	31	1	34
6:45 AM	to	7:00 AM	2	117	0	19	3	22	0	16	32	303	3	26	13	44	2	33
7:00 AM	to	7:15 AM	2	154	0	22	11	42	1	16	42	285	9	45	10	56	0	36
7:15 AM	to	7:30 AM	2	157	0	28	7	38	0	18	30	302	4	68	16	63	0	45
7:30 AM	to	7:45 AM	0	169	0	34	7	45	0	8	41	276	5	81	12	73	0	64
7:45 AM	to	8:00 AM	1	181	0	32	10	45	0	18	35	321	9	52	8	68	0	41
8:00 AM	to	8:15 AM	1	186	0	41	12	50	1	28	49	338	3	90	22	81	0	86
8:15 AM	to	8:30 AM	1	185	0	42	10	37	0	55	35	338	7	150	12	61	1	81
8:30 AM	to	8:45 AM	3	198	1	37	14	63	2	26	38	366	7	71	3	70	0	66
8:45 AM	to	9:00 AM	1	157	0	40	23	57	0	23	44	330	11	68	12	80	0	77
9:00 AM	to	9:15 AM	3	157	0	39	8	38	2	34	44	351	11	85	10	81	0	82
9:15 AM	to	9:30 AM	4	201	0	46	18	50	0	28	43	323	13	67	16	92	0	76

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**14th Street**				**Pennsylvania Avenue**				**14th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	2	243	0	80	16	67	1	19	46	211	11	82	38	57	0	136
4:15 PM	to	4:30 PM	2	262	1	56	33	66	0	47	36	228	14	102	37	42	0	91
4:30 PM	to	4:45 PM	0	241	0	80	25	80	1	32	46	208	14	88	34	50	0	170
4:45 PM	to	5:00 PM	3	208	0	91	20	96	0	40	36	231	13	85	31	49	0	106
5:00 PM	to	5:15 PM	5	234	0	79	21	123	0	45	33	205	16	104	30	36	0	141
5:15 PM	to	5:30 PM	2	202	0	72	22	104	1	32	43	211	11	138	37	36	0	120
5:30 PM	to	5:45 PM	4	249	0	78	20	94	1	49	37	217	9	180	36	31	0	306
5:45 PM	to	6:00 PM	2	233	1	57	15	94	0	52	29	216	16	129	23	42	1	141
6:00 PM	to	6:15 PM	1	274	0	54	15	92	0	37	36	227	15	106	23	27	0	110
6:15 PM	to	6:30 PM	3	265	1	28	12	78	4	37	18	207	8	100	21	36	0	200
6:30 PM	to	6:45 PM	2	300	1	41	15	83	1	23	25	211	10	166	22	46	0	154
6:45 PM	to	7:00 PM	1	296	1	36	13	67	1	21	19	219	12	152	17	45	0	152

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**14th Street**				**Pennsylvania Avenue**				**14th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	11	713	1	162	63	208	4	111	169	1370	42	291	41	323	0	301
PM INTERSECTION PEAK HOUR																		
4:15 PM	to	5:15 PM	10	945	1	306	99	365	1	164	151	872	57	379	132	177	0	508
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	8	697	1	158	55	195	4	138	161	1385	36	374	37	292	1	306
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	9	958	1	261	72	384	2	170	145	871	51	553	119	136	1	677

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	14th Street				**Pennsylvania Avenue**				**14th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.67	0.88	0.25	**0.87**	0.60	0.77	0.50	**0.79**	0.91	0.95	0.82	**0.96**	0.77	0.90	0.25	**0.90**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.56	0.87	0.25	**0.88**	0.82	0.92	0.50	**0.90**	0.84	0.96	0.80	**0.96**	0.80	0.81	0.25	**0.88**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 7924 **PM Period Intersection Volume:** 8311

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**13th Street**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	3	0	5	13	19	30	0	19	0	0	0	24	0	33	30	0
6:45 AM	to	7:00 AM	3	0	27	24	24	47	0	17	0	0	0	35	0	19	24	1
7:00 AM	to	7:15 AM	14	0	21	52	36	60	0	18	0	0	0	42	0	50	30	1
7:15 AM	to	7:30 AM	7	0	29	39	34	56	1	21	0	0	0	63	0	45	27	0
7:30 AM	to	7:45 AM	7	0	26	44	28	77	0	9	0	0	0	46	0	40	35	2
7:45 AM	to	8:00 AM	18	0	40	42	36	68	0	17	0	0	0	65	0	62	38	2
8:00 AM	to	8:15 AM	12	0	51	72	59	99	0	26	0	0	0	70	0	69	54	0
8:15 AM	to	8:30 AM	15	0	36	112	48	69	0	24	0	0	0	94	0	63	43	2
8:30 AM	to	8:45 AM	11	0	45	87	53	84	0	31	0	0	0	109	0	61	41	1
8:45 AM	to	9:00 AM	20	0	63	80	69	85	0	35	0	0	0	131	0	58	41	0
9:00 AM	to	9:15 AM	9	0	74	84	81	86	0	23	0	0	0	107	0	64	51	1
9:15 AM	to	9:30 AM	13	0	59	71	81	79	0	18	0	0	0	70	0	64	56	1

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**13th Street**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	14	0	83	74	47	102	1	42	0	0	0	91	0	94	15	4
4:15 PM	to	4:30 PM	14	0	104	44	55	75	0	44	0	0	0	93	0	89	17	1
4:30 PM	to	4:45 PM	18	0	106	47	44	96	0	48	0	0	0	148	0	88	20	3
4:45 PM	to	5:00 PM	15	0	96	62	38	91	0	41	0	0	0	115	0	83	21	6
5:00 PM	to	5:15 PM	33	0	90	66	54	103	0	38	0	0	0	132	0	75	28	1
5:15 PM	to	5:30 PM	35	0	125	74	48	115	1	45	0	0	0	129	0	78	40	2
5:30 PM	to	5:45 PM	34	0	107	82	35	106	0	43	0	0	0	136	0	62	34	2
5:45 PM	to	6:00 PM	35	0	115	62	43	97	0	44	0	0	0	131	0	71	40	12
6:00 PM	to	6:15 PM	28	0	97	84	48	99	0	40	0	0	0	133	0	84	23	10
6:15 PM	to	6:30 PM	30	0	112	48	66	95	0	39	0	0	0	100	0	85	33	7
6:30 PM	to	6:45 PM	21	0	86	56	56	90	0	57	0	0	0	69	0	54	24	3
6:45 PM	to	7:00 PM	28	0	63	37	59	70	0	47	0	0	0	58	0	61	16	6

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**13th Street**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	53	0	241	322	284	334	0	107	0	0	0	417	0	247	189	3
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	137	0	437	284	180	421	1	170	0	0	0	528	0	286	142	17
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	55	0	218	363	251	324	0	113	0	0	0	441	0	246	176	4
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	132	0	444	302	174	417	1	172	0	0	0	529	0	295	137	26

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	13th Street				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.69	0.00	0.74	**0.82**	0.77	0.94	0.00	**0.86**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.96	0.86	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.94	0.00	0.89	**0.90**	0.91	0.91	0.25	**0.90**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.88	0.86	**0.92**

Overall AM PEAK HOUR FACTOR = **0.87** **Overall PM PEAK HOUR FACTOR** = **0.90**

AM Period Intersection Volume: 3115 **PM Period Intersection Volume:** 4458

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 26, 2012

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**One Way**				**Pennsylvania Avenue**				**12th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	39	33	68	0	87	21	307	28	17	9	60	0	38
6:45 AM	to	7:00 AM	0	0	0	34	25	82	0	41	25	326	23	17	4	78	0	41
7:00 AM	to	7:15 AM	0	0	0	42	38	82	0	45	26	360	24	32	6	84	0	55
7:15 AM	to	7:30 AM	0	0	0	47	32	96	0	51	23	396	20	23	18	94	0	45
7:30 AM	to	7:45 AM	0	0	0	47	52	137	0	64	44	400	25	41	11	97	0	59
7:45 AM	to	8:00 AM	0	0	0	67	65	162	0	56	36	409	39	39	16	113	0	64
8:00 AM	to	8:15 AM	0	0	0	73	70	152	0	117	39	390	27	40	13	98	0	72
8:15 AM	to	8:30 AM	0	0	0	55	70	169	0	68	28	384	26	47	21	113	0	77
8:30 AM	to	8:45 AM	0	0	0	68	78	183	0	78	45	385	45	40	17	121	0	88
8:45 AM	to	9:00 AM	0	0	0	58	77	171	0	59	26	360	37	46	22	108	0	98
9:00 AM	to	9:15 AM	0	0	0	41	74	179	0	68	34	286	33	50	16	129	0	63
9:15 AM	to	9:30 AM	0	0	0	41	51	141	0	51	28	250	33	35	19	132	0	61

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**One Way**				**Pennsylvania Avenue**				**12th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	79	46	140	0	79	28	175	26	43	18	131	0	107
4:15 PM	to	4:30 PM	0	0	0	89	46	158	0	71	21	205	18	34	27	163	0	100
4:30 PM	to	4:45 PM	0	0	0	79	42	128	0	85	24	176	19	77	15	165	0	122
4:45 PM	to	5:00 PM	0	0	0	118	53	142	0	113	26	252	23	65	23	154	0	98
5:00 PM	to	5:15 PM	0	0	0	127	44	161	0	105	25	222	19	68	39	158	0	115
5:15 PM	to	5:30 PM	0	0	0	107	47	146	1	99	18	218	14	69	37	166	0	120
5:30 PM	to	5:45 PM	0	0	0	148	48	169	0	164	24	206	22	75	30	146	0	159
5:45 PM	to	6:00 PM	0	0	0	115	59	139	0	96	23	240	20	70	38	152	0	104
6:00 PM	to	6:15 PM	0	0	0	102	48	159	0	128	30	201	28	73	36	145	0	95
6:15 PM	to	6:30 PM	0	0	0	55	47	145	0	130	22	232	13	57	36	152	0	69
6:30 PM	to	6:45 PM	0	0	0	77	47	170	1	114	27	214	26	34	29	107	0	59
6:45 PM	to	7:00 PM	0	0	0	63	29	131	0	133	28	201	25	41	13	71	0	48

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**One Way**				**Pennsylvania Avenue**				**12th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	0	0	0	263	283	666	0	319	148	1568	137	166	67	445	0	301
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	0	0	0	500	192	618	1	481	93	898	78	612	129	624	0	492
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	0	0	0	222	299	702	0	273	133	1415	141	183	76	471	0	326
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	0	0	0	472	202	613	1	487	95	865	84	287	141	609	0	478

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	One Way				**Pennsylvania Avenue**				**12th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.96	0.96	0.00	**0.96**	0.74	0.92	0.78	**0.89**	0.86	0.91	0.00	**0.94**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.86	0.91	0.25	**0.94**	0.79	0.90	0.75	**0.92**	0.93	0.92	0.00	**0.92**

Overall AM PEAK HOUR FACTOR = **0.93** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 8674 **PM Period Intersection Volume:** 7488

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 26, 2012

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**11th St.**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	3	0	30	11	39	97	0	48	0	0	0	42	0	60	25	193
6:45 AM	to 7:00 AM	10	0	21	14	36	106	0	48	0	0	0	29	0	73	30	136
7:00 AM	to 7:15 AM	8	0	28	12	49	104	0	66	0	0	0	46	0	80	25	147
7:15 AM	to 7:30 AM	7	0	27	14	62	128	0	57	0	0	0	24	0	84	34	150
7:30 AM	to 7:45 AM	12	0	46	24	83	177	2	76	0	0	0	30	0	104	38	111
7:45 AM	to 8:00 AM	15	0	46	26	65	210	0	72	0	0	0	34	0	104	35	122
8:00 AM	to 8:15 AM	17	0	44	16	76	199	0	70	0	0	0	22	0	107	35	147
8:15 AM	to 8:30 AM	27	0	44	28	96	224	0	123	0	0	0	34	0	122	33	134
8:30 AM	to 8:45 AM	19	0	57	20	93	235	1	114	0	0	0	36	0	117	47	130
8:45 AM	to 9:00 AM	17	0	51	21	111	245	0	75	0	0	0	45	0	102	37	124
9:00 AM	to 9:15 AM	26	0	48	26	107	218	0	88	0	0	0	27	0	113	41	72
9:15 AM	to 9:30 AM	14	0	36	18	103	184	0	36	0	0	0	20	0	122	41	66

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**11th St.**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	14	0	69	53	42	173	0	108	0	0	0	41	0	136	14	193
4:15 PM	to 4:30 PM	32	0	84	35	49	168	0	97	0	0	0	39	0	168	18	136
4:30 PM	to 4:45 PM	14	0	77	52	53	154	0	144	0	0	0	53	0	185	9	147
4:45 PM	to 5:00 PM	31	0	79	46	52	162	0	155	0	0	0	57	0	166	19	150
5:00 PM	to 5:15 PM	35	0	95	40	48	157	0	161	0	0	0	52	0	158	16	111
5:15 PM	to 5:30 PM	46	0	114	63	48	159	0	172	0	0	0	53	0	170	15	122
5:30 PM	to 5:45 PM	30	0	111	51	51	178	0	183	0	0	0	40	0	145	18	147
5:45 PM	to 6:00 PM	29	0	88	34	41	167	0	236	0	0	0	53	0	172	18	134
6:00 PM	to 6:15 PM	43	0	92	39	42	166	0	162	0	0	0	35	0	147	16	130
6:15 PM	to 6:30 PM	28	0	100	70	58	161	0	166	0	0	0	53	0	152	23	124
6:30 PM	to 6:45 PM	40	0	105	4	53	173	1	126	0	0	0	64	0	118	15	72
6:45 PM	to 7:00 PM	27	0	95	10	55	127	0	150	0	0	0	15	0	71	21	66

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**11th St.**				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	89	0	200	95	407	922	1	400	0	0	0	142	0	454	158	460
PM INTERSECTION PEAK HOUR																	
5:00 PM	to 6:00 PM	140	0	408	188	188	661	0	752	0	0	0	198	0	645	67	514
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	89	0	200	95	407	922	1	400	0	0	0	142	0	454	158	460
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	148	0	405	187	182	670	0	753	0	0	0	181	0	634	67	533

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	11th St.				**Pennsylvania Avenue**				**One Way**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.82	0.00	0.88	**0.95**	0.92	0.94	0.25	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.93	0.84	**0.93**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.80	0.00	0.89	**0.86**	0.89	0.94	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.92	0.93	**0.92**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 5312 **PM Period Intersection Volume:** 6006

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 26, 2012

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Pennsylvania Avenue**				**10th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	8	4	13	36	0	122	0	55	7	0	3	16	10	79	0	24
6:45 AM	to	7:00 AM	2	1	8	36	0	123	0	47	12	0	13	19	8	85	0	29
7:00 AM	to	7:15 AM	5	3	9	31	0	133	0	61	19	0	15	27	7	103	0	22
7:15 AM	to	7:30 AM	9	4	11	52	0	158	0	84	16	0	22	27	11	105	0	27
7:30 AM	to	7:45 AM	11	7	19	36	0	219	0	101	12	0	31	23	17	135	0	40
7:45 AM	to	8:00 AM	6	5	15	37	0	234	0	84	19	0	27	24	16	141	0	48
8:00 AM	to	8:15 AM	9	4	14	56	0	225	0	104	20	0	52	32	17	132	0	49
8:15 AM	to	8:30 AM	10	7	15	37	0	267	0	130	21	0	52	30	13	134	0	45
8:30 AM	to	8:45 AM	8	8	26	31	0	265	0	122	17	0	50	30	14	158	0	49
8:45 AM	to	9:00 AM	10	13	20	28	0	300	1	75	14	0	61	35	18	135	0	54
9:00 AM	to	9:15 AM	12	5	24	29	0	253	1	100	30	0	47	38	18	149	0	41
9:15 AM	to	9:30 AM	11	11	17	40	0	229	0	60	14	0	41	20	15	150	0	43

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Pennsylvania Avenue**				**10th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	11	26	51	81	0	184	0	98	10	0	9	54	17	178	0	113
4:15 PM	to	4:30 PM	14	40	47	42	0	193	0	72	10	0	8	30	15	250	0	78
4:30 PM	to	4:45 PM	8	35	53	67	0	186	0	122	16	0	7	62	19	241	0	77
4:45 PM	to	5:00 PM	20	52	46	73	0	184	0	153	19	0	10	34	27	227	0	87
5:00 PM	to	5:15 PM	19	66	58	65	0	179	0	144	14	0	6	80	28	241	0	79
5:15 PM	to	5:30 PM	26	55	65	84	0	167	1	154	13	0	3	62	23	253	0	98
5:30 PM	to	5:45 PM	32	64	63	89	0	197	0	160	14	0	12	49	20	240	0	123
5:45 PM	to	6:00 PM	25	68	57	70	0	174	0	187	11	0	7	73	12	245	0	91
6:00 PM	to	6:15 PM	19	44	76	60	0	181	2	158	9	0	6	40	14	213	0	76
6:15 PM	to	6:30 PM	13	45	65	47	0	205	0	158	11	0	6	33	25	232	0	110
6:30 PM	to	6:45 PM	30	41	68	26	0	197	0	151	14	0	10	40	29	186	2	81
6:45 PM	to	7:00 PM	24	40	21	22	0	146	0	105	8	0	6	12	20	147	0	42

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Pennsylvania Avenue**				**10th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:15 AM	to	9:15 AM	40	33	85	125	0	1085	2	427	82	0	210	133	63	576	0	189
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	102	253	243	308	0	717	1	645	52	0	28	264	83	979	0	391
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	40	33	85	125	0	1085	2	427	82	0	210	133	63	576	0	189
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	102	231	261	303	0	719	3	659	47	0	28	224	69	951	0	388

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	10th Street				**Pennsylvania Avenue**				**10th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.83	0.63	0.82	**0.92**	0.00	0.90	0.50	**0.90**	0.68	0.00	0.86	**0.95**	0.88	0.91	0.00	**0.93**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.80	0.85	0.86	**0.93**	0.00	0.91	0.38	**0.92**	0.84	0.00	0.58	**0.72**	0.75	0.94	0.00	**0.92**

Overall AM PEAK HOUR FACTOR = **0.95** **Overall PM PEAK HOUR FACTOR** = **0.94**

AM Period Intersection Volume: 5179 **PM Period Intersection Volume:** 6826

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, May 20, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**Pennsylvania Ave.**				**One Way**				**Pennsylvania Ave.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	2	67	2	15	0	76	0	21	0	0	0	13	22	64	0	27
6:45 AM	to	7:00 AM	3	124	11	17	0	84	0	22	0	0	0	17	30	80	0	35
7:00 AM	to	7:15 AM	4	174	13	31	0	96	0	43	0	0	0	15	40	58	0	18
7:15 AM	to	7:30 AM	6	188	7	32	4	118	0	66	0	0	0	25	30	73	0	28
7:30 AM	to	7:45 AM	8	188	13	57	0	134	0	74	0	0	0	33	38	74	0	42
7:45 AM	to	8:00 AM	7	195	18	38	3	148	0	102	0	0	0	40	32	89	0	40
8:00 AM	to	8:15 AM	3	209	24	55	2	180	0	115	0	0	0	57	37	128	0	59
8:15 AM	to	8:30 AM	12	194	34	47	0	190	0	154	0	0	0	45	41	116	0	43
8:30 AM	to	8:45 AM	6	194	26	72	0	226	0	176	0	0	0	68	26	118	0	73
8:45 AM	to	9:00 AM	5	172	31	76	0	214	0	160	0	0	0	98	33	127	0	81
9:00 AM	to	9:15 AM	10	207	28	76	9	203	0	121	0	0	0	72	50	123	0	58
9:15 AM	to	9:30 AM	8	141	42	80	0	237	0	130	0	0	0	58	43	128	0	46

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**Pennsylvania Ave.**				**One Way**				**Pennsylvania Ave.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	2	67	2	15	0	76	0	21	0	0	0	89	91	210	0	79
4:15 PM	to	4:30 PM	3	124	11	17	0	84	0	22	0	0	0	79	107	190	0	108
4:30 PM	to	4:45 PM	4	174	13	31	0	96	0	43	0	0	0	99	118	213	0	87
4:45 PM	to	5:00 PM	6	188	7	32	4	118	0	66	0	0	0	88	103	191	0	110
5:00 PM	to	5:15 PM	8	188	13	57	0	134	0	74	0	0	0	134	113	188	0	115
5:15 PM	to	5:30 PM	7	195	18	38	3	148	0	102	0	0	0	95	111	227	0	108
5:30 PM	to	5:45 PM	3	209	24	55	2	180	0	115	0	0	0	97	112	211	0	101
5:45 PM	to	6:00 PM	12	194	34	47	0	190	0	154	0	0	0	91	127	200	0	89
6:00 PM	to	6:15 PM	6	194	26	72	0	226	0	176	0	0	0	72	127	188	0	70
6:15 PM	to	6:30 PM	5	172	31	76	0	214	0	160	0	0	0	67	135	204	0	78
6:30 PM	to	6:45 PM	10	207	28	76	9	203	0	121	0	0	0	62	154	189	0	53
6:45 PM	to	7:00 PM	8	141	42	80	0	237	0	130	0	0	0	52	111	131	0	35

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**9th St.**				**Pennsylvania Ave.**				**One Way**				**Pennsylvania Ave.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	29	714	127	304	9	880	0	587	0	0	0	296	152	496	0	258
PM INTERSECTION PEAK HOUR																		
5:45 PM	to	6:45 PM	33	767	119	271	9	833	0	611	0	0	0	292	543	781	0	290
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	33	767	119	271	9	833	0	611	0	0	0	283	150	484	0	255
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	28	792	102	212	5	744	0	547	0	0	0	355	477	826	0	368

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	9th St.				**Pennsylvania Ave.**				**One Way**				**Pennsylvania Ave.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.69	0.93	0.88	**0.94**	0.25	0.92	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.75	0.95	0.00	**0.92**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.58	0.95	0.75	**0.96**	0.42	0.82	0.00	**0.83**	0.00	0.00	0.00	**#DIV/0!**	0.94	0.91	0.00	**0.96**

Overall AM PEAK HOUR FACTOR = **0.95** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 5900 **PM Period Intersection Volume:** 8051

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**7th Street**				**Pennsylvania Avenue**				**7th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	2	33	0	3	9	45	0	22	5	77	25	13	11	27	7	11
6:45 AM	to	7:00 AM	2	35	0	8	4	78	0	35	4	92	15	24	16	26	13	14
7:00 AM	to	7:15 AM	0	49	0	11	10	71	0	26	1	101	25	34	20	33	26	14
7:15 AM	to	7:30 AM	1	42	2	4	29	94	0	37	5	88	31	52	17	42	28	15
7:30 AM	to	7:45 AM	2	61	0	7	22	110	0	33	5	84	30	47	25	52	26	14
7:45 AM	to	8:00 AM	3	47	0	17	22	127	0	43	2	125	31	55	18	51	29	22
8:00 AM	to	8:15 AM	2	49	1	13	38	136	0	47	13	150	34	38	20	67	38	18
8:15 AM	to	8:30 AM	4	57	1	13	34	143	0	48	10	143	37	49	20	84	29	36
8:30 AM	to	8:45 AM	8	50	0	27	24	157	0	68	5	148	35	50	30	98	33	33
8:45 AM	to	9:00 AM	5	43	1	30	18	155	0	72	6	137	35	51	29	116	38	44
9:00 AM	to	9:15 AM	4	48	1	11	30	170	0	56	9	132	48	76	20	141	36	37
9:15 AM	to	9:30 AM	6	50	0	22	37	132	0	66	3	123	59	40	32	121	27	36

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**7th Street**				**Pennsylvania Avenue**				**7th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	6	92	0	14	25	124	0	90	7	91	15	90	48	136	17	42
4:15 PM	to	4:30 PM	6	90	1	2	31	100	0	79	6	81	22	128	52	178	24	63
4:30 PM	to	4:45 PM	11	112	0	0	31	106	0	76	6	78	15	112	38	191	27	54
4:45 PM	to	5:00 PM	5	75	0	1	24	127	0	115	4	83	18	117	48	153	21	41
5:00 PM	to	5:15 PM	7	108	0	9	16	127	0	120	8	75	18	147	46	178	20	80
5:15 PM	to	5:30 PM	8	115	0	7	30	119	0	97	6	107	25	118	52	173	20	36
5:30 PM	to	5:45 PM	10	111	1	10	43	110	0	89	5	99	15	200	46	184	13	43
5:45 PM	to	6:00 PM	15	88	0	2	36	111	0	57	9	94	21	105	48	176	27	58
6:00 PM	to	6:15 PM	9	114	0	4	36	105	0	77	8	118	20	84	41	155	27	36
6:15 PM	to	6:30 PM	9	76	2	25	25	109	1	79	4	100	30	108	42	163	32	31
6:30 PM	to	6:45 PM	14	77	0	38	29	88	0	70	1	128	22	47	36	131	27	51
6:45 PM	to	7:00 PM	10	59	1	33	28	79	0	70	4	146	14	92	28	120	28	21

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**7th Street**				**Pennsylvania Avenue**				**7th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	23	191	2	90	109	614	0	262	23	540	177	217	111	476	134	150
PM INTERSECTION PEAK HOUR																		
5:15 PM	to	6:15 PM	42	428	1	23	145	445	0	320	28	418	81	507	187	688	87	173
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	21	198	3	81	106	625	0	244	30	560	155	226	99	439	136	150
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	42	428	1	23	145	445	0	320	28	418	81	507	187	688	87	173

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	7th Street				**Pennsylvania Avenue**				**7th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.66	0.87	0.75	**0.90**	0.78	0.92	0.00	**0.91**	0.75	0.95	0.81	**0.98**	0.83	0.78	0.89	**0.86**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.70	0.93	0.25	**0.96**	0.84	0.93	0.00	**0.96**	0.78	0.89	0.81	**0.90**	0.90	0.93	0.81	**0.96**

Overall AM PEAK HOUR FACTOR = **0.93** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 5623 **PM Period Intersection Volume:** 7141

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**6th Street**				**Pennsylvania Avenue**				**6th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	2	26	3	9	16	45	0	17	0	68	6	9	2	19	6	14
6:45 AM	to	7:00 AM	2	27	3	13	14	72	0	16	2	89	10	10	1	22	9	11
7:00 AM	to	7:15 AM	3	22	10	5	23	72	0	20	1	110	5	14	0	32	6	14
7:15 AM	to	7:30 AM	8	26	10	5	26	114	0	18	0	100	6	16	0	45	11	9
7:30 AM	to	7:45 AM	14	32	8	16	28	118	0	32	2	112	6	13	3	40	12	15
7:45 AM	to	8:00 AM	6	37	7	18	39	132	0	39	3	117	12	14	3	46	15	14
8:00 AM	to	8:15 AM	8	37	8	14	46	150	0	52	0	128	14	13	3	71	18	17
8:15 AM	to	8:30 AM	2	40	13	16	48	177	0	59	1	137	6	10	0	79	17	17
8:30 AM	to	8:45 AM	12	39	20	23	44	166	0	92	1	132	7	12	2	94	11	26
8:45 AM	to	9:00 AM	7	42	17	24	45	157	0	82	0	109	9	19	3	106	16	39
9:00 AM	to	9:15 AM	11	34	15	17	50	182	0	74	1	111	15	20	8	120	19	39
9:15 AM	to	9:30 AM	10	48	19	12	51	151	0	78	0	121	8	14	3	111	13	19

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**6th Street**				**Pennsylvania Avenue**				**6th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	23	122	48	0	27	115	0	0	1	43	11	0	5	137	10	0
4:15 PM	to	4:30 PM	21	121	46	0	28	95	0	0	3	47	7	0	6	166	16	0
4:30 PM	to	4:45 PM	18	128	61	0	28	117	0	0	1	61	9	0	1	192	6	0
4:45 PM	to	5:00 PM	17	112	53	0	22	126	0	0	5	70	6	0	1	146	7	0
5:00 PM	to	5:15 PM	18	127	57	0	28	110	2	0	3	59	9	0	5	172	16	0
5:15 PM	to	5:30 PM	16	133	57	0	33	121	0	0	0	61	8	0	3	170	8	0
5:30 PM	to	5:45 PM	30	111	44	0	24	106	1	0	0	82	11	0	5	179	8	0
5:45 PM	to	6:00 PM	23	125	60	0	35	108	0	0	1	69	5	0	4	172	7	0
6:00 PM	to	6:15 PM	30	94	49	0	30	115	0	0	2	76	13	0	4	146	18	0
6:15 PM	to	6:30 PM	38	96	34	0	27	103	2	0	3	93	7	0	1	155	18	0
6:30 PM	to	6:45 PM	20	72	17	0	34	78	0	0	0	95	9	0	3	124	9	0
6:45 PM	to	7:00 PM	20	62	19	0	36	82	0	0	0	75	9	0	3	103	19	0

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**6th Street**				**Pennsylvania Avenue**				**6th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	40	163	71	76	190	656	0	326	2	473	39	65	16	431	59	123
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	87	496	218	0	120	445	3	0	4	271	33	0	17	693	39	0
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	32	155	65	80	187	682	0	307	3	489	37	61	13	399	63	121
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	99	463	210	0	122	450	1	0	3	288	37	0	16	667	41	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	6th Street				**Pennsylvania Avenue**				**6th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.67	0.92	0.81	**0.89**	0.94	0.94	0.00	**0.94**	0.75	0.89	0.62	**0.92**	0.41	0.83	0.83	**0.81**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.83	0.87	0.88	**0.93**	0.87	0.93	0.25	**0.93**	0.38	0.88	0.71	**0.88**	0.80	0.93	0.57	**0.94**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.98**

AM Period Intersection Volume: 5009 **PM Period Intersection Volume:** 6754

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
	Direction:	Southbound				Westbound				Northbound				Eastbound			
	Roadway:	**No Approach**				**Pennsylvania Avenue**				**Constitution Avenue West**				**Pennsylvania Avenue**			
	Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM to 6:45 AM		0	0	0	1	0	53	91	13	90	0	0	0	0	22	0	11
6:45 AM to 7:00 AM		0	0	0	4	0	88	101	10	104	0	0	0	0	25	0	7
7:00 AM to 7:15 AM		0	0	0	2	0	99	122	13	108	0	0	1	0	41	0	13
7:15 AM to 7:30 AM		0	0	0	1	0	134	164	14	128	0	1	0	0	57	2	10
7:30 AM to 7:45 AM		0	0	0	3	0	145	156	25	132	0	0	0	0	47	0	17
7:45 AM to 8:00 AM		0	0	0	4	0	172	163	26	116	0	0	0	0	58	0	11
8:00 AM to 8:15 AM		0	0	0	5	0	191	193	30	119	0	0	0	0	71	0	11
8:15 AM to 8:30 AM		0	0	0	2	0	226	180	25	136	0	0	0	0	100	0	20
8:30 AM to 8:45 AM		0	0	0	2	0	206	211	28	112	0	1	0	0	116	0	31
8:45 AM to 9:00 AM		0	0	0	1	0	221	152	35	123	0	0	0	0	141	0	31
9:00 AM to 9:15 AM		0	0	0	1	0	233	168	19	144	0	0	0	0	131	0	28
9:15 AM to 9:30 AM		0	0	0	1	0	202	168	34	154	0	0	0	0	133	0	42
PM PEAK																	
	Direction:	Southbound				Westbound				Northbound				Eastbound			
	Roadway:	**No Approach**				**Pennsylvania Avenue**				**Constitution Avenue West**				**Pennsylvania Avenue**			
	Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM to 4:15 PM		0	0	0	0	0	143	143	62	155	0	0	0	0	181	0	53
4:15 PM to 4:30 PM		0	0	0	16	0	136	169	156	170	0	0	0	1	209	0	36
4:30 PM to 4:45 PM		0	0	0	0	0	136	174	127	170	0	0	0	0	247	0	62
4:45 PM to 5:00 PM		0	0	0	1	0	162	174	73	161	0	0	0	0	200	0	59
5:00 PM to 5:15 PM		0	0	0	2	0	138	196	60	182	0	0	0	2	230	0	56
5:15 PM to 5:30 PM		0	0	0	8	0	144	198	88	191	0	0	0	0	221	0	50
5:30 PM to 5:45 PM		0	0	0	14	0	131	187	76	148	0	0	0	1	215	0	78
5:45 PM to 6:00 PM		0	0	0	7	0	142	182	68	170	0	0	0	0	235	0	41
6:00 PM to 6:15 PM		0	0	0	3	0	142	161	77	151	0	0	0	0	194	0	45
6:15 PM to 6:30 PM		0	0	0	2	0	139	123	57	152	0	0	0	1	189	0	29
6:30 PM to 6:45 PM		0	0	0	0	0	103	116	36	112	0	0	0	0	140	0	59
6:45 PM to 7:00 PM		0	0	0	0	0	120	103	35	87	0	0	0	0	124	0	19
PEAK HOURS																	
	Direction:	Southbound				Westbound				Northbound				Eastbound			
	Roadway:	**No Approach**				**Pennsylvania Avenue**				**Constitution Avenue West**				**Pennsylvania Avenue**			
	Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:30 AM to 9:30 AM		0	0	0	5	0	862	699	116	533	0	1	0	0	521	0	132
PM INTERSECTION PEAK HOUR																	
4:30 PM to 5:30 PM		0	0	0	11	0	580	742	348	704	0	0	0	2	898	0	227
AM SYSTEM PEAK HOUR																	
8:15 AM to 9:15 AM		0	0	0	6	0	886	711	107	515	0	1	0	0	488	0	110
PM SYSTEM PEAK HOUR																	
5:15 PM to 6:15 PM		0	0	0	32	0	559	728	309	660	0	0	0	1	865	0	214

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	No Approach				**Pennsylvania Avenue**				**Constitution Avenue West**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.95	0.84	**0.96**	0.89	0.00	0.25	**0.90**	0.00	0.87	0.00	**0.87**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.97	0.92	**0.94**	0.86	0.00	0.00	**0.86**	0.25	0.92	0.00	**0.92**

Overall AM PEAK HOUR FACTOR = **0.96** **Overall PM PEAK HOUR FACTOR** = **0.93**

AM Period Intersection Volume: 6251 **PM Period Intersection Volume:** 7801

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**No Approach**				**Pennsylvania Avenue**				**4th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	8	0	137	2	0	6	0	11	12	11	105	0	13
6:45 AM	to	7:00 AM	0	0	0	17	0	164	1	0	5	0	26	9	10	118	0	8
7:00 AM	to	7:15 AM	0	0	0	8	0	195	0	0	12	0	21	5	16	123	0	4
7:15 AM	to	7:30 AM	0	0	0	12	0	264	1	0	16	0	42	12	11	176	0	9
7:30 AM	to	7:45 AM	0	0	0	18	0	266	1	0	12	0	33	16	14	158	0	5
7:45 AM	to	8:00 AM	0	0	0	15	0	284	1	0	23	0	56	12	18	152	0	2
8:00 AM	to	8:15 AM	0	0	0	8	0	340	0	0	31	0	53	20	10	184	0	5
8:15 AM	to	8:30 AM	0	0	0	16	0	337	0	0	23	0	73	28	22	194	0	8
8:30 AM	to	8:45 AM	0	0	0	17	0	363	2	0	21	0	63	33	25	200	0	15
8:45 AM	to	9:00 AM	0	0	0	12	0	313	11	0	19	0	57	24	35	238	0	7
9:00 AM	to	9:15 AM	0	0	0	11	0	345	1	0	19	0	50	28	35	240	0	7
9:15 AM	to	9:30 AM	0	0	0	18	0	319	2	0	35	0	65	23	37	255	0	9

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**No Approach**				**Pennsylvania Avenue**				**4th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	20	0	238	0	0	14	0	31	45	53	285	0	24
4:15 PM	to	4:30 PM	0	0	0	14	0	252	1	0	24	0	49	31	60	338	0	16
4:30 PM	to	4:45 PM	0	0	0	23	0	263	1	0	32	0	43	23	64	372	0	16
4:45 PM	to	5:00 PM	0	0	0	69	0	278	0	6	22	0	47	83	35	304	0	14
5:00 PM	to	5:15 PM	0	0	0	31	0	287	0	0	22	0	53	45	61	355	0	18
5:15 PM	to	5:30 PM	0	0	0	18	0	297	0	0	29	0	61	32	63	348	0	18
5:30 PM	to	5:45 PM	0	0	0	24	0	265	2	0	18	0	40	40	33	320	0	28
5:45 PM	to	6:00 PM	0	0	0	17	0	282	1	0	15	0	45	43	46	368	0	13
6:00 PM	to	6:15 PM	0	0	0	11	0	286	0	0	26	0	37	18	49	318	0	24
6:15 PM	to	6:30 PM	0	0	0	17	0	200	1	0	18	0	34	17	33	239	0	5
6:30 PM	to	6:45 PM	0	0	0	14	0	183	1	5	13	0	36	20	28	242	0	39
6:45 PM	to	7:00 PM	0	0	0	24	0	171	0	4	16	0	48	14	21	188	0	21

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**No Approach**				**Pennsylvania Avenue**				**4th Street**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	0	0	0	58	0	1340	16	0	94	0	235	108	132	933	0	38
PM INTERSECTION PEAK HOUR																		
4:30 PM	to	5:30 PM	0	0	0	141	0	1125	1	6	105	0	204	183	223	1379	0	66
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	0	0	0	56	0	1358	14	0	82	0	243	113	117	872	0	37
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	0	0	0	70	0	1130	3	0	88	0	183	133	191	1354	0	83

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	No Approach				**Pennsylvania Avenue**				**4th Street**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.94	0.32	**0.94**	0.89	0.00	0.83	**0.85**	0.84	0.91	0.00	**0.90**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.95	0.38	**0.95**	0.76	0.00	0.75	**0.75**	0.76	0.92	0.00	**0.93**

Overall AM PEAK HOUR FACTOR = 0.97 **Overall PM PEAK HOUR FACTOR = 0.92**

AM Period Intersection Volume: 6508 **PM Period Intersection Volume:** 8005

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Constitution Avenue East**				**Pennsylvania Avenue**				**No Approach**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	135	0	0	0	0	1	0	6	0	0	0	0	0	15	96	4
6:45 AM	to	7:00 AM	168	0	0	0	0	0	0	13	0	0	0	4	0	9	115	5
7:00 AM	to	7:15 AM	194	0	0	0	0	1	0	4	0	0	0	1	0	20	114	5
7:15 AM	to	7:30 AM	271	0	0	0	0	0	0	4	0	0	0	1	0	51	142	8
7:30 AM	to	7:45 AM	269	0	0	0	0	1	0	8	0	0	0	0	0	19	160	1
7:45 AM	to	8:00 AM	283	0	0	0	0	3	0	6	0	0	0	0	0	29	148	2
8:00 AM	to	8:15 AM	334	0	0	0	0	2	0	15	0	0	0	0	0	29	196	4
8:15 AM	to	8:30 AM	336	0	0	0	0	0	0	15	0	0	0	0	0	32	195	5
8:30 AM	to	8:45 AM	360	0	0	0	0	1	0	20	0	0	0	0	0	40	182	6
8:45 AM	to	9:00 AM	324	0	0	0	0	6	0	14	0	0	0	1	0	45	222	7
9:00 AM	to	9:15 AM	322	0	0	0	0	4	1	9	0	0	0	0	0	45	195	0
9:15 AM	to	9:30 AM	325	0	0	0	0	0	0	40	0	0	0	0	0	63	223	0

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Constitution Avenue East**				**Pennsylvania Avenue**				**No Approach**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	238	0	0	0	0	0	0	38	0	0	0	0	0	64	225	16
4:15 PM	to	4:30 PM	248	0	0	0	0	4	1	98	0	0	0	3	0	80	261	8
4:30 PM	to	4:45 PM	261	0	0	0	0	5	0	138	0	0	0	0	0	97	280	9
4:45 PM	to	5:00 PM	284	0	0	0	0	6	0	40	0	0	0	0	0	97	250	21
5:00 PM	to	5:15 PM	277	0	0	0	0	16	0	27	0	0	0	3	0	88	272	1
5:15 PM	to	5:30 PM	296	0	1	0	0	8	0	30	0	0	0	2	0	89	294	1
5:30 PM	to	5:45 PM	259	0	0	0	0	11	0	25	0	0	0	1	0	86	253	14
5:45 PM	to	6:00 PM	273	0	0	0	0	4	0	21	0	0	0	0	0	100	278	0
6:00 PM	to	6:15 PM	262	0	0	0	0	5	0	19	0	0	0	0	0	87	238	5
6:15 PM	to	6:30 PM	221	0	0	0	0	8	0	28	0	0	0	0	0	91	223	2
6:30 PM	to	6:45 PM	176	0	0	0	0	4	0	15	0	0	0	0	0	62	191	17
6:45 PM	to	7:00 PM	168	0	0	0	0	3	0	10	0	0	0	0	0	39	143	1

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Constitution Avenue East**				**Pennsylvania Avenue**				**No Approach**				**Pennsylvania Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:30 AM	to	9:30 AM	1331	0	0	0	0	11	1	83	0	0	0	1	0	193	822	13
PM INTERSECTION PEAK HOUR																		
4:30 PM	to	5:30 PM	1118	0	1	0	0	35	0	235	0	0	0	5	0	371	1096	32
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	1342	0	0	0	0	11	1	58	0	0	0	1	0	162	794	18
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	1090	0	1	0	0	28	0	95	0	0	0	3	0	362	1063	20

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Constitution Avenue East				**Pennsylvania Avenue**				**No Approach**				**Pennsylvania Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.93	0.00	0.00	**0.93**	0.00	0.46	0.25	**0.50**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.90	0.89	**0.90**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.92	0.00	0.25	**0.92**	0.00	0.64	0.00	**0.64**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.91	0.90	**0.93**

Overall AM PEAK HOUR FACTOR = **0.97** **Overall PM PEAK HOUR FACTOR** = **0.92**

AM Period Intersection Volume: 5726 **PM Period Intersection Volume:** 6927

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 11, 2013

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**14th Street**				**Constitution Avenue**				**14th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	16	115	0	19	21	92	0	47	9	219	1	43	36	471	1	17
6:45 AM	to 7:00 AM	10	117	0	28	44	116	1	56	37	280	0	53	22	267	2	26
7:00 AM	to 7:15 AM	16	116	0	29	33	107	0	51	34	377	0	54	7	257	2	9
7:15 AM	to 7:30 AM	17	125	0	31	28	112	2	61	38	371	2	43	6	250	8	14
7:30 AM	to 7:45 AM	12	141	1	26	30	113	0	58	37	313	0	51	34	367	0	16
7:45 AM	to 8:00 AM	21	117	0	22	33	131	2	71	38	408	0	58	15	326	2	26
8:00 AM	to 8:15 AM	15	142	0	43	23	128	1	47	34	433	0	46	20	329	3	18
8:15 AM	to 8:30 AM	21	155	0	19	35	141	1	58	37	423	2	59	12	323	1	18
8:30 AM	to 8:45 AM	27	155	0	17	25	102	1	37	34	480	2	49	11	307	4	11
8:45 AM	to 9:00 AM	10	167	2	24	20	138	6	59	38	438	0	67	15	320	2	12
9:00 AM	to 9:15 AM	17	151	0	65	30	119	3	39	54	457	0	42	14	314	6	57
9:15 AM	to 9:30 AM	20	132	0	17	30	110	3	42	39	366	3	65	26	293	3	30
PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**14th Street**				**Constitution Avenue**				**14th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	40	361	0	37	20	282	8	44	42	270	3	20	33	285	6	47
4:15 PM	to 4:30 PM	51	364	1	82	18	227	7	52	42	273	3	64	37	276	3	56
4:30 PM	to 4:45 PM	48	384	1	45	16	285	4	30	32	258	0	58	32	300	1	63
4:45 PM	to 5:00 PM	54	391	0	39	11	296	2	23	29	264	0	72	33	318	7	65
5:00 PM	to 5:15 PM	53	470	0	47	13	354	6	192	45	265	1	37	37	306	3	71
5:15 PM	to 5:30 PM	63	463	0	48	16	388	4	38	28	297	0	52	29	334	4	56
5:30 PM	to 5:45 PM	66	577	1	41	21	394	5	92	46	303	2	49	54	336	3	38
5:45 PM	to 6:00 PM	79	501	0	36	13	374	9	42	32	306	3	54	38	289	4	40
6:00 PM	to 6:15 PM	77	499	1	40	12	294	4	81	37	280	0	45	38	325	9	37
6:15 PM	to 6:30 PM	56	474	1	44	12	282	2	53	22	166	0	46	48	277	0	27
6:30 PM	to 6:45 PM	73	563	1	33	6	319	1	36	17	249	0	22	36	238	2	36
6:45 PM	to 7:00 PM	40	645	0	21	3	379	0	25	19	282	0	27	36	230	2	14
PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**14th Street**				**Constitution Avenue**				**14th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	75	628	2	125	110	500	11	193	163	1798	4	217	52	1264	13	98
PM INTERSECTION PEAK HOUR																	
5:15 PM	to 6:15 PM	285	2040	2	165	62	1450	22	253	143	1186	5	200	159	1284	20	171
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	75	628	2	125	110	500	11	193	163	1798	4	217	52	1264	13	98
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	285	2040	2	165	62	1450	22	253	143	1186	5	200	159	1284	20	171
PEAK HOUR FACTORS		Southbound				Westbound				Northbound				Eastbound			
		14th Street				**Constitution Avenue**				**14th Street**				**Constitution Avenue**			
AM Peak Hour		Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR		0.69	0.94	0.25	**0.97**	0.79	0.89	0.46	**0.88**	0.75	0.94	0.50	**0.95**	0.87	0.98	0.54	**0.99**
		Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR		0.90	0.88	0.50	**0.90**	0.74	0.92	0.61	**0.91**	0.78	0.97	0.42	**0.95**	0.74	0.96	0.56	**0.93**

Overall AM PEAK HOUR FACTOR = **0.99** **Overall PM PEAK HOUR FACTOR** = **0.92**

AM Period Intersection Volume: 12699 **PM Period Intersection Volume:** 18110

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 11, 2013

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**12th Street**				**Constitution Avenue**				**12th Street Expressway**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	1	2	0	16	7	98	2	11	30	227	35	13	3	191	41	10
6:45 AM	to	7:00 AM	2	3	1	15	11	120	2	18	44	236	47	16	6	207	56	19
7:00 AM	to	7:15 AM	1	2	3	31	11	169	1	10	33	261	47	23	2	214	66	16
7:15 AM	to	7:30 AM	1	1	4	29	35	168	3	13	19	293	44	18	0	215	62	14
7:30 AM	to	7:45 AM	6	4	4	27	12	150	5	10	42	329	42	19	2	259	65	24
7:45 AM	to	8:00 AM	4	0	0	36	14	196	1	19	51	343	42	26	2	278	67	27
8:00 AM	to	8:15 AM	3	1	3	36	16	183	4	15	44	376	49	22	8	280	61	19
8:15 AM	to	8:30 AM	5	0	2	33	14	181	0	17	48	347	54	39	7	298	67	21
8:30 AM	to	8:45 AM	5	2	2	45	19	167	6	28	47	364	37	56	6	269	55	24
8:45 AM	to	9:00 AM	4	3	1	34	12	198	4	22	45	342	36	38	5	297	59	21
9:00 AM	to	9:15 AM	9	4	0	59	17	165	6	20	36	383	27	23	14	301	58	34
9:15 AM	to	9:30 AM	6	0	3	26	29	234	13	40	33	304	32	15	11	268	59	18

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**12th Street**				**Constitution Avenue**				**12th Street Expressway**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	15	12	2	133	20	275	1	78	14	228	10	71	5	212	32	185
4:15 PM	to	4:30 PM	11	7	4	90	12	256	11	56	22	226	16	73	5	265	31	183
4:30 PM	to	4:45 PM	16	2	1	124	21	305	10	64	20	230	12	44	5	243	30	101
4:45 PM	to	5:00 PM	21	8	0	141	7	336	24	47	24	246	22	55	4	236	31	93
5:00 PM	to	5:15 PM	15	8	1	143	15	303	9	45	17	238	18	77	5	283	33	136
5:15 PM	to	5:30 PM	23	17	3	144	15	314	5	61	25	239	17	91	2	280	42	163
5:30 PM	to	5:45 PM	30	23	2	112	7	335	21	76	26	225	24	130	12	294	39	132
5:45 PM	to	6:00 PM	7	15	4	138	16	295	37	55	30	242	19	73	5	262	53	113
6:00 PM	to	6:15 PM	21	15	5	91	5	231	17	70	46	295	13	96	3	309	33	163
6:15 PM	to	6:30 PM	19	15	5	90	9	272	26	36	44	275	16	93	5	302	34	88
6:30 PM	to	6:45 PM	17	20	1	79	8	246	21	52	29	264	14	66	1	222	42	61
6:45 PM	to	7:00 PM	9	16	1	61	6	242	9	28	37	232	16	37	2	224	31	77

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**12th Street**				**Constitution Avenue**				**12th Street Expressway**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	17	6	8	148	61	729	14	82	184	1429	176	155	26	1144	242	85
PM INTERSECTION PEAK HOUR																		
5:30 PM	to	6:30 PM	77	68	16	431	37	1133	101	237	146	1037	72	392	25	1167	159	496
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	23	9	5	171	62	711	16	87	176	1436	154	156	32	1165	239	100
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	81	70	14	485	43	1175	80	262	127	1001	73	390	22	1145	167	571

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	12th Street				**Constitution Avenue**				**12th Street Expressway**				**Constitution Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.64	0.56	0.63	**0.71**	0.82	0.90	0.67	**0.92**	0.92	0.94	0.71	**0.98**	0.57	0.97	0.89	**0.96**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.68	0.76	0.70	**0.75**	0.67	0.88	0.54	**0.89**	0.69	0.85	0.76	**0.85**	0.46	0.93	0.79	**0.97**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 10993 **PM Period Intersection Volume:** 11221

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 26, 2012

Intersection: **10th Street NW & H Street NW**

AM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	8	0	5	2	4	153	0	13	0	0	0	7	0	236	9	0
6:45 AM	to	7:00 AM	8	0	5	2	7	149	0	7	0	0	0	6	0	268	26	0
7:00 AM	to	7:15 AM	8	0	3	1	2	167	1	11	0	0	0	15	0	255	29	0
7:15 AM	to	7:30 AM	9	0	3	0	11	151	0	13	0	0	0	17	0	250	30	0
7:30 AM	to	7:45 AM	15	0	2	0	11	217	0	18	0	0	0	15	0	265	40	1
7:45 AM	to	8:00 AM	23	0	5	1	12	190	0	4	0	0	0	6	0	317	46	2
8:00 AM	to	8:15 AM	14	0	6	1	23	176	0	11	0	0	0	15	0	273	56	1
8:15 AM	to	8:30 AM	16	0	4	1	25	188	0	10	0	0	0	15	0	276	55	1
8:30 AM	to	8:45 AM	12	0	7	0	26	187	0	31	0	0	0	18	0	278	60	7
8:45 AM	to	9:00 AM	26	0	7	1	26	196	2	15	0	0	0	18	0	277	55	11
9:00 AM	to	9:15 AM	12	0	9	1	22	177	1	14	0	0	0	20	0	256	62	3
9:15 AM	to	9:30 AM	16	0	6	3	13	155	0	14	0	0	0	21	0	267	50	0

PM PEAK

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	38	0	5	5	6	199	0	58	0	0	0	67	0	274	9	133
4:15 PM	to	4:30 PM	45	0	9	4	11	229	0	81	0	0	0	72	0	282	4	100
4:30 PM	to	4:45 PM	47	0	4	1	7	256	0	109	0	0	0	64	0	305	12	82
4:45 PM	to	5:00 PM	69	0	9	3	11	301	0	44	0	0	0	44	0	297	10	104
5:00 PM	to	5:15 PM	72	0	15	1	7	274	0	52	0	0	0	72	0	290	13	95
5:15 PM	to	5:30 PM	66	0	10	0	12	264	0	76	0	0	0	94	0	309	12	94
5:30 PM	to	5:45 PM	82	0	9	0	12	287	0	33	0	0	0	55	0	320	8	124
5:45 PM	to	6:00 PM	69	0	14	0	4	274	0	39	0	0	0	37	0	302	9	41
6:00 PM	to	6:15 PM	67	0	5	0	9	246	0	22	0	0	0	34	0	305	4	48
6:15 PM	to	6:30 PM	59	0	9	1	7	240	0	24	0	0	0	37	0	307	10	42
6:30 PM	to	6:45 PM	69	0	12	0	5	180	0	16	0	0	0	17	0	243	10	31
6:45 PM	to	7:00 PM	47	0	9	0	3	182	0	21	0	0	0	10	0	281	5	11

PEAK HOURS

		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**10th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	65	0	22	3	86	741	0	56	0	0	0	54	0	1144	217	11
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	289	0	43	4	42	1126	0	205	0	0	0	407	0	1216	43	417
AM SYSTEM PEAK HOUR																		
8:15 AM	to	9:15 AM	66	0	27	3	99	748	3	70	0	0	0	71	0	1087	232	22
PM SYSTEM PEAK HOUR																		
5:15 PM	to	6:15 PM	284	0	38	0	37	1071	0	170	0	0	0	220	0	1236	33	307

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	10th Street				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.63	0.00	0.75	**0.70**	0.95	0.95	0.38	**0.95**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.98	0.94	**0.98**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.87	0.00	0.68	**0.88**	0.77	0.93	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.97	0.69	**0.97**

Overall AM PEAK HOUR FACTOR = **0.96** **Overall PM PEAK HOUR FACTOR** = **0.94**

AM Period Intersection Volume: 6257 **PM Period Intersection Volume:** 7487

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th Street**				**Constitution Avenue**				**One Way**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	13	107	2	16	3	105	16	8	0	0	0	4	5	184	5	4
6:45 AM	to 7:00 AM	14	126	1	13	5	115	19	17	0	0	0	4	9	240	3	12
7:00 AM	to 7:15 AM	13	174	4	18	3	117	26	13	0	0	0	4	18	199	6	9
7:15 AM	to 7:30 AM	21	186	4	21	4	167	26	15	0	0	0	4	18	249	1	9
7:30 AM	to 7:45 AM	29	178	11	31	6	151	27	7	0	0	0	8	11	239	6	13
7:45 AM	to 8:00 AM	29	201	8	35	3	170	33	23	0	0	0	5	19	232	3	5
8:00 AM	to 8:15 AM	22	181	8	22	7	179	42	13	0	0	0	5	20	248	4	4
8:15 AM	to 8:30 AM	34	234	7	22	1	181	41	22	0	0	0	6	33	242	7	4
8:30 AM	to 8:45 AM	24	179	8	27	6	180	61	43	0	0	0	8	13	254	10	6
8:45 AM	to 9:00 AM	28	189	12	54	11	182	24	17	0	0	0	15	17	225	5	11
9:00 AM	to 9:15 AM	30	180	8	57	10	182	27	46	0	0	0	10	14	264	9	11
9:15 AM	to 9:30 AM	26	166	11	31	5	197	46	26	0	0	0	11	21	251	10	11

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th Street**				**Constitution Avenue**				**One Way**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	46	371	5	144	15	185	66	167	0	0	0	124	30	202	3	105
4:15 PM	to 4:30 PM	72	393	11	91	7	220	63	117	0	0	0	94	39	237	3	102
4:30 PM	to 4:45 PM	56	392	13	88	5	232	61	88	0	0	0	149	45	220	3	102
4:45 PM	to 5:00 PM	54	365	5	112	12	228	44	134	0	0	0	52	39	248	0	50
5:00 PM	to 5:15 PM	67	372	13	58	12	243	50	60	0	0	0	61	51	239	3	76
5:15 PM	to 5:30 PM	72	404	11	47	9	246	50	47	0	0	0	42	52	242	2	72
5:30 PM	to 5:45 PM	62	378	14	71	7	197	55	49	0	0	0	20	64	240	3	61
5:45 PM	to 6:00 PM	50	378	10	54	13	197	59	57	0	0	0	14	53	237	3	47
6:00 PM	to 6:15 PM	65	381	13	39	7	182	43	33	0	0	0	11	51	255	5	16
6:15 PM	to 6:30 PM	60	422	10	24	11	147	43	24	0	0	0	9	49	269	7	20
6:30 PM	to 6:45 PM	47	366	4	15	5	159	48	33	0	0	0	10	41	229	3	19
6:45 PM	to 7:00 PM	40	300	17	17	6	117	43	19	0	0	0	7	27	218	5	13

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**9th Street**				**Constitution Avenue**				**One Way**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:15 AM	to 9:15 AM	116	782	35	160	28	725	153	128	0	0	0	39	77	985	31	32
PM INTERSECTION PEAK HOUR																	
4:30 PM	to 5:30 PM	249	1533	42	305	38	949	205	329	0	0	0	304	187	949	8	300
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	116	782	35	160	28	725	153	128	0	0	0	39	77	985	31	32
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	249	1541	48	211	36	822	207	186	0	0	0	87	220	974	13	196

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	9th Street				**Constitution Avenue**				**One Way**				**Constitution Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.85	0.84	0.73	**0.85**	0.64	1.00	0.63	**0.92**	0.00	0.00	0.00	**#DIV/0!**	0.58	0.93	0.78	**0.95**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.86	0.95	0.86	**0.94**	0.69	0.84	0.88	**0.87**	0.00	0.00	0.00	**#DIV/0!**	0.86	0.95	0.65	**0.97**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.94**

AM Period Intersection Volume: 7940 **PM Period Intersection Volume:** 11843

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**Constitution Avenue**				**7th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to 6:45 AM	9	32	0	12	3	101	11	3	17	85	13	13	15	148	21	9
6:45 AM	to 7:00 AM	10	39	1	20	1	107	13	9	19	84	20	17	16	196	25	6
7:00 AM	to 7:15 AM	10	49	0	16	2	121	19	4	19	123	18	24	16	185	3	5
7:15 AM	to 7:30 AM	15	38	0	17	1	152	27	4	25	125	27	38	12	227	6	8
7:30 AM	to 7:45 AM	8	66	0	24	6	171	23	6	19	109	18	9	22	225	4	36
7:45 AM	to 8:00 AM	9	52	0	28	6	164	27	5	30	141	21	17	21	218	1	55
8:00 AM	to 8:15 AM	10	56	0	25	6	186	32	9	22	197	28	15	14	231	1	39
8:15 AM	to 8:30 AM	12	68	0	20	3	178	27	5	39	196	30	5	24	225	2	19
8:30 AM	to 8:45 AM	14	57	0	17	5	204	36	16	30	183	28	14	21	236	3	37
8:45 AM	to 9:00 AM	13	56	0	6	0	170	48	25	36	164	39	12	22	223	2	36
9:00 AM	to 9:15 AM	10	64	0	7	14	161	34	11	30	184	53	17	25	234	5	35
9:15 AM	to 9:30 AM	19	55	2	5	7	185	20	24	43	186	48	8	38	218	3	20

PM PEAK																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**Constitution Avenue**				**7th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to 4:15 PM	27	113	0	66	5	214	35	92	20	107	27	109	28	184	11	122
4:15 PM	to 4:30 PM	22	118	2	40	5	227	38	105	30	102	39	64	44	190	2	148
4:30 PM	to 4:45 PM	31	115	0	52	2	251	53	105	26	92	23	75	35	193	3	130
4:45 PM	to 5:00 PM	23	104	0	59	3	228	43	57	20	107	29	122	36	217	0	159
5:00 PM	to 5:15 PM	29	125	0	42	5	261	64	124	31	107	16	95	58	210	2	230
5:15 PM	to 5:30 PM	28	126	0	38	3	249	58	65	26	127	21	57	46	205	4	154
5:30 PM	to 5:45 PM	15	129	0	74	2	228	66	57	27	129	19	38	51	199	3	274
5:45 PM	to 6:00 PM	19	121	1	16	6	240	67	71	18	120	15	30	41	202	3	152
6:00 PM	to 6:15 PM	19	130	0	17	6	188	67	59	24	138	22	19	34	217	11	97
6:15 PM	to 6:30 PM	16	104	0	21	7	170	57	86	15	126	16	10	36	228	14	78
6:30 PM	to 6:45 PM	27	73	0	1	3	163	34	23	18	100	18	18	14	169	52	53
6:45 PM	to 7:00 PM	20	63	1	12	4	141	18	39	25	107	7	13	15	146	62	86

PEAK HOURS																	
Direction:		Southbound				Westbound				Northbound				Eastbound			
Roadway:		**7th Street**				**Constitution Avenue**				**7th Street**				**Constitution Avenue**			
Movement:		Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																	
8:30 AM	to 9:30 AM	56	232	2	35	26	720	138	76	139	717	168	51	106	911	13	128
PM INTERSECTION PEAK HOUR																	
5:00 PM	to 6:00 PM	91	501	1	170	16	978	255	317	102	483	71	220	196	816	12	810
AM SYSTEM PEAK HOUR																	
8:15 AM	to 9:15 AM	49	245	0	50	22	713	145	57	135	727	150	48	92	918	12	127
PM SYSTEM PEAK HOUR																	
5:15 PM	to 6:15 PM	81	506	1	145	17	905	258	252	95	514	77	144	172	823	21	677

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	7th Street				**Constitution Avenue**				**7th Street**				**Constitution Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.88	0.90	0.00	**0.92**	0.39	0.87	0.76	**0.90**	0.87	0.93	0.71	**0.95**	0.92	0.97	0.60	**0.97**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.72	0.97	0.25	**0.95**	0.71	0.91	0.96	**0.94**	0.88	0.93	0.88	**0.93**	0.84	0.95	0.48	**0.97**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 8382 **PM Period Intersection Volume:** 9671

Gorove/Slade Associates

Project Name :	FBI Hoover
Project # :	2079-013
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, May 15, 2014

Intersection: **10th Street NW & H Street NW**

AM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**6th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM to 6:45 AM	29	0	1	0	1	92	0	0	0	0	0	3	0	91	68	0
6:45 AM to 7:00 AM	21	0	1	1	1	97	0	3	0	0	0	5	0	102	104	0
7:00 AM to 7:15 AM	18	0	5	0	1	118	0	2	0	0	0	2	0	92	106	0
7:15 AM to 7:30 AM	27	0	3	1	1	158	0	4	0	0	0	7	0	134	113	4
7:30 AM to 7:45 AM	31	0	2	0	3	159	0	1	0	0	0	4	0	134	108	4
7:45 AM to 8:00 AM	36	0	5	0	3	156	0	2	0	0	0	6	0	111	123	11
8:00 AM to 8:15 AM	34	0	5	0	2	194	0	5	0	0	0	6	0	114	137	8
8:15 AM to 8:30 AM	32	0	6	0	3	172	0	0	0	0	0	2	0	130	139	6
8:30 AM to 8:45 AM	38	0	6	1	3	207	0	7	0	0	0	6	0	123	133	1
8:45 AM to 9:00 AM	34	0	6	0	3	173	0	5	0	0	0	3	0	140	113	6
9:00 AM to 9:15 AM	33	0	6	0	2	167	0	4	0	0	0	4	0	138	117	4
9:15 AM to 9:30 AM	43	0	9	0	2	165	0	5	0	0	0	4	0	140	128	6

PM PEAK																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**6th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM to 4:15 PM	127	0	6	6	3	128	0	33	0	0	0	37	0	145	51	14
4:15 PM to 4:30 PM	113	0	11	1	1	165	0	21	0	0	0	91	0	156	55	9
4:30 PM to 4:45 PM	120	0	9	8	6	177	0	23	0	0	0	26	0	160	67	11
4:45 PM to 5:00 PM	114	0	4	2	2	179	0	10	0	0	0	43	0	151	80	5
5:00 PM to 5:15 PM	126	0	11	0	5	202	0	21	0	0	0	39	0	160	69	14
5:15 PM to 5:30 PM	123	0	7	0	3	195	0	19	0	0	0	6	0	167	68	3
5:30 PM to 5:45 PM	108	0	11	1	1	187	0	20	0	0	0	4	0	128	88	6
5:45 PM to 6:00 PM	120	0	10	0	2	185	0	8	0	0	0	9	0	155	73	14
6:00 PM to 6:15 PM	88	0	6	0	5	164	0	6	0	0	0	7	0	146	90	5
6:15 PM to 6:30 PM	89	0	10	0	2	132	0	10	0	0	0	3	0	133	109	5
6:30 PM to 6:45 PM	59	0	10	0	2	129	0	2	0	0	0	1	0	101	93	5
6:45 PM to 7:00 PM	62	0	1	0	1	104	0	8	0	0	0	5	0	81	82	3

PEAK HOURS																
Direction:	Southbound				Westbound				Northbound				Eastbound			
Roadway:	**6th Street**				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																
8:00 AM to 9:00 AM	138	0	23	1	11	746	0	17	0	0	0	17	0	507	522	21
PM INTERSECTION PEAK HOUR																
4:30 PM to 5:30 PM	483	0	31	10	16	753	0	73	0	0	0	114	0	638	284	33
AM SYSTEM PEAK HOUR																
8:15 AM to 9:15 AM	137	0	24	1	11	719	0	16	0	0	0	15	0	531	502	17
PM SYSTEM PEAK HOUR																
5:15 PM to 6:15 PM	439	0	34	1	11	731	0	53	0	0	0	26	0	596	319	28

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	6th Street				**Constitution Avenue**				**No Approach**				**Constitution Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.90	0.00	1.00	**0.91**	0.92	0.87	0.00	**0.87**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.95	0.90	**0.96**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.89	0.00	0.77	**0.91**	0.55	0.94	0.00	**0.94**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.89	0.89	**0.97**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 5152 **PM Period Intersection Volume:** 5933

Appendix B3

Existing Bicycle Accommodations

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

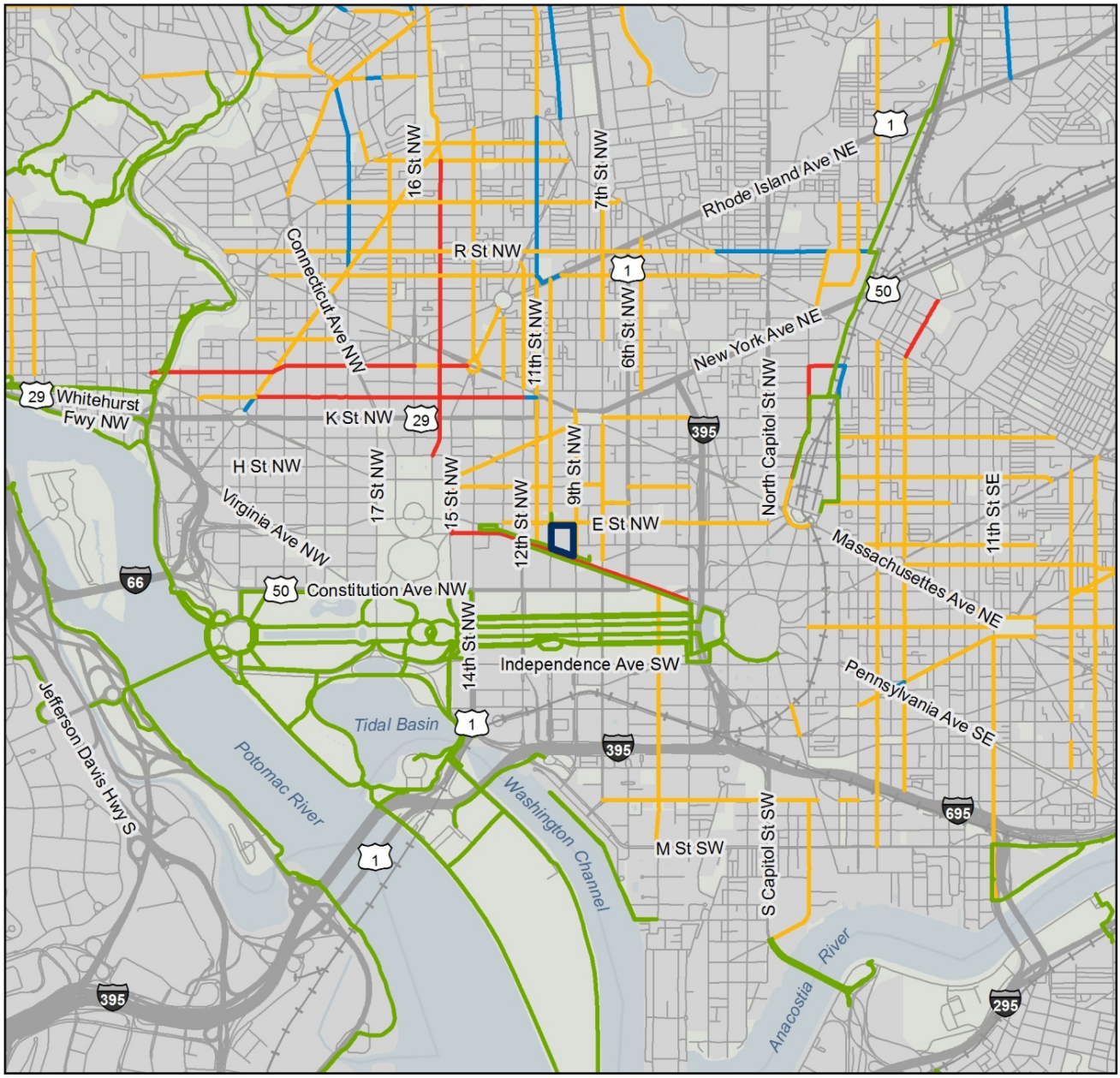
GSA

October 2015

B3 Existing Bicycle Accommodations

Table B3-1 and figure B3-1 summarize bicycle accommodations within two miles of the JEH parcel. Several on-street bike lanes or shared lanes have gaps. Major barriers to bicycling in the area include the lack of north-south bicycle accommodations between Pennsylvania Avenue NW and the National Mall, the lack of a connection on 4th Street NE between T Street NE and Florida Avenue NE, and the lack of accommodations within Dupont Circle and Logan Circle. There is also a large gap in east-west bicycle accommodations between Massachusetts Avenue NW, New York Avenue NW, and North Capitol Street.

Figure B3-1: Bicycle Accommodations within Two Miles of the JEH Parcel



Site Boundary

Bicycle Facility

- Cycle Track
- Bicycle Lane
- Shared Lane
- Bike Trails

0 2,000 4,000
Feet
1 inch = 3,500 feet

Sources:
ESRI (2013), GSA (2013)
DC GIS (2013), DDOT (2014)

Table B3-1: Bicycle Accommodations and Gaps/Barriers within Two Miles of the JEH Parcel

Name	From	To	Type	Gaps
W St NW	16th St NW	Florida Ave NW	Bike Lane	
V St NW	Florida Ave NW	Vermont Ave NW	Bike Lane	
T St NW	Florida Ave NW	Florida Ave NW	Bike Lane	
R St NW	Massachusetts Ave NW	Florida Ave NW	Bike Lane	
R St NW	Florida Ave NW	Eckington Pl NE	Shared Lane	
R St NE	Eckington Pl NE	Harry Thomas Way NE	Bike Lane	
R St NE	Harry Thomas Way NE	Metropolitan Branch Trail	Shared Lane	
Q St NW	Massachusetts Ave NW	11th Street NW	Bike Lane	Q St NW breaks at intersection with Rhode Island Ave
Q St NW	11th Street NW	Rhode Island Ave	Shared Lane	
Q St NW	Rhode Island Ave NW	Florida Ave NW	Bike Lane	
N St NW	22nd St NW	Connecticut Ave NW	Bike Lane	
M St NW	28th St NW	Thomas Circle NW	Cycle Track	29th St NW to 28th St NW
M St NE	First St NE	Metropolitan Branch Trail	Cycle Track	
M St NE	Metropolitan Branch Trail	Delaware Ave NE	Shared Lane	
L St NW	Pennsylvania Ave NW	New Hampshire Ave	Bike Lane	
L St NW	22nd St NW	12th St NW	Cycle Track	
L St NW	12th St NW	11th St NW	Shared Lane	
I St NE	2nd St NE	Florida Ave NE	Bike Lane	
G St NW	15th St NW	10th St NW	Bike Lane	10th St NW to 9th St NW; 7th St NW to 6th St NW
G St NW	9th St NW	7th St NW	Bike Lane	
G St NW	6th St NW	3rd St NW	Bike Lane	
G St NE	2nd St NE	Maryland Ave NE	Bike Lane	
F St NW	7th St NW	8th St NW	Bike Lane	
F St NE	Columbus Circle NE	8th St NE	Bike Lane	
E St NW	13th St NW	North Capital St NW	Bike Lane	17th St NW to 13th St NW
I St SW	7th St SW	New Jersey Ave SE	Bike Lane	New Jersey Ave SE to 2nd St SE
I ST SW	2nd St SE	3rd St SE	Bike Lane	
18th St NW	New Hampshire Ave	Columbia Road NW	Shared Lane	
17th St NW	Massachusetts Ave NW	Florida Ave NW	Bike Lane	
15th St NW	H St NW	V St NW	Cycle Track	

Name	From	To	Type	Gaps
15th St NW	V St NW	Irving St NW	Bike Lane	
14th St NW	Thomas Circle NW	Florida Ave NW	Bike Lane	
13th St NW	Massachusetts Ave NW	O Street NW	Bike Lane	
12th Street NW	Massachusetts Ave NW	Vermont Ave NW	Bike Lane	
11th St NW	Pennsylvania Ave NW	Q St NW	Bike Lane	
11th St NW	Q St NW	Florida Ave NW	Shared Lane	
11th St NW	Florida Ave NW	Monroe St NW	Bike Lane	
10th St NW	Pennsylvania Ave NW	Rhode Island Ave NW	Bike Lane	
9th St NW	Pennsylvania Ave	Mt. Vernon Pl NW	Bike Lane	
7th St NW	Indiana Ave NW	Massachusetts Ave NW	Bike Lane	
7th St NW	N St NW	Florida Ave NW	Bike Lane	
5th St NW	L St NW	Rhode Island Ave	Bike Lane	
5th St NW	Howard Pl NW	Ward St NW	Bike Lane	
4th St SW	M St SW	Pennsylvania Ave NW	Bike Lane	
Potomac Ave SE	S Capital St SW	First St SE	Bike Lane	
1st St SE	Potomac Ave SE	I St SE	Bike Lane	
1st St NE	G St NE	M St NE	Cycle Track	
New Jersey Ave SE	E St SW	D St SW	Bike Lane	
4th St SE	M St SE	Maryland Ave NE	Bike Lane	
4th St NE	Massachusetts Ave NE	Florida Ave NE	Bike Lane	Florida Ave NE to T St NE (rail yard)
4th St NE	T St NE	Lincoln Road NE	Bike Lane	
Eckington Pl NE	Florida Ave NE	R St NE	Bike Lane	
2nd St NE	R St NE	T St NE	Bike Lane	
Harry Thomas Way NE/3rd St NE	Eckington Pl NE	T ST NE	Bike Lane	
6th St SE	Virginia Ave SE	Massachusetts Ave NE	Bike Lane	
6th St NE	Maryland Ave NE	Florida Ave NE	Bike Lane	
6th St NE	Florida Ave NE	Penn St NE	Cycle Track	
11th St SE	Water St SE	East Capital St SE	Bike Lane	
Pennsylvania Ave NW	15th St NW	Constitution Ave NW	Cycle Track	17th St NW to 15th St NW; Constitution Ave NW to 2nd St SE
Massachusetts Ave NE	6th St NE	11th St SE	Bike Lane	

Name	From	To	Type	Gaps
Columbia Rd NW	16th St NW	T St NW	Bike Lane	
Champlain St NW	Florida Ave NW	Kalorama Rd NW	Bike Lane	
Euclid St NW	17th St NW	16th St NW	Bike Lane	
New Hampshire Ave NW	Washington Circle NW	L St NW	Shared Lane	
New Hampshire Ave NW	L St NW	W St NW	Bike Lane	
Vermont Ave NW	Thomas Circle NW	Logan Circle NW	Bike Lane	
North Carolina Ave SE	3rd St SE	4th St SE	Bike Lane	
North Carolina Ave SE	5th St SE	11th St SE	Bike Lane	
New York Ave NW	15th St NW	9th St NW	Bike Lane	
Rock Creek Trail	Theodore Roosevelt Memorial Bridge	Massachusetts Ave NW (and beyond)	Shared Use Path	
Georgetown Waterfront Trail	Rock Creek Parkway	Wisconsin Ave NW	Shared Use Path	
Metropolitan Branch Trail	Union Station	Fort Totten	Shared Use Path	
14th St Bridge Crossing	Ohio Dr SW	George Washington Parkway, VA	Shared Use Path	
South Capital Bridge Crossing	Potomac Ave SE	Anacostia Dr	Shared Use Path	
Mount Vernon Trail	Mount Vernon, VA	Key Bridge	Shared Use Path	
National Malls Trails	National Mall/Tidal Basin	-	Shared Use Path	

Source: DDOT Bicycle Facility GIS Shapefile. Received 12/11/14

Appendix B4

Metrorail Station Capacity Analysis

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

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B4 Metrorail Station Capacity Analysis Details

A capacity analysis was conducted at the four Metrorail stations within the study area. At Gallery Place-Chinatown and Metro Center Metro Stations, only the two entrances closest to the JEH parcel were analyzed, as those entrances are most likely to be used by patrons of the building. The capacity analysis was performed on the vertical elements of each station at each level, the faregate aisles, fare vending machines, and platform areas. Fifteen-minute ridership totals (entries and exits) were obtained for March of 2014 for each station entrance (WMATA 2014a). For the No-action Alternative analyses, 2025 15-minute projected ridership totals (entries and exits) were calculated by adding the projected trips from planned projects and the regional transit growth rate to existing conditions. For the RFDS analyses, 2025 RFDS 1 and RFDS 2 15-minute projected ridership totals (entries and exits) were calculated using 2025 No-action ridership and projected net ridership associated with each scenario, disaggregated to 15-minute periods, and distributed to station entrances proportionally based on current ridership. Note that the capacity analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

B4.1 Methodology

B4.1.1 Vertical Element Methodology

To conduct the vertical element capacity analysis, the volume of passengers using escalators and stairs between the street and mezzanine, mezzanine and platform, and upper platform and lower platform were compared to their capacity for the existing (or projected) weekday peak 15-minute period of exiting passengers (WMATA 2014a; MWCOG 2015). Capacities and assumptions were based on the *Transit Capacity and Quality of Service Manual* (TCQSM) and previous WMATA studies, including the *Naylor Road Station Access & Capacity Study* (Transportation Research Board (TRB) 2013; WMATA 2012). The passenger volumes between the upper and lower platforms at Gallery Place-Chinatown and Metro Center were calculated based on the March 2014 15-minute ridership totals and passenger transfer volumes from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). For the No-action Alternative and RFDS Build Conditions, these ridership totals and transfer volumes were grown to 2025 levels.

To calculate 15-minute escalator and stair capacity for each vertical movement at a station, the standard escalator capacity of 90 people per minute and standard stair capacity of 10 people per foot (of width) per minute were multiplied by the number of each and 15 (resulting in a 15-minute capacity of 1,350 passengers per escalator). To calculate 15-minute passenger volumes using each, first a peaking factor of 1.28 was used to adjust peak 15-minute entry and exit volumes to account for uneven distributions over the 15-minute period (i.e., surges of passengers exiting when a train offloads – a value determined by WMATA based on previous station capacity studies). Then, these adjusted volumes were multiplied by the proportion of passengers using escalators, stairs, or elevators. These proportions were based on the following assumptions:

- Five percent of all passengers typically use elevators, according to WMATA,
- When a stair is provided adjacent to an escalator, approximately 10 percent of passengers will use the stair even when the escalator is traveling in the same direction, and
- The overall configuration of the escalators and stairs.

Finally, the volume to capacity (v/c) ratio was calculated for the vertical elements for each vertical movement, separated by those serving entries to the station and those serving exits. For the purpose of this analysis, a v/c ratio of 0.7 was considered to be “at capacity,” including the *Naylor Road Station Access & Capacity Study*

(WMATA 2012). If calculated v/c ratios exceeded 0.7, then recommendations for the number of new vertical elements were generated. Additionally, if stair v/c ratios exceeded 0.7, then the actual flow rate was calculated (passengers per foot per minute). Table B4-1 summarizes the assumptions used in the vertical element capacity analysis.

Table B4-1: Assumptions Used in Vertical Element Capacity Analysis

Assumption	Value	Source
Peaking Factor	1.28	WMATA
Escalator: Passengers/Minute	90	TCQSM
Stairs: Passengers/Foot/Minute	10	TCQSM
Percent Passengers Using Elevator	5%	WMATA

Source: WMATA (2012); TRB (2013)

B4.1.2 Faregate Aisle Methodology

Similar to the vertical capacity analysis, the peak number of passengers or projected peak number of passengers) using the faregate aisles in a 15-minute period was compared to the capacity of the faregate aisles. Current faregate aisles can accommodate 35 passengers per minute, according to WMATA (2012). To calculate a 15-minute capacity for faregate aisles at the station, this figure was multiplied by the number of regular faregate aisles and 15 minutes. To account for uneven distributions of passengers entering and exiting the station, a peaking factor of 1.28 was applied to the 15-minute ridership. Faregate aisle directions can be adjusted to meet demand throughout the day, and thus entries and exits were analyzed together. ADA faregate aisles were not included in the capacity for each station entrance, given that they are intended to serve passengers with disabilities. The capacity analysis for faregate aisles is reported as a v/c ratio, and includes the number of faregate aisles necessary to accommodate existing or projected peak entries and exits at a v/c ratio of 0.7, which is considered capacity.

In the future, WMATA plans to upgrade its faregate aisle technology to provide more capacity per minute and new payment forms. Since the new faregate aisle technology is only in the pilot stage and therefore it is unknown whether or not the new technology will in fact be adopted, this analysis uses the current faregate aisle capacity of 35 passengers per minute to provide the most conservative estimates.

B4.1.3 Fare Vending Machine Methodology

The fare vending machine capacity analysis compared the number of existing or projected transactions at fare vending machines during the peak 15-minute entering period to the transaction capacity of the fare vending machines. The peak entering period is when the most number of passengers entering the system are likely to purchase fares. According to WMATA, between 4 and 20 percent of passengers using a station will use fare vending machines, and the machines can process between 1.5 and 1.67 transactions per minute (WMATA 2014b). The exact figures depend on station location and the primary types of passengers served (i.e., regular commuters versus tourists). Like the vertical element and faregate aisle capacity analyses, a peaking factor of 1.28 was used to account for surges of passengers when trains offload. The capacity analysis for faregate vending machines is reported as a v/c ratio, and includes the number of fare vending machines necessary to accommodate existing or projected patronage at a v/c ratio of 0.7, which is considered capacity.

B4.1.4 Platform Area Analysis Methodology

To determine if the area of each station platform is sufficient to accommodate existing or projected peak capacity, the space required to accommodate the peak number of passengers entering and exiting a single train was calculated and compared to the net platform area. Net platform areas were calculated by subtracting the area occupied by vertical elements, pylons, benches, advertisements, platform edges, detectable warning panels, and other elements on platforms from the total platform area (WMATA Station Plans 2015a and site visits in January 2015).

The analysis used existing (or projected) entries and exits for each station's 15-minute peak entry period to account for the highest number of passengers waiting on a platform at a given time. Using the peak headway for the platform being analyzed, the number of people waiting for a single train (entries per train) was calculated along with the number of people exiting a single train (exits per train). At stations with center platforms, the entries and exits per train account for the worst-case scenario, when two trains would be serving each track simultaneously. To adjust ridership for schedule irregularities and uneven distributions of passengers per train, a missed headway factor of two and a peaking factor of 1.28 were used to adjust entries per train, while the peaking factor only was used to adjust exits per train (see table B4-2). A missed headway factor adjusts waiting passenger volume per train for service disruptions when a trip is missed, and therefore the headway is doubled.

Since passengers tend to congregate near vertical elements (stairs and escalators), to account for uneven passenger distribution along the platform, the net platform areas were split into three 200-foot long sections. Each section was assigned a different weight, 50 percent, 35 percent, and 15 percent, to reflect the percentage of passengers waiting or exiting trains in the respective area. Adjusted entries and exits were multiplied by each platform area's respective weight to determine how many passengers enter and exit per train in each section.

The maximum area occupied by passengers waiting to enter a train and the area occupied by exiting passengers were calculated to ensure that the platform capacity can accommodate both sets of passengers while a train is serving the platform. Using a spacing per passenger of 10 ft^2 (pedestrian level of service [LOS] B), the remaining unoccupied space in each platform section was calculated. If this figure was negative, the pedestrian LOS was calculated and reported (since it would be less than LOS B). Therefore, if a platform capacity table does not include the Pedestrian LOS, the LOS is B. The maximum queue of passengers waiting on the platform was also calculated, by dividing the area occupied by waiting passengers by 200 feet. A list of assumptions used in the platform area analysis is included in table B4-2.

Table B4-2: Assumptions Used in Platform Area Analysis

Assumption	Amount	Unit	Source/ Formula
Missed Headway Factor	2	-	WMATA
Peaking Factor	1.28	-	WMATA
Spacing per Person (LOS B)	10	ft^2/person	WMATA, TCQSM

Source: WMATA (2012); TRB (2013)

B4.2 Existing Condition Metrorail Capacity Analysis

B4.2.1 Archives-Navy Memorial

As was previously discussed, there are two sets of vertical elements at the Archives-Navy Memorial Metro Station, those between the platform and the mezzanine, and those between the mezzanine and the street level. The peak 15-minute period at this station for exiting passengers is between 8:45 AM and 9:00 AM.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-3.

Table B4-3: Archives-Navy Memorial Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	25	WMATA
12	15-Minute Exits	524	WMATA
13	Adjusted 15-Minute Entries	32	= #11 x #2
14	Adjusted 15-Minute Exits	671	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	30	= #13 x #5
16	Adjusted Exit Escalator Volume	638	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.24**	= #16 / #20

Of the three escalators between the street and mezzanine, two operate in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 30 passengers would use the single

entry escalator and 623 would use the two exit escalators during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.02 while the v/c ratio for the exit escalator was 0.24. Both of these figures are well below 0.7, which is considered capacity.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-4.

Table B4-4: Archives-Navy Memorial Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	25	WMATA
12	15-Minute Exits	524	WMATA
13	Adjusted 15-Minute Entries	32	= #11 x #2
14	Adjusted 15-Minute Exits	671	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	30	= #13 x #5
16	Adjusted Exit Escalator Volume	638	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.47**	= #16 / #20

Of the two escalators at the station, one operates in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 30 passengers would use the entry escalator and 623 would use the exit escalator during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.02 while the v/c ratio for the exit escalator was 0.47. Both of these figures are below 0.7, which is considered capacity.

Faregate Aisle Capacity

Archives-Navy Memorial Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.22, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the six that are provided are more than sufficient. Table B4-5 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-5: Archives-Navy Memorial Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	25	WMATA
6	Exits	524	WMATA
7	Adjusted Entries	32	= #5 x #2
8	Adjusted Exits	671	= #6 x #2
9	Total Adjusted Volume	703	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.22**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Archives-Navy Memorial, fare vending machines can accommodate 1.5 transactions per minute, and approximately 10 percent of all passengers will use them. This station typically has a high number of tourists and regular commuters and therefore would have a slow transaction rate and a moderate percentage of passengers using the fare vending machines. Archives-Navy Memorial Metro Station has five fare vending machines, and therefore can accommodate 113 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 74 passengers at this station would attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.66, below what is considered capacity at 0.7. Using a v/c of 0.7 as capacity, approximately five fare vending machines would be necessary to meet current demand. Table B4-6 summarizes the fare vending machine capacity analysis results at the station.

Table B4-6: Archives-Navy Memorial Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	524	WMATA
7	Exits	56	WMATA
8	Adjusted Entries	671	= #6 x #2
9	Adjusted Exits	71	= #7 x #2
10	Adjusted Total	742	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	74	= #10 x #3
12	Fare Vendors	5	Site Visit
13	Fare Vendor Capacity	113	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.66**	= #11 / #13
15	**Fare Vendors Needed**	**5**	= #11 / #4 / #5 / 15

Platform Area Analysis

The peak 15-minute peak entry period at Archives-Navy Memorial Metro Station was 5:00 PM to 5:15 PM. The net platform area was measured at 12,795 ft², or three 200-foot long sections of 4,265 ft² each. Table B4-7 details the assumptions and ridership used in this analysis.

Table B4-7: Archives-Navy Memorial Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	501	Passengers	WMATA
2	Peak 15-Minute Exits	56	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	175	Passengers	= #1 / #4
6	Exits per Train	19	Passengers	= #2 / #4
7	Missed Headway Factor	2		WMATA
8	Peaking Factor	1.28		WMATA
9	Adjusted Entries per Train	448	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	71	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA

#	Assumption	Amount	Unit	Source/Formula
12	Platform Space Available	12,795	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked 200-foot section of platform would have 1,672 ft^2 of unoccupied space, while the second and third most trafficked 200-foot sections would have 2,450 ft^2 and 3,487 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 11.2 feet, significantly shorter than the usable platform width of 19 feet. Table B4-8 details the platform area analysis calculations for the station.

Table B4-8: Archives-Navy Memorial Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,265	4,265	4,265	= #12 / 3
14	Waiting Passengers	224	157	67	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,238	1,566	671	= #14 x #11
16	Waiting Passenger Queue (ft)	11.2	7.8	3.4	= #15 / 200
17	Exiting Passengers	36	25	11	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	355	249	107	= #17 x #11
19	Net Area Remaining (ft^2)	1,672	2,450	3,487	= #13 - #15 - #18

*Table continued from table B4-7.

B4.2.2 Federal Triangle Station

At Federal Triangle Metro Station, there are two sets of vertical elements, those between the platform and the mezzanine level, and those between the mezzanine level and the street level. The elements between the mezzanine and street level are split into two portions, however the elements are identical. At the split, there is an entrance into the Ronald Reagan Building, meaning that passengers accessing this building only use the lower portion of the mezzanine-to-street elements. For the purposes of this analysis, however, the mezzanine-to-street elements were evaluated as if they were a single, continuous set. The peak 15-minute period for exiting passengers is between 8:45 AM and 9:00 AM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-9.

Table B4-9: Federal Triangle Mezzanine-to-Platform Vertical Capacity Analysis

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM

#	Assumption	Value	Source/Formula
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	15	WMATA
12	15-Minute Exits	467	WMATA
13	Adjusted 15-Minute Entries	19	= #11 x #2
14	Adjusted 15-Minute Exits	598	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	19	= #13 x #5
16	Adjusted Exit Escalator Volume	568	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

There are three escalators between the mezzanine and the platform. Two of the escalators are paired, with one always moving downward toward the platform (serving entries), and the other always moving upward toward the mezzanine (serving exits). The third escalator is on the other side of the mezzanine level and operates in the upward direction (serving exits) during the peak 15-minute period.

Approximately 19 passengers would use the downward escalator to enter the platform, while 568 would use the two upward escalators to exit the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.21 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-10.

Table B4-10: Federal Triangle Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	15	WMATA
12	15-Minute Exits	467	WMATA
13	Adjusted 15-Minute Entries	19	= #11 x #2
14	Adjusted 15-Minute Exits	598	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	19	= #13 x #5
16	Adjusted Exit Escalator Volume	568	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

There are two sets of three escalators at the Federal Triangle Metro Station. The two sets of escalators are separated by a platform that provides passengers underground access to the Reagan Building. During the peak 15-minute period, two escalators operate in the upward direction towards the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries).

Approximately 19 passengers would use the downward escalator to enter the platform, while 568 would use the two upward escalators to exit the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.21 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Aisle Capacity

The Federal Triangle Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.20, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the six that are provided are sufficient. Table B4-11 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-11: Federal Triangle Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	15	WMATA
6	Exits	467	WMATA
7	Adjusted Entries	19	= #5 x #2
8	Adjusted Exits	598	= #6 x #2
9	Total Adjusted Volume	617	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.20**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Federal Triangle, fare vending machines can accommodate 1.67 transactions per minute, and approximately 10 percent of all passengers will use them. Federal Triangle typically sees high amounts of regular commuters and tourists, but more regular commuters than tourists. Therefore, it would have a high transaction rate with a moderate percentage of passengers using fare vending machines. Federal Triangle has six fare vending machines, and therefore can accommodate 150 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 69 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.46, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately four fare vending machines would be necessary to meet current demand. Table B4-12 summarizes the fare vending machine capacity analysis results at the station.

Table B4-12: Federal Triangle Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	501	WMATA
7	Exits	38	WMATA
8	Adjusted Entries	641	= #6 x #2
9	Adjusted Exits	49	= #7 x #2
10	Adjusted Total	690	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	69	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity	150	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.46**	= #11 / #13
15	**Fare Vendors Needed**	**4**	= #11 / #4 / #5 / 15

Platform Area Analysis

The 15-minute peak entry period at Federal Triangle Metro Station is 5:00 PM to 5:15 PM. The net platform area was calculated at 12,687 ft², or three 200-foot long sections of 4,229 ft² each. Table B4-13 details the assumptions and ridership used in this analysis.

Table B4-13: Federal Triangle Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	501	Passengers	WMATA
2	Peak 15-Minute Exits	38	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	84	Passengers	= #1 / #4
6	Exits per Train	6	Passengers	= #2 / #4
7	Missed Headway Factor	2		WMATA
8	Peaking Factor	1.28		WMATA
9	Adjusted Entries per Train	214	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	49	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA

#	Assumption	Amount	Unit	Source/Formula
12	Platform Space Available	12,687	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have 2,916 ft^2 of unoccupied space, while the second and third most trafficked sections would have 3,310 ft^2 and 3,835 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 5.3 feet, significantly shorter than the usable platform width of 19 feet. Table B4-14 details the platform area analysis calculations for the station.

Table B4-14: Federal Triangle Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,229	4,229	4,229	= #12 / 3
14	Waiting Passengers	107	75	32	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,069	748	321	= #14 x #11
16	Waiting Passenger Queue (ft)	5.3	3.7	1.6	= #15 / 200
17	Exiting Passengers	24	17	7	Area 1 = #10 X 0.50 Area 2 = #10 X 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	245	171	73	= #17 x #11
19	Net Area Remaining (ft^2)	2,916	3,310	3,835	= #13 - #15 - #18

*Table continued from table B4-13.

B4.2.3 Gallery Place-Chinatown East Entrance

At the east entrance to Gallery Place-Chinatown Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 6:15 PM and 6:30 PM. This station entrance has three sets of vertical elements, those between the Green/Yellow platform and the Red-Glenmont platform, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Red Line level is split into two separate platforms with one side serving Glenmont trains and the other serving Shady Grove trains. The vertical elements between the Green/Yellow platform and the Red-Glenmont platform were not analyzed, as passengers accessing the JEH building from those lines likely use Archives-Navy Memorial Metro Station which is significantly closer to the JEH building.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-15.

Table B4-15: Gallery Place-Chinatown East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA

#	Assumption	Value	Source/Formula
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	212	WMATA
12	15-Minute Exits	355	WMATA
13	Adjusted 15-Minute Entries	272	= #11 x #2
14	Adjusted 15-Minute Exits	455	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	231	= #13 x #5
16	Adjusted Exit Escalator Volume	387	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.09**	= #15 / #19
22	**Exit Escalator V/C**	**0.14**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	27	= #13 x #9
24	Adjusted Exit Stair Volumes	45	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	5.0	WMATA
27	Stair Capacity* (15-Minute)	675	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.11**	= (#23 + #24) / #27

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Between the street and the mezzanine, two escalators operate in the upward direction toward the street (serving exits) and two escalators operate in the downward direction toward the mezzanine (serving entries). Approximately 387 passengers would use the upward escalator to exit the mezzanine, while 231 would use the downward escalator to enter the mezzanine during the peak 15-minute period. The resulting volume to capacity

(v/c) ratio was 0.09 for the entry escalators and 0.14 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this station entrance is located between the four escalators. Approximately 27 passengers would use the staircase to enter the station, while 45 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the per-minute capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 5.0-foot wide staircase, the 15-minute capacity was calculated at 675 passengers. Overall, the resulting v/c ratio for the staircase was 0.11, which is well below 0.7 or what is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-16.

Table B4-16: Gallery Place-Chinatown East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	112	WMATA
12	15-Minute Exits	266	WMATA
13	Adjusted 15-Minute Entries	144	= #11 x #2
14	Adjusted 15-Minute Exits	340	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	137	= #13 x #5
16	Adjusted Exit Escalator Volume	323	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15

#	Assumption	Value	Source/Formula
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.10**	= #15 / #19
22	**Exit Escalator V/C**	**0.24**	= #16 / #20

Of the two escalators between the mezzanine and the Glenmont platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 323 passengers would use the upward escalator to exit the platform, while 137 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.10 for the entry escalator and 0.24 for the exit escalator. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-17.

Table B4-17: Gallery Place-Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	144	WMATA
12	15-Minute Exits	190	WMATA
13	Adjusted 15-Minute Entries	184	= #11 x #2
14	Adjusted 15-Minute Exits	243	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	184	= #13 x #5
16	Adjusted Exit Escalator Volume	243	= #14 x #6

#	Assumption	Value	Source/Formula
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.14**	= #15 / #19
22	**Exit Escalator V/C**	**0.18**	= #16 / #20

Of the two escalators between the mezzanine and the Shady Grove platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 243 passengers would use the upward escalator to exit the platform, while 184 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.14 for the entry escalators and 0.18 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-18.

Table B4-18: Gallery Place-Chinatown East Upper Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	893	WMATA
12	15-Minute Exits	552	WMATA
13	Adjusted 15-Minute Entries	1,143	= #11 x #2
14	Adjusted 15-Minute Exits	707	= #12 x #2

#	Assumption	Value	Source/Formula
		Escalators	
15	Adjusted Entry Escalator Volume	743	= #13 x #5
16	Adjusted Exit Escalator Volume	601	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	3	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	4,050	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.28**	= #15 / #19
22	**Exit Escalator V/C**	**0.15**	= #16 / #20
		Stairs	
23	Adjusted Entry Stair Volumes	343	= #13 x #9
24	Adjusted Exit Stair Volumes	71	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	905	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.46**	= (#23 + #24) / #27

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Of the five escalators between the lower platform and the Red-Glenmont platform, three operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 601 passengers would use the upward escalators to exit the lower platform, while 743 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.28 for the entry escalators and 0.15 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this location is paired with a single escalator. Approximately 343 passengers would use the staircase to enter the lower platform, while 71 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the per-minute capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 6.7-foot wide staircase, the 15-minute capacity was calculated at 905 passengers. Overall, the resulting v/c ratio for the staircase was 0.46, which is well below 0.7 or what is considered capacity.

Faregate Aisle Capacity

The east entrance to Gallery Place-Chinatown Metro Station currently has twelve faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.13, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the 11 that are provided are sufficient. Table B4-19 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-19: Gallery Place-Chinatown East Faregate Aisle Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	212	WMATA
6	Exits	355	WMATA
7	Adjusted Entries	272	= #5 x #2
8	Adjusted Exits	455	= #6 x #2
9	Total Adjusted Volume	727	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	11	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	12	Site Visit
13	Current 15-Minute Capacity	5,775	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.13**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 transactions per minute and approximately 20 percent of all passengers will use them. This station sees a high number of tourists and passengers who are not regular users of the system, and therefore would have a low transaction rate with a high percentage of passengers using the fare vending machines. The east entrance to Gallery Place-Chinatown Metro Station has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 122 passengers could attempt to use them during the peak 15-minute period. This results in a v/c ratio of 0.91, well above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately eight fare vending machines would be necessary to meet current demand.

Table B4-20 summarizes the fare vending machine capacity analysis.

Table B4-20: Gallery Place-Chinatown East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA

#	Assumption	Value	Source/Formula
5	Capacity V/C	0.7	WMATA
	Ridership		
6	Entries	329	WMATA
7	Exits	149	WMATA
8	Adjusted Entries	421	= #6 x #2
9	Adjusted Exits	191	= #7 x #2
10	Adjusted Total	612	= #8 + #9
	Fare Vendors		
11	Adjusted Fare Vendor Volume	122	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.91**	= #11 / #13
15	**Fare Vendors Needed**	**8**	= #11 / #4 / #5 / 15

B4.2.4 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown west entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There is one set of vertical elements connecting the mezzanine level and the street level, one set connecting the mezzanine with the Red-Glenmont platform, and another connecting the mezzanine with the Red-Shady Grove platform.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-21.

Table B4-21: Gallery Place–Chinatown West Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	12	WMATA
12	15-Minute Exits	301	WMATA

#	Assumption	Value	Source/Formula
13	Adjusted 15-Minute Entries	16	= #11 x #2
14	Adjusted 15-Minute Exits	386	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	16	= #13 x #5
16	Adjusted Exit Escalator Volume	386	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.29**	= #16 / #20

Between the street and the mezzanine, one escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 386 passengers would use the upward escalator to exit the station, while 16 would use the downward escalator to enter the station during the peak 15-minute period. This resulted in an entry escalator capacity of 1,350 passengers and an exit escalator capacity of 1,350 passengers. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.29 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-22.

Table B4-22: Gallery Place–Chinatown West Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	5	WMATA
12	15-Minute Exits	144	WMATA
13	Adjusted 15-Minute Entries	7	= #11 x #2

#	Assumption	Value	Source/Formula
14	Adjusted 15-Minute Exits	185	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	7	= #13 x #5
16	Adjusted Exit Escalator Volume	185	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.14**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 185 passengers would use the upward escalator to exit the platform, while seven would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.14 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-23.

Table B4-23: Gallery Place–Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	7	WMATA
12	15-Minute Exits	157	WMATA
13	Adjusted 15-Minute Entries	9	= #11 x #2
14	Adjusted 15-Minute Exits	201	= #12 x #2
	Escalators		

#	Assumption	Value	Source/Formula
15	Adjusted Entry Escalator Volume	9	= #13 x #5
16	Adjusted Exit Escalator Volume	201	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.15**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 201 passengers would use the upward escalator to exit the platform, while nine would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.15 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The Gallery Place west entrance currently has five faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.19, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-24 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-24: Gallery Place-Chinatown West Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	12	WMATA
6	Exits	301	WMATA
7	Adjusted Entries	16	= #5 x #2
8	Adjusted Exits	386	= #6 x #2
9	Total Adjusted Volume	402	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	4	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	5	Site Visit
13	Current 15-Minute Capacity	2,100	= #10 x #3 x 15

#	Assumption	Value	Source/Formula
14	**Current Faregate Aisle V/C**	**0.19**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown, (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute and approximately 20 percent of all passengers will use them. The Gallery Place-Chinatown west entrance has three fare vending machines, and therefore can accommodate 68 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 78 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.15, well above the acceptable capacity of 0.70. Using a v/c of 0.7 as capacity, approximately five fare vending machines would be necessary to meet current demand. Table B4-25 summarizes the fare vending machine capacity analysis.

Table B4-25: Gallery Place-Chinatown West Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	254	WMATA
7	Exits	50	WMATA
8	Adjusted Entries	325	= #6 x #2
9	Adjusted Exits	64	= #7 x #2
10	Adjusted Total	389	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	78	= #10 x #3
12	Fare Vendors	3	Site Visit
13	Fare Vendor Capacity	68	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.15**	= #11 / #13
15	**Fare Vendors Needed**	**5**	= #11 / #4 / #5 / 15

B4.2.5 Gallery Place-Chinatown Platform Area Analysis

The peak 15-minute peak entry period at Gallery Place-Chinatown station is between 5:00 PM and 5:15 PM.

Green/Yellow Platform

The Green/Yellow net platform area was calculated at 14,261 ft², or three 200-foot long sections of 4,754 ft² each. Table B4-26 details the assumptions and ridership used in this analysis.

Table B4-26: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,629	Passengers	WMATA
2	Peak 15-Minute Exits	1,128	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	272	Passengers	= #1 / #4
6	Exits per Train	188	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	695	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	241	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,261	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform would have 75 ft^2 of unoccupied space, while the second and third most trafficked sections would have 1,479 ft^2 and 3,350 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 17.4 feet, shorter than the usable platform width of 23 feet. Table B4-27 details the platform area analysis calculations for the Green/Yellow platform.

Table B4-27: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,754	4,754	4,754	= #12 / 3
14	Waiting Passengers	348	243	104	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,476	2,433	1,043	= #14 x #11
16	Waiting Passenger Queue (ft)	17.4	12.2	5.2	= #15 / 200
17	Exiting Passengers	120	84	36	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,203	842	361	= #17 x #11
19	Net Area Remaining (ft^2)	75	1,479	3,350	= #13 - #15 - #18

*Table continued from table B4-26.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 5,741 ft^2, or three 200-foot long sections of 1,914 ft^2 each. Table B4-28 details the assumptions and ridership used in this analysis.

Table B4-28: Gallery Place-Chinatown Shady Grove Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,016	Passengers	WMATA
2	Peak 15-Minute Exits	534	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	169	Passengers	= #1 / #4
6	Exits per Train	89	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	433	Passengers	= #5 x #7 x #11
10	Adjusted Exits per Train	114	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,741	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section of platform would have no unoccupied space, while the third most trafficked section would have 1,092 ft^2 of unoccupied space. The most trafficked section of the platform would provide a spacing of 7.0 ft^2 per passenger, equating to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 10.8 feet. With a usable platform width of only 10 feet, there is not sufficient space for waiting passengers and passengers exiting trains. Table B4-29 details the platform area analysis calculations for the Shady Grove platform.

Table B4-29: Gallery Place-Chinatown Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,914	1,914	1,914	= #12 / 3
14	Waiting Passengers	217	152	65	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,167	1,517	650	= #14 x #11
16	Waiting Passenger Queue (ft)	10.8	7.6	3.3	= #15 / 200
17	Exiting Passengers	57	40	17	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	570	399	171	= #17 x #11
19	Net Area Remaining (ft^2)	-824	-3	1,092	= #13 - #15 - #18
20	Area (ft^2) per passenger	7.0	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	-	-	TCQSM

*Table continued from table B4-28.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 5,639 ft², or three 200-foot long sections of 1,880 ft² each. Table B4-30 details the assumptions and ridership used in this analysis.

Table B4-30: Gallery Place-Chinatown Glenmont Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	641	Passengers	WMATA
2	Peak 15-Minute Exits	975	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	107	Passengers	= #1 / #4
6	Exits per Train	163	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	273	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	208	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,639	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform would have no unoccupied space, while the second and third most trafficked sections would have 195 ft² and 1,158 ft², respectively. The most trafficked section of the platform would provide 7.8 ft² per passenger, which corresponds to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 6.8 feet, which is shorter than the usable platform width of 10 feet. However, this only provides 3.2 feet to accommodate exiting passengers. Table B4-31 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-31: Gallery Place-Chinatown Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,880	1,880	1,880	= #12 / 3
14	Waiting Passengers	137	96	41	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,367	957	410	= #14 x #11
16	Waiting Passenger Queue (ft)	6.8	4.8	2.0	= #15 / 200
17	Exiting Passengers	104	73	31	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,040	728	312	= #17 x #11

# *	Description	Area 1	Area 2	Area 3	Formula
19	Net Area Remaining (ft^2)	-527	195	1,158	= #13 - #15 - #18
20	Area (ft^2) per passenger	7.8	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-30.

B4.2.6 Metro Center East Entrance

At the Metro Center east entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There are two sets of vertical elements, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Metro Center east entrance has two side platforms serving the Red Line with two escalators serving each side platform.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity is detailed in table B4-32.

Table B4-32: Metro Center East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	24	WMATA
12	15-Minute Exits	175	WMATA
13	Adjusted 15-Minute Entries	31	= #11 x #2
14	Adjusted 15-Minute Exits	224	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	31	= #13 x #5
16	Adjusted Exit Escalator Volume	224	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15

#	Assumption	Value	Source/Formula
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.17**	= #16 / #20

Between the mezzanine and the Shady Grove platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 224 passengers would use the upward escalator to exit the platform, while 31 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.17 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-33.

Table B4-33: Metro Center East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	20	WMATA
12	15-Minute Exits	259	WMATA
13	Adjusted 15-Minute Entries	25	= #11 x #2
14	Adjusted 15-Minute Exits	332	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	25	= #13 x #5
16	Adjusted Exit Escalator Volume	332	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15

#	Assumption	Value	Source/Formula
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.25**	= #16 / #20

Between the mezzanine and the Glenmont platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 332 passengers would use the upward escalator to exit the platform, while 25 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.25 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-34.

Table B4-34: Metro Center East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	44	WMATA
12	15-Minute Exits	434	WMATA
13	Adjusted 15-Minute Entries	56	= #11 x #2
14	Adjusted 15-Minute Exits	556	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	56	= #13 x #5
16	Adjusted Exit Escalator Volume	556	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15

#	Assumption	Value	Source/Formula
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Approximately 556 passengers would use the two upward escalator to exit the station, while 56 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.04 for the entry escalators and 0.21 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The east entrance to Metro Center Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.19, well below 0.7, which is considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-35 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-35: Metro Center East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	44	WMATA
6	Exits	434	WMATA
7	Adjusted Entries	56	= #5 x #2
8	Adjusted Exits	556	= #6 x #2
9	Total Adjusted Volume	612	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.19**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center east entrance has eight fare vending machines, and therefore can accommodate 180 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 114 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.63, just below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately eight fare vending machines would be necessary to meet current demand; this matches the current supply. Table B4-36 summarizes the fare vending machine capacity analysis results.

Table B4-36: Metro Center East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	346	WMATA
7	Exits	100	WMATA
8	Adjusted Entries	443	= #6 x #2
9	Adjusted Exits	127	= #7 x #2
10	Adjusted Total	571	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	114	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity	180	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.63**	= #11 / #13
15	**Fare Vendors Needed**	**8**	= #11 / #4 / #5 / 15

B4.2.7 Metro Center South Entrance

At the south entrance to Metro Center Station, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. At this entrance, there are two sets of vertical elements, those between the mezzanine and street level and those between the mezzanine and the Blue/Orange/Silver Lines platform. The Red Line platform to Glenmont is on the same level as the mezzanine at this entrance.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-37.

Table B4-37: Metro Center South Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	20	WMATA
12	15-Minute Exits	427	WMATA
13	Adjusted 15-Minute Entries	25	= #11 x #2
14	Adjusted 15-Minute Exits	547	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	25	= #13 x #5
16	Adjusted Exit Escalator Volume	547	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.20**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Using these assumptions, approximately 547 passengers would use the two upward escalators to exit the station, while 25 passengers would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.20 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-38.

Table B4-38: Metro Center South Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	477	WMATA
12	15-Minute Exits	1,106	WMATA
13	Adjusted 15-Minute Entries	610	= #11 x #2
14	Adjusted 15-Minute Exits	1,416	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	396	= #13 x #5
16	Adjusted Exit Escalator Volume	1,204	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.29**	= #15 / #19
22	**Exit Escalator V/C**	**0.45**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	183	= #13 x #9
24	Adjusted Exit Stair Volumes	142	= #14 x #10
25	Stairs	3	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	2,714	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.12**	= (#23 + #24) / #27

*10% reduction in capacity due to bi-directional friction.

Of the three escalators between the lower platform and the Red-Glenmont platform, two operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 1,204 passengers would use the upward escalators to exit the lower platform, while 396 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.29 for the entry escalators and 0.12 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The three staircases between the lower platform and the Red-Glenmont platform are grouped together. Approximately 183 passengers would use the staircase to enter the lower platform, while 142 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the per-minute capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With three, 6.7-foot wide staircase, the 15-minute capacity was calculated at 2,714 passengers. Overall, the resulting v/c ratio for the stairs was 0.12, which is well below 0.7 or what is considered capacity.

Faregate Capacity

The south entrance to Metro Center Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.18, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-39 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-39: Metro Center South Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	20	WMATA
6	Exits	427	WMATA
7	Adjusted Entries	25	= #5 x #2
8	Adjusted Exits	547	= #6 x #2
9	Total Adjusted Volume	572	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.18**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center south entrance has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 112 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.83, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately eight fare vending machines are necessary to meet current demand. Table B4-40 summarizes the fare vending machine capacity analysis for this station entrance.

Table B4-40: Metro Center South Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	330	WMATA
7	Exits	108	WMATA
8	Adjusted Entries	423	= #6 x #2
9	Adjusted Exits	139	= #7 x #2
10	Adjusted Total	561	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	112	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.83**	= #11 / #13
15	**Fare Vendors Needed**	**8**	= #11 / #4 / #5 / 15

B4.2.8 Metro Center Platform Area Analysis

The peak 15-minute entry period at Metro Center is between 5:30 PM and 5:45 PM.

Blue/Orange/Silver Platform

The Blue/Orange/Silver net platform area was calculated at 17,434 ft², or three 200-foot long sections of 5,811 ft² each. Table B4-41 details the assumptions and ridership used in this analysis.

Table B4-41: Metro Center Blue/Orange/Silver Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,618	Passengers	WMATA

#	Assumption	Amount	Unit	Source/Formula
2	Peak 15-Minute Exits	1,651	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	270	Passengers	= #1 / #4
6	Exits per Train	275	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	691	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	352	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	17,434	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (level of service B), the most trafficked section of platform would have 598 ft^2 of unoccupied space, while the second and third most trafficked sections would have 2,162 ft^2 and 4,247 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 17.3 feet, shorter than the usable platform width of 31 feet. Table B4-42 details the platform waiting area analysis calculations for the Blue/Orange/Silver platform.

Table B4-42: Metro Center Blue/Orange/Silver Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	5,811	5,811	5,811	= #12 / 3
14	Waiting Passengers	345	242	104	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,453	2,417	1,036	= #14 x #11
16	Waiting Passenger Queue (ft)	17.3	12.1	5.2	= #15 / 200
17	Exiting Passengers	176	123	53	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,761	1,233	528	= #17 x #11
19	Net Area Remaining (ft^2)	598	2,162	4,247	= #13 - #15 - #18

*Table continued from table B4-41.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 7,775 ft^2, or three 200-foot long sections of 2,592 ft^2 each. Table B4-43 details the assumptions and ridership used in this analysis.

Table B4-43: Metro Center Glenmont Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,171	Passengers	WMATA
2	Peak 15-Minute Exits	548	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	195	Passengers	= #1 / #4
6	Exits per Train	91	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	500	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	117	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,775	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have zero feet of unoccupied space, while the second and third most trafficked sections would have 433 ft^2 and 1,667 ft^2, respectively. The most trafficked section of the platform would provide 8.4 ft^2 per passenger, which corresponds to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 12.5 feet, shorter than the usable platform width of 15 feet. However, this only provides 2.5 feet to accommodate exiting passengers. Table B4-44 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-44: Metro Center Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,592	2,592	2,592	= #12 / 3
14	Waiting Passengers	250	175	75	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,498	1,749	749	= #14 x #11
16	Waiting Passenger Queue (ft)	12.5	8.7	3.7	= #15 / 200
17	Exiting Passengers	59	41	18	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	585	410	176	= #17 x #11
19	Net Area Remaining (ft^2)	-491	433	1,667	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.4	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-43.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 7,774 ft², or three 200-foot long sections of 2,591 ft² each. Table B4-45 details the assumptions and ridership used in this analysis.

Table B4-45: Metro Center Shady Grove Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,183	Passengers	WMATA
2	Peak 15-Minute Exits	691	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	197	Passengers	= #1 / #4
6	Exits per Train	115	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	505	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	147	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,774	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have no unoccupied space, while the second and third most trafficked sections would have 309 ft² and 1,613 ft², respectively. The most trafficked section of the platform would provide 7.9 ft² per passenger, which corresponds to pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 12.6 feet, which is shorter than the usable platform width of 15 feet. However, this only provides 2.4 feet to accommodate exiting passengers. Table B4-46 details the platform waiting area analysis calculations for the Shady Grove platform (and is continued from table B4-45).

Table B4-46: Metro Center Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,591	2,591	2,591	= #12 / 3
14	Waiting Passengers	252	177	76	1 = #9 x 0.50 2 = #9 x 0.35 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,524	1,767	757	= #14 x #11
16	Waiting Passenger Queue (ft)	12.6	8.8	3.8	= #15 / 200
17	Exiting Passengers	74	52	22	1 = #10 X 0.50 2 = #10 X 0.35 3 = #10 X 0.15
18	Exiting Passenger Area (ft^2)	737	516	221	= #17 x #11

# *	Description	Area 1	Area 2	Area 3	Formula
19	Net Area Remaining (ft^2)	-669	309	1,613	= #13 - #15 - #18
20	Area (ft^2) per passenger	7.9	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-45.

B4.3 No-action Alternative Metrorail Capacity Analysis

B4.3.1 Archives-Navy Memorial

There are two sets of vertical elements at the Archives-Navy Memorial Metro Station, those between the platform and the mezzanine, and those between the mezzanine and the street level. The peak 15-minute period at this station for exiting passengers is between 8:45 AM and 9:00 AM.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-47.

Table B4-47: Archives-Navy Memorial Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	46	WMATA
12	15-Minute Exits	670	WMATA
13	Adjusted 15-Minute Entries	59	= #11 x #2
14	Adjusted 15-Minute Exits	858	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	56	= #13 x #5
16	Adjusted Exit Escalator Volume	815	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit

#	Assumption	Value	Source/Formula
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.30**	= #16 / #20

Of the three escalators between the street and mezzanine, two operate in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 46 passengers would use the single entry escalator and 815 would use the two exit escalators during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.04 while the v/c ratio for the exit escalator was 0.30. Both of these figures are well below 0.7, which is considered capacity.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-48.

Table B4-48: Archives-Navy Memorial Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent: Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	46	WMATA
12	15-Minute Exits	670	WMATA
13	Adjusted 15-Minute Entries	59	= #11 x #2
14	Adjusted 15-Minute Exits	858	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	56	= #13 x #5
16	Adjusted Exit Escalator Volume	815	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15

#	Assumption	Value	Source/Formula
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.60**	= #16 / #20

Of the two escalators at the station, one operates in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 46 passengers would use the entry escalator and 815 would use the exit escalator during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.04 while the v/c ratio for the exit escalator was 0.60. Both of these figures are below 0.7, which is considered capacity.

Faregate Aisle Capacity

Archives-Navy Memorial Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.29, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the six that are provided are more than sufficient. Table B4-49 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-49: Archives-Navy Memorial Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
5	Entries	46	WMATA
6	Exits	670	WMATA
7	Adjusted Entries	59	= #5 x #2
8	Adjusted Exits	858	= #6 x #2
9	Total Adjusted Volume	917	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.29**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Archives-Navy Memorial, fare vending machines can accommodate 1.5 transactions per minute, and approximately 10 percent of all passengers will use them. Archives-Navy Memorial

Metro Station has five fare vending machines, and therefore can accommodate 113 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 95 passengers at this station would attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.84, which exceeds what is considered capacity at 0.7. Using a v/c of 0.7 as capacity, approximately seven fare vending machines would be necessary to meet current demand. Table B4-50 summarizes the fare vending machine capacity analysis results at the station.

Table B4-50: Archives-Navy Memorial Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
6	Entries	665	WMATA
7	Exits	77	WMATA
8	Adjusted Entries	851	= #6 x #2
9	Adjusted Exits	99	= #7 x #2
10	Adjusted Total	950	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	95	= #10 x #3
12	Fare Vendors	5	Site Visit
13	Fare Vendor Capacity (15-Minute)	113	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.84**	= #11 / #13
15	**Fare Vendors Needed**	**7**	= #11 / #4 / #5 / 15

Platform Area Analysis

The peak 15-minute peak entry period at Archives-Navy Memorial Station was 5:00 PM to 5:15 PM. The net platform area was measured at 12,795 ft², or three 200-foot long sections of 4,265 ft² each. Table B4-51 details the assumptions and ridership used in this analysis.

Table B4-51: Archives-Navy Memorial Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	665	Passengers	WMATA
2	Peak 15-Minute Exits	77	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	222	Passengers	= #1 / #4

#	Assumption	Amount	Unit	Source/Formula
6	Exits per Train	26	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	568	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	33	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,795	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked 200-foot section of platform would have 1,263 ft^2 of unoccupied space, while the second and third most trafficked 200-foot sections would have 2,164 ft^2 and 3,364 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 14.2 feet, shorter than the usable platform width of 19 feet. Table B4-52 details the platform area analysis calculations for the station.

Table B4-52: Archives-Navy Memorial Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,265	4,265	4,265	= #12 / 3
14	Waiting Passengers	284	199	85	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,838	1,986	851	= #14 x #11
16	Waiting Passenger Queue (ft)	14.2	9.9	4.3	= #15 / 200
17	Exiting Passengers	16	11	5	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	164	115	49	= #17 x #11
19	Net Area Remaining (ft^2)	1,263	2,164	3,364	= #13 - #15 - #18

*Table continued from table B4-51.

B4.3.2 Federal Triangle Station

At Federal Triangle Station, there are two sets of vertical elements, those between the platform and the mezzanine level, and those between the mezzanine level and the street level. The elements between the mezzanine and street level are split into two portions, however the elements are identical. At the split, there is an entrance into the Ronald Reagan Building, meaning that passengers accessing this building only use the lower portion of the mezzanine-to-street elements. For the purposes of this analysis, however, the mezzanine-to-street elements were evaluated as if they were a single, continuous set. The peak 15-minute period for exiting passengers is between 8:45 AM and 9:00 AM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-53.

Table B4-53: Federal Triangle Mezzanine-to-Platform Vertical Capacity Analysis

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	28	WMATA
12	15-Minute Exits	597	WMATA
13	Adjusted 15-Minute Entries	36	= #11 x #2
14	Adjusted 15-Minute Exits	764	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	34	= #13 x #5
16	Adjusted Exit Escalator Volume	726	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

There are three escalators between the mezzanine and the platform. Two of the escalators are paired, with one always moving downward toward the platform (serving entries), and the other always moving upward toward the mezzanine (serving exits). The third escalator is on the other side of the mezzanine level and operates in the upward direction (serving exits) during the peak 15-minute period.

Approximately 34 passengers would use the downward escalator to enter the platform, while 726 would use the two upward escalators to exit the platform during the peak 15-minute period. The resulting volume to capacity

(v/c) ratio was 0.03 for the entry escalators and 0.27 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-54.

Table B4-54: Federal Triangle Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	28	WMATA
12	15-Minute Exits	597	WMATA
13	Adjusted 15-Minute Entries	36	= #11 x #2
14	Adjusted 15-Minute Exits	764	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	34	= #13 x #5
16	Adjusted Exit Escalator Volume	726	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

There are two sets of three escalators at the Federal Triangle Metro Station. The two sets of escalators are separated by a platform that provides passengers underground access to the Reagan Building. During the peak

15-minute period, two escalators operate in the upward direction towards the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries).

Approximately 34 passengers would use the downward escalator to enter the station, while 726 would use the two upward escalators to exit the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.27 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Aisle Capacity

Federal Triangle Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.25, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the six that are provided are sufficient. Table B4-55 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-55: Federal Triangle Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	28	WMATA
6	Exits	597	WMATA
7	Adjusted Entries	36	= #5 x #2
8	Adjusted Exits	764	= #6 x #2
9	Total Adjusted Volume	800	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.25**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Federal Triangle, fare vending machines can accommodate 1.67 transactions per minute, and approximately 10 percent of all passengers will use them. Federal Triangle has six fare vending machines, and therefore can accommodate 150 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 88 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.59,

below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately six fare vending machines would be necessary to meet current demand. Table B4-56 summarizes the fare vending machine capacity analysis results at the station.

Table B4-56: Federal Triangle Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	635	WMATA
7	Exits	55	WMATA
8	Adjusted Entries	813	= #6 x #2
9	Adjusted Exits	71	= #7 x #2
10	Adjusted Total	884	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	88	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	150	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.59**	= #11 / #13
15	**Fare Vendors Needed**	**6**	= #11 / #4 / #5 / 15

Platform Area Analysis

The 15-minute peak entry period at Federal Triangle Metro Station is 5:00 PM to 5:15 PM. The net platform area was calculated at 12,687 ft², or three 200-foot long sections of 4,229 ft² each. Table B4-57 details the assumptions and ridership used in this analysis.

Table B4-57: Federal Triangle Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	635	Passengers	WMATA
2	Peak 15-Minute Exits	55	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	106	Passengers	= #1 / #4
6	Exits per Train	9	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA

#	Assumption	Amount	Unit	Source/Formula
9	Adjusted Entries per Train	271	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	12	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,687	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have 2,815 ft^2 of unoccupied space, while the second and third most trafficked sections would have 3,239 ft^2 and 3,805 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 6.8 feet, significantly shorter than the usable platform width of 19 feet. Table B4-58 details the platform area analysis calculations for the station.

Table B4-58: Federal Triangle Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,229	4,229	4,229	= #12 / 3
14	Waiting Passengers	136	95	41	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,355	949	407	= #14 x #11
16	Waiting Passenger Queue (ft)	6.8	4.7	2.0	= #15 / 200
17	Exiting Passengers	6	4	2	Area 1 = #10 X 0.50 Area 2 = #10 X 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	59	41	18	= #17 x #11
19	Net Area Remaining (ft^2)	2,815	3,239	3,805	= #13 - #15 - #18

*Table continued from table XX.

B4.3.3 Gallery Place-Chinatown East Entrance

At the east entrance to Gallery Place-Chinatown Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 6:15 PM and 6:30 PM. This station entrance has three sets of vertical elements, those between the Green/Yellow platform and the Red-Glenmont platform, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Red Line level is split into two separate platforms with one side serving Glenmont trains and the other serving Shady Grove trains. The vertical elements between the Green/Yellow platform and the Red-Glenmont platform were not analyzed, as passengers accessing the JEH building from those lines likely use Archives-Navy Memorial Station which is significantly closer to the JEH building.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-59.

Table B4-59: Gallery Place-Chinatown East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	266	WMATA
12	15-Minute Exits	445	WMATA
13	Adjusted 15-Minute Entries	340	= #11 x #2
14	Adjusted 15-Minute Exits	570	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	289	= #13 x #5
16	Adjusted Exit Escalator Volume	485	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.11**	= #15 / #19
22	**Exit Escalator V/C**	**0.18**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	34	= #13 x #9
24	Adjusted Exit Stair Volumes	57	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	5.0	WMATA
27	Stair Capacity* (15-Minute)	675	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.13**	= (#23 + #24) / #27

#	Assumption	Value	Source/Formula
29	Stair Flow Rate (Passengers/Foot/Minute)	1.2	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Between the street and the mezzanine, two escalators operate in the upward direction toward the street (serving exits) and two escalators operate in the downward direction toward the mezzanine (serving entries). Approximately 485 passengers would use the upward escalator to exit the mezzanine, while 289 would use the downward escalator to enter the mezzanine during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.11 for the entry escalators and 0.18 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this station entrance is located between the four escalators. Approximately 34 passengers would use the staircase to enter the station, while 57 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the per-minute capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 5.0-foot wide staircase, the 15-minute capacity was calculated at 675 passengers. Overall, the resulting v/c ratio for the staircase was 0.13, which is well below 0.7 or what is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-60.

Table B4-60: Gallery Place-Chinatown East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	141	WMATA
12	15-Minute Exits	333	WMATA
13	Adjusted 15-Minute Entries	180	= #11 x #2
14	Adjusted 15-Minute Exits	426	= #12 x #2

#	Assumption	Value	Source/Formula
Escalators			
15	Adjusted Entry Escalator Volume	171	= #13 x #5
16	Adjusted Exit Escalator Volume	405	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.13**	= #15 / #19
22	**Exit Escalator V/C**	**0.30**	= #16 / #20

Of the two escalators between the mezzanine and the Glenmont platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 405 passengers would use the upward escalator to exit the platform, while 171 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.13 for the entry escalator and 0.30 for the exit escalator. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-61.

Table B4-61: Gallery Place-Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	180	WMATA

#	Assumption	Value	Source/Formula
12	15-Minute Exits	238	WMATA
13	Adjusted 15-Minute Entries	231	= #11 x #2
14	Adjusted 15-Minute Exits	305	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	231	= #13 x #5
16	Adjusted Exit Escalator Volume	305	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.17**	= #15 / #19
22	**Exit Escalator V/C**	**0.23**	= #16 / #20

Of the two escalators between the mezzanine and the Shady Grove platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 305 passengers would use the upward escalator to exit the platform, while 231 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.17 for the entry escalators and 0.23 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-62.

Table B4-62: Gallery Place-Chinatown East Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM

#	Assumption	Value	Source/Formula
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	1,099	WMATA
12	15-Minute Exits	681	WMATA
13	Adjusted 15-Minute Entries	1,407	= #11 x #2
14	Adjusted 15-Minute Exits	872	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	914	= #13 x #5
16	Adjusted Exit Escalator Volume	741	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	3	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	4,050	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.34**	= #15 / #19
22	**Exit Escalator V/C**	**0.18**	= #16 / #20
	Stairs		
23	Adjusted Entry Stair Volumes	422	= #13 x #9
24	Adjusted Exit Stair Volumes	87	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	905	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.56**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	5.1	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Of the five escalators between the lower platform and the Red-Glenmont platform, three operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 741 passengers would use the upward escalators to exit the lower platform, while 914 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.34 for the entry escalators and 0.18 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this location is paired with a single escalator. Approximately 422 passengers would use the staircase to enter the lower platform, while 87 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity per minute of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 6.7-foot wide staircase, the 15-minute capacity was calculated at

905 passengers. Overall, the resulting v/c ratio for the staircase was 0.56, which is below 0.7 or what is considered capacity.

Faregate Aisle Capacity

The east entrance to Gallery Place-Chinatown Metro Station currently has twelve faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.16, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the 11 that are provided are sufficient. Table B4-63 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-63: Gallery Place-Chinatown East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	266	WMATA
6	Exits	445	WMATA
7	Adjusted Entries	340	= #5 x #2
8	Adjusted Exits	570	= #6 x #2
9	Total Adjusted Volume	910	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	11	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	12	Site Visit
13	Current 15-Minute Capacity	5,775	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.16**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 transactions per minute and approximately 20 percent of all passengers will use them. The east entrance to Gallery Place-Chinatown Metro Station has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 153 passengers could attempt to use them during the peak 15-minute period. This results in a v/c ratio of 1.14, well above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines would be necessary to meet current demand. Table B4-64 summarizes the fare vending machine capacity analysis.

Table B4-64: Gallery Place-Chinatown East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	412	WMATA
7	Exits	187	WMATA
8	Adjusted Entries	528	= #6 x #2
9	Adjusted Exits	239	= #7 x #2
10	Adjusted Total	766	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	153	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	1.14	= #11 / #13
15	**Fare Vendors Needed**	10	= #11 / #4 / #5 / 15

B4.3.4 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown west entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There is one set of vertical elements connecting the mezzanine level and the street level, one set connecting the mezzanine with the Red-Glenmont platform, and another connecting the mezzanine with the Red-Shady Grove platform.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-65.

Table B4-65: Gallery Place–Chinatown West Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA

#	Assumption	Value	Source/Formula
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	15	WMATA
12	15-Minute Exits	378	WMATA
13	Adjusted 15-Minute Entries	20	= #11 x #2
14	Adjusted 15-Minute Exits	484	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	20	= #13 x #5
16	Adjusted Exit Escalator Volume	484	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.36**	= #16 / #20

Between the street and the mezzanine, one escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 484 passengers would use the upward escalator to exit the station, while 20 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.36 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-66.

Table B4-66: Gallery Place–Chinatown West Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout

#	Assumption	Value	Source/Formula
Ridership			
11	15-Minute Entries	7	WMATA
12	15-Minute Exits	181	WMATA
13	Adjusted 15-Minute Entries	9	= #11 x #2
14	Adjusted 15-Minute Exits	231	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	9	= #13 x #5
16	Adjusted Exit Escalator Volume	231	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.17**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 231 passengers would use the upward escalator to exit the platform, while nine would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.17 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-67.

Table B4-67: Gallery Place–Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	9	WMATA

#	Assumption	Value	Source/Formula
12	15-Minute Exits	197	WMATA
13	Adjusted 15-Minute Entries	11	= #11 x #2
14	Adjusted 15-Minute Exits	252	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	11	= #13 x #5
16	Adjusted Exit Escalator Volume	252	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.19**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 252 passengers would use the upward escalator to exit the platform, while 11 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.19 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The Gallery Place west entrance currently has five faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-68 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-68: Gallery Place-Chinatown West Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	15	WMATA
6	Exits	378	WMATA
7	Adjusted Entries	20	= #5 x #2
8	Adjusted Exits	484	= #6 x #2
9	Total Adjusted Volume	503	= #7 + #8
Current Faregate Infrastructure			

#	Assumption	Value	Source/Formula
10	Regular Aisles	4	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	5	Site Visit
13	Current 15-Minute Capacity	2,100	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown, (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute and approximately 20 percent of all passengers will use them. The Gallery Place-Chinatown west entrance has three fare vending machines, and therefore can accommodate 68 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 98 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.45, well above the acceptable capacity of 0.70. Using a v/c of 0.7 as capacity, approximately seven fare vending machines would be necessary to meet current demand. Table B4-69 summarizes the fare vending machine capacity analysis.

Table B4-69: Gallery Place-Chinatown West Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	318	WMATA
7	Exits	63	WMATA
8	Adjusted Entries	407	= #6 x #2
9	Adjusted Exits	80	= #7 x #2
10	Adjusted Total	488	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	98	= #10 x #3
12	Fare Vendors	3	Site Visit
13	Fare Vendor Capacity (15-Minute)	68	= #12 x #4 x 15
14	**Fare Vendor V/C**	1.45	= #11 / #13
15	**Fare Vendors Needed**	**7**	= #11 / #4 / #5 / 15

B4.3.5 Gallery Place-Chinatown Platform Area Analysis

The peak 15-minute peak entry period at Gallery Place-Chinatown Metro Station is between 5:00 PM and 5:15 PM.

Green/Yellow Platform

The Green/Yellow net platform area was calculated at 14,261 ft², or three 200-foot long sections of 4,754 ft² each. Table B4-70 details the assumptions and ridership used in this analysis.

Table B4-70: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,051	Passengers	WMATA
2	Peak 15-Minute Exits	1,436	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	342	Passengers	= #1 / #4
6	Exits per Train	239	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	875	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	306	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,261	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform (Area 1) would have no unoccupied space, while the second and third most trafficked sections would have 619 ft² and 2,982 ft², respectively. The most trafficked section of the platform would provide a spacing of 8.0 ft² per passenger, equating to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.9 feet, just shorter than the usable platform width of 23 feet. This only provides 1.1 feet to accommodate exiting passengers. Table B4-71 details the platform area analysis calculations for the Green/Yellow platform.

Table B4-71: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,754	4,754	4,754	= #12 / 3
14	Waiting Passengers	438	306	131	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	4,375	3,063	1,313	= #14 x #11
16	Waiting Passenger Queue (ft)	21.9	15.3	6.6	= #15 / 200

# *	Description	Area 1	Area 2	Area 3	Formula
17	Exiting Passengers	153	107	46	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,532	1,072	460	= #17 x #11
19	Net Area Remaining (ft^2)	0	619	2,982	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.0	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-70.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 5,741 ft^2, or three 200-foot long sections of 1,914 ft^2 each. Table B4-72 details the assumptions and ridership used in this analysis.

Table B4-72: Gallery Place-Chinatown Shady Grove Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,302	Passengers	WMATA
2	Peak 15-Minute Exits	667	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	217	Passengers	= #1 / #4
6	Exits per Train	111	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	555	Passengers	= #5 x #7 x #11
10	Adjusted Exits per Train	142	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,741	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section of platform would have no unoccupied space, while the third most trafficked section would have 867 ft^2 of unoccupied space. The most trafficked section of the platform would provide a spacing of 5.5 ft^2 per passenger, equating to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 13.9 feet. With a usable platform width of only 10 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-73 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-73: Gallery Place-Chinatown Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,914	1,914	1,914	= #12 / 3
14	Waiting Passengers	278	194	83	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,777	1,944	833	= #14 x #11
16	Waiting Passenger Queue (ft)	13.9	9.7	4.2	= #15 / 200
17	Exiting Passengers	71	50	21	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	712	498	213	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	867	= #13 - #15 - #18
20	Area (ft^2) per passenger	5.5	7.8	18.3	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-72.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 5,639 ft^2, or three 200-foot long sections of 1,880 ft^2 each. Table B4-74 details the assumptions and ridership used in this analysis.

Table B4-74: Gallery Place-Chinatown Glenmont Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	807	Passengers	WMATA
2	Peak 15-Minute Exits	1,220	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	135	Passengers	= #1 / #4
6	Exits per Train	203	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	344	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	260	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,639	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have

972 ft². The most trafficked section of the platform would provide 6.2 ft² per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 8.6 feet, which is shorter than the usable platform width of 10 feet. However, this only provides 1.4 feet to accommodate exiting passengers. Table B4-75 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-75: Gallery Place-Chinatown Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,880	1,880	1,880	= #12 / 3
14	Waiting Passengers	172	121	52	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,722	1,206	517	= #14 x #11
16	Waiting Passenger Queue (ft)	8.6	6.0	2.6	= #15 / 200
17	Exiting Passengers	130	91	39	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,302	911	390	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	972	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.2	8.9	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-74.

B4.3.6 Metro Center East Entrance

At the Metro Center east entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There are two sets of vertical elements, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Metro Center east entrance has two side platforms serving the Red Line with two escalators serving each side platform.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity is detailed in table B4-76.

Table B4-76: Metro Center East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8

#	Assumption	Value	Source/Formula
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	30	WMATA
12	15-Minute Exits	219	WMATA
13	Adjusted 15-Minute Entries	38	= #11 x #2
14	Adjusted 15-Minute Exits	280	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	38	= #13 x #5
16	Adjusted Exit Escalator Volume	280	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

Between the mezzanine and the Shady Grove platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 280 passengers would use the upward escalator to exit the platform, while 38 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.21 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-77.

Table B4-77: Metro Center East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM

#	Assumption	Value	Source/Formula
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	25	WMATA
12	15-Minute Exits	325	WMATA
13	Adjusted 15-Minute Entries	31	= #11 x #2
14	Adjusted 15-Minute Exits	416	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	31	= #13 x #5
16	Adjusted Exit Escalator Volume	416	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.31**	= #16 / #20

Between the mezzanine and the Glenmont platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 416 passengers would use the upward escalator to exit the platform, while 31 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.31 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-78.

Table B4-78: Metro Center East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA

#	Assumption	Value	Source/Formula
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	55	WMATA
12	15-Minute Exits	544	WMATA
13	Adjusted 15-Minute Entries	70	= #11 x #2
14	Adjusted 15-Minute Exits	697	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	70	= #13 x #5
16	Adjusted Exit Escalator Volume	697	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.05**	= #15 / #19
22	**Exit Escalator V/C**	**0.26**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Approximately 697 passengers would use the two upward escalator to exit the station, while 70 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.05 for the entry escalators and 0.26 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The east entrance to Metro Center Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which is considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-79 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-79: Metro Center East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	55	WMATA
6	Exits	544	WMATA
7	Adjusted Entries	70	= #5 x #2
8	Adjusted Exits	697	= #6 x #2
9	Total Adjusted Volume	766	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center east entrance has eight fare vending machines, and therefore can accommodate 180 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 143 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.79, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines would be necessary to meet current demand. Table B4-80 summarizes the fare vending machine capacity analysis results.

Table B4-80: Metro Center East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	434	WMATA

#	Assumption	Value	Source/Formula
7	Exits	125	WMATA
8	Adjusted Entries	556	= #6 x #2
9	Adjusted Exits	160	= #7 x #2
10	Adjusted Total	715	= #8 + #9
Fare Vendor			
11	Adjusted Fare Vendor Volume	143	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity (15-Minute)	180	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.79**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.3.7 Metro Center South Entrance

At the south entrance to Metro Center Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. At this entrance, there are two sets of vertical elements, those between the mezzanine and street level and those between the mezzanine and the Blue/Orange/Silver Lines platform. The Red Line platform to Glenmont is on the same level as the mezzanine at this entrance.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-81.

Table B4-81: Metro Center South Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	36	WMATA
12	15-Minute Exits	546	WMATA

#	Assumption	Value	Source/Formula
13	Adjusted 15-Minute Entries	46	= #11 x #2
14	Adjusted 15-Minute Exits	699	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	46	= #13 x #5
16	Adjusted Exit Escalator Volume	699	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.26**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Using these assumptions, approximately 699 passengers would use the two upward escalators to exit the station, while 46 passengers would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.26 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-82.

Table B4-82: Metro Center South Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			

#	Assumption	Value	Source/Formula
11	15-Minute Entries	592	WMATA
12	15-Minute Exits	1,374	WMATA
13	Adjusted 15-Minute Entries	758	= #11 x #2
14	Adjusted 15-Minute Exits	1,758	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	493	= #13 x #5
16	Adjusted Exit Escalator Volume	1,495	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.36**	= #15 / #19
22	**Exit Escalator V/C**	**0.55**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	227	= #13 x #9
24	Adjusted Exit Stair Volumes	176	= #14 x #10
25	Stairs	3	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	2,714	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.15**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	1.3	= (#23 + #24) / (#25 + #26) / 15

*10% reduction in capacity due to bi-directional friction.

Of the three escalators between the lower platform and the Red-Glenmont platform, two operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 1,495 passengers would use the upward escalators to exit the lower platform, while 493 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.36 for the entry escalators and 0.55 for the exit escalators. These v/c ratios are below 0.7, which is considered capacity.

The three staircases between the lower platform and the Red-Glenmont platform are grouped together. Approximately 227 passengers would use the staircase to enter the lower platform, while 176 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With three, 6.7-foot wide staircase, the 15-minute capacity was calculated at 2,714 passengers. Overall, the resulting v/c ratio for the stairs was 0.15, which is well below 0.7 or what is considered capacity.

Faregate Capacity

The south entrance to Metro Center Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-83 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-83: Metro Center South Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	36	WMATA
6	Exits	546	WMATA
7	Adjusted Entries	46	= #5 x #2
8	Adjusted Exits	699	= #6 x #2
9	Total Adjusted Volume	745	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center south entrance has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 145 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.07, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines are necessary to meet current demand. Table B4-84 summarizes the fare vending machine capacity analysis for this station entrance.

Table B4-84: Metro Center South Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA

#	Assumption	Value	Source/Formula
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	419	WMATA
7	Exits	148	WMATA
8	Adjusted Entries	536	= #6 x #2
9	Adjusted Exits	189	= #7 x #2
10	Adjusted Total	725	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	145	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.07**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.3.8 Metro Center Platform Area Analysis

The peak 15-minute entry period at Metro Center Metro Station is between 5:30 PM and 5:45 PM.

Blue/Orange/Silver Platform

The Blue/Orange/Silver net platform area was calculated at 17,434 ft², or three 200-foot long sections of 5,811 ft² each. Table B4-85 details the assumptions and ridership used in this analysis.

Table B4-85: Metro Center Blue/Orange/Silver Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,044	Passengers	WMATA
2	Peak 15-Minute Exits	2,078	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	341	Passengers	= #1 / #4
6	Exits per Train	346	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	872	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	443	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA

#	Assumption	Amount	Unit	Source/Formula
12	Platform Space Available	17,434	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (level of service B), the most trafficked section of platform would have no unoccupied space, while the second and third most trafficked sections would have 1,207 ft^2 and 3,838 ft^2, respectively. The most trafficked section of the platform would provide 8.8 ft^2 per passenger, which corresponds to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.8 feet, shorter than the usable platform width of 31 feet. Table B4-86 details the platform waiting area analysis calculations for the Blue/Orange/Silver platform.

Table B4-86: Metro Center Blue/Orange/Silver Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	5,811	5,811	5,811	= #12 / 3
14	Waiting Passengers	436	305	131	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	4,361	3,052	1,308	= #14 x #11
16	Waiting Passenger Queue (ft)	21.8	15.3	6.5	= #15 / 200
17	Exiting Passengers	222	155	67	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	2,217	1,552	665	= #17 x #11
19	Net Area Remaining (ft^2)	0	1,207	3,838	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.8	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-85.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 7,775 ft^2, or three 200-foot long sections of 2,592 ft^2 each. Table B4-87 details the assumptions and ridership used in this analysis.

Table B4-87: Metro Center Glenmont Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,472	Passengers	WMATA
2	Peak 15-Minute Exits	680	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	245	Passengers	= #1 / #4
6	Exits per Train	113	Passengers	= #2 / #4

#	Assumption	Amount	Unit	Source/Formula
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	628	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	145	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,775	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section of platform would have no unoccupied space, while the third most trafficked section would have 1,432 ft^2. The most trafficked section of the platform would provide 6.7 ft^2 per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 15.7 feet, which exceeds the usable platform width of 15 feet and therefore would not provide sufficient space for both entering and exiting passengers. Table B4-88 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-88: Metro Center Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,592	2,592	2,592	= #12 / 3
14	Waiting Passengers	314	220	94	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,139	2,198	942	= #14 x #11
16	Waiting Passenger Queue (ft)	15.7	11.0	4.7	= #15 / 200
17	Exiting Passengers	73	51	22	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	725	508	218	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,432	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.7	9.6	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-87.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 7,774 ft^2, or three 200-foot long sections of 2,591 ft^2 each. Table B4-89 details the assumptions and ridership used in this analysis.

Table B4-89: Metro Center Shady Grove Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,490	Passengers	WMATA

#	Assumption	Amount	Unit	Source/Formula
2	Peak 15-Minute Exits	859	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	248	Passengers	= #1 / #4
6	Exits per Train	143	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	636	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	183	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,774	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have 1,363 ft^2. The most trafficked section of the platform would provide 6.3 ft^2 per passenger, which corresponds to pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 15.9 feet, which exceeds the usable platform width of 15 feet and therefore would not provide sufficient space for both entering and exiting passengers. Table B4-90 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-90: Metro Center Shady Grove Platform Waiting Area Analysis Calculations*

#	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,591	2,591	2,591	= #12 / 3
14	Waiting Passengers	318	222	95	1 = #9 x 0.50 2 = #9 x 0.35 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,178	2,225	953	= #14 x #11
16	Waiting Passenger Queue (ft)	15.9	11.1	4.8	= #15 / 200
17	Exiting Passengers	92	64	27	1 = #10 X 0.50 2 = #10 X 0.35 3 = #10 X 0.15
18	Exiting Passenger Area (ft^2)	916	641	275	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,363	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.3	9.0	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-89.

B4.4 RFDS 1 Build Condition Metrorail Capacity Analysis

B4.4.1 Archives-Navy Memorial

There are two sets of vertical elements at the Archives-Navy Memorial Metro Station, those between the platform and the mezzanine, and those between the mezzanine and the street level. The peak 15-minute period at this station for exiting passengers is between 8:45 AM and 9:00 AM.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-91.

Table B4-91: Archives-Navy Memorial Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	51	WMATA
12	15-Minute Exits	690	WMATA
13	Adjusted 15-Minute Entries	65	= #11 x #2
14	Adjusted 15-Minute Exits	883	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	62	= #13 x #5
16	Adjusted Exit Escalator Volume	839	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.05**	= #15 / #19
22	**Exit Escalator V/C**	**0.31**	= #16 / #20

Of the three escalators between the street and mezzanine, two operate in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 62 passengers would use the single

entry escalator and 839 would use the two exit escalators during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator would be 0.05 while the v/c ratio for the exit escalator would be 0.31. Both of these figures are well below 0.7, which is considered capacity.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-92.

Table B4-92: Archives-Navy Memorial Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	51	WMATA
12	15-Minute Exits	690	WMATA
13	Adjusted 15-Minute Entries	65	= #11 x #2
14	Adjusted 15-Minute Exits	883	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	62	= #13 x #5
16	Adjusted Exit Escalator Volume	839	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.05**	= #15 / #19
22	**Exit Escalator V/C**	**0.62**	= #16 / #20

Of the two escalators at the station, one operates in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 62 passengers would use the entry escalator and 839 would use the exit escalator during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.05 while the v/c ratio for the exit escalator was 0.62. Both of these figures are below 0.7, which is considered capacity.

Faregate Aisle Capacity

Archives-Navy Memorial Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.30, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the six that are provided are more than sufficient. Table B4-93 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-93: Archives-Navy Memorial Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
5	15-Minute Entries	51	WMATA
6	15-Minute Exits	690	WMATA
7	Adjusted 15-Minute Entries	65	= #5 x #2
8	Adjusted 15-Minute Exits	883	= #6 x #2
9	Adjusted 15-Minute Total	949	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.30**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Archives-Navy Memorial, fare vending machines can accommodate 1.5 transactions per minute, and approximately 10 percent of all passengers will use them. Archives-Navy Memorial Station has five fare vending machines, and therefore can accommodate 113 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 98 passengers at this station would attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.87, which exceeds what is considered capacity at 0.7. Using a v/c of 0.7 as capacity, approximately seven fare vending machines would be necessary to meet current demand. Table B4-94 summarizes the fare vending machine capacity analysis results at the station.

Table B4-94: Archives-Navy Memorial Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA

#	Assumption	Value	Source/Formula
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
6	15-Minute Entries	682	WMATA
7	15-Minute Exits	83	WMATA
8	Adjusted 15-Minute Entries	873	= #6 x #2
9	Adjusted 15-Minute Exits	106	= #7 x #2
10	Adjusted 15-Minute Total	979	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	98	= #10 x #3
12	Fare Vendors	5	Site Visit
13	Fare Vendor Capacity (15-Minute)	113	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.87**	**= #11 / #13**
15	**Fare Vendors Needed**	**7**	**= #11 / #4 / #5 / 15**

Platform Area Analysis

The peak 15-minute peak entry period at Archives-Navy Memorial Station was 5:00 PM to 5:15 PM. The net platform area was measured at 12,795 ft², or three 200-foot long sections of 4,265 ft² each. Table B4-95 details the assumptions and ridership used in this analysis.

Table B4-95: Archives-Navy Memorial Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	682	Passengers	WMATA
2	Peak 15-Minute Exits	83	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	227	Passengers	= #1 / #4
6	Exits per Train	28	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	582	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	35	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,795	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked 200-foot section of platform would have 1,178 ft^2 of unoccupied space, while the second and third most trafficked 200-foot sections would have 2,104 ft^2 and 3,339 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 14.6 feet, shorter than the usable platform width of 19 feet. Table B4-96 details the platform area analysis calculations for the station.

Table B4-96: Archives-Navy Memorial Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,265	4,265	4,265	= #12 / 3
14	Waiting Passengers	291	204	87	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,910	2,037	873	= #14 x #11
16	Waiting Passenger Queue (ft)	14.6	10.2	4.4	= #15 / 200
17	Exiting Passengers	18	12	5	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	177	124	53	= #17 x #11
19	Net Area Remaining (ft^2)	1,178	2,104	3,339	= #13 - #15 - #18

*Table continued from table B4-95.

B4.4.2 Federal Triangle Station

At Federal Triangle Station, there are two sets of vertical elements, those between the platform and the mezzanine level, and those between the mezzanine level and the street level. The elements between the mezzanine and street level are split into two portions, however the elements are identical. At the split, there is an entrance into the Ronald Reagan Building, meaning that passengers accessing this building only use the lower portion of the mezzanine-to-street elements. For the purposes of this analysis, however, the mezzanine-to-street elements were evaluated as if they were a single, continuous set. The peak 15-minute period for exiting passengers is between 8:45 AM and 9:00 AM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-97.

Table B4-97: Federal Triangle Mezzanine-to-Platform Vertical Capacity Analysis

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8

#	Assumption	Value	Source/Formula
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	31	WMATA
12	15-Minute Exits	614	WMATA
13	Adjusted 15-Minute Entries	40	= #11 x #2
14	Adjusted 15-Minute Exits	787	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	38	= #13 x #5
16	Adjusted Exit Escalator Volume	747	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.28**	= #16 / #20

There are three escalators between the mezzanine and the platform. Two of the escalators are paired, with one always moving downward toward the platform (serving entries), and the other always moving upward toward the mezzanine (serving exits). The third escalator is on the other side of the mezzanine level and operates in the upward direction (serving exits) during the peak 15-minute period.

Approximately 38 passengers would use the downward escalator to enter the platform, while 747 would use the two upward escalators to exit the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.28 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-98.

Table B4-98: Federal Triangle Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM

#	Assumption	Value	Source/Formula
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	31	WMATA
12	15-Minute Exits	614	WMATA
13	Adjusted 15-Minute Entries	40	= #11 x #2
14	Adjusted 15-Minute Exits	787	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	38	= #13 x #5
16	Adjusted Exit Escalator Volume	747	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.28**	= #16 / #20

There are two sets of three escalators at Federal Triangle Metro Station. The two sets of escalators are separated by a platform that provides passengers underground access to the Reagan Building. During the peak 15-minute period, two escalators operate in the upward direction towards the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries).

Approximately 38 passengers would use the downward escalator to enter the station, while 747 would use the two upward escalators to exit the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.28 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Aisle Capacity

Federal Triangle Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.26, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to

function below capacity, and thus the six that are provided are sufficient. Table B4-99 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-99: Federal Triangle Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	31	WMATA
6	15-Minute Exits	614	WMATA
7	Adjusted 15-Minute Entries	40	= #5 x #2
8	Adjusted 15-Minute Exits	787	= #6 x #2
9	Adjusted 15-Minute Total	826	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.26**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Federal Triangle, fare vending machines can accommodate 1.67 transactions per minute, and approximately 10 percent of all passengers will use them. Federal Triangle has six fare vending machines, and therefore can accommodate 150 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 91 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.60, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately six fare vending machines would be necessary to meet current demand. Table B4-100 summarizes the fare vending machine capacity analysis results at the station.

Table B4-100: Federal Triangle Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA

#	Assumption	Value	Source/Formula
Ridership			
6	15-Minute Entries	652	WMATA
7	15-Minute Exits	57	WMATA
8	Adjusted 15-Minute Entries	834	= #6 x #2
9	Adjusted 15-Minute Exits	73	= #7 x #2
10	Adjusted 15-Minute Total	907	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	91	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	150	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.60**	= #11 / #13
15	**Fare Vendors Needed**	**6**	= #11 / #4 / #5 / 15

Platform Area Analysis

The 15-minute peak entry period at Federal Triangle Station is 5:00 PM to 5:15 PM. The net platform area was calculated at 12,687 ft², or three 200-foot long sections of 4,229 ft² each. Table B4-101 details the assumptions and ridership used in this analysis.

Table B4-101: Federal Triangle Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	652	Passengers	WMATA
2	Peak 15-Minute Exits	57	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	109	Passengers	= #1 / #4
6	Exits per Train	9	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	278	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	12	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,687	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have 2,778 ft² of unoccupied space, while the second and third most trafficked sections would have 3,214 ft² and 3,794 ft², respectively. The maximum queue of passengers waiting on the platform would be 7.0 feet, significantly shorter than the usable platform width of 19 feet. Table B4-102 details the platform area analysis calculations for the station.

Table B4-102: Federal Triangle Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,229	4,229	4,229	= #12 / 3
14	Waiting Passengers	139	97	42	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,390	973	417	= #14 x #11
16	Waiting Passenger Queue (ft)	7.0	4.9	2.1	= #15 / 200
17	Exiting Passengers	6	4	2	Area 1 = #10 X 0.50 Area 2 = #10 X 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	61	43	18	= #17 x #11
19	Net Area Remaining (ft^2)	2,778	3,214	3,794	= #13 - #15 - #18

*Table continued from table B4-101.

B4.4.3 Gallery Place-Chinatown East Entrance

At the east entrance to Gallery Place-Chinatown Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 6:15 PM and 6:30 PM. This station entrance has three sets of vertical elements, those between the Green/Yellow platform and the Red-Glenmont platform, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Red Line level is split into two separate platforms with one side serving Glenmont trains and the other serving Shady Grove trains.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-103.

Table B4-103: Gallery Place-Chinatown East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			

#	Assumption	Value	Source/Formula
11	15-Minute Entries	277	WMATA
12	15-Minute Exits	470	WMATA
13	Adjusted 15-Minute Entries	355	= #11 x #2
14	Adjusted 15-Minute Exits	602	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	302	= #13 x #5
16	Adjusted Exit Escalator Volume	511	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.11**	= #15 / #19
22	**Exit Escalator V/C**	**0.19**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	36	= #13 x #9
24	Adjusted Exit Stair Volumes	60	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	5.0	WMATA
27	Stair Capacity* (15-Minute)	675	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.14**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	1.3	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Between the street and the mezzanine, two escalators operate in the upward direction toward the street (serving exits) and two escalators operate in the downward direction toward the mezzanine (serving entries). Approximately 511 passengers would use the upward escalator to exit the mezzanine, while 302 would use the downward escalator to enter the mezzanine during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.11 for the entry escalators and 0.19 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this station entrance is located between the four escalators. Approximately 36 passengers would use the staircase to enter the station, while 60 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity per minute of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 5.0-foot wide staircase, the 15-minute capacity was calculated at 675 passengers. Overall, the resulting v/c ratio for the staircase was 0.14, which is well below 0.7 or what is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-104.

Table B4-104: Gallery Place-Chinatown East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	145	WMATA
12	15-Minute Exits	351	WMATA
13	Adjusted 15-Minute Entries	185	= #11 x #2
14	Adjusted 15-Minute Exits	450	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	176	= #13 x #5
16	Adjusted Exit Escalator Volume	427	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.13**	= #15 / #19
22	**Exit Escalator V/C**	**0.32**	= #16 / #20

Of the two escalators between the mezzanine and the Glenmont platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 427 passengers would use the upward escalator to exit the platform, while 176 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume

to capacity (v/c) ratio was 0.13 for the entry escalator and 0.32 for the exit escalator. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-105.

Table B4-105: Gallery Place-Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	188	WMATA
12	15-Minute Exits	248	WMATA
13	Adjusted 15-Minute Entries	241	= #11 x #2
14	Adjusted 15-Minute Exits	318	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	241	= #13 x #5
16	Adjusted Exit Escalator Volume	318	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.18**	= #15 / #19
22	**Exit Escalator V/C**	**0.24**	= #16 / #20

Of the two escalators between the mezzanine and the Shady Grove platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the

platform (serving entries). Approximately 318 passengers would use the upward escalator to exit the platform, while 241 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.18 for the entry escalators and 0.24 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-106.

Table B4-106: Gallery Place-Chinatown East Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM, Station layout
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	1,103	WMATA
12	15-Minute Exits	688	WMATA
13	Adjusted 15-Minute Entries	1,411	= #11 x #2
14	Adjusted 15-Minute Exits	881	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	917	= #13 x #5
16	Adjusted Exit Escalator Volume	749	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	3	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	4,050	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.34**	= #15 / #19
22	**Exit Escalator V/C**	**0.18**	= #16 / #20
Stairs			

#	Assumption	Value	Source/Formula
23	Adjusted Entry Stair Volumes	423	= #13 x #9
24	Adjusted Exit Stair Volumes	88	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	905	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.57**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	5.1	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Of the five escalators between the lower platform and the Red-Glenmont platform, three operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 749 passengers would use the upward escalators to exit the lower platform, while 917 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.34 for the entry escalators and 0.18 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this location is paired with a single escalator. Approximately 423 passengers would use the staircase to enter the lower platform, while 88 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity per minute of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 6.7-foot wide staircase, the 15-minute capacity was calculated at 905 passengers. Overall, the resulting v/c ratio for the staircase was 0.57, which is below 0.7 or what is considered capacity.

Faregate Aisle Capacity

The east entrance to Gallery Place-Chinatown Station currently has twelve faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.17, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the 11 that are provided are sufficient. Table B4-107 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-107: Gallery Place-Chinatown East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	277	WMATA
6	15-Minute Exits	470	WMATA
7	Adjusted 15-Minute Entries	355	= #5 x #2

#	Assumption	Value	Source/Formula
8	Adjusted 15-Minute Exits	602	= #6 x #2
9	Adjusted 15-Minute Total	957	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	11	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	12	Site Visit
13	Current 15-Minute Capacity	5,775	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.17**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 transactions per minute and approximately 20 percent of all passengers will use them. The east entrance to Gallery Place-Chinatown Metro Station has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 160 passengers could attempt to use them during the peak 15-minute period. This results in a v/c ratio of 1.19, well above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 11 fare vending machines would be necessary to meet current demand. Table B4-108 summarizes the fare vending machine capacity analysis.

Table B4-108: Gallery Place-Chinatown East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	423	WMATA
7	15-Minute Exits	202	WMATA
8	Adjusted 15-Minute Entries	541	= #6 x #2
9	Adjusted 15-Minute Exits	259	= #7 x #2
10	Adjusted 15-Minute Total	800	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	160	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15

#	Assumption	Value	Source/Formula
14	**Fare Vendor V/C**	**1.19**	= #11 / #13
15	**Fare Vendors Needed**	**11**	= #11 / #4 / #5 / 15

B4.4.4 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown west entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There is one set of vertical elements connecting the mezzanine level and the street level, one set connecting the mezzanine with the Red-Glenmont platform, and another connecting the mezzanine with the Red-Shady Grove platform.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-109.

Table B4-109: Gallery Place –Chinatown West Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	18	WMATA
12	15-Minute Exits	389	WMATA
13	Adjusted 15-Minute Entries	23	= #11 x #2
14	Adjusted 15-Minute Exits	498	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	23	= #13 x #5
16	Adjusted Exit Escalator Volume	498	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.37**	= #16 / #20

Between the street and the mezzanine, one escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 498 passengers would use the upward escalator to exit the station, while 23 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.37 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-110.

Table B4-110: Gallery Place–Chinatown West Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	8	WMATA
12	15-Minute Exits	186	WMATA
13	Adjusted 15-Minute Entries	10	= #11 x #2
14	Adjusted 15-Minute Exits	238	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	10	= #13 x #5
16	Adjusted Exit Escalator Volume	238	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.18**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 238 passengers would use the upward escalator to exit the platform, while 10 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume

to capacity (v/c) ratio was 0.01 for the entry escalators and 0.18 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-111.

Table B4-111: Gallery Place–Chinatown West Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	10	WMATA
12	15-Minute Exits	203	WMATA
13	Adjusted 15-Minute Entries	13	= #11 x #2
14	Adjusted 15-Minute Exits	260	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	13	= #13 x #5
16	Adjusted Exit Escalator Volume	260	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.19**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 260 passengers would use the upward escalator to exit the platform, while 13 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.19 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The Gallery Place west entrance currently has five faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.25, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-112 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-112: Gallery Place-Chinatown West Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	18	WMATA
6	15-Minute Exits	389	WMATA
7	Adjusted 15-Minute Entries	23	= #5 x #2
8	Adjusted 15-Minute Exits	498	= #6 x #2
9	Adjusted 15-Minute Total	521	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	4	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	5	Site Visit
13	Current 15-Minute Capacity	2,100	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.25**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown, (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute and approximately 20 percent of all passengers will use them. The Gallery Place-Chinatown west entrance has three fare vending machines, and therefore can accommodate 68 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 101 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.50, well above the acceptable capacity of 0.70. Using a v/c of 0.7 as capacity, approximately seven fare vending machines would be necessary to meet current demand. Table B4-113 summarizes the fare vending machine capacity analysis.

Table B4-113: Gallery Place-Chinatown West Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA

#	Assumption	Value	Source/Formula
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	327	WMATA
7	15-Minute Exits	68	WMATA
8	Adjusted 15-Minute Entries	418	= #6 x #2
9	Adjusted 15-Minute Exits	87	= #7 x #2
10	Adjusted 15-Minute Total	505	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	101	= #10 x #3
12	Fare Vendors	3	Site Visit
13	Fare Vendor Capacity (15-Minute)	68	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.50**	= #11 / #13
15	**Fare Vendors Needed**	**7**	= #11 / #4 / #5 / 15

B4.4.5 Gallery Place-Chinatown Platform Area Analysis

The peak 15-minute peak entry period at Gallery Place-Chinatown Metro Station is between 5:00 PM and 5:15 PM.

Green/Yellow Platform

The Green/Yellow net platform area was calculated at 14,261 ft², or three 200-foot long sections of 4,754 ft² each. Table B4-114 details the assumptions and ridership used in this analysis.

Table B4-114: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,056	Passengers	WMATA
2	Peak 15-Minute Exits	1,443	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	343	Passengers	= #1 / #4
6	Exits per Train	240	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	877	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	308	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA

#	Assumption	Amount	Unit	Source/Formula
12	Platform Space Available	14,261	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform (Area 1) would have no unoccupied space, while the second and third most trafficked sections would have 606 ft^2 and 2,976 ft^2, respectively. The most trafficked section of the platform would provide a spacing of 8.0 ft^2 per passenger, equating to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.9 feet, just shorter than the usable platform width of 23 feet. This only provides 1.1 feet for exiting passengers. Table B4-115 details the platform area analysis calculations for the Green/Yellow platform.

Table B4-115: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,754	4,754	4,754	= #12 / 3
14	Waiting Passengers	439	307	132	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	4,387	3,071	1316	= #14 x #11
16	Waiting Passenger Queue (ft)	21.9	15.4	6.6	= #15 / 200
17	Exiting Passengers	154	108	46	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1539	1077	462	= #17 x #11
19	Net Area Remaining (ft^2)	0	606	2,976	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.0	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-114.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 5,741 ft^2, or three 200-foot long sections of 1,914 ft^2 each. Table B4-116 details the assumptions and ridership used in this analysis.

Table B4-116: Gallery Place-Chinatown Shady Grove Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,311	Passengers	WMATA
2	Peak 15-Minute Exits	671	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	218	Passengers	= #1 / #4
6	Exits per Train	112	Passengers	= #2 / #4

#	Assumption	Amount	Unit	Source/Formula
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	559	Passengers	= #5 x #7 x #11
10	Adjusted Exits per Train	143	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,741	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section of platform would have no unoccupied space, while the third most trafficked section would have 860 ft^2 of unoccupied space. The most trafficked section of the platform would provide a spacing of 5.4 ft^2 per passenger, equating to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 14.0 feet. With a usable platform width of only 10 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-117 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-117: Gallery Place-Chinatown Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,914	1,914	1,914	= #12 / 3
14	Waiting Passengers	280	196	84	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,797	1,958	839	= #14 x #11
16	Waiting Passenger Queue (ft)	14.0	9.8	4.2	= #15 / 200
17	Exiting Passengers	72	50	21	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	716	501	215	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	860	= #13 - #15 - #18
20	Area (ft^2) per passenger	5.4	7.8	18	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-116.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 5,639 ft^2, or three 200-foot long sections of 1,880 ft^2 each. Table B4-118 details the assumptions and ridership used in this analysis.

Table B4-118: Gallery Place-Chinatown Glenmont Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	812	Passengers	WMATA

#	Assumption	Amount	Unit	Source/Formula
2	Peak 15-Minute Exits	1,231	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	135	Passengers	= #1 / #4
6	Exits per Train	205	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	346	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	263	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,639	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have 966 ft^2. The most trafficked section of the platform would provide 6.2 ft^2 per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 8.7 feet, which is just shorter than the usable platform width of 10 feet. However, this only provides 1.3 feet to accommodate exiting passengers. Table B4-119 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-119: Gallery Place-Chinatown Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,880	1,880	1,880	= #12 / 3
14	Waiting Passengers	173	121	52	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,732	1,212	520	= #14 x #11
16	Waiting Passenger Queue (ft)	8.7	6.1	2.6	= #15 / 200
17	Exiting Passengers	131	92	39	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,313	919	394	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	966	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.2	8.8	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-118.

B4.4.6 Metro Center East Entrance

At the Metro Center east entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There are two sets of vertical elements, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Metro Center east entrance has two side platforms serving the Red Line with two escalators serving each side platform.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity is detailed in table B4-120.

Table B4-120: Metro Center East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	35	WMATA
12	15-Minute Exits	226	WMATA
13	Adjusted 15-Minute Entries	44	= #11 x #2
14	Adjusted 15-Minute Exits	289	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	44	= #13 x #5
16	Adjusted Exit Escalator Volume	289	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

Between the mezzanine and the Shady Grove platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 289 passengers would use the upward escalator to exit the platform, while 44 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.21 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-121.

Table B4-121: Metro Center East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	28	WMATA
12	15-Minute Exits	335	WMATA
13	Adjusted 15-Minute Entries	36	= #11 x #2
14	Adjusted 15-Minute Exits	429	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	36	= #13 x #5
16	Adjusted Exit Escalator Volume	429	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.32**	= #16 / #20

Between the mezzanine and the Glenmont platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 429 passengers would use the upward escalator to exit the platform, while 36 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.32 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-122.

Table B4-122: Metro Center East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	63	WMATA
12	15-Minute Exits	561	WMATA
13	Adjusted 15-Minute Entries	81	= #11 x #2
14	Adjusted 15-Minute Exits	718	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	81	= #13 x #5
16	Adjusted Exit Escalator Volume	718	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.06**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Approximately 718 passengers would use the two upward escalator to exit the station, while 81 would use the

downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.06 for the entry escalators and 0.27 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The east entrance to Metro Center Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.25, well below 0.7, which is considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-123 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-123: Metro Center East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	63	WMATA
6	15-Minute Exits	561	WMATA
7	Adjusted 15-Minute Entries	81	= #5 x #2
8	Adjusted 15-Minute Exits	718	= #6 x #2
9	Adjusted 15-Minute Total	798	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.25**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center east entrance has eight fare vending machines, and therefore can accommodate 180 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 148 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.82, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines would be necessary to meet current demand. Table B4-124 summarizes the fare vending machine capacity analysis results.

Table B4-124: Metro Center East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	445	WMATA
7	15-Minute Exits	133	WMATA
8	Adjusted 15-Minute Entries	570	= #6 x #2
9	Adjusted 15-Minute Exits	170	= #7 x #2
10	Adjusted 15-Minute Total	740	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	148	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity (15-Minute)	180	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.82**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.4.7 Metro Center South Entrance

At the south entrance to Metro Center Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. At this entrance, there are two sets of vertical elements, those between the mezzanine and street level and those between the mezzanine and the Blue/Orange/Silver Lines platform. The Red Line platform to Glenmont is on the same level as the mezzanine at this entrance.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-125.

Table B4-125: Metro Center South Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8

#	Assumption	Value	Source/Formula
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	40	WMATA
12	15-Minute Exits	562	WMATA
13	Adjusted 15-Minute Entries	51	= #11 x #2
14	Adjusted 15-Minute Exits	720	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	51	= #13 x #5
16	Adjusted Exit Escalator Volume	720	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Using these assumptions, approximately 720 passengers would use the two upward escalators to exit the station, while 51 passengers would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.04 for the entry escalators and 0.27 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-126.

Table B4-126: Metro Center South Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM

#	Assumption	Value	Source/Formula
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	596	WMATA
12	15-Minute Exits	1,386	WMATA
13	Adjusted 15-Minute Entries	762	= #11 x #2
14	Adjusted 15-Minute Exits	1,774	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	495	= #13 x #5
16	Adjusted Exit Escalator Volume	1,508	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.37**	= #15 / #19
22	**Exit Escalator V/C**	**0.56**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	229	= #13 x #9
24	Adjusted Exit Stair Volumes	177	= #14 x #10
25	Stairs	3	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	2,714	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.15**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	1.3	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity due to bi-directional friction.

Of the three escalators between the lower platform and the Red-Glenmont platform, two operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 1,508 passengers would use the upward escalators to exit the lower platform, while 495 would use the downward escalators to enter the lower platform during the peak 15-

minute period. The resulting volume to capacity (v/c) ratio was 0.37 for the entry escalators and 0.56 for the exit escalators. These v/c ratios are below 0.7, which is considered capacity.

The three staircases between the lower platform and the Red-Glenmont platform are grouped together. Approximately 229 passengers would use the staircase to enter the lower platform, while 177 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With three, 6.7-foot wide staircase, the 15-minute capacity was calculated at 2,714 passengers. Overall, the resulting v/c ratio for the stairs was 0.15, which is well below 0.7 or what is considered capacity.

Faregate Capacity

The south entrance to Metro Center Metro Station currently has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-127 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-127: Metro Center South Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	40	WMATA
6	15-Minute Exits	562	WMATA
7	Adjusted 15-Minute Entries	51	= #5 x #2
8	Adjusted 15-Minute Exits	720	= #6 x #2
9	Adjusted 15-Minute Total	771	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of

all passengers will use them. The Metro Center south entrance has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 150 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.11, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines are necessary to meet current demand. Table B4-128 summarizes the fare vending machine capacity analysis for this station entrance.

Table B4-128: Metro Center South Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	430	WMATA
7	15-Minute Exits	156	WMATA
8	Adjusted 15-Minute Entries	550	= #6 x #2
9	Adjusted 15-Minute Exits	200	= #7 x #2
10	Adjusted 15-Minute Total	750	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	150	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.11**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.4.8 Metro Center Platform Area Analysis

The peak 15-minute entry period at the Metro Center Metro Station is between 5:30 PM and 5:45 PM.

Blue/Orange/Silver Platform

The Blue/Orange/Silver net platform area was calculated at 17,434 ft², or three 200-foot long sections of 5,811 ft² each. Table B4-129 details the assumptions and ridership used in this analysis.

Table B4-129: Metro Center Blue/Orange/Silver Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,056	Passengers	WMATA
2	Peak 15-Minute Exits	2,090	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3

#	Assumption	Amount	Unit	Source/Formula
5	Entries per Train	343	Passengers	= #1 / #4
6	Exits per Train	348	Passengers	= #2 / #4
7	Missed Headway Factor	2	--	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	877	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	446	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	17,434	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (level of service B), the most trafficked section of platform would have no unoccupied space, while the second and third most trafficked sections would have 1,181 ft^2 and 3,827 ft^2, respectively. The most trafficked section of the platform would provide 8.8 ft^2 per passenger, which corresponds to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.9 feet, shorter than the usable platform width of 31 feet. Table B4-130 details the platform waiting area analysis calculations for the Blue/Orange/Silver platform.

Table B4-130: Metro Center Blue/Orange/Silver Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	5,811	5,811	5,811	= #12 / 3
14	Waiting Passengers	439	307	132	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	4,386	3,070	1316	= #14 x #11
16	Waiting Passenger Queue (ft)	21.9	15.3	6.6	= #15 / 200
17	Exiting Passengers	223	156	67	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	2,229	1,561	669	= #17 x #11
19	Net Area Remaining (ft^2)	0	1,181	3,827	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.8	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-129.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 7,775 ft^2, or three 200-foot long sections of 2,592 ft^2 each. Table B4-131 details the assumptions and ridership used in this analysis.

Table B4-131: Metro Center Glenmont Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,479	Passengers	WMATA
2	Peak 15-Minute Exits	685	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	246	Passengers	= #1 / #4
6	Exits per Train	114	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	631	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	146	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,775	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section would have no unoccupied space, while the third most trafficked section would have 1,426 ft^2. The most trafficked section of the platform would provide 6.7 ft^2 per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 15.8 feet. With a usable platform width of only 15 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-132 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-132: Metro Center Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,592	2,592	2,592	= #12 / 3
14	Waiting Passengers	315	221	95	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,155	2,208	946	= #14 x #11
16	Waiting Passenger Queue (ft)	15.8	11.0	4.7	= #15 / 200
17	Exiting Passengers	73	51	22	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	730	511	219	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,426	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.7	9.5	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-131.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 7,774 ft², or three 200-foot long sections of 2,591 ft² each. Table B4-133 details the assumptions and ridership used in this analysis.

Table B4-133: Metro Center Shady Grove Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,496	Passengers	WMATA
2	Peak 15-Minute Exits	861	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	249	Passengers	= #1 / #4
6	Exits per Train	144	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	638	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	184	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,774	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have 1,358 ft². The most trafficked section of the platform would provide 6.3 ft² per passenger, which corresponds to pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 16.0 feet. With a usable platform width of only 15 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-134 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-134: Metro Center Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,591	2,591	2,591	= #12 / 3
14	Waiting Passengers	319	223	96	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,191	2,234	957	= #14 x #11
16	Waiting Passenger Queue (ft)	16.0	11.2	4.8	= #15 / 200
17	Exiting Passengers	92	64	28	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	919	643	276	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,358	= #13 - #15 - #18

# *	Description	Area 1	Area 2	Area 3	Formula
20	Area (ft^2) per passenger	6.3	9.0	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-133.

B4.5 RFDS 2 Build Condition Metrorail Capacity Analysis

B4.5.1 Archives-Navy Memorial

There are two sets of vertical elements at the Archives-Navy Memorial Metro Station, those between the platform and the mezzanine, and those between the mezzanine and the street level. The peak 15-minute period at this station for exiting passengers is between 8:45 AM and 9:00 AM.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-135.

Table B4-135: Archives-Navy Memorial Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	59	WMATA
12	15-Minute Exits	671	WMATA
13	Adjusted 15-Minute Entries	75	= #11 x #2
14	Adjusted 15-Minute Exits	858	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	71	= #13 x #5
16	Adjusted Exit Escalator Volume	815	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15

#	Assumption	Value	Source/Formula
21	**Entry Escalator V/C**	**0.05**	= #15 / #19
22	**Exit Escalator V/C**	**0.30**	= #16 / #20

Of the three escalators between the street and mezzanine, two operate in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 71 passengers would use the single entry escalator and 815 would use the two exit escalators during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator would be 0.05 while the v/c ratio for the exit escalator would be 0.30. Both of these figures are well below 0.7, which is considered capacity.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-136.

Table B4-136: Archives-Navy Memorial Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	59	WMATA
12	15-Minute Exits	671	WMATA
13	Adjusted 15-Minute Entries	75	= #11 x #2
14	Adjusted 15-Minute Exits	858	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	71	= #13 x #5
16	Adjusted Exit Escalator Volume	815	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.05**	= #15 / #19
22	**Exit Escalator V/C**	**0.60**	= #16 / #20

Of the two escalators at the station, one operates in the upward direction (serving exits) and one operates in the downward direction (serving entries). Approximately 71 passengers would use the entry escalator and 815 would use the exit escalator during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalator was 0.05 while the v/c ratio for the exit escalator was 0.60. Both of these figures are below 0.7, which is considered capacity.

Faregate Aisle Capacity

Archives-Navy Memorial Metro Station has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.30, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the six that are provided are more than sufficient. Table B4-137 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-137: Archives-Navy Memorial Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
5	15-Minute Entries	59	WMATA
6	15-Minute Exits	671	WMATA
7	Adjusted 15-Minute Entries	75	= #5 x #2
8	Adjusted 15-Minute Exits	858	= #6 x #2
9	Adjusted 15-Minute Total	933	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.30**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Archives-Navy Memorial, fare vending machines can accommodate 1.5 transactions per minute, and approximately 10 percent of all passengers will use them. Archives-Navy Memorial Metro Station has five fare vending machines, and therefore can accommodate 113 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 98 passengers at this station would attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.87, which exceeds what is considered capacity at 0.7. Using a v/c of 0.7 as capacity,

approximately seven fare vending machines would be necessary to meet projected demand. Table B4-138 summarizes the fare vending machine capacity analysis results at the station.

Table B4-138: Archives-Navy Memorial Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA, TCQSM
Ridership			
6	15-Minute Entries	676	WMATA
7	15-Minute Exits	90	WMATA
8	Adjusted 15-Minute Entries	866	= #6 x #2
9	Adjusted 15-Minute Exits	116	= #7 x #2
10	Adjusted 15-Minute Total	981	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	98	= #10 x #3
12	Fare Vendors	5	Site Visit
13	Fare Vendor Capacity (15-Minute)	113	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.87**	= #11 / #13
15	**Fare Vendors Needed**	**7**	= #11 / #4 / #5 / 15

Platform Area Analysis

The peak 15-minute peak entry period at Archives-Navy Memorial Station was 5:00 PM to 5:15 PM. The net platform area was measured at 12,795 ft², or three 200-foot long sections of 4,265 ft² each. Table B4-139 details the assumptions and ridership used in this analysis.

Table B4-139: Archives-Navy Memorial Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	676	Passengers	WMATA
2	Peak 15-Minute Exits	90	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	225	Passengers	= #1 / #4
6	Exits per Train	30	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	577	Passengers	= #5 x #7 x #8

#	Assumption	Amount	Unit	Source/Formula
10	Adjusted Exits per Train	39	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,795	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked 200-foot section of platform would have 1,187 ft^2 of unoccupied space, while the second and third most trafficked 200-foot sections would have 2,110 ft^2 and 3,342 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 14.4 feet, shorter than the usable platform width of 19 feet. Table B4-140 details the platform area analysis calculations for the station.

Table B4-140: Archives-Navy Memorial Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,265	4,265	4,265	= #12 / 3
14	Waiting Passengers	289	202	87	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,885	2,020	866	= #14 x #11
16	Waiting Passenger Queue (ft)	14.4	10.1	4.3	= #15 / 200
17	Exiting Passengers	19	13	6	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	193	135	58	= #17 x #11
19	Net Area Remaining (ft^2)	1,187	2,110	3,342	= #13 - #15 - #18

*Table continued from table B4-139.

B4.5.2 Federal Triangle Station

At Federal Triangle Metro Station, there are two sets of vertical elements, those between the platform and the mezzanine level, and those between the mezzanine level and the street level. The elements between the mezzanine and street level are split into two portions, however the elements are identical. At the split, there is an entrance into the Ronald Reagan Building, meaning that passengers accessing this building only use the lower portion of the mezzanine-to-street elements. For the purposes of this analysis, however, the mezzanine-to-street elements were evaluated as if they were a single, continuous set. The peak 15-minute period for exiting passengers is between 8:45 AM and 9:00 AM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table B4-141.

Table B4-141: Federal Triangle Mezzanine-to-Platform Vertical Capacity Analysis

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA

#	Assumption	Value	Source/Formula
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	36	WMATA
12	15-Minute Exits	597	WMATA
13	Adjusted 15-Minute Entries	46	= #11 x #2
14	Adjusted 15-Minute Exits	765	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	43	= #13 x #5
16	Adjusted Exit Escalator Volume	726	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

There are three escalators between the mezzanine and the platform. Two of the escalators are paired, with one always moving downward toward the platform (serving entries), and the other always moving upward toward the mezzanine (serving exits). The third escalator is on the other side of the mezzanine level and operates in the upward direction (serving exits) during the peak 15-minute period.

Approximately 43 passengers would use the downward escalator to enter the platform, while 726 would use the two upward escalators to exit the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.27 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Street-to-Mezzanine Vertical Element Capacity

The street-to-mezzanine vertical element capacity analysis is detailed in table B4-142.

Table B4-142: Federal Triangle Street-to-Mezzanine Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	36	WMATA
12	15-Minute Exits	597	WMATA
13	Adjusted 15-Minute Entries	46	= #11 x #2
14	Adjusted 15-Minute Exits	765	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	43	= #13 x #5
16	Adjusted Exit Escalator Volume	726	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.27**	= #16 / #20

There are two sets of three escalators at Federal Triangle Metro Station. The two sets of escalators are separated by a platform that provides passengers underground access to the Reagan Building. During the peak 15-minute period, two escalators operate in the upward direction towards the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries).

Approximately 43 passengers would use the downward escalator to enter the station, while 726 would use the two upward escalators to exit the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.27 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Aisle Capacity

Federal Triangle Metro Station has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.26, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the six that are provided are sufficient. Table B4-143 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-143: Federal Triangle Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	36	WMATA
6	15-Minute Exits	597	WMATA
7	Adjusted 15-Minute Entries	46	= #5 x #2
8	Adjusted 15-Minute Exits	765	= #6 x #2
9	Adjusted 15-Minute Total	810	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.26**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Federal Triangle, fare vending machines can accommodate 1.67 transactions per minute, and approximately 10 percent of all passengers will use them. Federal Triangle Metro Station has six fare vending machines, and therefore can accommodate 150 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 10 percent of passengers will need to use the machines, approximately 91 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.60, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately six fare vending machines would be necessary to meet projected demand. Table B4-144 summarizes the fare vending machine capacity analysis results at the station.

Table B4-144: Federal Triangle Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA

#	Assumption	Value	Source/Formula
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	10%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	646	WMATA
7	15-Minute Exits	62	WMATA
8	Adjusted 15-Minute Entries	827	= #6 x #2
9	Adjusted 15-Minute Exits	80	= #7 x #2
10	Adjusted 15-Minute Total	906	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	91	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	150	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.60**	= #11 / #13
15	**Fare Vendors Needed**	**6**	= #11 / #4 / #5 / 15

Platform Area Analysis

The 15-minute peak entry period at Federal Triangle Metro Station is 5:00 PM to 5:15 PM. The net platform area was calculated at 12,687 ft², or three 200-foot long sections of 4,229 ft² each. Table B4-145 details the assumptions and ridership used in this analysis.

Table B4-145: Federal Triangle Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	646	Passengers	WMATA
2	Peak 15-Minute Exits	62	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	108	Passengers	= #1 / #4
6	Exits per Train	10	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	276	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	13	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	12,687	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the most trafficked section of platform would have 2,785 ft^2 of unoccupied space, while the second and third most trafficked sections would have 3,218 ft^2 and 3,796 ft^2, respectively. The maximum queue of passengers waiting on the platform would be 6.9 feet, significantly shorter than the usable platform width of 19 feet. Table B4-146 details the platform area analysis calculations for the station.

Table B4-146: Federal Triangle Station Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,229	4,229	4,229	= #12 / 3
14	Waiting Passengers	138	96	41	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,378	965	413	= #14 x #11
16	Waiting Passenger Queue (ft)	6.9	4.8	2.1	= #15 / 200
17	Exiting Passengers	7	5	2	Area 1 = #10 X 0.50 Area 2 = #10 X 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	66	46	20	= #17 x #11
19	Net Area Remaining (ft^2)	2,785	3,218	3,796	= #13 - #15 - #18

*Table continued from table B4-145.

B4.5.3 Gallery Place-Chinatown East Entrance

At the east entrance to Gallery Place-Chinatown Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 6:15 PM and 6:30 PM. This station entrance has three sets of vertical elements, those between the Green/Yellow platform and the Red-Glenmont platform, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Red Line level is split into two separate platforms with one side serving Glenmont trains and the other serving Shady Grove trains.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-147.

Table B4-147: Gallery Place-Chinatown East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8

#	Assumption	Value	Source/Formula
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	273	WMATA
12	15-Minute Exits	502	WMATA
13	Adjusted 15-Minute Entries	350	= #11 x #2
14	Adjusted 15-Minute Exits	643	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	298	= #13 x #5
16	Adjusted Exit Escalator Volume	546	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.11**	= #15 / #19
22	**Exit Escalator V/C**	**0.20**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	35	= #13 x #9
24	Adjusted Exit Stair Volumes	64	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	5.0	WMATA
27	Stair Capacity* (15-Minute)	675	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.15**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	1.3	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Between the street and the mezzanine, two escalators operate in the upward direction toward the street (serving exits) and two escalators operate in the downward direction toward the mezzanine (serving entries). Approximately 546 passengers would use the upward escalator to exit the mezzanine, while 298 would use the downward escalator to enter the mezzanine during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.11 for the entry escalators and 0.20 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this station entrance is located between the four escalators. Approximately 35 passengers would use the staircase to enter the station, while 64 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity per minute of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 5.0-foot wide staircase, the 15-minute capacity was calculated at 675 passengers. Overall, the resulting v/c ratio for the staircase was 0.15, which is well below 0.7 or what is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-148.

Table B4-148: Gallery Place-Chinatown East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	95%	= 1 - #9 - #7
6	Percent Exits Using Escalator	95%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	143	WMATA
12	15-Minute Exits	375	WMATA
13	Adjusted 15-Minute Entries	183	= #11 x #2
14	Adjusted 15-Minute Exits	480	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	174	= #13 x #5
16	Adjusted Exit Escalator Volume	456	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.13**	= #15 / #19

#	Assumption	Value	Source/Formula
22	**Exit Escalator V/C**	**0.34**	= #16 / #20

Of the two escalators between the mezzanine and the Glenmont platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 456 passengers would use the upward escalator to exit the platform, while 174 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.13 for the entry escalator and 0.34 for the exit escalator. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-149.

Table B4-149: Gallery Place-Chinatown East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	186	WMATA
12	15-Minute Exits	262	WMATA
13	Adjusted 15-Minute Entries	238	= #11 x #2
14	Adjusted 15-Minute Exits	335	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	238	= #13 x #5
16	Adjusted Exit Escalator Volume	335	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit

#	Assumption	Value	Source/Formula
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.18**	= #15 / #19
22	**Exit Escalator V/C**	**0.25**	= #16 / #20

Of the two escalators between the mezzanine and the Shady Grove platform, one operates in the upward direction towards the mezzanine (serving exits) and the other operates in the downward direction towards the platform (serving entries). Approximately 335 passengers would use the upward escalator to exit the platform, while 238 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.18 for the entry escalators and 0.25 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-150.

Table B4-150: Gallery Place-Chinatown East Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM, Station Layout
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	1,101	WMATA
12	15-Minute Exits	697	WMATA
13	Adjusted 15-Minute Entries	1,410	= #11 x #2
14	Adjusted 15-Minute Exits	892	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	916	= #13 x #5

#	Assumption	Value	Source/Formula
16	Adjusted Exit Escalator Volume	759	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	3	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	4,050	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.34**	= #15 / #19
22	**Exit Escalator V/C**	**0.19**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	423	= #13 x #9
24	Adjusted Exit Stair Volumes	89	= #14 x #10
25	Stairs	1	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	905	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.57**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	5.1	= (#23 + #24) / (#25 + #26) / 15

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Of the five escalators between the lower platform and the Red-Glenmont platform, three operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 759 passengers would use the upward escalators to exit the lower platform, while 916 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.34 for the entry escalators and 0.19 for the exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

The staircase at this location is paired with a single escalator. Approximately 423 passengers would use the staircase to enter the lower platform, while 89 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity per minute of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With a single, 6.7-foot wide staircase, the 15-minute capacity was calculated at 905 passengers. Overall, the resulting v/c ratio for the staircase was 0.57, which is below 0.7 or what is considered capacity.

Faregate Aisle Capacity

The east entrance to Gallery Place-Chinatown Metro Station has twelve faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.17, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the 11 that are provided are sufficient. Table B4-151 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-151: Gallery Place-Chinatown East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	6:15 PM to 6:30 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	273	WMATA
6	15-Minute Exits	502	WMATA
7	Adjusted 15-Minute Entries	350	= #5 x #2
8	Adjusted 15-Minute Exits	643	= #6 x #2
9	Adjusted 15-Minute Total	993	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	11	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	12	Site Visit
13	Current 15-Minute Capacity	5,775	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.17**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 transactions per minute and approximately 20 percent of all passengers will use them. The east entrance to Gallery Place-Chinatown Metro Station has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 164 passengers could attempt to use them during the peak 15-minute period. This results in a v/c ratio of 1.22, well above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 11 fare vending machines would be necessary to meet projected demand. Table B4-152 summarizes the fare vending machine capacity analysis.

Table B4-152: Gallery Place-Chinatown East Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	419	WMATA

#	Assumption	Value	Source/Formula
7	15-Minute Exits	223	WMATA
8	Adjusted 15-Minute Entries	537	= #6 x #2
9	Adjusted 15-Minute Exits	285	= #7 x #2
10	Adjusted 15-Minute Total	821	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	164	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.22**	= #11 / #13
15	**Fare Vendors Needed**	**11**	= #11 / #4 / #5 / 15

B4.5.4 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown west entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There is one set of vertical elements connecting the mezzanine level and the street level, one set connecting the mezzanine with the Red-Glenmont platform, and another connecting the mezzanine with the Red-Shady Grove platform.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-153.

Table B4-153: Gallery Place – Chinatown West Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	21	WMATA
12	15-Minute Exits	378	WMATA
13	Adjusted 15-Minute Entries	27	= #11 x #2
14	Adjusted 15-Minute Exits	484	= #12 x #2
Escalators			

#	Assumption	Value	Source/Formula
15	Adjusted Entry Escalator Volume	27	= #13 x #5
16	Adjusted Exit Escalator Volume	484	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**0.36**	= #16 / #20

Between the street and the mezzanine, one escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 484 passengers would use the upward escalator to exit the station, while 27 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.02 for the entry escalators and 0.36 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-154.

Table B4-154: Gallery Place – Chinatown West Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	9	WMATA
12	15-Minute Exits	181	WMATA
13	Adjusted 15-Minute Entries	12	= #11 x #2
14	Adjusted 15-Minute Exits	231	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	12	= #13 x #5
16	Adjusted Exit Escalator Volume	231	= #14 x #6

#	Assumption	Value	Source/Formula
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.17**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 231 passengers would use the upward escalator to exit the platform, while 12 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.17 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity analysis is detailed in table B4-155.

Table B4-155: Gallery Place – Chinatown West Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	12	WMATA
12	15-Minute Exits	197	WMATA
13	Adjusted 15-Minute Entries	15	= #11 x #2
14	Adjusted 15-Minute Exits	253	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	15	= #13 x #5
16	Adjusted Exit Escalator Volume	253	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit

#	Assumption	Value	Source/Formula
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.01**	= #15 / #19
22	**Exit Escalator V/C**	**0.19**	= #16 / #20

One escalator operates in the upward direction (serving exits) while the other operates in the downward direction (serving entries). Approximately 253 passengers would use the upward escalator to exit the platform, while 15 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.01 for the entry escalators and 0.19 for exit escalators. The resulting v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The Gallery Place west entrance has five faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-156 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-156: Gallery Place-Chinatown West Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	21	WMATA
6	15-Minute Exits	378	WMATA
7	Adjusted 15-Minute Entries	27	= #5 x #2
8	Adjusted 15-Minute Exits	484	= #6 x #2
9	Adjusted 15-Minute Total	511	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	4	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	5	Site Visit
13	Current 15-Minute Capacity	2,100	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Gallery Place-Chinatown, (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute and approximately 20 percent of all passengers will use them. The Gallery Place-Chinatown west entrance has three fare vending machines, and therefore can accommodate 68 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 102 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.51, well above the acceptable capacity of 0.70. Using a v/c of 0.7 as capacity, approximately seven fare vending machines would be necessary to meet projected demand. Table B4-157 summarizes the fare vending machine capacity analysis.

Table B4-157: Gallery Place-Chinatown West Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	324	WMATA
7	15-Minute Exits	75	WMATA
8	Adjusted 15-Minute Entries	414	= #6 x #2
9	Adjusted 15-Minute Exits	96	= #7 x #2
10	Adjusted 15-Minute Total	510	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	102	= #10 x #3
12	Fare Vendors	3	Site Visit
13	Fare Vendor Capacity (15-Minute)	68	= #12 x #4 x 15
14	**Fare Vendor V/C**	**1.51**	= #11 / #13
15	**Fare Vendors Needed**	**7**	= #11 / #4 / #5 / 15

B4.5.5 Gallery Place-Chinatown Platform Area Analysis

The peak 15-minute peak entry period at Gallery Place-Chinatown Metro Station is between 5:00 PM and 5:15 PM.

Green/Yellow Platform

The Green/Yellow net platform area was calculated at 14,261 ft², or three 200-foot long sections of 4,754 ft² each. Table B4-158 details the assumptions and ridership used in this analysis.

Table B4-158: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,055	Passengers	WMATA

#	Assumption	Amount	Unit	Source/Formula
2	Peak 15-Minute Exits	1,451	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	342	Passengers	= #1 / #4
6	Exits per Train	242	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	877	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	310	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,261	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform (Area 1) would have no unoccupied space, while the second and third most trafficked sections would have 602 ft^2 and 2,974 ft^2, respectively. The most trafficked section of the platform would provide a spacing of 8.0 ft^2 per passenger, equating to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.9 feet, shorter than the usable platform width of 23 feet but only allowing 1.1 feet for exiting passengers. Table B4-159 details the platform area analysis calculations for the Green/Yellow platform.

Table B4-159: Gallery Place-Chinatown Green/Yellow Platform Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,754	4,754	4,754	= #12 / 3
14	Waiting Passengers	438	307	131	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	4,383	3,068	1315	= #14 x #11
16	Waiting Passenger Queue (ft)	21.9	15.3	6.6	= #15 / 200
17	Exiting Passengers	155	108	46	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,548	1,084	464	= #17 x #11
19	Net Area Remaining (ft^2)	0	602	2,974	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.0	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-158.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 5,741 ft², or three 200-foot long sections of 1,914 ft² each. Table B4-160 details the assumptions and ridership used in this analysis.

Table B4-160: Gallery Place-Chinatown Shady Grove Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,308	Passengers	WMATA
2	Peak 15-Minute Exits	676	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	218	Passengers	= #1 / #4
6	Exits per Train	113	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	--	WMATA
9	Adjusted Entries per Train	558	Passengers	= #5 x #7 x #11
10	Adjusted Exits per Train	144	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,741	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked section of platform and the second most trafficked section of platform would have no unoccupied space, while the third most trafficked section would have 860 ft² of unoccupied space. The most trafficked section of the platform would provide a spacing of 5.5 ft² per passenger, equating to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 13.9 feet. With a usable platform width of only 10 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-161 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-161: Gallery Place-Chinatown Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,914	1,914	1,914	= #12 / 3
14	Waiting Passengers	279	195	84	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,790	1,953	837	= #14 x #11
16	Waiting Passenger Queue (ft)	13.9	9.8	4.2	= #15 / 200
17	Exiting Passengers	72	50	22	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	721	505	216	= #17 x #11

# *	Description	Area 1	Area 2	Area 3	Formula
19	Net Area Remaining (ft^2)	0	0	860	= #13 - #15 – #18
20	Area (ft^2) per passenger	5.5	7.8	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-160.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 5,639 ft^2, or three 200-foot long sections of 1,880 ft^2 each. Table B4-162 details the assumptions and ridership used in this analysis.

Table B4-162: Gallery Place-Chinatown Glenmont Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	810	Passengers	WMATA
2	Peak 15-Minute Exits	1,245	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	135	Passengers	= #1 / #4
6	Exits per Train	207	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	346	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	266	Passengers	= #2 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	5,639	ft^2	Station Layout from WMATA

Using a spacing of 10 ft^2 per passenger (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have 963 ft^2. The most trafficked section of the platform would provide 6.1 ft^2 per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 8.6 feet, which is shorter than the usable platform width of 10 feet. However, this only provides 1.4 feet to accommodate exiting passengers. Table B4-163 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-163: Gallery Place-Chinatown Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	1,880	1,880	1,880	= #12 / 3
14	Waiting Passengers	173	121	52	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,729	1,210	519	= #14 x #11

# *	Description	Area 1	Area 2	Area 3	Formula
16	Waiting Passenger Queue (ft)	8.6	6.1	2.6	= #15 / 200
17	Exiting Passengers	133	93	40	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,328	929	398	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	963	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.1	8.8	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-162.

B4.5.6 Metro Center East Entrance

At the Metro Center east entrance, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. There are two sets of vertical elements, those between the Red Line platforms and the mezzanine level, and those between the mezzanine level and the street level. The Metro Center east entrance has two side platforms serving the Red Line with two escalators serving each side platform.

Mezzanine-to-Shady Grove Platform Vertical Element Capacity

The mezzanine-to-Shady Grove platform vertical element capacity is detailed in table B4-164.

Table B4-164: Metro Center East Mezzanine-to-Shady Grove Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	42	WMATA
12	15-Minute Exits	219	WMATA
13	Adjusted 15-Minute Entries	53	= #11 x #2
14	Adjusted 15-Minute Exits	281	= #12 x #2

#	Assumption	Value	Source/Formula
Escalators			
15	Adjusted Entry Escalator Volume	53	= #13 x #5
16	Adjusted Exit Escalator Volume	281	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.21**	= #16 / #20

Between the mezzanine and the Shady Grove platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 281 passengers would use the upward escalator to exit the platform, while 53 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.04 for the entry escalators and 0.21 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Glenmont Platform Vertical Element Capacity

The mezzanine-to-Glenmont platform vertical element capacity analysis is detailed in table B4-165.

Table B4-165: Metro Center East Mezzanine-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	34	WMATA
12	15-Minute Exits	325	WMATA

#	Assumption	Value	Source/Formula
13	Adjusted 15-Minute Entries	44	= #11 x #2
14	Adjusted 15-Minute Exits	417	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	44	= #13 x #5
16	Adjusted Exit Escalator Volume	417	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	1	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	1,350	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.03**	= #15 / #19
22	**Exit Escalator V/C**	**0.31**	= #16 / #20

Between the mezzanine and the Glenmont platform, one escalator operates in the upward direction toward the mezzanine (serving exits) while the other operates in the downward direction toward the platform (serving entries). Approximately 417 passengers would use the upward escalator to exit the platform, while 44 would use the downward escalator to enter the platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.03 for the entry escalators and 0.31 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-166.

Table B4-166: Metro Center East Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
	Ridership		
11	15-Minute Entries	76	WMATA
12	15-Minute Exits	545	WMATA

#	Assumption	Value	Source/Formula
13	Adjusted 15-Minute Entries	97	= #11 x #2
14	Adjusted 15-Minute Exits	697	= #12 x #2
	Escalators		
15	Adjusted Entry Escalator Volume	97	= #13 x #5
16	Adjusted Exit Escalator Volume	697	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.07**	= #15 / #19
22	**Exit Escalator V/C**	**0.26**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Approximately 697 passengers would use the two upward escalator to exit the station, while 97 would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.07 for the entry escalators and 0.26 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Faregate Capacity

The east entrance to Metro Center Metro Station has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.25, well below 0.7, which is considered capacity. Projected ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-167 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-167: Metro Center East Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
	Ridership		
5	15-Minute Entries	76	WMATA
6	15-Minute Exits	545	WMATA
7	Adjusted 15-Minute Entries	97	= #5 x #2
8	Adjusted 15-Minute Exits	697	= #6 x #2
9	Adjusted 15-Minute Total	794	= #7 + #8
	Current Faregate Infrastructure		

#	Assumption	Value	Source/Formula
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.25**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center east entrance has eight fare vending machines, and therefore can accommodate 180 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 150 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.83, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines would be necessary to meet projected demand. Table B4-168 summarizes the fare vending machine capacity analysis results.

Table B4-168: Metro Center East Fare Vending Machines Capacity Analysis Results

#	Assumptions	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	441	WMATA
7	15-Minute Exits	143	WMATA
8	Adjusted 15-Minute Entries	565	= #6 x #2
9	Adjusted 15-Minute Exits	183	= #7 x #2
10	Adjusted 15-Minute Total	748	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	150	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity (15-Minute)	180	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.83**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.5.7 Metro Center South Entrance

At the south entrance to Metro Center Metro Station, the peak 15-minute period of total ridership activity (entries and exits) was between 8:45 AM and 9:00 AM. At this entrance, there are two sets of vertical elements, those between the mezzanine and street level and those between the mezzanine and the Blue/Orange/Silver Lines platform. The Red Line platform to Glenmont is on the same level as the mezzanine at this entrance.

Mezzanine-to-Street Vertical Element Capacity

The mezzanine-to-street vertical element capacity analysis is detailed in table B4-169.

Table B4-169: Metro Center South Mezzanine-to-Street Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	100%	= 1 - #9 - #7
6	Percent Exits Using Escalator	100%	= 1 - #10 - #8
7	Percent Entries Using Elevator	0%	WMATA
8	Percent Exits Using Elevator	0%	WMATA
9	Percent Entries Using Stairs	0%	TCQSM
10	Percent Exits Using Stairs	0%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	46	WMATA
12	15-Minute Exits	546	WMATA
13	Adjusted 15-Minute Entries	59	= #11 x #2
14	Adjusted 15-Minute Exits	699	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	59	= #13 x #5
16	Adjusted Exit Escalator Volume	699	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**0.26**	= #16 / #20

Between the street and mezzanine levels, two escalators operate in the upward direction toward the street (serving exits) and one escalator operates in the downward direction toward the mezzanine (serving entries). Using these assumptions, approximately 699 passengers would use the two upward escalators to exit the station, while 594 passengers would use the downward escalator to enter the station during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.04 for the entry escalators and 0.26 for exit escalators. These v/c ratios are well below 0.7, which is considered capacity.

Lower Platform-to-Glenmont Platform Vertical Element Capacity

The lower platform-to-Glenmont platform vertical element capacity analysis is detailed in table B4-170.

Table B4-170: Metro Center South Lower Platform-to-Glenmont Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	65%	= 1 - #9 - #7
6	Percent Exits Using Escalator	85%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	30%	TCQSM
10	Percent Exits Using Stairs	10%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	602	WMATA
12	15-Minute Exits	1,374	WMATA
13	Adjusted 15-Minute Entries	770	= #11 x #2
14	Adjusted 15-Minute Exits	1,759	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	501	= #13 x #5
16	Adjusted Exit Escalator Volume	1,495	= #14 x #6
17	Entry Escalators	1	Site Visit
18	Exit Escalators	2	Site Visit
19	Entry Escalator Capacity (15-Minute)	1,350	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	2,700	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.37**	= #15 / #19
22	**Exit Escalator V/C**	**0.55**	= #16 / #20

#	Assumption	Value	Source/Formula
Stairs			
23	Adjusted Entry Stair Volumes	231	= #13 x #9
24	Adjusted Exit Stair Volumes	176	= #14 x #10
25	Stairs	3	Site Visit
26	Stair Width (Feet)	6.7	WMATA
27	Stair Capacity* (15-Minute)	2,714	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.15**	= (#23 + #24) / #27
29	Stair Flow Rate (Passengers/Foot/Minute)	1.3	= (#23 + #24) / (#25 + #26) / 15

*10% reduction in capacity due to bi-directional friction.

Of the three escalators between the lower platform and the Red-Glenmont platform, two operate in the upward direction towards the Glenmont platform (serving exits) and two operate in the downward direction towards the lower platform (serving entries). Approximately 1,495 passengers would use the upward escalators to exit the lower platform, while 501 would use the downward escalators to enter the lower platform during the peak 15-minute period. The resulting volume to capacity (v/c) ratio was 0.37 for the entry escalators and 0.55 for the exit escalators. These v/c ratios are below 0.7, which is considered capacity.

The three staircases between the lower platform and the Red-Glenmont platform are grouped together. Approximately 231 passengers would use the staircase to enter the lower platform, while 176 would use them to exit the lower platform during the peak 15-minute period. The 15-minute capacity of the staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With three, 6.7-foot wide staircase, the 15-minute capacity was calculated at 2,714 passengers. Overall, the resulting v/c ratio for the stairs was 0.15, which is well below 0.7 or what is considered capacity.

Faregate Capacity

The south entrance to Metro Center Station has seven faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the array of faregate aisles has a v/c ratio of 0.24, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only three regular faregate aisles to function below capacity, and thus the four that are provided are sufficient. Table B4-171 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table B4-171: Metro Center South Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	8:45 AM to 9:00 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	15-Minute Entries	46	WMATA
6	15-Minute Exits	546	WMATA

#	Assumption	Value	Source/Formula
7	Adjusted 15-Minute Entries	59	= #5 x #2
8	Adjusted 15-Minute Exits	699	= #6 x #2
9	Adjusted 15-Minute Total	758	= #7 + #8
Current Faregate Infrastructure			
10	Regular Aisles	6	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	7	Site Visit
13	Current 15-Minute Capacity	3,150	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.24**	= #9 / #13
15	**Faregate Aisles Needed**	**3**	= #9 / #3 / #4 / 15

Fare Vending Machines

According to WMATA, at a station like Metro Center (where many passengers are likely unfamiliar with the system), fare vending machines can accommodate 1.5 passengers per minute, and approximately 20 percent of all passengers will use them. The Metro Center south entrance has six fare vending machines, and therefore can accommodate 135 passengers in a 15-minute period. Using the peaking factor of 1.28 and assuming 20 percent of passengers will need to use the machines, approximately 152 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 1.13, above the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately 10 fare vending machines are necessary to meet projected demand. Table B4-172 summarizes the fare vending machine capacity analysis for this station entrance.

Table B4-172: Metro Center South Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:30 PM to 5:45 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	20%	WMATA
4	Fare Vendors: People Per Minute	1.5	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	15-Minute Entries	426	WMATA
7	15-Minute Exits	168	WMATA
8	Adjusted 15-Minute Entries	545	= #6 x #2
9	Adjusted 15-Minute Exits	215	= #7 x #2
10	Adjusted 15-Minute Total	760	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	152	= #10 x #3
12	Fare Vendors	6	Site Visit
13	Fare Vendor Capacity (15-Minute)	135	= #12 x #4 x 15

#	Assumption	Value	Source/Formula
14	**Fare Vendor V/C**	**1.13**	= #11 / #13
15	**Fare Vendors Needed**	**10**	= #11 / #4 / #5 / 15

B4.5.8 Metro Center Platform Area Analysis

The peak 15-minute entry period at the Metro Center Metro Station is between 5:30 PM and 5:45 PM.

Blue/Orange/Silver Platform

The Blue/Orange/Silver net platform area was calculated at 17,434 ft², or three 200-foot long sections of 5,811 ft² each. Table B4-173 details the assumptions and ridership used in this analysis.

Table B4-173: Metro Center Blue/Orange/Silver Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	2,052	Passengers	WMATA
2	Peak 15-Minute Exits	2,102	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	342	Passengers	= #1 / #4
6	Exits per Train	350	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	875	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	448	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	17,434	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (level of service B), the most trafficked section of platform would have no unoccupied space, while the second and third most trafficked sections would have 1,178 ft² and 3,826 ft², respectively. The most trafficked section of the platform would provide 8.8 ft² per passenger, which corresponds to a pedestrian level of service C. The maximum queue of passengers waiting on the platform would be 21.9 feet, shorter than the usable platform width of 31 feet. Table B4-174 details the platform waiting area analysis calculations for the Blue/Orange/Silver platform.

Table B4-174: Metro Center Blue/Orange/Silver Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	5,811	5,811	5,811	= #12 / 3
14	Waiting Passengers	438	306	131	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15

# *	Description	Area 1	Area 2	Area 3	Formula
15	Waiting Passenger Area (ft^2)	4,377	3,064	1313	= #14 x #11
16	Waiting Passenger Queue (ft)	21.9	15.3	6.6	= #15 / 200
17	Exiting Passengers	224	157	67	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	2,242	1,569	673	= #17 x #11
19	Net Area Remaining (ft^2)	0	1,178	3,826	= #13 - #15 - #18
20	Area (ft^2) per passenger	8.8	-	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**C**	-	-	TCQSM

*Table continued from table B4-173.

Red-Glenmont Platform

The Red-Glenmont net platform area was calculated at 7,775 ft^2, or three 200-foot long sections of 2,592 ft^2 each. Table B4-175 details the assumptions and ridership used in this analysis.

Table B4-175: Metro Center Glenmont Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,477	Passengers	WMATA
2	Peak 15-Minute Exits	691	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	246	Passengers	= #1 / #4
6	Exits per Train	115	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	630	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	147	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,775	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked sections would have 1,425 ft^2 of unoccupied space. The most trafficked section of the platform would provide 6.7 ft^2 per passenger, which corresponds to a pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 15.8 feet. With a useable platform width of only 15 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-176 details the platform waiting area analysis calculations for the Glenmont platform.

Table B4-176: Metro Center Glenmont Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,592	2,592	2,592	= #12 / 3
14	Waiting Passengers	315	221	95	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,150	2,205	945	= #14 x #11
16	Waiting Passenger Queue (ft)	15.8	11.0	4.7	= #15 / 200
17	Exiting Passengers	74	52	22	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	737	516	221	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,425	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.7	9.5	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-175.

Red-Shady Grove Platform

The Red-Shady Grove net platform area was calculated at 7,774 ft^2, or three 200-foot long sections of 2,591 ft^2 each. Table B4-177 details the assumptions and ridership used in this analysis.

Table B4-177: Metro Center Shady Grove Platform Area Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	1,494	Passengers	WMATA
2	Peak 15-Minute Exits	865	Passengers	WMATA
3	Peak Headway	2.5	Minutes	WMATA
4	Trains per 15 Minutes per Direction	6	Trains	= 15 / #3
5	Entries per Train	249	Passengers	= #1 / #4
6	Exits per Train	144	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	638	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	184	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	7,774	ft^2	Station Layout from WMATA

Using a per passenger spacing of 10 ft^2 (pedestrian level of service B), the most trafficked and second most trafficked sections of platform would have no unoccupied space, while the third most trafficked section would have 1,358 ft^2. The most trafficked section of the platform would provide 6.3 ft^2 per passenger, which corresponds to

pedestrian level of service D. The maximum queue of passengers waiting on the platform would be 15.9 feet. With a useable platform width of only 15 feet, there would not be sufficient space for waiting passengers and passengers exiting trains. Table B4-178 details the platform waiting area analysis calculations for the Shady Grove platform.

Table B4-178: Metro Center Shady Grove Platform Waiting Area Analysis Calculations

# *	Description	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	2,591	2,591	2,591	= #12 / 3
14	Waiting Passengers	319	223	96	1 = #9 x 0.50 2 = #9 x 0.35 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	3,188	2,231	956	= #14 x #11
16	Waiting Passenger Queue (ft)	15.9	11.2	4.8	= #15 / 200
17	Exiting Passengers	92	65	28	1 = #10 x 0.50 2 = #10 x 0.30 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	922	646	277	= #17 x #11
19	Net Area Remaining (ft^2)	0	0	1,358	= #13 - #15 - #18
20	Area (ft^2) per passenger	6.3	9.0	-	= #13 / (#14 + #17)
21	**Pedestrian LOS**	**D**	**C**	-	TCQSM

*Table continued from table B4-177.

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2014a Weekday Metrorail Faregate Data, March 2014. Received August 4, 2014.

2014b Email with WMATA employees (Robin McElhenny Smith and Danielle Wesolek), received on January 27, 2014.

Site Visits

1. Site visits by Louis Berger on July 16 and 17, 2014.
2. Site visits by FourSquare in November 2014.
3. Site visits by FourSquare in January 2015.
4. Site visit by FourSquare on February 12, 2015.

Appendix B5

Metrorail Station Evacuation Analysis

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

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B5 Metrorail Station Evacuation Analysis

Although WMATA is not required to meet National Fire Protection Association (NFPA) 130 standards, WMATA requested an evacuation analysis be conducted in order to evaluate evacuation capacities and procedures, as WMATA typically performs this analysis for all their station capacity analysis studies. The peak 15-minute entry period at each station was analyzed, all of which fell during the PM peak period (WMATA 2014a). For the No-action Alternative, projected 2025 ridership during the peak 15-minute entry period at each station was analyzed, these values also all fell during the PM peak period.

NFPA 130 details specific requirements for station capacity during emergency situations (TRB 2013). Specifically, the following is required:

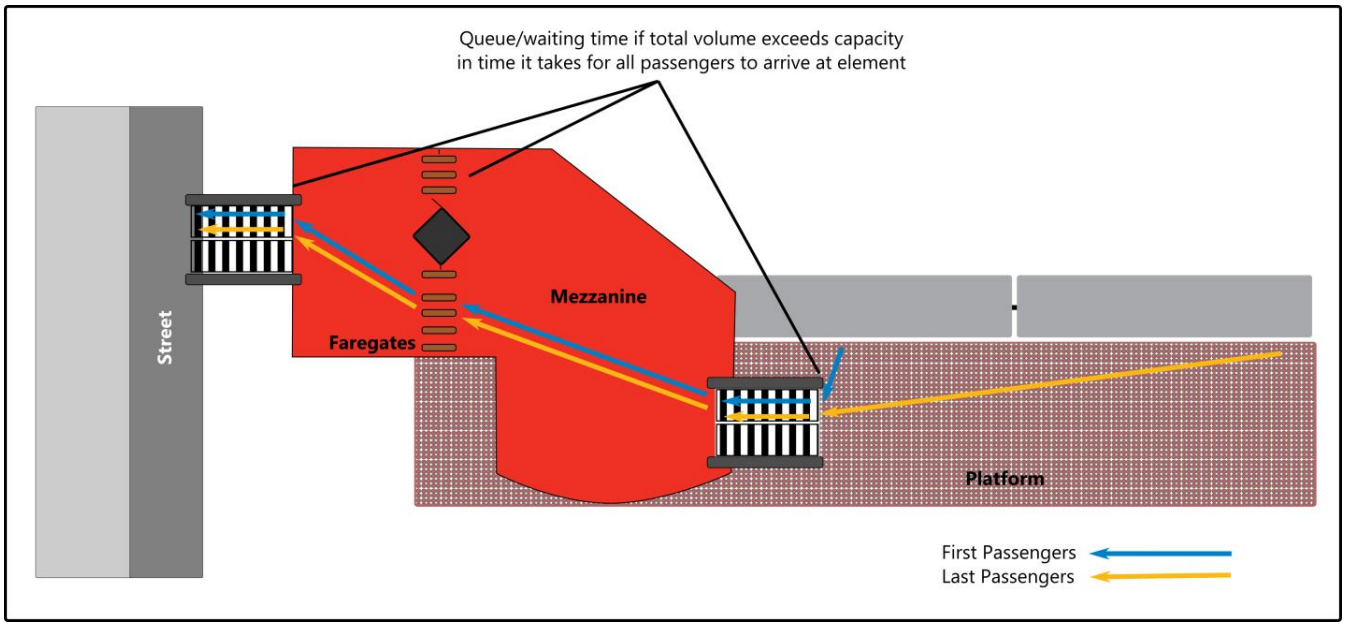
- All passengers clear the platform in less than four minutes;
- All passengers must reach a “point of safety” within six minutes;
- Passengers move more quickly on stairs than under normal operating conditions, increasing the capacity from 10 feet per minute to 19 feet per minute; and
- One of the escalators must be assumed to be out of service, and the capacity of the remaining escalators is assumed to be the same as a stair.

B5.1 Methodology

The evacuation analysis uses a number of factors to calculate platform evacuation time and station evacuation time (to a point of safety). The number of passengers who would need to evacuate is based on the total amount of passengers waiting on the platform for a train multiplied by two (in order to account for a worst-case scenario where a single train headway is missed) and an entire trainload of passengers needing to off-load and exit. A peaking factor of 1.28 is also applied in order to account for an uneven distribution of passengers waiting for a train within the peak 15-minute period (a value determined by WMATA based on previous station capacity studies) (WMATA, 2012). In order to account for a worst-case scenario, it is assumed that an at-capacity eight car train (960 passengers) is serving every platform in each station. Walking distances between the ends of the platform and vertical elements, vertical elements and fare aisles, fare aisles and mezzanine-to-street vertical elements, and walking distances on vertical elements themselves are all factors, as are the flow rates of passengers through vertical elements and fare aisles. Train headways and 15-minute ridership data are also used to calculate evacuation times (WMATA 2014b, WMATA 2014a).

The overall platform evacuation time is calculated by adding the longest walking time on the platform to reach the vertical elements to the waiting time at the vertical elements. The “point of safety” evacuation time is calculated by adding the platform evacuation time to the walking time on the platform-to-mezzanine vertical elements, the walking time between the platform-to-mezzanine vertical elements and the fare aisles, the waiting time at the fare aisles, the walking time between the fare aisles and the mezzanine-to-street vertical elements, and the walking time on the mezzanine-to-street vertical elements. Waiting times only exist if volumes flowing through an element exceed their capacity in the amount of time between when the first passenger reaches them and the last passenger reaches them (see figure B5-1). For example, if it takes three minutes for the last passengers to reach the platform/mezzanine vertical elements at the platform level, then the platform/mezzanine vertical elements have three minutes to clear all passengers to avoid having a waiting time. If there are 500 passengers to clear in this three minutes but only a vertical element that clears 100 passengers per minute, then in three minutes only 300 of the 500 passengers are cleared, and the remaining 200 passengers would form a queue that would take an additional two minutes (waiting time) to clear.

Figure B5-1: NFPA Evacuation Analysis, Walking, and Waiting Times



The main assumptions used in the NFPA 130 analysis are detailed in table B5-1. Walking speeds, stair capacity, and fare aisle capacities are all based on NFPA 130 standards.

Table B5-1: NFPA 130 Analysis Assumptions

#	Assumptions	Amount	Unit	Source
1	Metrorail Capacity	120	pax/car	WMATA
2	Escalator Width	4.0	ft	Site Inventory
3	Stair Width	5.0	ft	Site Inventory
4	Peaking Factor	1.28	-	WMATA
5	Missed Headway Factor	2.0	-	NFPA 130
6	Walking Speed	124	ft/min	NFPA 130
7	Vertical Walking Speed	48	ft/min	NFPA 130
8	Capacity for Stairs	19	pax/ft/min	NFPA 130
9	Fare Aisle Capacity	50	pax/min	NFPA 130
10	ADA and Service Fare Aisle Capacity*	75	pax/min	NFPA 130

*In an evacuation situation, all fare aisles would be opened, and since the ADA aisle is wider than regular aisles, it has a higher capacity.
Note: pax = passengers, ft = feet, min = minutes

The following details the NFPA 130 analysis for Archives-Navy Memorial Station, Federal Triangle Station, the east and west entrances to Gallery Place-Chinatown Station, and the south and east entrances to Metro Center Station. Note that the evacuation analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

B5.2 Existing Condition NFPA 130 Evacuation Analysis

B5.2.1 Archives-Navy Memorial

At Archives-Navy Memorial Station, the peak entry period was between 5:00 PM and 5:15 PM, when 524 passengers entered the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 448. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario is 2,368 (see table B5-2).

Table B5-2: NFPA 130 Ridership Assumptions at Archives-Navy Memorial Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	524	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	Trains	= 15 / #13
15	Entries per Train	175	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	448	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,368	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-3. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable, resulting in a waiting time of approximately 27.9 minutes. Combined with a maximum walking time of 3.3 minutes between the farthest end of the platform and the platform-to-mezzanine escalator, this would result in a platform clearance time of approximately 31 minutes.

To reach a point of safety, it would take an additional 3.4 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 34.5 minutes.

Table B5-3: NFPA 130 Evacuation Analysis for Archives-Navy Memorial Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total Platform to Mezzanine Capacity				**76**
Fare Aisle Capacity				

	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	1		75	75
Total Fare Aisle Capacity				**450**
Mezzanine to Street Capacity				
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total Mezzanine to Street Capacity				**152**

Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Minutes**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		408	124	3.3	3.3
Platform/Mezzanine Vertical		30	48	0.6	3.9
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	4.8
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	5.9
Mezzanine/Street Vertical		40	48	0.8	6.7
Walking Time for First Passenger (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Minutes**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	2.6
Mezzanine/Street Vertical		40	48	0.8	3.5

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Minutes**	**Cumulative Minutes**
Platform/Mezzanine Vertical	3.3	250	2,117	76	27.9	27.9
Fare Aisles	31.1	13,982	0	450	0.0	27.9
Mezzanine/Street Vertical	31.1	4,723	0	152	0.0	27.9
Platform Clearance Time	**31.2**					
Point of Safety Time	**34.5**					

Note: pax = passengers, ft = feet, min = minutes,

Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.2.2 Federal Triangle

At Federal Triangle Station, the peak entry period was between 5:00 PM and 5:15 PM, when 501 passengers enter the station. Based on a peak headway of 2.5 minutes, six trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 214. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario is 2,134 (see table B5-4).

Table B5-4: NFPA 130 Ridership Assumptions at Federal Triangle Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	501	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	2.5	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	Entries per Train	84	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	214	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,134	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-5. Following NFPA 130 standards, only two platform-to-mezzanine escalators would be usable, resulting in a waiting time of approximately 12.5 minutes. Combined with a maximum walking time of 1.6 minutes between the farthest end of the platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 14 minutes.

To reach a point of safety, it would take an additional 3.5 minutes of walking time for passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a brief, 0.1-minute waiting time at the mezzanine-to-street escalators. The lack of significant additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 17.7 minutes.

Table B5-5: NFPA 130 Evacuation Analysis for Federal Triangle Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0

Escalators	2	4.0	19	152
Total				**152**
Fare Aisle Capacity				
	#		**Pax/Min/Aisle**	**Pax/Min**
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**
Mezzanine to Street Capacity				
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		195	124	1.6	1.6
Platform/Mezzanine Vertical		30	48	0.6	2.2
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	2.5
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	3.9
Mezzanine/Street Vertical		60	48	1.3	5.1
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	1.0
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	2.4
Mezzanine/Street Vertical		60	48	1.3	3.6

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical	1.6	239	1895	152	12.5	12.5
Fare Aisles	14.0	7328	0	525	0.0	12.5

Mezzanine/Street Vertical	14.0	2122	12	152	0.1	12.5
Platform Clearance Time	**14.0**					
Point of Safety Time	**17.7**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.2.3 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown Station west entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Green/Yellow platform, the Red-Glenmont platform, or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Based on the layout of the station, it is assumed that no passengers waiting for Green or Yellow Line trains, 50 percent of passengers waiting for Glenmont trains, and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 137 on the Glenmont platform and 144 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance is 1,081 (see table B5-6).

Table B5-6: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown West Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	320	Passengers	WMATA
12	1/3 Waiting Shady Grove	339	Passengers	WMATA
13	Peak Headway	2.5	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	1/2 Waiting Glenmont per Train	53	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	56	Passengers	= #12 / #14
17	Adjusted 1/2 Wait Glenmont per Train	137	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Wait Shady Grove per Train	144	Passengers	= #16 x #4 x #5
19	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-7. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 6.7 minutes on the Glenmont platform and 4.7 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.4 minutes between the midpoint of the Red platforms and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 8.1 minutes.

To reach a point of safety, it would take an additional 3.6 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 11.7 minutes.

Table B5-7: NFPA 130 Evacuation Analysis for Gallery Place-Chinatown West Entrance

Glenmont to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Shady Grove to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	4		50	200	
Service Gate	2		75	150	
Total				**425**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		170	124	1.4	1.4
Red Platform/Mezzanine Vertical		30	48	0.6	2.0
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	2.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	4.1

Mezzanine/Street Vertical		40	48	0.8	5.0
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	2.8
Mezzanine/Street Vertical		40	48	0.8	3.7

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical Glenmont	1.4	104	512	76	6.7	6.7
Platform/Mezzanine Vertical Shady Grove	1.4	104	360	76	4.7	4.7
Fare Aisles	8.0	3,414	0	425	0.0	6.7
Mezzanine/Street Vertical	8.0	1,221	0	152	0.0	6.7
Platform Clearance Time	**8.1**					
Point of Safety Time	**11.7**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.2.4 Gallery Place-Chinatown East Entrance

At the Gallery Place-Chinatown Station east entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Green/Yellow platform, the Red-Glenmont platform, or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 50 percent or passengers waiting on the Red-Glenmont platform, 33 percent of passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Green/Yellow platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and three trains would serve each Green/Yellow track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 137 on the Glenmont platform, 144 on the Shady Grove platform, and 678 on the Green/Yellow platform. Four at-capacity eight-car trains (one on each track) could hold up to 3,840 passengers.

Using the same assumption as waiting passengers, this would result in approximately 960 passengers on Green/Yellow trains, 480 passengers on the Red-Glenmont trains, and 320 passengers on Red-Shady Grove trains using this station entrance to exit (see table B5-8).

Table B5-8: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	320	Passengers	WMATA
12	1/3 Waiting Shady Grove	339	Passengers	WMATA
13	1/2 Waiting Green/Yellow	794	Passengers	WMATA
14	Peak Headway (Red)	2.5	Minutes	WMATA
15	Peak Headway (Green/Yellow)	4	Minutes	WMATA
16	Trains per 15-Minutes (Red)	6	Trains	= 15 / #14
17	Trains per 15-Minutes (Green/Yellow)	3	Trains	= 15 / #15
18	1/2 Waiting Glenmont per Train	53	Passengers	= #11 / #16
19	1/3 Waiting Shady Grove per Train	56	Passengers	= #12 / #16
20	1/2 Waiting Green/Yellow per Train	265	Passengers	= #13 / #17
21	Adjusted 1/2 Waiting Glenmont per Train	137	Passengers	= #18 x #4 x #5
22	Adjusted 1/3 Waiting Shady Grove per Train	144	Passengers	= #19 x #4 x #5
23	Adjusted 1/2 Waiting Green/Yellow per Train	678	Passengers	= #20 x #4 x #5
24	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
25	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3
26	1/2 Total on Green/Yellow Trains	960	Passengers	= (8 x #1) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-9. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per Red platform, while four platform-to-platform escalators and one stair would be usable between the Green/Yellow platform and the Red-Glenmont platform. This results in a waiting time of approximately 3.7 minutes on the Green/Yellow platform, 25.6 minutes on the Glenmont platform and 4.2 minutes on the Shady Grove platform. Combined with a maximum walking time of 2.2 minutes between the midpoint of the Red platforms and the Red platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 27.8 minutes for all three platforms combined.

To reach a point of safety, it would take an additional 3.7 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of significant additional waiting time results from the waiting time at the platform-to-platform escalators and stair, and platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 31.4 minutes.

Table B5-9: NFPA 130 Evacuation Analysis for Gallery Place-Chinatown East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0

Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Green/Yellow Platform to Red Platform Capacity				
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**
Stairs	1	5.0	19	95
Escalators	4	4.0	19	304
Total				**399**
Fare Aisle Capacity				
	#		**Pax/Min/Aisle**	**Pax/Min**
ADA Aisle	1		75	75
Regular Aisle	11		50	550
Service Gate	2		75	150
Total				**775**
Mezzanine to Street Capacity				
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**
Stairs	1	5.0	19	95
Escalators	3	4.0	19	228
Total				**323**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		56	124	0.5	0.5*
Platform/Platform Vertical		30	48	0.6	1.1*
Platform/Platform Vertical to Platform/Mezzanine Vertical		29	124	0.2	1.3*
Red Platform to Platform/Mezzanine Vertical		272	124	2.2	2.2
Red Platform/Mezzanine Vertical		30	48	0.6	2.8
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	3.8
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	5.1

Mezzanine/Street Vertical		40	48	0.8	5.9
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Platform/Mezzanine Vertical		2	124	0.0	0.7
Red Platform to Platform/Mezzanine Vertical		36	124	0.3	1.0**
Red Platform/Mezzanine Vertical		30	48	0.6	1.3
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	2.4
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.6
Mezzanine/Street Vertical		40	48	0.8	4.4

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical Green/Yellow	0.4	148	1490	399	3.7	3.7
Platform/Mezzanine Vertical Glenmont	4.1	312	1,942	76	25.6	25.6
Platform/Mezzanine Vertical Shady Grove	1.9	145	320	76	4.2	4.2
Fare Aisles	27.0	20,949	0	775	0.0	25.6
Mezzanine/Street Vertical	27.0	8,731	0	323	0.0	25.6
Platform Clearance Time	**27.8**					
Point of Safety Time	**31.4**					

*Amount not included in cumulative total because Red Platform to Platform/Mezzanine Vertical walking time was higher.
**Amount not included in cumulative total because Green/Yellow Platform to Red Platform/Mezzanine Vertical walking time is lower.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.2.5 Metro Center South Entrance

At the Metro Center Station south entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform

based on the destination station. Transfers from the Blue, Orange, and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 33 percent or passengers waiting on the Red-Glenmont platform, no passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Blue/Orange/Silver platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and six trains would serve each Blue/Orange/Silver track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 167 on the Glenmont platform, and 344 on the Green/Yellow platform. Three at-capacity eight-car trains (one on the Red-Glenmont track and one on each track Blue/Orange/Silver track) could hold up to 2,880 passengers. Using the same assumptions as waiting passengers, this would result in approximately 960 passengers on Blue/Orange/Silver trains, and 320 passengers on the Red-Glenmont trains using this station entrance to exit (see table B5-10).

Table B5-10: NFPA 130 Ridership Assumptions at Metro Center South Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	390	Passengers	WMATA
12	1/2 Waiting Blue/Orange/Silver	807	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Peak Headway (Blue/Orange/Silver)	2.5	Minutes	WMATA
15	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
16	Trains per 15-Minutes (Blue/Orange/Silver)	6	Trains	= 15 / #14
17	1/3 Waiting Glenmont per Train	65	Passengers	= #11 / #15
18	1/2 Waiting Blue/Orange/Silver per Train	135	Passengers	= #12 / 16
19	Adjusted 1/3 Waiting Glenmont per Train	167	Passengers	= #17 x #4 x #5
20	Adjusted 1/2 Waiting Blue/Orange/Silver per Train	344	Passengers	= #18 x #4 x #5
21	1/3 Total on Glenmont Train	320	Passengers	= (8 x #1) / 3
22	1/2 Total on Blue/Orange/Silver Trains	960	Passengers	= (8 x #1 x 2) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-11. Following NFPA 130 standards, only two platform-to-platform escalators and three stairs (in a single set) would be usable between the Blue/Orange/Silver platform and the Red-Glenmont platform. This results in a waiting time of approximately 2.1 minutes on the Blue/Orange/Silver platform. Combined with a maximum walking time of 2.2 minutes between the midpoint of the Blue/Orange/Silver platform and the platform-to-platform escalators and stair, this would result in a Blue/Orange Silver platform clearance time of approximately 3.1 minutes. Since there is no mezzanine level at this entrance, passengers exiting from the Red-Glenmont platform can proceed directly to the fare aisles.

To reach a point of safety, it would take an additional 4.2 minutes of walking time for passengers to walk up the platform-to-platform escalators or stair, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be an 11.6-minute waiting time at the mezzanine-to-street escalators, since only two would be usable. Overall, the total time to reach a point of safety is approximately 15.7 minutes.

Table B5-11: NFPA 130 Evacuation Analysis for Metro Center South Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Blue/Orange/Silver Platform to Red Platform Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	3	5.0	19	285
Escalators	2	4.0	19	152
Total				**437**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**
Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		120	124	1.0	1.0
Platform/Platform Vertical		30	48	0.6	1.6
Platform/Platform Vertical to Fare Aisles		240	124	1.9	3.5
Red Platform to Fare Aisles		280	124	2.3	2.3*

Fare Aisles to Mezzanine/Street Vertical		100	124	0.8	4.3
Mezzanine/Street Vertical		40	48	0.8	5.2
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Lower Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Fare Aisles		143	124	1.2	1.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.1
Mezzanine/Street Vertical		40	48	0.8	3.9

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Platform Vertical B/O/S	0.9	388	917	437	2.1	2.1
Fare Aisles	3.8	1978	0	525	0.0	2.1
Mezzanine Vertical	3.4	511	1280	152	8.4	10.5
Lower Platform Clearance Time	**3.1**					
Point of Safety Time	**15.7**					

*Amount not included in cumulative total because Lower Platform to Fare Aisles walking time was higher.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.2.6 Metro Center East Entrance

At the Metro Center east entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Considering the layout of the station, it is assumed that no passengers waiting for Blue, Orange, or Silver Line trains, 33 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted

entries per train) is 167 on the Glenmont platform and 168 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance is 320 per Red platform (see table B5-12).

Table B5-12: NFPA 130 Ridership Assumptions at Metro Center East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	390	Passengers	WMATA
12	1/3 Waiting Shady Grove	394	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
15	1/3 Waiting Glenmont per Train	65	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	66	Passengers	= #12 / #14
17	Adjusted 1/3 Waiting Glenmont per Train	167	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Waiting Shady Grove per Train	168	Passengers	= #16 x #4 x #5
19	1/3 Total on Glenmont Trains	320	Passengers	= (8 x #1) / 3
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-13. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 5.3 minutes on each Red platform. Combined with a maximum walking time of 1.2 minutes between the midpoint of each Red platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 6.5 minutes.

To reach a point of safety, it would take an additional 3.2 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 9.7 minutes.

Table B5-13: NFPA 130 Evacuation Analysis for Metro Center East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/ Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/ Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**

Fare Aisle Capacity				
	#		Pax/Min/ Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**

Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/ Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		145	124	1.2	1.2
Red Platform/Mezzanine Vertical		30	48	0.6	1.8
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	3.1
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	3.5
Mezzanine/Street Vertical		40	48	0.8	4.4

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Red Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	2.0
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	2.4
Mezzanine/Street Vertical		40	48	0.8	3.3

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.1	83	404	76	5.3	5.3

Platform/Mezzanine Vertical Shady Grove	1.1	83	406	76	5.3	5.3
Fare Aisles	6.4	3373	0	525	0.0	5.3
Mezzanine/Street Vertical	6.4	976	0	152	0.0	5.3
Platform Clearance Time	**6.5**					
Point of Safety Time	**9.7**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3 No-action Alternative NFPA 130 Evacuation Analysis

B5.3.1 Archives-Navy Memorial

At Archives-Navy Memorial Station, the peak entry period was between 5:00 PM and 5:15 PM, when 665 passengers would enter the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 568. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario is 2,488 (see table B5-14).

Table B5-14: NFPA 130 Ridership Assumptions at Archives-Navy Memorial Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	665	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	Trains	= 15 / #13
15	Entries per Train	222	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	568	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,488	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-15. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable, resulting in a waiting time of approximately 29.4 minutes. Combined with a maximum walking time of 3.3 minutes between the farthest end of the platform and the platform-to-mezzanine escalator, this would result in a platform clearance time of approximately 32.7 minutes.

To reach a point of safety, it would take an additional 3.4 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which

spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 36.1 minutes.

Table B5-15: NFPA 130 Evacuation Analysis Details for Archives-Navy Memorial Station

Platform to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total Platform to Mezzanine Capacity				**76**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	1		75	75	
Total Fare Aisle Capacity				**450**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total Mezzanine to Street Capacity				**152**	
Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		408	124	3.3	3.3
Platform/Mezzanine Vertical		30	48	0.6	3.9
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	4.8
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	5.9
Mezzanine/Street Vertical		40	48	0.8	6.7
Walking Time for First Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	1.6

Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	2.6	
Mezzanine/Street Vertical		40	48	0.8	3.5	
Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Minutes**	**Cumulative Minutes**
Platform/Mezzanine Vertical	3.3	250	2,237	76	29.4	29.4
Fare Aisles	32.7	14,693	0	450	0.0	29.4
Mezzanine/Street Vertical	32.7	4,963	0	152	0.0	29.4
Platform Clearance Time	**32.7**					
Point of Safety Time	**36.1**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3.2 Federal Triangle

At Federal Triangle Station, the peak entry period was between 5:00 PM and 5:15 PM, when 635 passengers would enter the station. Based on a peak headway of 2.5 minutes, six trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 271. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario is 2,191 (see table B5-16).

Table B5-16: NFPA 130 Ridership Assumptions at Federal Triangle Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	635	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	3	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	Entries per Train	106	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	271	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,191	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-17. Following NFPA 130 standards, only two platform-to-mezzanine escalators would be usable, resulting in a waiting time of approximately 12.8 minutes. Combined with a maximum walking time of 1.6 minutes between the farthest end of the platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 14.4 minutes.

To reach a point of safety, it would take an additional 3.5 minutes of walking time for passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a brief, 0.1-minute waiting time at the mezzanine-to-street escalators. The lack of significant additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 18.1 minutes.

Table B5-17: NFPA 130 Evacuation Analysis Details for Federal Triangle Station

Platform to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	2		75	150	
Total				**525**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		195	124	1.6	1.6
Platform/Mezzanine Vertical		30	48	0.6	2.2
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	2.5
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	3.9
Mezzanine/Street Vertical		60	48	1.3	5.1
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1

Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	1.0
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	2.4
Mezzanine/Street Vertical		60	48	1.3	3.6

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical	1.6	239	1,952	152	12.8	12.8
Fare Aisles	14.3	7,526	0	525	0.0	12.8
Mezzanine/Street Vertical	14.3	2,179	12	152	0.1	12.9
Platform Clearance Time	**14.4**					
Point of Safety Time	**18.1**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3.3 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown Station west entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Based on the layout of the station, it is assumed that no passengers waiting for Green or Yellow Line trains, 50 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 170 on the Glenmont platform and 183 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance is 1,154 (see table B5-18).

Table B5-18: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown West Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	399	Passengers	WMATA
12	1/3 Waiting Shady Grove	430	Passengers	WMATA
13	Peak Headway	2.5	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13

# *	Ridership or Assumption	Amount	Unit	Source/Formula
15	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #14
17	Adjusted 1/3 Wait Glenmont per Train	170	Passengers	= #15 x #4 x #5
18	Adjusted 1/2 Wait Shady Grove per Train	183	Passengers	= #16 x #4 x #5
19	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-19. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 7.2 minutes on the Glenmont platform and 5.3 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.4 minutes between the midpoint of the Red platforms and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 8.6 minutes.

To reach a point of safety, it would take an additional 3.6 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 12.2 minutes.

Table B5-19: NFPA 130 Evacuation Analysis Details for Gallery Place-Chinatown West Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	4		50	200
Service Gate	2		75	150
Total				**425**
Mezzanine to Street Capacity				

	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		170	124	1.4	1.4
Red Platform/Mezzanine Vertical		30	48	0.6	2.0
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	2.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	4.1
Mezzanine/Street Vertical		40	48	0.8	5.0

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	2.8
Mezzanine/Street Vertical		40	48	0.8	3.7

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.4	104	546	76	7.2	7.2
Platform/Mezzanine Vertical Shady Grove	1.4	104	399	76	5.3	5.3
Fare Aisles	8.5	3,603	0	425	0.0	7.2
Mezzanine/Street Vertical	8.5	1,289	0	152	0.0	7.2
Platform Clearance Time	**8.6**					
Point of Safety Time	**12.2**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type

Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3.4 Gallery Place-Chinatown East Entrance

At the Gallery Place-Chinatown Station east entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 50 percent or passengers waiting on the Red-Glenmont platform, 33 percent of passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Green/Yellow platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and three trains would serve each Green/Yellow track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 170 on the Glenmont platform, 183 on the Shady Grove platform, and 845 on the Green/Yellow platform. Four at-capacity eight-car trains (one on each track) could hold up to 3,840 passengers. Using the same assumption as waiting passengers, this would result in approximately 960 passengers on Green/Yellow trains, 480 passengers on the Red-Glenmont trains, and 320 passengers on Red-Shady Grove trains using this station entrance to exit (see table B5-20).

Table B5-20: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	399	Passengers	WMATA
12	1/3 Waiting Shady Grove	430	Passengers	WMATA
13	1/2 Waiting Green/Yellow	990	Passengers	WMATA
14	Peak Headway (Red)	2.5	Minutes	WMATA
15	Peak Headway (Green/Yellow)	4	Minutes	WMATA
16	Trains per 15-Minutes (Red)	6	Trains	= 15 / #14
17	Trains per 15-Minutes (Green/Yellow)	3	Trains	= 15 / #15
18	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #16
19	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #16
20	1/2 Waiting Green/Yellow per Train	330	Passengers	= #13 / #17
21	Adjusted 1/2 Waiting Glenmont per Train	170	Passengers	= #18 x #4 x #5
22	Adjusted 1/3 Waiting Shady Grove per Train	183	Passengers	= #19 x #4 x #5
23	Adjusted 1/2 Waiting Green/Yellow per Train	845	Passengers	= #20 x #4 x #5
24	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
25	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3
26	1/2 Total on Green/Yellow Trains	960	Passengers	= (8 x #1) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-21. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per Red platform, while four platform-to-platform escalators and one stair

would be usable between the Green/Yellow platform and the Red-Glenmont platform. This results in a waiting time of approximately 4.2 minutes on the Green/Yellow platform, 27.8 minutes on the Glenmont platform and 4.7 minutes on the Shady Grove platform. Combined with a maximum walking time of 2.2 minutes between the midpoint of the Red platforms and the Red platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 30.0 minutes for all three platforms combined.

To reach a point of safety, it would take an additional 3.7 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-platform escalators and stair, and platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 33.7 minutes.

Table B5-21: NFPA 130 Evacuation Analysis Details for Gallery Place-Chinatown East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Green/Yellow Platform to Red Platform Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	1	5.0	19	95
Escalators	4	4.0	19	304
Total				**399**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	11		50	550
Service Gate	2		75	150
Total				**775**
Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	1	5.0	19	95
Escalators	3	4.0	19	228

Total				**323**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		56	124	0.5	0.5*
Platform/Platform Vertical		30	48	0.6	1.1*
Platform/Platform Vertical to Platform/Mezzanine Vertical		29	124	0.2	1.3*
Red Platform to Platform/Mezzanine Vertical		272	124	2.2	2.2
Red Platform/Mezzanine Vertical		30	48	0.6	2.8
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	3.8
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	5.1
Mezzanine/Street Vertical		40	48	0.8	5.9
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Platform/Mezzanine Vertical		2	124	0.0	0.7
Red Platform to Platform/Mezzanine Vertical		36	124	0.3	1.0**
Red Platform/Mezzanine Vertical		30	48	0.6	1.3
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	2.4
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.6
Mezzanine/Street Vertical		40	48	0.8	4.4

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical Green/Yellow	0.4	148	1,657	399	4.2	4.2***
Platform/Mezzanine Vertical Glenmont	4.5	344	2,111	76	27.8	27.8
Platform/Mezzanine Vertical Shady Grove	1.9	145	359	76	4.7	4.7***

Fare Aisles	29.3	22,671	0	775	0.0	27.8
Mezzanine/Street Vertical	29.3	9,449	0	323	0.0	27.8
Platform Clearance Time	**30.0**					
Point of Safety Time	**33.7**					

*Amount not included in cumulative total because Red Platform to Platform/Mezzanine Vertical walking time was higher.
**Amount not included in cumulative total because Green/Yellow Platform to Red Platform/Mezzanine Vertical walking time is lower.
***Amount not included in cumulative total because Glenmont Platform/Mezzanine Vertical Element wait time is longer.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3.5 Metro Center South Entrance

At the Metro Center Station south entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 33 percent or passengers waiting on the Red-Glenmont platform, no passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Blue/Orange/Silver platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and six trains would serve each Blue/Orange/Silver track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 207 on the Glenmont platform, and 431 on the Blue/Orange/Silver platform. Three at-capacity eight-car trains (one on the Red-Glenmont track and one on each track Blue/Orange/Silver track) could hold up to 2,880 passengers. Using the same assumptions as waiting passengers, this would result in approximately 960 passengers on Blue/Orange/Silver trains, and 320 passengers on the Red-Glenmont trains using this station entrance to exit (see table B5-22).

Table B5-22: NFPA 130 Ridership Assumptions at Metro Center South Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	485	Passengers	WMATA
12	1/2 Waiting Blue/Orange/Silver	1,009	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Peak Headway (Blue/Orange/Silver)	2.5	Minutes	WMATA
15	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
16	Trains per 15-Minutes (Blue/Orange/Silver)	6	Trains	= 15 / #14
17	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #15
18	1/2 Waiting Blue/Orange/Silver per Train	168	Passengers	= #12 / 16
19	Adjusted 1/3 Waiting Glenmont per Train	207	Passengers	= #17 x #4 x #5

# *	Ridership or Assumption	Amount	Unit	Source/Formula
20	Adjusted 1/2 Waiting Blue/Orange/Silver per Train	431	Passengers	= #18 x #4 x #5
21	1/3 Total on Glenmont Train	320	Passengers	= (8 x #1) / 3
22	1/2 Total on Blue/Orange/Silver Trains	960	Passengers	= (8 x #1 x 2) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-23. Following NFPA 130 standards, only two platform-to-platform escalators and three stairs (in a single set) would be usable between the Blue/Orange/Silver platform and the Red-Glenmont platform. This results in a waiting time of approximately 2.3 minutes on the Blue/Orange/Silver platform. Combined with a maximum walking time of 1.0 minute between the midpoint of the Blue/Orange/Silver platform and the platform-to-platform escalators and stair, this would result in a Blue/Orange Silver platform clearance time of approximately 3.3 minutes. Since there is no mezzanine level at this entrance, passengers exiting from the Red-Glenmont platform can proceed directly to the fare aisles.

To reach a point of safety, it would take an additional 4.2 minutes of walking time for passengers to walk up the platform-to-platform escalators or stair, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a 9.1-minute waiting time at the mezzanine-to-street escalators, since only two would be usable. Overall, the total time to reach a point of safety is approximately 16.5 minutes.

Table B5-23: NFPA 130 Evacuation Analysis Details for Metro Center South Entrance

B/O/S Platform to Red Platform Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	3	5.0	19	285	
Escalators	2	4.0	19	152	
Total				**437**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	2		75	150	
Total				**525**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		120	124	1.0	1.0

Platform/Platform Vertical		30	48	0.6	1.6
Platform/Platform Vertical to Fare Aisles		240	124	1.9	3.5
Red Platform to Fare Aisles		280	124	2.3	2.3*
Fare Aisles to Mezzanine/Street Vertical		100	124	0.8	4.3
Mezzanine/Street Vertical		40	48	0.8	5.2
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Lower Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Fare Aisles		143	124	1.2	1.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.1
Mezzanine/Street Vertical		40	48	0.8	3.9

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Platform Vertical B/O/S	0.9	388	1,003	437	2.3	2.3
Fare Aisles	4.0	2,081	0	525	0.0	2.3
Mezzanine Vertical	3.6	541	1,376	152	9.1	11.4
Lower Platform Clearance Time	**3.3**					
Area of Safety Time	**16.5**					

*Amount not included in cumulative total because Lower Platform to Fare Aisles walking time was higher.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.3.6 Metro Center East Entrance

At the Metro Center east entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Considering the layout of the station, it is assumed that no passengers waiting for Blue, Orange, or Silver Line trains, 33 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is 207 on the Glenmont platform and 210 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance is 320 per Red platform (see table B5-24).

Table B5-24: NFPA 130 Ridership Assumptions at Metro Center East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	485	Passengers	WMATA
12	1/3 Waiting Shady Grove	491	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
15	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	82	Passengers	= #12 / #14
17	Adjusted 1/3 Waiting Glenmont per Train	207	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Waiting Shady Grove per Train	210	Passengers	= #16 x #4 x #5
19	1/3 Total on Glenmont Trains	320	Passengers	= (8 x #1) / 3
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-25. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 5.8 minutes on the Glenmont platform and 5.9 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.2 minutes between the midpoint of each Red platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 7.1 minutes.

To reach a point of safety, it would take an additional 3.2 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 10.2 minutes.

Table B5-25: NFPA 130 Evacuation Analysis Details for Metro Center East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				

	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**
Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		145	124	1.2	1.2
Red Platform/Mezzanine Vertical		30	48	0.6	1.8
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	3.1
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	3.5
Mezzanine/Street Vertical		40	48	0.8	4.4
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Red Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	2.0
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	2.4
Mezzanine/Street Vertical		40	48	0.8	3.3
Waiting Time					

	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.1	83	444	76	5.8	5.8
Platform/Mezzanine Vertical Shady Grove	1.1	83	447	76	5.9	5.9
Fare Aisles	7.0	3,659	0	525	0.0	5.9
Mezzanine/Street Vertical	7.0	1,059	0	152	0.0	5.9
Platform Clearance Time	**7.1**					
Point of Safety Time	**10.2**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4 RFDS 1 Build Condition NFPA 130 Evacuation Analysis

B5.4.1 Archives-Navy Memorial

At Archives-Navy Memorial Station, the peak entry period was between 5:00 PM and 5:15 PM, when 682 passengers would enter the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 582. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario would be 2,502 (see table B5-26).

Table B5-26: NFPA 130 Ridership Assumptions at Archives-Navy Memorial Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	682	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	Trains	= 15 / #13
15	Entries per Train	227	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	582	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,502	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-27. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable, resulting in a waiting time of approximately 29.6 minutes. Combined with a

maximum walking time of 3.3 minutes between the farthest end of the platform and the platform-to-mezzanine escalator, this would result in a platform clearance time of approximately 32.9 minutes.

To reach a point of safety, it would take an additional 3.4 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 36.3 minutes.

Table B5-27: NFPA 130 Analysis Details for Archives-Navy Memorial Station

Platform to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total Platform to Mezzanine Capacity				**76**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	1		75	75	
Total Fare Aisle Capacity				**450**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total Mezzanine to Street Capacity				**152**	
Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		408	124	3.3	3.3
Platform/Mezzanine Vertical		30	48	0.6	3.9
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	4.8
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	5.9
Mezzanine/Street Vertical		40	48	0.8	6.7
Walking Time for First Passenger (Excluding Wait Time)					

		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	2.6
Mezzanine/Street Vertical		40	48	0.8	3.5
Waiting Time					
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Minutes**	**Cumulative Minutes**
Platform/Mezzanine Vertical	3.3	250	2,252	76	29.6	29.6
Fare Aisles	32.8	14,678	0	450	0.0	29.6
Mezzanine/Street Vertical	32.8	4,992	0	152	0.0	29.6
Platform Clearance Time	**32.9**					
Point of Safety Time	**36.3**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4.2 Federal Triangle

At Federal Triangle Station, the peak entry period was between 5:00 PM and 5:15 PM, when 652 passengers would enter the station. Based on a peak headway of 2.5 minutes, six trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 278. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario would be 2,198 (see table B5-28).

Table B5-28: NFPA 130 Ridership Assumptions at Federal Triangle Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	652	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	3	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	Entries per Train	109	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	278	Passengers	= #15 x #4 x #5

# *	Ridership or Assumption	Amount	Unit	Source/Formula
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,198	Passengers	= #17 + #18

* Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-29. Following NFPA 130 standards, only two platform-to-mezzanine escalators would be usable, resulting in a waiting time of approximately 12.9 minutes. Combined with a maximum walking time of 1.6 minutes between the farthest end of the platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 14.5 minutes.

To reach a point of safety, it would take an additional 3.5 minutes of walking time for passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a brief, 0.1-minute waiting time at the mezzanine-to-street escalators. The lack of significant additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 18.1 minutes.

Table B5-29: NFPA 130 Analysis Details for Federal Triangle Station

Platform to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	2		75	150	
Total				**525**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		195	124	1.6	1.6
Platform/Mezzanine Vertical		30	48	0.6	2.2

Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	2.5
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	3.9
Mezzanine/Street Vertical		60	48	1.3	5.1
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	1.0
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	2.4
Mezzanine/Street Vertical		60	48	1.3	3.6

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical	1.6	239	1,959	152	12.9	12.9
Fare Aisles	14.4	7,549	0	525	0.0	12.9
Mezzanine/Street Vertical	14.4	2,186	12	152	0.1	13.0
Platform Clearance Time	**14.5**					
Point of Safety Time	**18.1**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4.3 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown Station west entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Based on the layout of the station, it is assumed that no passengers waiting for Green or Yellow Line trains, 50 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 171 on the Glenmont platform and 185 on the Shady Grove platform. Two at-capacity eight-car trains could hold

up to 1,920 passengers, and therefore the number of passengers who are assumed would evacuate using this station entrance would be 480 on the Glenmont trains and 320 on the Shade Grove trains (see table B5-30).

Table B5-30: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown West Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	402	Passengers	WMATA
12	1/3 Waiting Shady Grove	433	Passengers	WMATA
13	Peak Headway	2.5	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #14
17	Adjusted 1/2 Wait Glenmont per Train	171	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Wait Shady Grove per Train	185	Passengers	= #16 x #4 x #5
19	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 2

* Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-31. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 7.2 minutes on the Glenmont platform and 5.3 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.4 minutes between the midpoint of the Red platforms and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 8.6 minutes.

To reach a point of safety, it would take an additional 3.6 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 12.2 minutes.

Table B5-31: NFPA 130 Analysis Details for Gallery Place-Chinatown West Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Fare Aisle Capacity				

	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	4		50	200
Service Gate	2		75	150
Total				**425**

Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		170	124	1.4	1.4
Red Platform/Mezzanine Vertical		30	48	0.6	2.0
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	2.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	4.1
Mezzanine/Street Vertical		40	48	0.8	5.0

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	2.8
Mezzanine/Street Vertical		40	48	0.8	3.7

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.4	104	547	76	7.2	7.2
Platform/Mezzanine Vertical Shady Grove	1.4	104	400	76	5.3	5.3
Fare Aisles	8.5	3,609	0	425	0.0	7.2

Mezzanine/Street Vertical	8.5	1,291	0	152	0.0	7.2
Platform Clearance Time	**8.6**					
Point of Safety Time	**12.2**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4.4 Gallery Place-Chinatown East Entrance

At the Gallery Place-Chinatown Station east entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 50 percent or passengers waiting on the Red-Glenmont platform, 33 percent of passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Green/Yellow platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and three trains would serve each Green/Yellow track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 171 on the Glenmont platform, 185 on the Shady Grove platform, and 847 on the Green/Yellow platform. Four at-capacity eight-car trains (one on each track) could hold up to 3,840 passengers. Using the same assumption as waiting passengers, this would result in approximately 960 passengers on Green/Yellow trains, 480 passengers on the Red-Glenmont trains, and 320 passengers on Red-Shady Grove trains using this station entrance to exit (see table B5-32).

Table B5-32: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	402	Passengers	WMATA
12	1/3 Waiting Shady Grove	433	Passengers	WMATA
13	1/2 Waiting Green/Yellow	992	Passengers	WMATA
14	Peak Headway (Red)	2.5	Minutes	WMATA
15	Peak Headway (Green/Yellow)	4	Minutes	WMATA
16	Trains per 15-Minutes (Red)	6	Trains	= 15 / #14
17	Trains per 15-Minutes (Green/Yellow)	3	Trains	= 15 / #15
18	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #16
19	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #16
20	1/2 Waiting Green/Yellow per Train	331	Passengers	= #13 / #17
21	Adjusted 1/2 Waiting Glenmont per Train	171	Passengers	= #18 x #4 x #5
22	Adjusted 1/3 Waiting Shady Grove per Train	185	Passengers	= #19 x #4 x #5
23	Adjusted 1/2 Waiting Green/Yellow per Train	847	Passengers	= #20 x #4 x #5

# *	Ridership or Assumption	Amount	Unit	Source/Formula
24	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
25	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3
26	1/2 Total on Green/Yellow Trains	960	Passengers	= (8 x #1) / 2

* Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-33. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per Red platform, while four platform-to-platform escalators and one stair would be usable between the Green/Yellow platform and the Red-Glenmont platform. This results in a waiting time of approximately 4.2 minutes on the Green/Yellow platform, 27.8 minutes on the Glenmont platform and 4.7 minutes on the Shady Grove platform. Combined with a maximum walking time of 2.2 minutes between the midpoint of the Red platforms and the Red platform-to-mezzanine escalators, this would result in a maximum platform clearance time of approximately 30.0 minutes for all three platforms combined.

To reach a point of safety, it would take an additional 3.7 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-platform escalators and stair, and platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 33.7 minutes.

Table B5-33: NFPA 130 Analysis Details for Gallery Place-Chinatown East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Green/Yellow Platform to Red Platform Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	1	5.0	19	95
Escalators	4	4.0	19	304
Total				**399**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	11		50	550

Service Gate	2		75	150	
Total				**775**	
Mezzanine to Street Capacity					
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**	
Stairs	1	5.0	19	95	
Escalators	3	4.0	19	228	
Total				**323**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		56	124	0.5	0.5*
Platform/Platform Vertical		30	48	0.6	1.1*
Platform/Platform Vertical to Platform/Mezzanine Vertical		29	124	0.2	1.3*
Red Platform to Platform/Mezzanine Vertical		272	124	2.2	2.2
Red Platform/Mezzanine Vertical		30	48	0.6	2.8
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	3.8
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	5.1
Mezzanine/Street Vertical		40	48	0.8	5.9
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Platform/Mezzanine Vertical		2	124	0.0	0.7
Red Platform to Platform/Mezzanine Vertical		36	124	0.3	1.0**
Red Platform/Mezzanine Vertical		30	48	0.6	1.3
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	2.4
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.6
Mezzanine/Street Vertical		40	48	0.8	4.4
Waiting Time					

	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Green/Yellow	0.4	148	1,659	399	4.2	4.2***
Platform/Mezzanine Vertical Glenmont	4.5	344	2,114	76	27.8	27.8
Platform/Mezzanine Vertical Shady Grove	1.9	145	360	76	4.7	4.7***
Fare Aisles	29.3	22,699	0	775	0.0	27.8
Mezzanine/Street Vertical	29.3	9,460	0	323	0.0	27.8
Platform Clearance Time	**30.0**					
Point of Safety Time	**33.7**					

*Amount not included in cumulative total because Red Platform to Platform/Mezzanine Vertical walking time was higher.
**Amount not included in cumulative total because Green/Yellow Platform to Red Platform/Mezzanine Vertical walking time is lower.
***Amount not included in cumulative total because Glenmont Platform/Mezzanine Vertical Element wait time is longer.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4.5 Metro Center South Entrance

At the Metro Center Station south entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 33 percent or passengers waiting on the Red-Glenmont platform, no passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Blue/Orange/Silver platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and six trains would serve each Blue/Orange/Silver track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 208 on the Glenmont platform, and 433 on the Blue/Orange/Silver platform. Three at-capacity eight-car trains (one on the Red-Glenmont track and one on each track Blue/Orange/Silver track) could hold up to 2,880 passengers. Using the same assumptions as waiting passengers, this would result in approximately 960 passengers on Blue/Orange/Silver trains, and 320 passengers on the Red-Glenmont trains using this station entrance to exit (see table B5-34).

Table B5-34: NFPA 130 Ridership Assumptions at Metro Center South Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	487	Passengers	WMATA
12	1/2 Waiting Blue/Orange/Silver	1,015	Passengers	WMATA

# *	Ridership or Assumption	Amount	Unit	Source/Formula
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Peak Headway (Blue/Orange/Silver)	2.5	Minutes	WMATA
15	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
16	Trains per 15-Minutes (Blue/Orange/Silver)	6	Trains	= 15 / #14
17	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #15
18	1/2 Waiting Blue/Orange/Silver per Train	169	Passengers	= #12 / 16
19	Adjusted 1/3 Waiting Glenmont per Train	208	Passengers	= #17 x #4 x #5
20	Adjusted 1/2 Waiting Blue/Orange/Silver per Train	433	Passengers	= #18 x #4 x #5
21	1/3 Total on Glenmont Train	320	Passengers	= (8 x #1) / 3
22	1/2 Total on Blue/Orange/Silver Trains	960	Passengers	= (8 x #1 x 2) / 2

* Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-35. Following NFPA 130 standards, only two platform-to-platform escalators and three stairs (in a single set) would be usable between the Blue/Orange/Silver platform and the Red-Glenmont platform. This results in a waiting time of approximately 2.3 minutes on the Blue/Orange/Silver platform. Combined with a maximum walking time of 1.0 minute between the midpoint of the Blue/Orange/Silver platform and the platform-to-platform escalators and stair, this would result in a Blue/Orange Silver platform clearance time of approximately 3.3 minutes. Since there is no mezzanine level at this entrance, passengers exiting from the Red-Glenmont platform can proceed directly to the fare aisles.

To reach a point of safety, it would take an additional 4.2 minutes of walking time for passengers to walk up the platform-to-platform escalators or stair, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a 9.1-minute waiting time at the mezzanine-to-street escalators, since only two would be usable. Overall, the total time to reach a point of safety would be approximately 16.5 minutes.

Table B5-35: NFPA 130 Analysis Details for Metro Center South Entrance

B/O/S Platform to Red Platform Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	3	5.0	19	285
Escalators	2	4.0	19	152
Total				**437**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**
Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min

Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		120	124	1.0	1.0
Platform/Platform Vertical		30	48	0.6	1.6
Platform/Platform Vertical to Fare Aisles		240	124	1.9	3.5
Red Platform to Fare Aisles		280	124	2.3	2.3*
Fare Aisles to Mezzanine/Street Vertical		100	124	0.8	4.3
Mezzanine/Street Vertical		40	48	0.8	5.2

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Fare Aisles		143	124	1.2	1.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.1
Mezzanine/Street Vertical		40	48	0.8	3.9

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Platform Vertical B/O/S	0.9	388	1,005	437	2.3	2.3
Fare Aisles	4.0	2,084	0	525	0.0	2.3
Mezzanine Vertical	3.6	542	1,379	152	9.1	11.4
Lower Platform Clearance Time	**3.3**					
Point of Safety Time	**16.5**					

*Amount not included in cumulative total because Lower Platform to Fare Aisles walking time was higher.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.4.6 Metro Center East Entrance

At the Metro Center east entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Considering the layout of the station, it is assumed that no passengers waiting for Blue, Orange, or Silver Line trains, 33 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 208 on the Glenmont platform and 210 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance would be 320 per Red platform (see table B5-36).

Table B5-36: NFPA 130 Ridership Assumptions at Metro Center East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	487	Passengers	WMATA
12	1/3 Waiting Shady Grove	493	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
15	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	82	Passengers	= #12 / #14
17	Adjusted 1/3 Waiting Glenmont per Train	208	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Waiting Shady Grove per Train	210	Passengers	= #16 x #4 x #5
19	1/3 Total on Glenmont Trains	320	Passengers	= (8 x #1) / 3
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

* Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-37. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 5.9 minutes on the Glenmont platform and 5.9 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.2 minutes between the midpoint of each Red platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 7.1 minutes.

To reach a point of safety, it would take an additional 3.2 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 10.3 minutes.

Table B5-37: NFPA 130 Analysis Details for Metro Center East Entrance

Glenmont to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Shady Grove to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	2		75	150	
Total				**525**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		145	124	1.2	1.2
Red Platform/Mezzanine Vertical		30	48	0.6	1.8
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	3.1
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	3.5
Mezzanine/Street Vertical		40	48	0.8	4.4
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes

Red Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Red Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	2.0
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	2.4
Mezzanine/Street Vertical		40	48	0.8	3.3

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.1	83	445	76	5.9	5.9
Platform/Mezzanine Vertical Shady Grove	1.1	83	448	76	5.9	5.9
Fare Aisles	7.0	3,664	0	525	0.0	5.9
Mezzanine/Street Vertical	7.0	1,061	0	152	0.0	5.9
Platform Clearance Time	**7.1**					
Point of Safety Time	**10.3**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5 RFDS 2 Build Condition NFPA 130 Evacuation Analysis

B5.5.1 Archives-Navy Memorial

At Archives-Navy Memorial Station, the peak entry period was between 5:00 PM and 5:15 PM, when 676 passengers would enter the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 577. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario would be 2,497 (see table B5-38).

Table B5-38: NFPA 130 Ridership Assumptions at Archives-Navy Memorial Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	676	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	Trains	= 15 / #13
15	Entries per Train	225	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	577	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= #16
19	Adjusted Total Passengers per Train	2,497	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-39. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable, resulting in a waiting time of approximately 29.6 minutes. Combined with a maximum walking time of 3.3 minutes between the farthest end of the platform and the platform-to-mezzanine escalator, this would result in a platform clearance time of approximately 32.9 minutes.

To reach a point of safety, it would take an additional 3.4 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 36.2 minutes.

Table B5-39: NFPA 130 Analysis Details for Archives-Navy Memorial Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total Platform to Mezzanine Capacity				**76**

Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	1		75	75
Total Fare Aisle Capacity				**450**

Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total Mezzanine to Street Capacity				**152**

Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		408	124	3.3	3.3
Platform/Mezzanine Vertical		30	48	0.6	3.9
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	4.8
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	5.9
Mezzanine/Street Vertical		40	48	0.8	6.7

Walking Time for First Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Minutes	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		110	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		130	124	1.0	2.6
Mezzanine/Street Vertical		40	48	0.8	3.5

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Minutes	Cumulative Minutes
Platform/Mezzanine Vertical	3.3	250	2,247	76	29.6	29.6
Fare Aisles	32.8	14,749	0	450	0.0	29.6
Mezzanine/Street Vertical	32.8	4,982	0	152	0.0	29.6
Platform Clearance Time	**32.9**					

Point of Safety Time	36.2

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5.2 Federal Triangle

At Federal Triangle Station, the peak entry period was between 5:00 PM and 5:15 PM, when 646 passengers would enter the station. Based on a peak headway of 2.5 minutes, six trains would serve the station during the peak 15-minute period on each track. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 276. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who would need to evacuate the station in a worst-case scenario would be 2,196 (see table B5-40).

Table B5-40: NFPA 130 Ridership Assumptions at Federal Triangle Station

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	15-Minute Entries	646	Passengers	WMATA
12	15-Minute Exits	-	Passengers	WMATA
13	Peak Headway	3	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	Entries per Train	108	Passengers	= #11 / #14
16	Exits per Train	1,920	Passengers	= 8 x 2 x #1
17	Adjusted Entries per Train	276	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	1,920	Passengers	= # 16
19	Adjusted Total Passengers per Train	2,196	Passengers	= #17 + #18

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-41. Following NFPA 130 standards, only two platform-to-mezzanine escalators would be usable, resulting in a waiting time of approximately 12.9 minutes. Combined with a maximum walking time of 1.6 minutes between the farthest end of the platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 14.4 minutes.

To reach a point of safety, it would take an additional 3.5 minutes of walking time for passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a brief, 0.1-minute waiting time at the mezzanine-to-street escalators. The lack of significant additional waiting time results from the long waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 18.1 minutes.

Table B5-41: NFPA 130 Analysis Details for Federal Triangle Station

Platform to Mezzanine Capacity

	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**
Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	4.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		195	124	1.6	1.6
Platform/Mezzanine Vertical		30	48	0.6	2.2
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	2.5
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	3.9
Mezzanine/Street Vertical		60	48	1.3	5.1
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		38	124	0.3	1.0
Fare Aisles to Mezzanine/Street Vertical		171	124	1.4	2.4
Mezzanine/Street Vertical		60	48	1.3	3.6

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes

Platform/Mezzanine Vertical	1.6	239	1,957	152	12.9	12.9
Fare Aisles	14.4	7,541	0	525	0.0	12.9
Mezzanine/Street Vertical	14.4	2,183	12	152	0.1	13.0
Platform Clearance Time	**14.4**					
Point of Safety Time	**18.1**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5.3 Gallery Place-Chinatown West Entrance

At the Gallery Place-Chinatown Station west entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Based on the layout of the station, it is assumed that no passengers waiting for Green or Yellow Line trains, 50 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 171 on the Glenmont platform and 184 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance would be 480 per platform (see table B5-42).

Table B5-42: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown West Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	401	Passengers	WMATA
12	1/3 Waiting Shady Grove	431	Passengers	WMATA
13	Peak Headway	2.5	Minutes	WMATA
14	Trains per 15-Minutes	6	Trains	= 15 / #13
15	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #14
17	Adjusted 1/2 Wait Glenmont per Train	171	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Wait Shady Grove per Train	184	Passengers	= #16 x #4 x #5
19	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
20	1/3 Total on Shady Grove Trains	480	Passengers	= (8 x #1) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-43. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 7.2 minutes on the

Glenmont platform and 5.3 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.4 minutes between the midpoint of the Red platforms and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 8.6 minutes.

To reach a point of safety, it would take an additional 3.6 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 12.2 minutes.

Table B5-43: NFPA 130 Analysis Details for Gallery Place-Chinatown West Entrance

Glenmont to Mezzanine Capacity					
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Shady Grove to Mezzanine Capacity					
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Fare Aisle Capacity					
	#		**Pax/Min/Aisle**	**Pax/Min**	
ADA Aisle	1		75	75	
Regular Aisle	4		50	200	
Service Gate	2		75	150	
Total				**425**	
Mezzanine to Street Capacity					
	#	**Width (Feet)**	**Pax/Foot/Min**	**Pax/Min**	
Stairs	0	4.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Red Platform to Platform/Mezzanine Vertical		170	124	1.4	1.4
Red Platform/Mezzanine Vertical		30	48	0.6	2.0

Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	2.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	4.1
Mezzanine/Street Vertical		40	48	0.8	5.0
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		115	124	0.9	1.6
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	2.8
Mezzanine/Street Vertical		40	48	0.8	3.7

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical Glenmont	1.4	104	547	76	7.2	7.2
Platform/Mezzanine Vertical Shady Grove	1.4	104	400	76	5.3	5.3
Fare Aisles	8.5	3,607	0	425	0.0	7.2
Mezzanine/Street Vertical	8.5	1,290	0	152	0.0	7.2
Platform Clearance Time	**8.6**					
Point of Safety Time	**12.2**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5.4 Gallery Place-Chinatown East Entrance

At the Gallery Place-Chinatown Station east entrance, the peak entry and transfer period was between 5:00 PM and 5:15 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Green/Yellow platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Green and Yellow Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 50 percent or passengers waiting on the Red-Glenmont platform, 33 percent of passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Green/Yellow platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and three trains would serve each Green/Yellow track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 171 on the Glenmont platform, 184 on the Shady Grove platform, and 846 on the Green/Yellow platform. Four at-capacity eight-car trains (one on each track) could hold up to 3,840 passengers. Using the same assumption as waiting passengers, this would result in approximately 960 passengers on Green/Yellow trains, 480 passengers on the Red-Glenmont trains, and 320 passengers on Red-Shady Grove trains using this station entrance to exit (see table B5-44).

Table B5-44: NFPA 130 Ridership Assumptions at Gallery Place-Chinatown East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/2 Waiting Glenmont	401	Passengers	WMATA
12	1/3 Waiting Shady Grove	431	Passengers	WMATA
13	1/2 Waiting Green/Yellow	992	Passengers	WMATA
14	Peak Headway (Red)	2.5	Minutes	WMATA
15	Peak Headway (Green/Yellow)	4	Minutes	WMATA
16	Trains per 15-Minutes (Red)	6	Trains	= 15 / #14
17	Trains per 15-Minutes (Green/Yellow)	3	Trains	= 15 / #15
18	1/2 Waiting Glenmont per Train	67	Passengers	= #11 / #16
19	1/3 Waiting Shady Grove per Train	72	Passengers	= #12 / #16
20	1/2 Waiting Green/Yellow per Train	331	Passengers	= #13 / #17
21	Adjusted 1/2 Waiting Glenmont per Train	171	Passengers	= #18 x #4 x #5
22	Adjusted 1/3 Waiting Shady Grove per Train	184	Passengers	= #19 x #4 x #5
23	Adjusted 1/2 Waiting Green/Yellow per Train	846	Passengers	= #20 x #4 x #5
24	1/2 Total on Glenmont Trains	480	Passengers	= (8 x #1) / 2
25	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3
26	1/2 Total on Green/Yellow Trains	960	Passengers	= (8 x #1) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-45. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per Red platform, while four platform-to-platform escalators and one stair would be usable between the Green/Yellow platform and the Red-Glenmont platform. This results in a waiting time of approximately 4.2 minutes on the Green/Yellow platform, 27.8 minutes on the Glenmont platform, and 4.7 minutes on the Shady Grove platform. Combined with a maximum walking time of 2.2 minutes between the midpoint of the Red platforms and the Red platform-to-mezzanine escalators, this would result in a maximum platform clearance time of approximately 30.0 minutes for all three platforms combined.

To reach a point of safety, it would take an additional 3.7 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-platform escalators and stair, and platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety would be approximately 33.7 minutes.

Table B5-45: NFPA 130 Analysis Details for Gallery Place-Chinatown East Entrance

Glenmont to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Shady Grove to Mezzanine Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	1	4.0	19	76	
Total				**76**	
Green/Yellow Platform to Red Platform Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	1	5.0	19	95	
Escalators	4	4.0	19	304	
Total				**399**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	11		50	550	
Service Gate	2		75	150	
Total				**775**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	1	5.0	19	95	
Escalators	3	4.0	19	228	
Total				**323**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Platform Vertical		56	124	0.5	0.5*
Platform/Platform Vertical		30	48	0.6	1.1*
Platform/Platform Vertical to Platform/Mezzanine Vertical		29	124	0.2	1.3*
Red Platform to Platform/Mezzanine Vertical		272	124	2.2	2.2

Red Platform/Mezzanine Vertical		30	48	0.6	2.8
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	3.8
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	5.1
Mezzanine/Street Vertical		40	48	0.8	5.9
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	**Feet/Min**	**Min**	**Cumulative Minutes**
Platform to Platform/Platform Vertical		10	124	0.1	0.1
Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Platform/Mezzanine Vertical		2	124	0.0	0.7
Red Platform to Platform/Mezzanine Vertical		36	124	0.3	1.0**
Red Platform/Mezzanine Vertical		30	48	0.6	1.3
Platform/Mezzanine Vertical to Fare Aisles		127	124	1.0	2.4
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.6
Mezzanine/Street Vertical		40	48	0.8	4.4

Waiting Time						
	Time to Clear (Min)	**Pax Cleared**	**Additional Pax to Clear**	**Pax/Min**	**Min**	**Cumulative Minutes**
Platform/Mezzanine Vertical Green/Yellow	0.4	148	1,658	399	4.2	4.2***
Platform/Mezzanine Vertical Glenmont	4.5	344	2,113	76	27.8	27.8
Platform/Mezzanine Vertical Shady Grove	1.9	145	359	76	4.7	4.7***
Fare Aisles	29.3	22,689	0	775	0.0	27.8
Mezzanine/Street Vertical	29.3	9,456	0	323	0.0	27.8
Platform Clearance Time	**30.0**					
Point of Safety Time	**33.7**					

*Amount not included in cumulative total because Red Platform to Platform/Mezzanine Vertical walking time was higher.
**Amount not included in cumulative total because Green/Yellow Platform to Red Platform/Mezzanine Vertical walking time is lower.
***Amount not included in cumulative total because Glenmont Platform/Mezzanine Vertical Element wait time is longer.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type

Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5.5 Metro Center South Entrance

At the Metro Center Station south entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011). It was assumed that 33 percent or passengers waiting on the Red-Glenmont platform, no passengers waiting on the Red-Shady Grove platform, and 50 percent of passengers waiting on the Blue/Orange/Silver platform would use this station entrance to exit, given the layout of the station.

Based on peak headways, six trains would serve each Red platform and six trains would serve each Blue/Orange/Silver track during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 208 on the Glenmont platform, and 432 on the Blue/Orange/Silver platform. Three at-capacity eight-car trains (one on the Red-Glenmont track and one on each track Blue/Orange/Silver track) could hold up to 2,880 passengers. Using the same assumptions as waiting passengers, this would result in approximately 960 passengers on Blue/Orange/Silver trains, and 320 passengers on the Red-Glenmont trains using this station entrance to exit (see table B5-46).

Table B5-46: NFPA 130 Ridership Assumptions at Metro Center South Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	487	Passengers	WMATA
12	1/2 Waiting Blue/Orange/Silver	1,013	Passengers	WMATA
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Peak Headway (Blue/Orange/Silver)	2.5	Minutes	WMATA
15	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
16	Trains per 15-Minutes (Blue/Orange/Silver)	6	Trains	= 15 / #14
17	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #15
18	1/2 Waiting Blue/Orange/Silver per Train	169	Passengers	= #12 / 16
19	Adjusted 1/3 Waiting Glenmont per Train	208	Passengers	= #17 x #4 x #5
20	Adjusted 1/2 Waiting Blue/Orange/Silver per Train	432	Passengers	= #18 x #4 x #5
21	1/3 Total on Glenmont Train	320	Passengers	= (8 x #1) / 3
22	1/2 Total on Blue/Orange/Silver Trains	960	Passengers	= (8 x #1 x 2) / 2

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-47. Following NFPA 130 standards, only two platform-to-platform escalators and three stairs (in a single set) would be usable between the Blue/Orange/Silver platform and the Red-Glenmont platform. This results in a waiting time of approximately 2.3 minutes on the Blue/Orange/Silver platform. Combined with a maximum walking time of 1.0 minute between the midpoint of the Blue/Orange/Silver platform and the platform-to-platform escalators and stair, this would result in a Blue/Orange Silver platform clearance time of approximately 3.3 minutes. Since there is no mezzanine level at this entrance, passengers exiting from the Red-Glenmont platform can proceed directly to the fare aisles.

To reach a point of safety, it would take an additional 4.2 minutes of walking time for passengers to walk up the platform-to-platform escalators or stair, through the fare aisles, and up the mezzanine-to-street escalators to the street level. There would be no additional waiting time at the fare aisles however there would be a 9.1-minute waiting time at the mezzanine-to-street escalators, since only two would be usable. Overall, the total time to reach a point of safety would be approximately 16.5 minutes.

Table B5-47: NFPA 130 Analysis Details for Metro Center South Entrance

B/O/S Platform to Red Platform Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	3	5.0	19	285	
Escalators	2	4.0	19	152	
Total				**437**	
Fare Aisle Capacity					
	#		Pax/Min/Aisle	Pax/Min	
ADA Aisle	1		75	75	
Regular Aisle	6		50	300	
Service Gate	2		75	150	
Total				**525**	
Mezzanine to Street Capacity					
	#	Width (Feet)	Pax/Foot/Min	Pax/Min	
Stairs	0	5.0	19	0	
Escalators	2	4.0	19	152	
Total				**152**	
Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		120	124	1.0	1.0
Platform/Platform Vertical		30	48	0.6	1.6
Platform/Platform Vertical to Fare Aisles		240	124	1.9	3.5
Red Platform to Fare Aisles		280	124	2.3	2.3*
Fare Aisles to Mezzanine/Street Vertical		100	124	0.8	4.3
Mezzanine/Street Vertical		40	48	0.8	5.2
Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Lower Platform to Platform/Platform Vertical		10	124	0.1	0.1

Platform/Platform Vertical		30	48	0.6	0.7
Platform/Platform Vertical to Fare Aisles		143	124	1.2	1.9
Fare Aisles to Mezzanine/Street Vertical		150	124	1.2	3.1
Mezzanine/Street Vertical		40	48	0.8	3.9

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Platform Vertical B/O/S	0.9	388	1,004	437	2.3	2.3
Fare Aisles	4.0	2,083	0	525	0.0	2.3
Mezzanine Vertical	3.6	542	1,378	152	9.1	11.4
Lower Platform Clearance Time	**3.3**					
Point of Safety Time	**16.5**					

*Amount not included in cumulative total because Lower Platform to Fare Aisles walking time was higher.
Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.5.6 Metro Center East Entrance

At the Metro Center east entrance, the peak entry and transfer period was between 5:30 PM and 5:45 PM. To calculate the number of passengers waiting for trains that would exit at this location, entry totals at this station entrance were assigned to either the Blue/Orange/Silver platform, the Red-Glenmont platform or the Red-Shady Grove platform based on the destination station. Transfers from the Blue, Orange and Silver Lines to each Red Line direction were calculated using totals from the *Gallery Place-Chinatown Station Capacity Improvements Phase 2 Study* (WMATA 2011).

Based on peak headways, six trains would serve each Red platform during the peak 15-minute period. Considering the layout of the station, it is assumed that no passengers waiting for Blue, Orange, or Silver Line trains, 33 percent of passengers waiting for Glenmont trains and 33 percent of passengers waiting for Shady Grove trains would use this station entrance to exit. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be 208 on the Glenmont platform and 210 on the Shady Grove platform. Two at-capacity eight-car trains could hold up to 1,920 passengers, and therefore the total number of passengers who are assumed would evacuate using this station entrance would be 320 per Red platform (see table B5-48).

Table B5-48: NFPA 130 Ridership Assumptions at Metro Center East Entrance

# *	Ridership or Assumption	Amount	Unit	Source/Formula
11	1/3 Waiting Glenmont	487	Passengers	WMATA
12	1/3 Waiting Shady Grove	493	Passengers	WMATA

# *	Ridership or Assumption	Amount	Unit	Source/Formula
13	Peak Headway (Red)	2.5	Minutes	WMATA
14	Trains per 15-Minutes (Red)	6	Trains	= 15 / #13
15	1/3 Waiting Glenmont per Train	81	Passengers	= #11 / #14
16	1/3 Waiting Shady Grove per Train	82	Passengers	= #12 / #14
17	Adjusted 1/3 Waiting Glenmont per Train	208	Passengers	= #15 x #4 x #5
18	Adjusted 1/3 Waiting Shady Grove per Train	210	Passengers	= #16 x #4 x #5
19	1/3 Total on Glenmont Trains	320	Passengers	= (8 x #1) / 3
20	1/3 Total on Shady Grove Trains	320	Passengers	= (8 x #1) / 3

*Table continued from table B5-1.

The full NFPA 130 analysis is detailed in table B5-49. Following NFPA 130 standards, only one platform-to-mezzanine escalator would be usable per platform, resulting in a waiting time of approximately 5.9 minutes on the Glenmont platform and 5.9 minutes on the Shady Grove platform. Combined with a maximum walking time of 1.2 minutes between the midpoint of each Red platform and the platform-to-mezzanine escalators, this would result in a platform clearance time of approximately 7.1 minutes.

To reach a point of safety, it would take an additional 3.2 minutes of walking time for all passengers to walk up the platform-to-mezzanine escalators, through the fare aisles, and up the mezzanine-to-street escalators to the street. There would be no additional waiting time at the fare aisles or the mezzanine-to-street escalators. The lack of additional waiting time results from the waiting time at the platform-to-mezzanine escalators, which spreads out passenger arrivals at the fare aisles and street-to-mezzanine escalators. Overall, the total time to reach a point of safety is approximately 10.2 minutes.

Table B5-49: NFPA 130 Analysis Details for Metro Center East Entrance

Glenmont to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Shady Grove to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	1	4.0	19	76
Total				**76**
Fare Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	6		50	300
Service Gate	2		75	150
Total				**525**

Mezzanine to Street Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	0	5.0	19	0
Escalators	2	4.0	19	152
Total				**152**

Walking Time for Last Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		145	124	1.2	1.2
Red Platform/Mezzanine Vertical		30	48	0.6	1.8
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	3.1
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	3.5
Mezzanine/Street Vertical		40	48	0.8	4.4

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Red Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Red Platform/Mezzanine Vertical		30	48	0.6	0.7
Platform/Mezzanine Vertical to Fare Aisles		157	124	1.3	2.0
Fare Aisles to Mezzanine/Street Vertical		58	124	0.5	2.4
Mezzanine/Street Vertical		40	48	0.8	3.3

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical Glenmont	1.1	83	445	76	5.9	5.9
Platform/Mezzanine Vertical Shady Grove	1.1	83	447	76	5.9	5.9
Fare Aisles	7.0	3,662	0	525	0.0	5.9
Mezzanine/Street Vertical	7.0	1,060	0	152	0.0	5.9
Platform Clearance Time	**7.1**					
Point of Safety Time	**10.2**					

Note: pax = passengers, ft = feet, min = minutes
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)

Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

B5.6 References

Transportation Research Board (TRB)

2013 Transit Capacity and Quality of Service Manual, 3rd Edition. Transportation Research Board for the National Academies of Science. Available online at: http://www.trb.org/main/blurbs/169437.aspx, accessed December 19, 2014.

Washington Metropolitan Area Transportation Authority (WMATA)

2011 WMATA Gallery Place-Chinatown Station Capacity Improvement Study. Received on January 22, 2015.

2012 Naylor Road Station Access and Capacity Study. Available online at: https://www.wmata.com/pdfs/planning/Naylor%20Road%20Metro%20Station%20Area%20Access%20and%20Capacity%20Study%20Final%20Report.pdf, accessed January 9, 2015.

2014a Weekday Metrorail Faregate Data, March 2014. Received August 4, 2014.

2014b Metrorail Frequency. Available online at: http://www.wmata.com/rail/frequency.cfm, accessed August 8, 2014.

Site Visits

1. Station Site Inventories by FourSquare in November 2014.

Appendix B6

Bus Stop ADA Compliance and Amenities

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

B6 Bus Stop ADA Compliance and Amenities

Table B6-1 summarizes ADA elements and amenities at each stop within the study area.

Table B6-1: Study Area Bus Stop Details

Stop ID	Stop Name	5-Foot by 8-Foot Loading Area?	Stop Amenities	Other Shuttle?	4-Foot Access to Stop
1000901	12TH ST / CONSTITUTION AVE	No		MTA	No
1003571	12TH ST / CONSTITUTION AVE	Yes	Bus Stop Sign, Newspaper Boxes		Yes
1003263	CONSTITUTION AVE NW / 12TH ST NW	Yes	Bus Stop Sign		Yes
1000859	CONSTITUTION AVE / 14TH ST	Yes	Bus Stop Sign, Bench, Trash Can, Braille Sign, Recycling Can	MTA	Yes
1002973	14TH ST NW / D ST NW	No	Bus Stop Sign, Lamp Post	LCT	No
1000956	14TH ST / D ST	Yes	Bus Stop Sign, Bus Schedules		Yes
1000993	PENNSYLVANIA AVE NW / 14TH ST NW	Yes	Bus Stop Sign, Bus Schedules		Yes
1000985	PENNSYLVANIA AVE NW / 14TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can		Yes
1000981	PENNSYLVANIA AVE NW / 12TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, RTPI (real-time information display), Newspaper Boxes	MTA	Yes
1000976	PENNSYLVANIA AVE NW / 13TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, RTPI	MTA	Yes
1003691	10TH ST NW / PENNSYLVANIA AVE NW	No	Bus Stop Sign		Yes
1003432	10TH ST / CONSTITUTION AVE (S2 S4 ONLY)	Yes	Shelter, Bus Stop Sign, Bench, Bus Schedules	MTA	Yes
1003570	10TH ST / CONSTITUTION AVE (63 & 64 ONLY)	Yes	Shelter, Bus Stop Sign, Bench, Area or System Map		Yes
1003262	CONSTITUTION AVE NW / 10TH ST NW	Yes	Bus Stop Sign, Bus Schedules, Braille Sign	MTA	Yes
1000857	CONSTITUTION AVE NW / 12TH ST NW	No	Bus Stop Sign, Bench, Trash Can, Bus Schedules, Recycling Can	PRTC	Yes
1000854	CONSTITUTION AVE / 10TH ST	Yes	Bus Stop Sign, Bench, Trash Can, Bike Racks, Recycling Can	MTA	Yes
1003288	10TH ST NW / PENNSYLVANIA AVE NW	No	Shelter, Bus Stop Sign, Bench		No

Stop ID	Stop Name	5-Foot by 8-Foot Loading Area?	Stop Amenities	Other Shuttle?	4-Foot Access to Stop
1003287	10TH ST / PENNSYLVANIA AVE NW	Yes	Shelter, Bus Stop Sign, Bench, Area or System Map, Bus Schedules, Braille Sign		Yes
1000944	PENNSYLVANIA AVE / 10TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Area or System Map	PRTC stop 1423, MTA	Yes
1000948	PENNSYLVANIA AVE / 10TH ST NW	Yes	Bus Stop Sign	MTA	Yes
1000958	PENNSYLVANIA AVE NW / 11TH ST NW	Yes	Bus Stop Sign	MTA	Yes
1000886	9TH ST / CONSTITUTION AVE	Yes	Bus Stop Sign, Trash Can, Bus Schedules		Yes
1003265	CONSTITUTION AVE NW / 9TH ST NW	Yes	Bus Stop Sign, Braille Sign	MTA	No
1000853	CONSTITUTION AVE NW / 9TH ST NW	No	Bus Stop Sign	MTA	No
1000846	7TH ST NW / CONSTITUTION AVE NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Bus Schedules		Yes
1000850	CONSTITUTION AVE NW / 7TH ST NW	No	Bus Stop Sign	PRTC	No
1000880	7TH ST / CONSTITUTION AVE NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Bus Schedules	MTA	Yes
1000867	CONSTITUTION AVE NW / 7TH ST NW	Yes	Bus Stop Sign, Bus Schedules, Braille Sign		Yes
1003264	CONSTITUTION AVE / 6TH ST	Yes	Bus Stop Sign, Trash Can		Yes
1000866	CONSTITUTION AVE / 6TH ST	Yes	Bus Stop Sign, Trash Can		Yes
1000863	CONSTITUTION AVE / 3RD ST	Yes	Bus Stop Sign, Braille Sign		Yes
1003283	PENNSYLVANIA AVE / CONSTITUTION AVE	Yes	Bus Schedules	PRTC, MTA	Yes
1000879	PENNSYLVANIA AVE / CONSTITUTION AVE	Yes	Bus Stop Sign	MTA	Yes
1000849	CONSTITUTION AVE / 3RD ST	Yes	Bus Stop Sign, Bus Schedules		Yes
1000889	PENNSYLVANIA AVE NW / 6TH ST NW	Yes	Bus Stop Sign	PRTC stop 1425, MTA	Yes
1000930	7TH ST / PENNSYLVANIA AVE	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, RTPI, Area or System Map, Bus Schedules, Circulator Fare Machine*		Yes

Stop ID	Stop Name	5-Foot by 8-Foot Loading Area?	Stop Amenities	Other Shuttle?	4-Foot Access to Stop
1000928	7TH ST / PENNSYLVANIA AVE	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Newspaper Boxes, Area or System Map, Bus Schedules		Yes
1003398	PENNSYLVANIA AVE NW / 7TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Bus Schedules	PRTC, MTA	Yes
1003033	PENNSYLVANIA AVE NW / 7TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, RTPI, Newspaper Boxes, Area or System Map, Bus Schedules, Braille Sign		Yes
1003763	PENNSYLVANIA AVE BETW 7TH & 9TH STS NW	Yes	Bus Stop Sign	Big Bus (tourist)	Yes
1000995	7TH ST / E ST	No	Bus Stop Sign, Trash Can, Newspaper Boxes, Bus Schedules		Yes
1001003	E ST NW / 7TH ST NW	Yes	Bus Stop Sign		Yes
1001011	E ST NW / 7TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Area or System Map, Bus Schedules		Yes
1001019	7TH ST / E ST	No	Shelter, Bus Stop Sign, Bench, Trash Can, Area or System Map, Bus Schedules		Yes
1000997	E ST NW / 8TH ST NW	Yes	Bus Stop Sign, Trash Can, Bus Schedules		Yes
1001014	E ST NW / 9TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Area or System Map		Yes
1001012	E ST NW / 10TH ST NW	Yes	Bus Stop Sign, Trash Can, Newspaper Boxes, Bus Schedules, Mailbox		Yes
1001004	E ST NW / 10TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Area or System Map, Bus Schedules		No
1000991	11TH ST NW / E ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Newspaper Boxes, Area or System Map, Bus Schedules	PRTC	Yes
1001005	E ST NW / 11TH ST NW	Yes	Bus Stop Sign, Trash Can, Bus Schedules, Recycling Can		Yes
1001018	11TH ST NW / E ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Newspaper Boxes, Area or System Map, Bus Schedules	PRTC stop 1422, MTA	Yes

Stop ID	Stop Name	5-Foot by 8-Foot Loading Area?	Stop Amenities	Other Shuttle?	4-Foot Access to Stop
1003203	E ST NW / 11TH ST NW	Yes	Bus Stop Sign, Trash Can, Recycling Can		Yes
1001055	9TH ST NW / F ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Circulator Fare Machine		Yes
1001084	9TH ST NW / G ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Newspaper Boxes, Area or System Map, Bus Schedules, Recycling Can		Yes
1001103	H ST NW / 9TH ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, RTPI, Area or System Map		Yes
1001134	9TH ST NW / H ST NW	Yes	Shelter, Bus Stop Sign, Bench, Trash Can, Recycling Can		Yes
1003727	H ST NW / 9TH ST NW	Yes	Bus Stop Sign		Yes
1000910	10TH ST / CONSTITUTION AVE	Yes	Shelter, Bench		Yes

*Circulator Fare Machine – This is an odd machine that the team has not seen elsewhere. The machine says it sells Circulator fares, but it is not clear if the machine works.
Notes: RTPI = real-time information display, MTA = Maryland Transit Administration, LCT = Loudoun County Transit, PRTC = Potomac-Rappahannock Transit Commission or OmniRide buses.
Source: FourSquare Site Visit on 2/12/15.

Appendix B7

Metrobus Capacity Analysis Details

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

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B7 Metrobus Capacity Analysis Details

Note that the capacity analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

B7.1 Existing Condition Bus Capacity Analysis Details

Table B7-1 details the full bus capacity analysis by route and direction. Despite capacity issues present at various locations and trips on certain routes, overall there are no capacity issues on any route within the study area during either peak hour.

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Table B7-1: Existing Condition Bus Capacity Analysis Details

Route / Direction	Existing (2014)											
	AM Peak Hour Trips	PM Peak Hour Trips	Average Maximum Load	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity per Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour V/C	PM Peak Hour V/C
11Y North	2.3	0.0	35	82	0	1	43	43	100	0	0.82	-
11Y South	0.0	1.5	41	0	61	1	43	43	0	64	-	0.95
16X East	3.3	0.0	9	31	0	1	41	41	137	0	0.23	-
16X West	0.0	2.3	10	0	23	1	41	41	0	92	-	0.25
32 East	4.7	4.0	40	188	161	1.2	41	49	227	195	0.83	0.83
32 West	6.3	4.5	21	133	95	1.2	41	49	308	219	0.43	0.43
34 East	2.7	3.3	22	59	71	1.2	39	47	125	152	0.47	0.47
34 West	3.0	3.0	4	13	13	1.2	39	47	140	140	0.09	0.09
36 East	2.7	3.5	39	103	135	1.2	40	48	129	169	0.80	0.80
36 West	4.0	2.5	19	74	46	1.2	40	49	194	121	0.38	0.38
37 North	0.0	3.0	4	0	12	1.2	39	47	0	140	-	0.09
37 South	3.3	0.0	7	25	0	1.2	39	47	156	0	0.16	-
39 East	0.0	3.0	30	0	90	1.2	40	48	0	144	-	0.63
39 West	4.0	0.0	33	131	0	1.2	40	48	193	0	0.68	-
42 North	4.0	6.3	9	36	57	1.2	41	49	197	308	0.18	0.18
42 South	5.3	5.8	8	43	46	1.2	41	49	261	282	0.16	0.16
52 North	3.7	4.0	21	75	82	1.2	40	48	175	190	0.43	0.43
52 South	3.7	2.8	17	62	47	1.2	40	48	175	131	0.36	0.36
54 North	3.0	3.8	17	51	63	1.2	40	48	143	179	0.35	0.35
54 South	4.0	3.0	17	68	51	1.2	40	48	190	143	0.36	0.36
63 North	4.0	5.0	6	26	32	1.2	39	47	190	237	0.14	0.14
63 South	5.7	3.3	6	37	21	1.2	40	47	269	154	0.14	0.14
64 North	4.0	4.0	8	30	30	1.2	40	48	191	191	0.16	0.16
64 South	4.3	3.8	9	39	34	1.2	40	48	207	179	0.19	0.19
70 North	4.7	5.0	12	57	61	1.2	66	79	368	395	0.16	0.16
70 South	5.0	4.8	11	53	50	1.2	66	79	393	373	0.13	0.13
74 North	4.7	4.0	21	97	83	1.2	40	48	224	192	0.43	0.43
74 South	4.7	4.0	19	91	78	1.2	40	48	224	192	0.40	0.40
79 North	6.7	6.5	16	105	103	1.2	40	48	321	313	0.33	0.33
79 South	8.0	6.0	12	99	75	1.2	40	48	385	289	0.26	0.26
7Y North	5.0	2.0	5	23	9	1	41	41	205	82	0.11	0.11
7Y South	1.7	4.0	6	10	24	1	41	41	69	165	0.15	0.15
80 North	4.3	6.0	34	147	204	1.1	40	44	191	265	0.77	0.77
80 South	6.7	5.0	37	246	185	1.1	40	44	294	220	0.84	0.84
A42 North	0.0	0.0	8	0	0	1.2	39	47	0	0	-	-
A42 South	0.0	0.0	9	0	0	1.2	39	47	0	0	-	-

Route / Direction	Existing (2014)											
	AM Peak Hour Trips	PM Peak Hour Trips	Average Maximum Load	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity per Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour V/C	PM Peak Hour V/C
A46 North	0.0	0.0	9	0	0	1.2	39	47	0	0	-	-
A46 South	0.0	0.0	6	0	0	1.2	39	47	0	0	-	-
A48 North	0.0	0.0	6	0	0	1.2	39	47	0	0	-	-
A48 South	0.0	0.0	8	0	0	1.2	39	47	0	0	-	-
A9 North	4.0	0.0	21	84	0	1.2	39	47	187	0	0.45	-
A9 South	0.0	3.3	17	0	56	1.2	39	47	0	152	-	0.37
D1 East	4.0	0.0	3	12	0	1.2	40	48	191	0	0.06	-
D1 West	0.0	1.3	2	0	2	1.2	41	50	0	62	-	0.03
D3 East	0.0	1.8	16	0	28	1.2	34	41	0	72	-	0.38
D3 West	2.7	0.0	16	43	0	1.2	40	48	128	0	0.34	-
D6 East	3.3	4.8	35	115	164	1.2	40	49	162	231	0.71	0.71
D6 West	5.7	3.8	28	160	106	1.2	40	48	274	181	0.58	0.58
G8 East	3.3	4.5	0	0	0	1.2	40	48	160	216	0.00	0.00
G8 West	6.3	4.0	40	255	161	1.2	40	48	305	193	0.84	0.84
N3 East	1.7	0.0	6	10	0	1.2	40	48	81	0	0.12	-
N3 West	0.0	1.0	2	0	2	1.2	41	50	0	50	-	0.04
P17 North	3.0	0.0	22	67	0	1.2	39	47	140	0	0.47	-
P17 South	0.0	3.5	22	0	78	1.2	39	47	0	164	-	0.48
P19 North	2.7	0.0	23	61	0	1.2	39	47	125	0	0.49	-
P19 South	0.0	2.5	24	0	59	1.2	39	47	0	117	-	0.50
P6 North	4.0	3.5	28	112	98	1.2	39	47	187	164	0.60	0.60
P6 South	3.3	3.3	25	84	82	1.2	39	47	156	152	0.54	0.54
S2 North	3.3	9.0	5	18	49	1.2	48	58	193	520	0.09	0.09
S2 South	12.3	5.0	9	111	45	1.2	43	52	642	260	0.17	0.17
S4 North	3.3	5.0	5	18	27	1.2	46	56	185	278	0.10	0.10
S4 South	4.0	4.0	7	27	27	1.2	44	52	210	210	0.13	0.13
W13 North	2.7	0.0	24	65	0	1.2	39	47	125	0	0.52	-
W13 South	0.0	2.8	25	0	68	1.2	39	47	0	129	-	0.53
X1 East	0.0	2.0	32	0	63	1.2	40	48	0	96	-	0.66
X1 West	3.7	0.0	34	123	0	1.2	42	50	183	0	0.67	-
X2 East	6.7	9.5	37	248	353	1.2	61	73	488	695	0.51	0.51
X2 West	8.0	7.5	48	381	358	1.2	61	73	586	549	0.65	0.65
X9 East	3.3	3.3	26	85	83	1.2	40	48	161	157	0.53	0.53
X9 West	3.7	2.8	0	0	0	1.2	40	48	176	132	0.00	0.00
Total	**224.3**	**207.0**		**4,315**	**3,952**				**11,425**	**10,698**	**0.38**	**0.37**

Note: Volume = Passenger Volume, V/C = Volume to Capacity Ratio.
Source: WMATA (2014b)

B7.2 No-action Alternative Bus Capacity Analysis Details

For the purposes of this No-action Alternative analysis, it was assumed that there are no major changes in Metrobus service in the study area by 2025. The 2025 No-action peak bus volumes were calculated by averaging maximum weekday passenger loads for each route and direction at stops within the study area by stop, multiplying this figure by the number of AM peak hour and PM peak hour trips to calculate ridership per peak hour by route and direction, and then growing the resulting ridership totals to 2025 using the regional bus growth rate. These totals were then summed to calculate a total ridership per peak hour for the study area. To calculate the AM peak hour and PM peak hour capacity of bus services within the study area, the capacity per trip of each Metrobus route during each peak hour was multiplied by the number of trips scheduled in each peak hour. Capacities per trip for each Metrobus route were based on the typical number of seats available on each trip and the WMATA load standard (WMATA 2013a).

Total 2014 AM peak hour bus ridership in the study area was calculated at just over 4,300 passengers, while PM peak hour bus ridership was calculated at approximately 3,950 passengers. Additional bus trips associated with the CityCenterDC project were added to these 2014 totals, while trips associated with the Old Post Office project were added to 2016 totals (see table B7-3). The trips were added proportionally to each route and direction in the study area based on their share of existing ridership. In combination with the 1.9 percent growth rate, bus passenger volumes in the study area by 2025 are expected to be approximately 5,350 during the AM peak hour and nearly 5,000 during the PM peak hour. This is well below the overall capacity of bus services within the study area, which is approximately 11,400 passengers during the AM peak hour and 10,700 passengers during the PM peak hour.

Overall, several routes are projected to have capacity issues within the study area by 2025. Route 11Y in the northbound direction is projected to have capacity issues during the AM peak hour, while Route 11Y southbound and Route 36 eastbound are projected to have capacity issues during the PM peak hour. Routes 32 eastbound, 80 southbound, and G8 westbound are projected to have capacity issues during both the AM and PM peak hours. Table B7-2 summarizes routes with projected capacity issues, while table B7-3 details the full bus capacity analysis by route, direction, and year (routes with projected capacity issues are highlighted in red).

Table B7-2: No-action Alternative Bus Capacity Issue Summary by Route and Direction

Route/Direction	2025 Capacity Issue
11Y North	AM Peak Hour
11Y South	PM Peak Hour
32 East	AM Peak Hour, PM Peak Hour
36 East	PM Peak Hour
80 South	AM Peak Hour, PM Peak Hour
G8 West	AM Peak Hour, PM Peak Hour

Source: GS (2008); GSA, in cooperation with NCPC (2013a); WMATA (2014b); MWCOG (2015)

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Table B7-3: No-action Alternative Bus Capacity Analysis Details

Route / Direction	Existing (2014)												2016		2025 No-action			
	AM Peak Hour Trips	PM Peak Hour Trips	Average Max Load	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity per Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume (with CCDC)	PM Peak Hour Volume (with CCDC)	AM Peak Hour Volume (with OPO)	PM Peak Hour Volume (with OPO)	AM Peak Hour Volume	PM Peak Hour Volume	AM V/C	PM V/C
11Y North	2.3	0.0	35	82	0	1	43	43	100	0	83	0	86.4	0.0	102	0	1.02	-
11Y South	0.0	1.5	41	0	61	1	43	43	0	64	0	62	0.0	65.2	0	77	-	1.19
16X East	3.3	0.0	9	31	0	1	41	41	137	0	32	0	33.0	0.0	39	0	0.29	-
16X West	0.0	2.3	10	0	23	1	41	41	0	92	0	24	0.0	24.7	0	29	-	0.32
32 East	4.7	4.0	40	188	161	1.2	41	49	227	195	190	164	198.3	171.6	234	203	1.03	1.04
32 West	6.3	4.5	21	133	95	1.2	41	49	308	219	135	97	140.7	100.9	166	119	0.54	0.54
34 East	2.7	3.3	22	59	71	1.2	39	47	125	152	59	73	62.0	76.2	73	90	0.59	0.59
34 West	3.0	3.0	4	13	13	1.2	39	47	140	140	13	14	14.0	14.1	17	17	0.12	0.12
36 East	2.7	3.5	39	103	135	1.2	40	48	129	169	104	138	108.9	144.3	129	170	0.99	1.01
36 West	4.0	2.5	19	74	46	1.2	40	49	194	121	75	48	78.6	49.6	93	59	0.48	0.48
37 North	0.0	3.0	4	0	12	1.2	39	47	0	140	0	12	0.0	12.8	0	15	-	0.11
37 South	3.3	0.0	7	25	0	1.2	39	47	156	0	25	0	26.3	0.0	31	0	0.20	-
39 East	0.0	3.0	30	0	90	1.2	40	48	0	144	0	92	0.0	95.9	0	113	-	0.79
39 West	4.0	0.0	33	131	0	1.2	40	48	193	0	132	0	138.3	0.0	163	0	0.85	-
42 North	4.0	6.3	9	36	57	1.2	41	49	197	308	37	58	38.4	60.5	45	71	0.23	0.23
42 South	5.3	5.8	8	43	46	1.2	41	49	261	282	43	47	45.0	49.0	53	58	0.20	0.21
52 North	3.7	4.0	21	75	82	1.2	40	48	175	190	76	84	79.6	87.6	94	104	0.54	0.54
52 South	3.7	2.8	17	62	47	1.2	40	48	175	131	63	48	65.7	49.8	78	59	0.44	0.45
54 North	3.0	3.8	17	51	63	1.2	40	48	143	179	51	65	53.6	67.6	63	80	0.44	0.45
54 South	4.0	3.0	17	68	51	1.2	40	48	190	143	68	52	71.5	54.2	84	64	0.44	0.45
63 North	4.0	5.0	6	26	32	1.2	39	47	190	237	26	33	27.2	34.3	32	40	0.17	0.17
63 South	5.7	3.3	6	37	21	1.2	40	47	269	154	37	21	38.6	22.4	46	26	0.17	0.17
64 North	4.0	4.0	8	30	30	1.2	40	48	191	191	31	31	31.9	32.3	38	38	0.20	0.20
64 South	4.3	3.8	9	39	34	1.2	40	48	207	179	39	34	41.0	35.8	48	42	0.23	0.24
70 North	4.7	5.0	12	57	61	1.2	66	79	368	395	58	63	60.5	65.4	71	77	0.19	0.20
70 South	5.0	4.8	11	53	50	1.2	66	79	393	373	53	51	55.6	53.3	66	63	0.17	0.17
74 North	4.7	4.0	21	97	83	1.2	40	48	224	192	98	85	102.3	88.6	121	105	0.54	0.54
74 South	4.7	4.0	19	91	78	1.2	40	48	224	192	92	79	95.7	82.8	113	98	0.50	0.51
79 North	6.7	6.5	16	105	103	1.2	40	48	321	313	106	105	111.3	109.6	131	129	0.41	0.41
79 South	8.0	6.0	12	99	75	1.2	40	48	385	289	100	76	105.0	79.5	124	94	0.32	0.33
7Y North	5.0	2.0	5	23	9	1	41	41	205	82	23	9	24.3	9.8	29	12	0.14	0.14
7Y South	1.7	4.0	6	10	24	1	41	41	69	165	10	25	10.7	25.8	13	30	0.18	0.19

Route / Direction	Existing (2014)												2016		2025 No-action			
	AM Peak Hour Trips	PM Peak Hour Trips	Average Max Load	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity per Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume (with CCDC)	PM Peak Hour Volume (with CCDC)	AM Peak Hour Volume (with OPO)	PM Peak Hour Volume (with OPO)	AM Peak Hour Volume	PM Peak Hour Volume	AM V/C	PM V/C
80 North	4.3	6.0	34	147	204	1.1	40	44	191	265	149	208	155.6	217.6	184	257	0.96	0.97
80 South	6.7	5.0	37	246	185	1.1	40	44	294	220	248	189	259.9	196.8	307	232	1.04	1.05
A42 North	0.0	0.0	8	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A42 South	0.0	0.0	9	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A46 North	0.0	0.0	9	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A46 South	0.0	0.0	6	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A48 North	0.0	0.0	6	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A48 South	0.0	0.0	8	0	0	1.2	39	47	0	0	0	0	0.0	0.0	0	0	-	-
A9 North	4.0	0.0	21	84	0	1.2	39	47	187	0	85	0	88.7	0.0	105	0	0.56	-
A9 South	0.0	3.3	17	0	56	1.2	39	47	0	152	0	57	0.0	59.7	0	71	-	0.46
D1 East	4.0	0.0	3	12	0	1.2	40	48	191	0	12	0	12.5	0.0	15	0	0.08	-
D1 West	0.0	1.3	2	0	2	1.2	41	50	0	62	0	2	0.0	2.0	0	2	-	0.04
D3 East	0.0	1.8	16	0	28	1.2	34	41	0	72	0	28	0.0	29.6	0	35	-	0.48
D3 West	2.7	0.0	16	43	0	1.2	40	48	128	0	44	0	45.8	0.0	54	0	0.42	-
D6 East	3.3	4.8	35	115	164	1.2	40	49	162	231	116	168	121.7	175.1	144	207	0.89	0.90
D6 West	5.7	3.8	28	160	106	1.2	40	48	274	181	162	108	169.1	113.0	200	133	0.73	0.74
G8 East	3.3	4.5	0	0	0	1.2	40	48	160	216	0	0	0.0	0.0	0	0	0.00	0.00
G8 West	6.3	4.0	40	255	161	1.2	40	48	305	193	258	165	269.9	172.1	319	203	1.05	1.06
N3 West	0.0	1.0	2	0	2	1.2	41	50	0	50	0	2	0.0	2.2	0	3	-	0.05
P17 North	3.0	0.0	22	67	0	1.2	39	47	140	0	67	0	70.3	0.0	83	0	0.59	-
P17 South	0.0	3.5	22	0	78	1.2	39	47	0	164	0	80	0.0	83.7	0	99	-	0.60
P19 North	2.7	0.0	23	61	0	1.2	39	47	125	0	62	0	64.9	0.0	77	0	0.61	-
P19 South	0.0	2.5	24	0	59	1.2	39	47	0	117	0	60	0.0	63.0	0	74	-	0.64
P6 North	4.0	3.5	28	112	98	1.2	39	47	187	164	113	100	117.9	104.1	139	123	0.74	0.75
P6 South	3.3	3.3	25	84	82	1.2	39	47	156	152	85	84	89.0	87.6	105	103	0.67	0.68
S2 North	3.3	9.0	5	18	49	1.2	48	58	193	520	18	50	19.1	52.0	23	61	0.12	0.12
S2 South	12.3	5.0	9	111	45	1.2	43	52	642	260	113	46	117.8	48.2	139	57	0.22	0.22
S4 North	3.3	5.0	5	18	27	1.2	46	56	185	278	18	27	18.9	28.7	22	34	0.12	0.12
S4 South	4.0	4.0	7	27	27	1.2	44	52	210	210	27	27	28.3	28.6	33	34	0.16	0.16
W13 North	2.7	0.0	24	65	0	1.2	39	47	125	0	66	0	68.7	0.0	81	0	0.65	-
W13 South	0.0	2.8	25	0	68	1.2	39	47	0	129	0	70	0.0	72.9	0	86	-	0.67
X1 East	0.0	2.0	32	0	63	1.2	40	48	0	96	0	65	0.0	67.4	0	80	-	0.83
X1 West	3.7	0.0	34	123	0	1.2	42	50	183	0	125	0	130.3	0.0	154	0	0.84	-

Route / Direction	Existing (2014)												2016		2025 No-action			
	AM Peak Hour Trips	PM Peak Hour Trips	Average Max Load	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity per Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume (with CCDC)	PM Peak Hour Volume (with CCDC)	AM Peak Hour Volume (with OPO)	PM Peak Hour Volume (with OPO)	AM Peak Hour Volume	PM Peak Hour Volume	AM V/C	PM V/C
X2 East	6.7	9.5	37	248	353	1.2	61	73	488	695	250	361	261.8	376.5	309	445	0.63	0.64
X2 West	8.0	7.5	48	381	358	1.2	61	73	586	549	385	365	402.9	381.3	476	450	0.81	0.82
X9 East	3.3	3.3	26	85	83	1.2	40	48	161	157	86	85	90.3	88.9	107	105	0.66	0.67
X9 West	3.7	2.8	0	0	0	1.2	40	48	176	132	0	0	0.0	0.0	0	0	0.00	0.00
Total	**224.3**	**207.0**		**4,315**	**3,952**				**11,425**	**10,698**	**4,357**	**4,039**	**4,558**	**4,215**	**5,383**	**4,978**		

Notes: Max = Maximum, Volume = Passenger Volume, CCDC = CityCenterDC project, OPO = Old Post Office project, V/C = Volume to Capacity Ratio.
Source: GS (2008); GSA, in cooperation with NCPC (2013a); WMATA (2014b); MWCOG (2015)

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WMATA has completed studies of the 30s Line (Routes 32 and 36), Route 80, and Route G8. Certain recommendations from these studies have already been implemented, and are all intended to help alleviate overcrowding on these routes. Table B7-4 summarizes recommendations in these studies that have recently been implemented or are planned for implementation prior to the 2025 No-action year within the study area.

Table B7-4: WMATA Studies on Routes in Study Area with Capacity Issues

Study	Recommendation	Recommended Implementation Year
30s Line	Add additional service Routes 30N, 30S, 31, and 33	2014
North Capitol Street Line (Route 80)	Add Route 80A to supplement Route 80 service between Fort Totten and McPherson Square	2014*
	MetroExtra Route 80X to implement limited-stop service in the corridor during peak periods	2016
	MetroExtra Route 80X midday service	2018
Rhode Island Avenue & Baltimore Avenue Lines Study (Route G8)	MetroExtra Route G9 to supplement Route G8 with limited stop service	Mid-term (no year given)

*Recommendations have yet to be implemented.
Source: WMATA (2008, 2013b, 2014a)

B7.3 RFDS 1 Build Condition Bus Capacity Analysis Details

The net Metrobus trips associated with RFDS 1 were added to the AM and PM peak hour bus volumes calculated for the study area in the 2025 No-action Alternative. Both the AM peak hour and the PM peak hour were analyzed due to the fact that the AM peak hour had the highest No-action bus volumes but the PM peak hour had a higher number of additional RFDS 1 trips than the AM peak hour. The trips were distributed proportionally to each route and direction within the study area based on 2025 No-action ridership levels.

The 2025 No-action peak bus volumes were calculated by averaging existing maximum weekday passenger loads for each route and direction at stops within the study area by stop, multiplying this figure by the number of AM peak hour and PM peak hour trips to calculate ridership per peak hour by route and direction, and then growing the resulting ridership totals to 2025 using the regional bus growth rate. These totals were then summed to calculate a total ridership per peak hour for the study area. To calculate the peak hour capacity of bus services within each study area, the capacity per trip of each Metrobus route during the peak hour was multiplied by the number of trips scheduled in the peak hour. Capacities per trip for each Metrobus route were based on the typical number of seats available on each trip and the WMATA load standard (WMATA 2013a).The capacity of bus services in 2025 was assumed to be the same as existing.

Overall, RFDS 1 bus volumes are projected to be nearly 5,470 passengers during the AM peak period, and approximately 5,066 passengers during the PM peak period. Both of these totals are well below projected capacity.

Overall, several routes are projected to have capacity issues within the study area by 2025 under RFDS 1. Route 11Y in the northbound direction is projected to have capacity issues during the AM peak hour, while Route 11Y southbound is projected to have capacity issues during the PM peak hour. Route 32 eastbound, 36 eastbound, 80 southbound, and G8 westbound are projected to have capacity issues during both the AM and PM peak hours. Table B7-5 summarizes routes with projected capacity issues, while table B7-6 details the full bus capacity analysis by route, direction, and year (routes with projected capacity issues are highlighted in red).

Table B7-5: RFDS 1 Bus Capacity Issue Summary by Route and Direction

Route/Direction	2025 Capacity Issue – RFDS 1
11Y North	AM Peak Hour
11Y South	PM Peak Hour
32 East	AM Peak Hour, PM Peak Hour
36 East	AM Peak Hour, PM Peak Hour
80 South	AM Peak Hour, PM Peak Hour
G8 West	AM Peak Hour, PM Peak Hour

Source: GS (2008); GSA, in cooperation with NCPC (2013a); WMATA (2014b); MWCOG (2015)

Table B7-6: RFDS 1 Bus Capacity Analysis Details

Route/ Direction	Existing (2014)										2025 No-action**				2025 RFDS 1					
	AM Peak Trips/ Hour	PM Peak Trips/ Hour	Average Max Load*	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity/ Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume	PM Peak Hour Volume	AM Peak V/C	PM Peak V/C	AM Peak Hour Net Trips	PM Peak Hour Net Trips	AM Peak Hour Total Volume	PM Peak Hour Total Volume	AM Peak Hour V/C	PM Peak Hour V/C
11Y North	2.3	0.0	35	81.8	0.0	1	43	43	100.3	0.0	102	0	1.02	-	1.6	0.0	104	0	1.03	-
11Y South	0.0	1.5	41	0.0	61.2	1	43	43	0.0	64.5	0	77	-	1.19	0.0	1.4	0	78	-	1.22
16X East	3.3	0.0	9	31.2	0.0	1	41	41	136.7	0.0	39	0	0.29	-	0.6	0.0	40	0	0.29	-
16X West	0.0	2.3	10	0.0	23.2	1	41	41	0.0	92.3	0	29	-	0.32	0.0	0.5	0	30	-	0.32
32 East	4.7	4.0	40	187.7	160.9	1.2	41	49	227.0	194.5	234	203	1.03	1.04	3.7	3.6	238	206	1.05	1.06
32 West	6.3	4.5	21	133.2	94.6	1.2	41	49	308.2	219.0	166	119	0.54	0.54	2.7	2.1	169	121	0.55	0.55
34 East	2.7	3.3	22	58.7	71.5	1.2	39	47	124.8	152.1	73	90	0.59	0.59	1.2	1.6	74	92	0.60	0.60
34 West	3.0	3.0	4	13.3	13.3	1.2	39	47	140.4	140.4	17	17	0.12	0.12	0.3	0.3	17	17	0.12	0.12
36 East	2.7	3.5	39	103.1	135.4	1.2	40	48	128.9	169.2	129	170	0.99	1.01	2.1	3.0	131	173	1.01	1.03
36 West	4.0	2.5	19	74.4	46.5	1.2	40	49	194.0	121.3	93	59	0.48	0.48	1.5	1.0	94	60	0.49	0.49
37 North	0.0	3.0	4	0.0	12.0	1.2	39	47	0.0	140.5	0	15	-	0.11	0.0	0.3	0	15	-	0.11
37 South	3.3	0.0	7	24.9	0.0	1.2	39	47	156.1	0.0	31	0	0.20	-	0.5	0.0	32	0	0.20	-
39 East	0.0	3.0	30	0.0	90.0	1.2	40	48	0.0	143.6	0	113	-	0.79	0.0	2.0	0	115	-	0.80
39 West	4.0	0.0	33	130.9	0.0	1.2	40	48	192.5	0.0	163	0	0.85	-	2.6	0.0	166	0	0.86	-
42 North	4.0	6.3	9	36.3	56.7	1.2	41	49	197.0	307.9	45	71	0.23	0.23	0.7	1.3	46	73	0.23	0.24
42 South	5.3	5.8	8	42.6	45.9	1.2	41	49	261.5	281.9	53	58	0.20	0.21	0.9	1.0	54	59	0.21	0.21
52 North	3.7	4.0	21	75.3	82.2	1.2	40	48	174.5	190.4	94	104	0.54	0.54	1.5	1.8	96	105	0.55	0.55
52 South	3.7	2.8	17	62.2	46.7	1.2	40	48	174.7	131.0	78	59	0.44	0.45	1.2	1.0	79	60	0.45	0.46
54 North	3.0	3.8	17	50.7	63.4	1.2	40	48	143.2	179.0	63	80	0.44	0.45	1.0	1.4	64	81	0.45	0.45
54 South	4.0	3.0	17	67.7	50.8	1.2	40	48	190.5	142.8	84	64	0.44	0.45	1.4	1.1	86	65	0.45	0.46
63 North	4.0	5.0	6	25.7	32.1	1.2	39	47	189.6	236.9	32	40	0.17	0.17	0.5	0.7	33	41	0.17	0.17
63 South	5.7	3.3	6	36.5	21.0	1.2	40	47	268.7	154.1	46	26	0.17	0.17	0.7	0.5	46	27	0.17	0.17
64 North	4.0	4.0	8	30.2	30.2	1.2	40	48	190.9	190.9	38	38	0.20	0.20	0.6	0.7	38	39	0.20	0.20
64 South	4.3	3.8	9	38.8	33.6	1.2	40	48	206.8	179.0	48	42	0.23	0.24	0.8	0.7	49	43	0.24	0.24
70 North	4.7	5.0	12	57.3	61.4	1.2	66	79	368.5	394.8	71	77	0.19	0.20	1.1	1.4	73	79	0.20	0.20
70 South	5.0	4.8	11	52.6	50.0	1.2	66	79	393.1	373.5	66	63	0.17	0.17	1.1	1.1	67	64	0.17	0.17
74 North	4.7	4.0	21	96.9	83.0	1.2	40	48	224.4	192.4	121	105	0.54	0.54	1.9	1.9	123	106	0.55	0.55
74 South	4.7	4.0	19	90.6	77.7	1.2	40	48	224.4	192.3	113	98	0.50	0.51	1.8	1.7	115	100	0.51	0.52
79 North	6.7	6.5	16	105.4	102.7	1.2	40	48	320.9	312.9	131	129	0.41	0.41	2.1	2.3	134	132	0.42	0.42
79 South	8.0	6.0	12	99.4	74.6	1.2	40	48	385.2	288.9	124	94	0.32	0.33	2.0	1.7	126	96	0.33	0.33
7Y North	5.0	2.0	5	23.0	9.2	1	41	41	205.0	82.0	29	12	0.14	0.14	0.5	0.2	29	12	0.14	0.14
7Y South	1.7	4.0	6	10.1	24.2	1	41	41	68.5	164.5	13	30	0.18	0.19	0.2	0.5	13	31	0.19	0.19
80 North	4.3	6.0	34	147.3	204.0	1.1	40	44	191.2	264.7	184	257	0.96	0.97	2.9	4.5	187	261	0.98	0.99
80 South	6.7	5.0	37	246.0	184.5	1.1	40	44	294.0	220.5	307	232	1.04	1.05	4.9	4.1	312	237	1.06	1.07
A42 North	0.0	0.0	8	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A42 South	0.0	0.0	9	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A46 North	0.0	0.0	9	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A46 South	0.0	0.0	6	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A48 North	0.0	0.0	6	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A48 South	0.0	0.0	8	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A9 North	4.0	0.0	21	83.9	0.0	1.2	39	47	187.2	0.0	105	0	0.56	-	1.7	0.0	106	0	0.57	-

Route/ Direction	Existing (2014)										2025 No-action**				2025 RFDS 1					
	AM Peak Trips/ Hour	PM Peak Trips/ Hour	Average Max Load*	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity/ Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume	PM Peak Hour Volume	AM Peak V/C	PM Peak V/C	AM Peak Hour Net Trips	PM Peak Hour Net Trips	AM Peak Hour Total Volume	PM Peak Hour Total Volume	AM Peak Hour V/C	PM Peak Hour V/C
A9 South	0.0	3.3	17	0.0	56.0	1.2	39	47	0.0	152.1	0	71	-	0.46	0.0	1.2	0	72	-	0.47
D1 East	4.0	0.0	3	11.9	0.0	1.2	40	48	190.7	0.0	15	0	0.08	-	0.2	0.0	15	0	0.08	-
D1 West	0.0	1.3	2	0.0	1.9	1.2	41	50	0.0	62.0	0	2	-	0.04	0.0	0.0	0	2	-	0.04
D3 East	0.0	1.8	16	0.0	27.8	1.2	34	41	0.0	72.4	0	35	-	0.48	0.0	0.6	0	36	-	0.49
D3 West	2.7	0.0	16	43.4	0.0	1.2	40	48	128.0	0.0	54	0	0.42	-	0.9	0.0	55	0	0.43	-
D6 East	3.3	4.8	35	115.2	164.1	1.2	40	49	161.9	230.7	144	207	0.89	0.90	2.3	3.7	146	210	0.90	0.91
D6 West	5.7	3.8	28	160.1	106.0	1.2	40	48	274.1	181.4	200	133	0.73	0.74	3.2	2.4	203	136	0.74	0.75
G8 East	3.3	4.5	0	0.0	0.0	1.2	40	48	160.3	216.5	0	0	0.00	0.00	0.0	0.0	0	0	0.00	0.00
G8 West	6.3	4.0	40	255.4	161.3	1.2	40	48	304.8	192.5	319	203	1.05	1.06	5.1	3.6	324	207	1.06	1.07
N3 East	1.7	0.0	6	9.7	0.0	1.2	40	48	80.5	0.0	12	0	0.15	-	0.2	0.0	12	0	0.15	-
N3 West	0.0	1.0	2	0.0	2.0	1.2	41	50	0.0	49.6	0	3	-	0.05	0.0	0.0	0	3	-	0.05
P17 North	3.0	0.0	22	66.6	0.0	1.2	39	47	140.4	0.0	83	0	0.59	-	1.3	0.0	84	0	0.60	-
P17 South	0.0	3.5	22	0.0	78.4	1.2	39	47	0.0	163.8	0	99	-	0.60	0.0	1.7	0	101	-	0.61
P19 North	2.7	0.0	23	61.5	0.0	1.2	39	47	124.8	0.0	77	0	0.61	-	1.2	0.0	78	0	0.62	-
P19 South	0.0	2.5	24	0.0	59.0	1.2	39	47	0.0	117.0	0	74	-	0.64	0.0	1.3	0	76	-	0.65
P6 North	4.0	3.5	28	111.6	97.6	1.2	39	47	187.2	163.8	139	123	0.74	0.75	2.2	2.2	141	125	0.76	0.76
P6 South	3.3	3.3	25	84.3	82.1	1.2	39	47	156.0	152.1	105	103	0.67	0.68	1.7	1.8	107	105	0.68	0.69
S2 North	3.3	9.0	5	18.1	48.7	1.2	48	58	192.7	520.3	23	61	0.12	0.12	0.4	1.1	23	62	0.12	0.12
S2 South	12.3	5.0	9	111.5	45.2	1.2	43	52	641.8	260.2	139	57	0.22	0.22	2.2	1.0	141	58	0.22	0.22
S4 North	3.3	5.0	5	17.9	26.9	1.2	46	56	185.3	278.0	22	34	0.12	0.12	0.4	0.6	23	34	0.12	0.12
S4 South	4.0	4.0	7	26.8	26.8	1.2	44	52	209.6	209.6	33	34	0.16	0.16	0.5	0.6	34	34	0.16	0.16
W13 North	2.7	0.0	24	65.1	0.0	1.2	39	47	124.8	0.0	81	0	0.65	-	1.3	0.0	82	0	0.66	-
W13 South	0.0	2.8	25	0.0	68.4	1.2	39	47	0.0	128.7	0	86	-	0.67	0.0	1.5	0	88	-	0.68
X1 East	0.0	2.0	32	0.0	63.2	1.2	40	48	0.0	96.1	0	80	-	0.83	0.0	1.4	0	81	-	0.84
X1 West	3.7	0.0	34	123.3	0.0	1.2	42	50	182.7	0.0	154	0	0.84	-	2.5	0.0	156	0	0.86	-
X2 East	6.7	9.5	37	247.8	353.1	1.2	61	73	488.1	695.5	309	445	0.63	0.64	4.9	7.9	314	453	0.64	0.65
X2 West	8.0	7.5	48	381.4	357.6	1.2	61	73	585.9	549.3	476	450	0.81	0.82	7.6	8.0	483	458	0.83	0.83
X9 East	3.3	3.3	26	85.5	83.3	1.2	40	48	160.5	156.5	107	105	0.66	0.67	1.7	1.9	108	107	0.67	0.68
X9 West	3.7	2.8	0	0.0	0.0	1.2	40	48	176.4	132.3	0	0	0.00	0.00	0.0	0.0	0	0	0.00	0.00
Total				**4,315**	**3,952**				**11,425**	**10,698**	**5,383**	**4,978**			**86.1**	**88.1**	**5,470**	**5,066**	**0.48**	**0.47**

*Maximum passenger loads were not available by time period. Values represent maximum passenger loads observed on weekdays.
**Including trips from planned development projects.
Notes: Max = Maximum, Volume = Passenger Volume, V/C = Volume to Capacity Ratio.
Source: WMATA (2014b); MWCOG (2015); DDOT Scoping Form (Appendix B1)

WMATA has completed studies of the 30s Line (Routes 32 and 36), Route 80, and Route G8. Certain recommendations from these studies have already been implemented, and are all intended to help alleviate overcrowding on these routes. Table B7-7 summarizes recommendations in these studies that have recently been implemented or are planned for implementation prior to the 2025 future development year within the study area.

Table B7-7: WMATA Studies on Routes in Study Area with Capacity Issues

Study	Recommendation	Recommended Implementation Year
30s Line	Add additional service Routes 30N, 30S, 31, and 33	2014
North Capitol Street Line (Route 80)	Add Route 80A to supplement Route 80 service between Fort Totten and McPherson Square	2014*
	MetroExtra Route 80X to implement limited-stop service in the corridor during peak periods	2016
	MetroExtra Route 80X midday service	2018
Rhode Island Avenue & Baltimore Avenue Lines Study (Route G8)	MetroExtra G9 route to supplement Route G8 with limited stop service	Mid-term (no year given)

*Recommendations have yet to be implemented.
Source: WMATA (2008, 2013b, 2014a)

B7.4 RFDS 2 Build Condition Bus Capacity Analysis Details

The net Metrobus trips associated with RFDS 2 were added to the AM peak hour and PM peak hour bus volumes calculated for the study area in the 2025 No-action Alternative. Both the AM peak hour and the PM peak hour were analyzed due to the fact that the AM peak hour had the highest No-action bus volumes but the PM peak hour had a higher number of additional RFDS 2 trips than the AM peak hour. The trips were distributed proportionally to each route and direction within the study area based on 2025 No-action ridership levels.

The 2025 No-action peak bus volumes were calculated by averaging existing maximum weekday passenger loads for each route and direction at stops within the study area by stop, multiplying this figure by the number of AM peak hour and PM peak hour trips to calculate ridership per peak hour by route and direction, and then growing the resulting ridership totals to 2025 using the regional bus growth rate. These totals were then summed to calculate a total ridership per peak hour for the study area. To calculate the peak hour capacity of bus services within each study area, the capacity per trip of each Metrobus route during the peak hour was multiplied by the number of trips scheduled in the peak hour. Capacities per trip for each Metrobus route were based on the typical number of seats available on each trip and the WMATA load standard (WMATA 2013a).The capacity of bus services in 2025 was assumed to be the same as existing.

Overall, future development RFDS 2 bus volumes are projected to be approximately 5,430 passengers during the AM peak period, and approximately 5,085 passengers during the PM peak period. Both of these totals are well below projected capacity.

Overall, several routes are projected to have capacity issues within the study area by 2025 under RFDS 2. Route 11Y in the northbound direction is projected to have capacity issues during the AM peak hour, while Route 11Y southbound is projected to have capacity issues during the PM peak hour. Routes 32 eastbound, 36 eastbound, 80 southbound, and G8 westbound are projected to have capacity issues during both the AM and PM peak hours. Table B7-8 summarizes routes with projected capacity issues, while table B7-9 details the full bus capacity analysis by route, direction, and year (routes with projected capacity issues are highlighted in red).

Table B7-8: RFDS 2 Bus Capacity Issue Summary by Route and Direction

Route/Direction	2025 Capacity Issue – RFDS 2
11Y North	AM Peak Hour
11Y South	PM Peak Hour
32 East	AM Peak Hour, PM Peak Hour
36 East	AM Peak Hour, PM Peak Hour
80 South	AM Peak Hour, PM Peak Hour
G8 West	AM Peak Hour, PM Peak Hour

Source: GS (2008); GSA, in cooperation with NCPC (2013a); WMATA (2014b); MWCOG (2015)

Table B7-9: RFDS 2 Bus Capacity Analysis Details

Route/ Direction	Existing (2014)										2025 No-action**				2025 RFDS 2					
	AM Peak Trips/ Hour	PM Peak Trips/ Hour	Average Max Load*	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity/ Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume	PM Peak Hour Volume	AM Peak V/C	PM Peak V/C	AM Peak Hour Net Trips	PM Peak Hour Net Trips	AM Peak Hour Total Volume	PM Peak Hour Total Volume	AM Peak Hour V/C	PM Peak Hour V/C
11Y North	2.3	0.0	35	81.8	0.0	1	43	43	100.3	0.0	102	0	1.02	-	0.9	0.0	103	0	1.03	-
11Y South	0.0	1.5	41	0.0	61.2	1	43	43	0.0	64.5	0	77	-	1.19	0.0	1.7	0	79	-	1.22
16X East	3.3	0.0	9	31.2	0.0	1	41	41	136.7	0.0	39	0	0.29	-	0.3	0.0	39	0	0.29	-
16X West	0.0	2.3	10	0.0	23.2	1	41	41	0.0	92.3	0	29	-	0.32	0.0	0.6	0	30	-	0.32
32 East	4.7	4.0	40	187.7	160.9	1.2	41	49	227.0	194.5	234	203	1.03	1.04	2.0	4.3	236	207	1.04	1.06
32 West	6.3	4.5	21	133.2	94.6	1.2	41	49	308.2	219.0	166	119	0.54	0.54	1.4	2.6	168	122	0.54	0.56
34 East	2.7	3.3	22	58.7	71.5	1.2	39	47	124.8	152.1	73	90	0.59	0.59	0.6	1.9	74	92	0.59	0.60
34 West	3.0	3.0	4	13.3	13.3	1.2	39	47	140.4	140.4	17	17	0.12	0.12	0.1	0.4	17	17	0.12	0.12
36 East	2.7	3.5	39	103.1	135.4	1.2	40	48	128.9	169.2	129	170	0.99	1.01	1.1	3.7	130	174	1.01	1.03
36 West	4.0	2.5	19	74.4	46.5	1.2	40	49	194.0	121.3	93	59	0.48	0.48	0.8	1.3	94	60	0.48	0.49
37 North	0.0	3.0	4	0.0	12.0	1.2	39	47	0.0	140.5	0	15	-	0.11	0.0	0.3	0	15	-	0.11
37 South	3.3	0.0	7	24.9	0.0	1.2	39	47	156.1	0.0	31	0	0.20	-	0.3	0.0	31	0	0.20	-
39 East	0.0	3.0	30	0.0	90.0	1.2	40	48	0.0	143.6	0	113	-	0.79	0.0	2.4	0	116	-	0.81
39 West	4.0	0.0	33	130.9	0.0	1.2	40	48	192.5	0.0	163	0	0.85	-	1.4	0.0	165	0	0.86	-
42 North	4.0	6.3	9	36.3	56.7	1.2	41	49	197.0	307.9	45	71	0.23	0.23	0.4	1.5	46	73	0.23	0.24
42 South	5.3	5.8	8	42.6	45.9	1.2	41	49	261.5	281.9	53	58	0.20	0.21	0.5	1.2	54	59	0.20	0.21
52 North	3.7	4.0	21	75.3	82.2	1.2	40	48	174.5	190.4	94	104	0.54	0.54	0.8	2.2	95	106	0.54	0.56
52 South	3.7	2.8	17	62.2	46.7	1.2	40	48	174.7	131.0	78	59	0.44	0.45	0.7	1.3	78	60	0.45	0.46
54 North	3.0	3.8	17	50.7	63.4	1.2	40	48	143.2	179.0	63	80	0.44	0.45	0.5	1.7	64	82	0.45	0.46
54 South	4.0	3.0	17	67.7	50.8	1.2	40	48	190.5	142.8	84	64	0.44	0.45	0.7	1.4	85	65	0.45	0.46
63 North	4.0	5.0	6	25.7	32.1	1.2	39	47	189.6	236.9	32	40	0.17	0.17	0.3	0.9	32	41	0.17	0.17
63 South	5.7	3.3	6	36.5	21.0	1.2	40	47	268.7	154.1	46	26	0.17	0.17	0.4	0.6	46	27	0.17	0.18
64 North	4.0	4.0	8	30.2	30.2	1.2	40	48	190.9	190.9	38	38	0.20	0.20	0.3	0.8	38	39	0.20	0.20
64 South	4.3	3.8	9	38.8	33.6	1.2	40	48	206.8	179.0	48	42	0.23	0.24	0.4	0.9	49	43	0.24	0.24
70 North	4.7	5.0	12	57.3	61.4	1.2	66	79	368.5	394.8	71	77	0.19	0.20	0.6	1.7	72	79	0.20	0.20
70 South	5.0	4.8	11	52.6	50.0	1.2	66	79	393.1	373.5	66	63	0.17	0.17	0.6	1.4	66	64	0.17	0.17
74 North	4.7	4.0	21	96.9	83.0	1.2	40	48	224.4	192.4	121	105	0.54	0.54	1.0	2.2	122	107	0.54	0.56
74 South	4.7	4.0	19	90.6	77.7	1.2	40	48	224.4	192.3	113	98	0.50	0.51	1.0	2.1	114	100	0.51	0.52
79 North	6.7	6.5	16	105.4	102.7	1.2	40	48	320.9	312.9	131	129	0.41	0.41	1.1	2.8	133	132	0.41	0.42
79 South	8.0	6.0	12	99.4	74.6	1.2	40	48	385.2	288.9	124	94	0.32	0.33	1.1	2.0	125	96	0.32	0.33
7Y North	5.0	2.0	5	23.0	9.2	1	41	41	205.0	82.0	29	12	0.14	0.14	0.2	0.2	29	12	0.14	0.14
7Y South	1.7	4.0	6	10.1	24.2	1	41	41	68.5	164.5	13	30	0.18	0.19	0.1	0.7	13	31	0.19	0.19
80 North	4.3	6.0	34	147.3	204.0	1.1	40	44	191.2	264.7	184	257	0.96	0.97	1.6	5.5	185	262	0.97	0.99
80 South	6.7	5.0	37	246.0	184.5	1.1	40	44	294.0	220.5	307	232	1.04	1.05	2.6	5.0	310	237	1.05	1.08
A42 North	0.0	0.0	8	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A42 South	0.0	0.0	9	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A46 North	0.0	0.0	9	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A46 South	0.0	0.0	6	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A48 North	0.0	0.0	6	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A48 South	0.0	0.0	8	0.0	0.0	1.2	39	47	0.0	0.0	0	0	-	-	0.0	0.0	0	0	-	-
A9 North	4.0	0.0	21	83.9	0.0	1.2	39	47	187.2	0.0	105	0	0.56	-	0.9	0.0	106	0	0.56	-

Route/ Direction	Existing (2014)										2025 No-action**				2025 RFDS 2					
	AM Peak Trips/ Hour	PM Peak Trips/ Hour	Average Max Load*	AM Peak Hour Volume	PM Peak Hour Volume	Load Standard	Peak Seats	Peak Capacity/ Trip	AM Peak Hour Capacity	PM Peak Hour Capacity	AM Peak Hour Volume	PM Peak Hour Volume	AM Peak V/C	PM Peak V/C	AM Peak Hour Net Trips	PM Peak Hour Net Trips	AM Peak Hour Total Volume	PM Peak Hour Total Volume	AM Peak Hour V/C	PM Peak Hour V/C
A9 South	0.0	3.3	17	0.0	56.0	1.2	39	47	0.0	152.1	0	71	-	0.46	0.0	1.5	0	72	-	0.47
D1 East	4.0	0.0	3	11.9	0.0	1.2	40	48	190.7	0.0	15	0	0.08	-	0.1	0.0	15	0	0.08	-
D1 West	0.0	1.3	2	0.0	1.9	1.2	41	50	0.0	62.0	0	2	-	0.04	0.0	0.1	0	2	-	0.04
D3 East	0.0	1.8	16	0.0	27.8	1.2	34	41	0.0	72.4	0	35	-	0.48	0.0	0.8	0	36	-	0.49
D3 West	2.7	0.0	16	43.4	0.0	1.2	40	48	128.0	0.0	54	0	0.42	-	0.5	0.0	55	0	0.43	-
D6 East	3.3	4.8	35	115.2	164.1	1.2	40	49	161.9	230.7	144	207	0.89	0.90	1.2	4.4	145	211	0.90	0.92
D6 West	5.7	3.8	28	160.1	106.0	1.2	40	48	274.1	181.4	200	133	0.73	0.74	1.7	2.9	201	136	0.73	0.75
G8 East	3.3	4.5	0	0.0	0.0	1.2	40	48	160.3	216.5	0	0	0.00	0.00	0.0	0.0	0	0	0.00	0.00
G8 West	6.3	4.0	40	255.4	161.3	1.2	40	48	304.8	192.5	319	203	1.05	1.06	2.7	4.4	321	208	1.05	1.08
N3 East	1.7	0.0	6	9.7	0.0	1.2	40	48	80.5	0.0	12	0	0.15	-	0.1	0.0	12	0	0.15	-
N3 West	0.0	1.0	2	0.0	2.0	1.2	41	50	0.0	49.6	0	3	-	0.05	0.0	0.1	0	3	-	0.05
P17 North	3.0	0.0	22	66.6	0.0	1.2	39	47	140.4	0.0	83	0	0.59	-	0.7	0.0	84	0	0.60	-
P17 South	0.0	3.5	22	0.0	78.4	1.2	39	47	0.0	163.8	0	99	-	0.60	0.0	2.1	0	101	-	0.62
P19 North	2.7	0.0	23	61.5	0.0	1.2	39	47	124.8	0.0	77	0	0.61	-	0.7	0.0	77	0	0.62	-
P19 South	0.0	2.5	24	0.0	59.0	1.2	39	47	0.0	117.0	0	74	-	0.64	0.0	1.6	0	76	-	0.65
P6 North	4.0	3.5	28	111.6	97.6	1.2	39	47	187.2	163.8	139	123	0.74	0.75	1.2	2.6	140	126	0.75	0.77
P6 South	3.3	3.3	25	84.3	82.1	1.2	39	47	156.0	152.1	105	103	0.67	0.68	0.9	2.2	106	106	0.68	0.69
S2 North	3.3	9.0	5	18.1	48.7	1.2	48	58	192.7	520.3	23	61	0.12	0.12	0.2	1.3	23	63	0.12	0.12
S2 South	12.3	5.0	9	111.5	45.2	1.2	43	52	641.8	260.2	139	57	0.22	0.22	1.2	1.2	140	58	0.22	0.22
S4 North	3.3	5.0	5	17.9	26.9	1.2	46	56	185.3	278.0	22	34	0.12	0.12	0.2	0.7	23	35	0.12	0.12
S4 South	4.0	4.0	7	26.8	26.8	1.2	44	52	209.6	209.6	33	34	0.16	0.16	0.3	0.7	34	34	0.16	0.16
W13 North	2.7	0.0	24	65.1	0.0	1.2	39	47	124.8	0.0	81	0	0.65	-	0.7	0.0	82	0	0.66	-
W13 South	0.0	2.8	25	0.0	68.4	1.2	39	47	0.0	128.7	0	86	-	0.67	0.0	1.8	0	88	-	0.68
X1 East	0.0	2.0	32	0.0	63.2	1.2	40	48	0.0	96.1	0	80	-	0.83	0.0	1.7	0	81	-	0.85
X1 West	3.7	0.0	34	123.3	0.0	1.2	42	50	182.7	0.0	154	0	0.84	-	1.3	0.0	155	0	0.85	-
X2 East	6.7	9.5	37	247.8	353.1	1.2	61	73	488.1	695.5	309	445	0.63	0.64	2.7	9.5	312	454	0.64	0.65
X2 West	8.0	7.5	48	381.4	357.6	1.2	61	73	585.9	549.3	476	450	0.81	0.82	4.1	9.7	480	460	0.82	0.84
X9 East	3.3	3.3	26	85.5	83.3	1.2	40	48	160.5	156.5	107	105	0.66	0.67	0.9	2.3	108	107	0.67	0.68
X9 West	3.7	2.8	0	0.0	0.0	1.2	40	48	176.4	132.3	0	0	0.00	0.00	0.0	0.0	0	0	0.00	0.00
Total				**4,315**	**3,952**				**11,425**	**10,698**	**5,383**	**4,978**			**46.4**	**106.8**	**5,430**	**5,085**	**0.48**	**0.48**

*Maximum Passenger Loads were not available by time period. Maximum passenger loads displayed represent those observed on an average weekday.
**Including trips from planned development projects.
Notes: Max = Maximum, Volume = Passenger Volume, V/C = Volume to Capacity Ratio.
Source: WMATA (2014b); MWCOG (2015); DDOT Scoping Form (Appendix B1).

WMATA has completed studies of the 30s Line (Routes 32 and 36), Route 80, and Route G8. Certain recommendations from these studies have already been implemented, and are all intended to help alleviate overcrowding on these routes. Table B7-10 summarizes recommendations in these studies that have recently been implemented or are planned for implementation prior to the 2025 future development year within the study area.

Table B7-10: WMATA Studies on Routes in Study Area with Capacity Issues

Study	Recommendation	Recommended Implementation Year
30s Line	Add additional service Routes 30N, 30S, 31, and 33	2014
North Capitol Street Line (Route 80)	Add Route 80A to supplement Route 80 service between Fort Totten and McPherson Square	2014*
	MetroExtra Route 80X to implement limited-stop service in the corridor during peak periods	2016
	MetroExtra Route 80X midday service	2018
Rhode Island Avenue & Baltimore Avenue Lines Study (Route G8)	MetroExtra G9 route to supplement Route G8 with limited stop service	Mid-term (no year given)

*Recommendations have yet to be implemented.
Source: WMATA (2008, 2013b, 2014a)

B7.5 References

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Appendix B8

Background Distribution

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

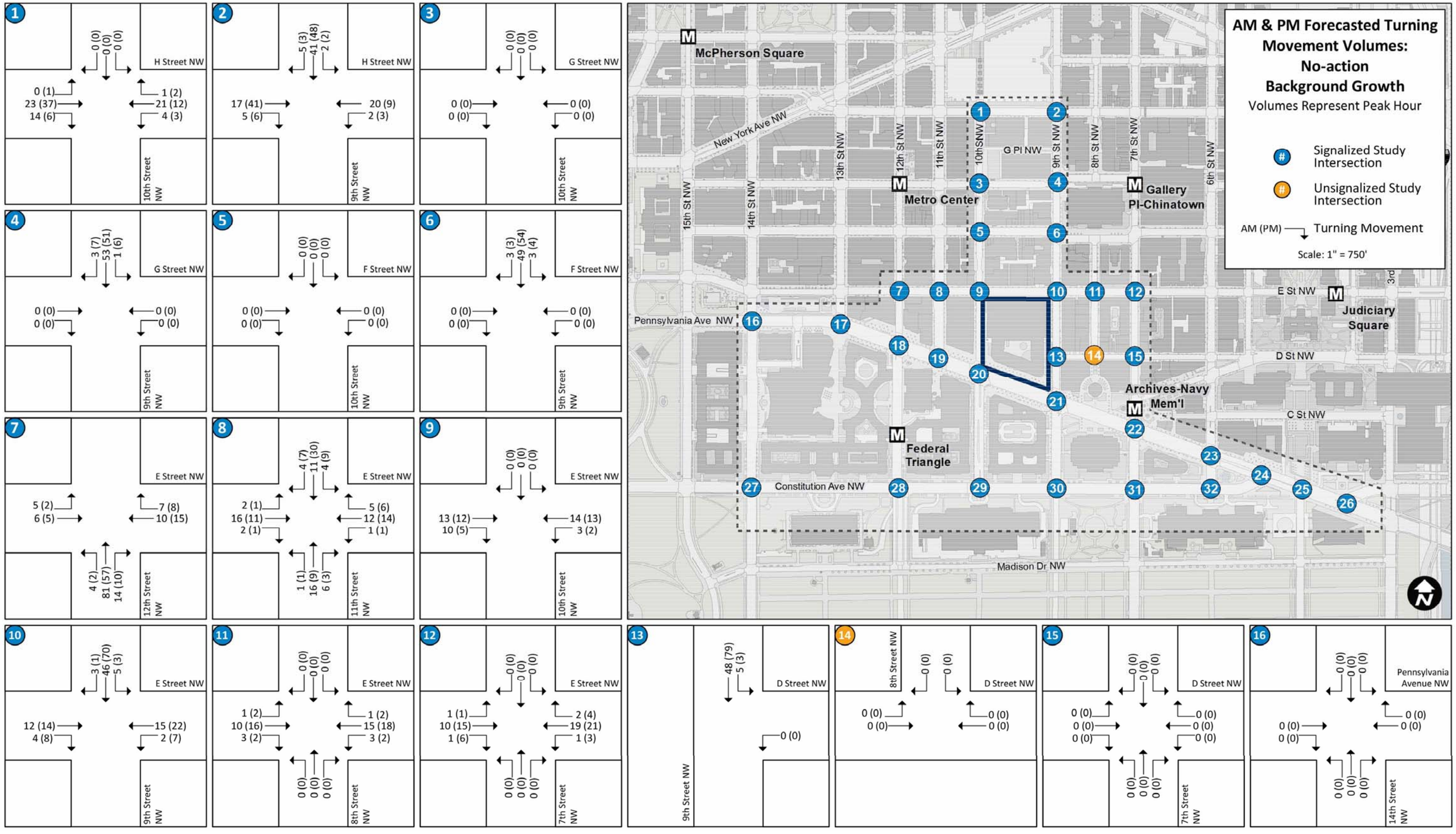
Prepared by

Louis Berger

for

GSA

October 2015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Volumes Represent Peak Hour
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Unsignalized Study Intersection
AM (PM) Turning Movement
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Metro Center
Gallery Pl-Chinatown
Judiciary Square
Archives-Navy Mem'l
Federal Triangle
New York Ave NW
G Pl NW
Pennsylvania Ave NW
E St NW
D St NW
C St NW
Constitution Ave NW
Madison Dr NW
15th St NW
14th St NW
13th St NW
12th St NW
11th St NW
10thSNW
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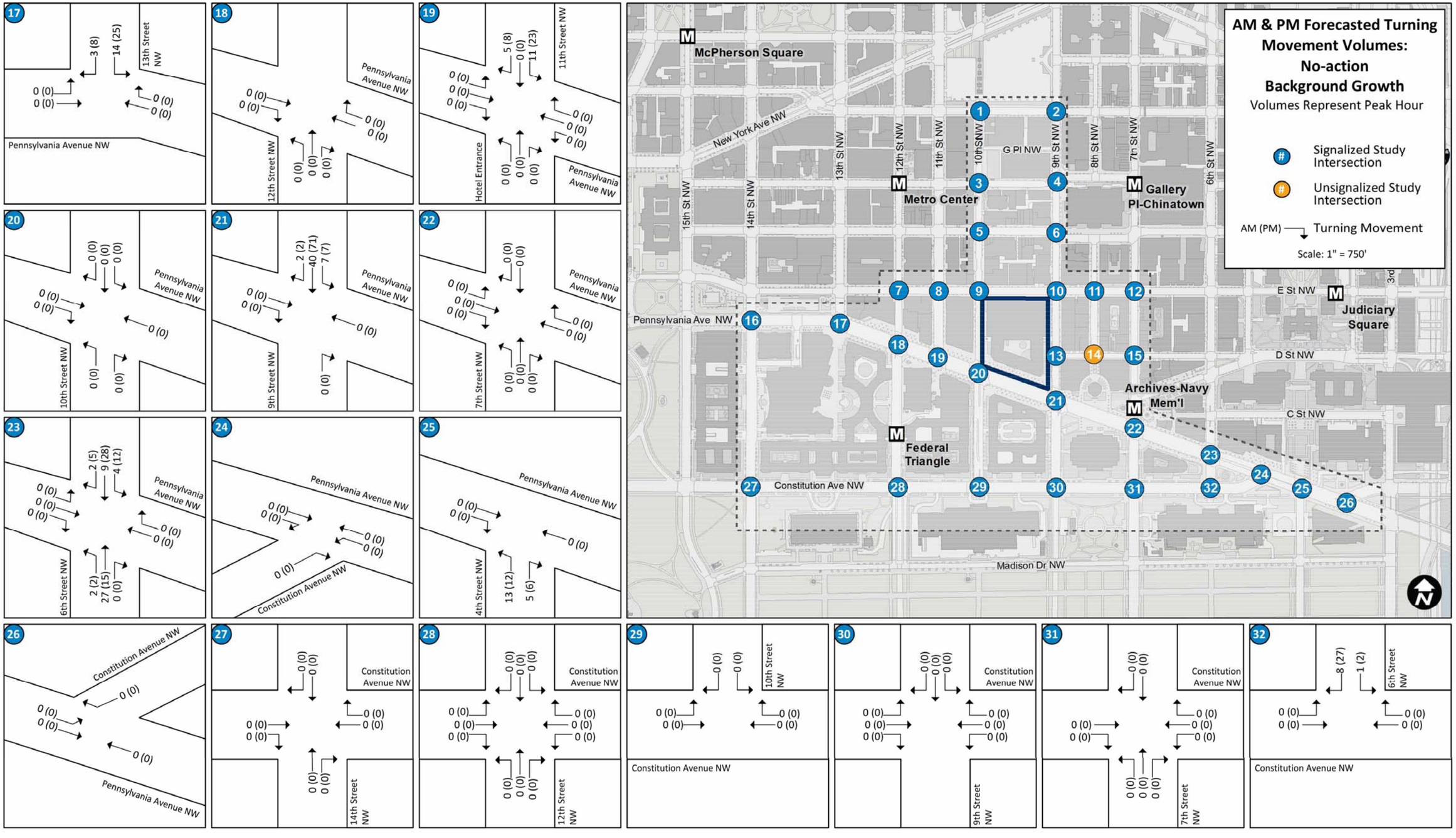
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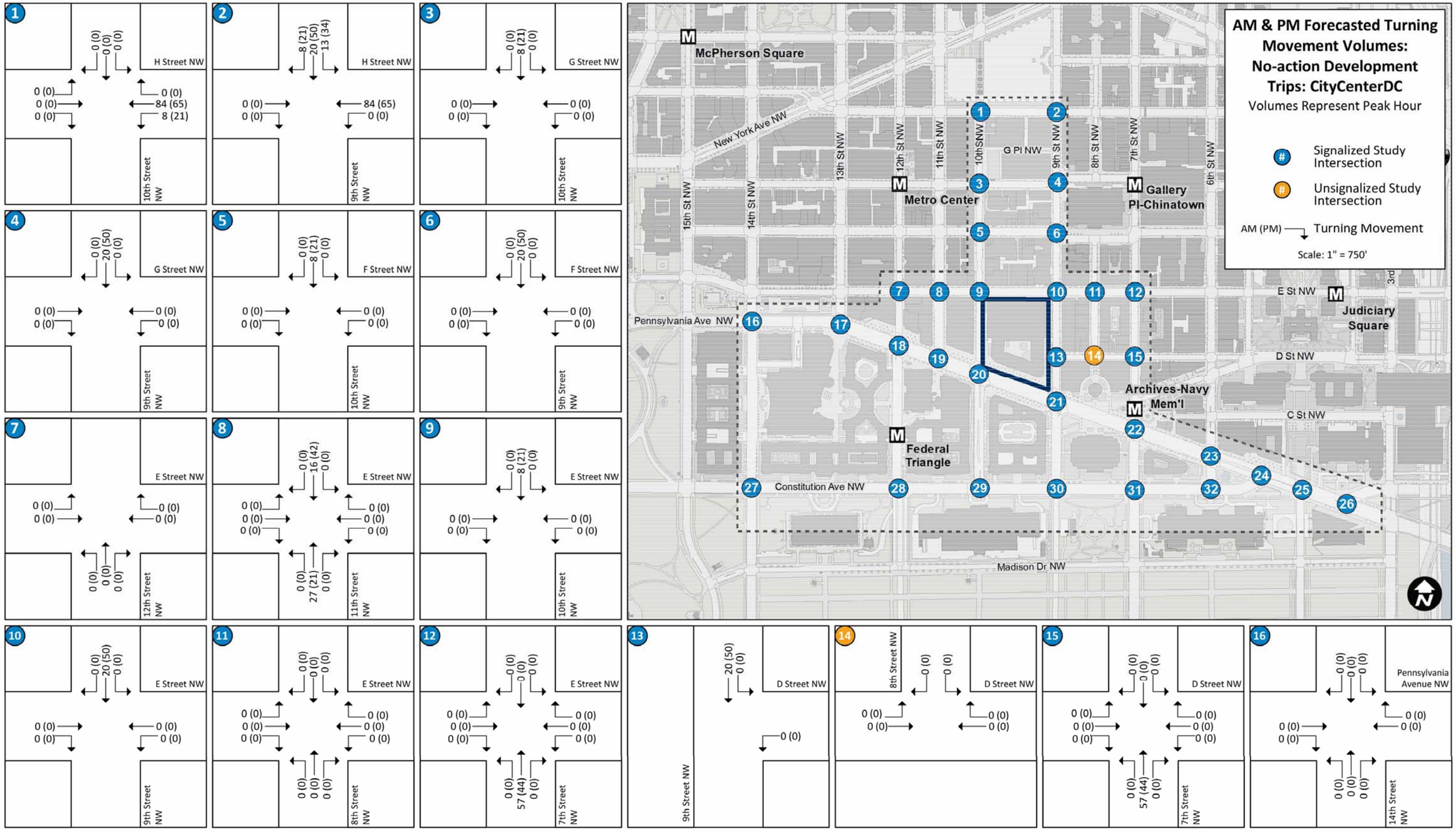
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Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 750'
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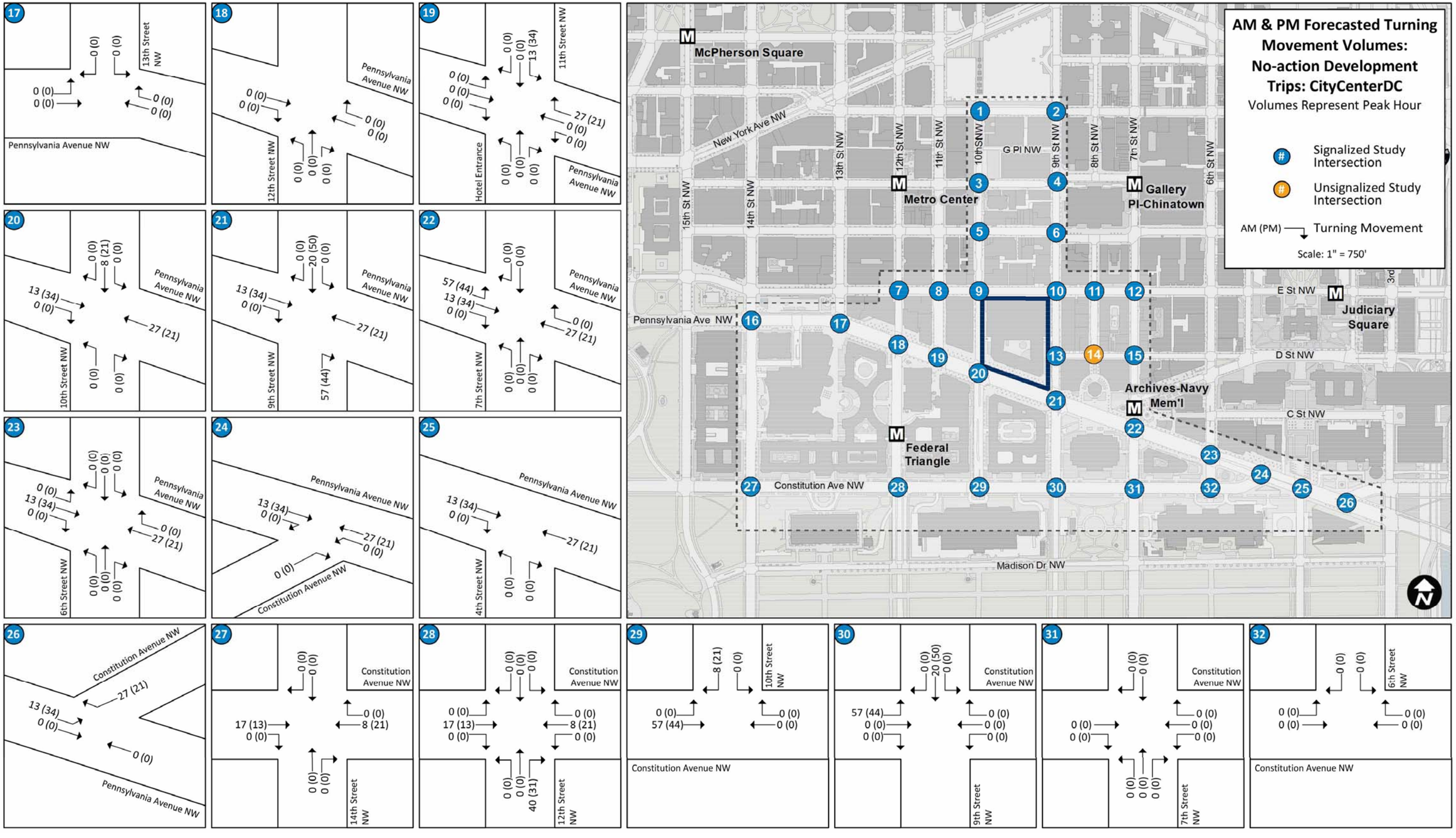
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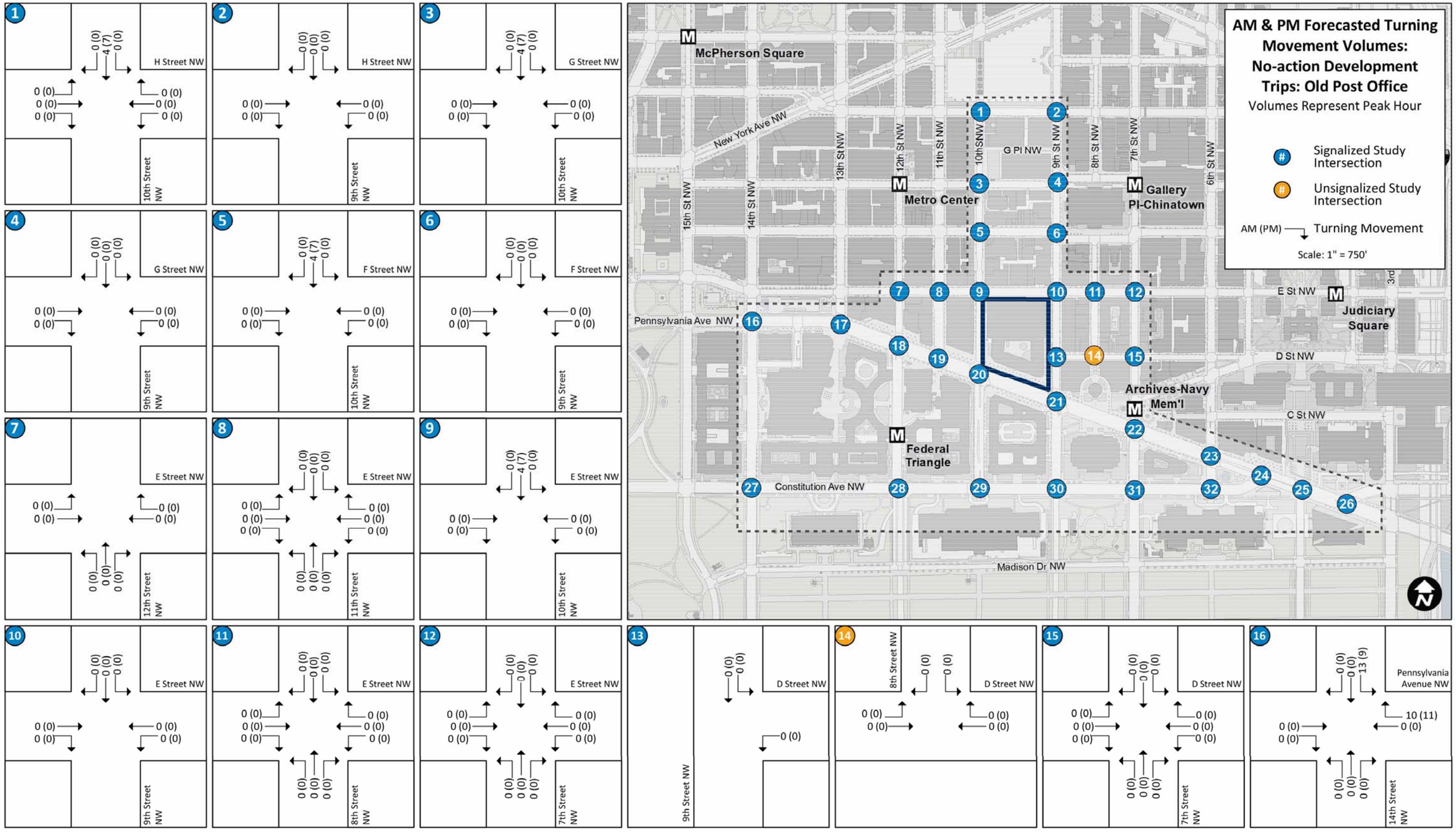
Hotel Entrance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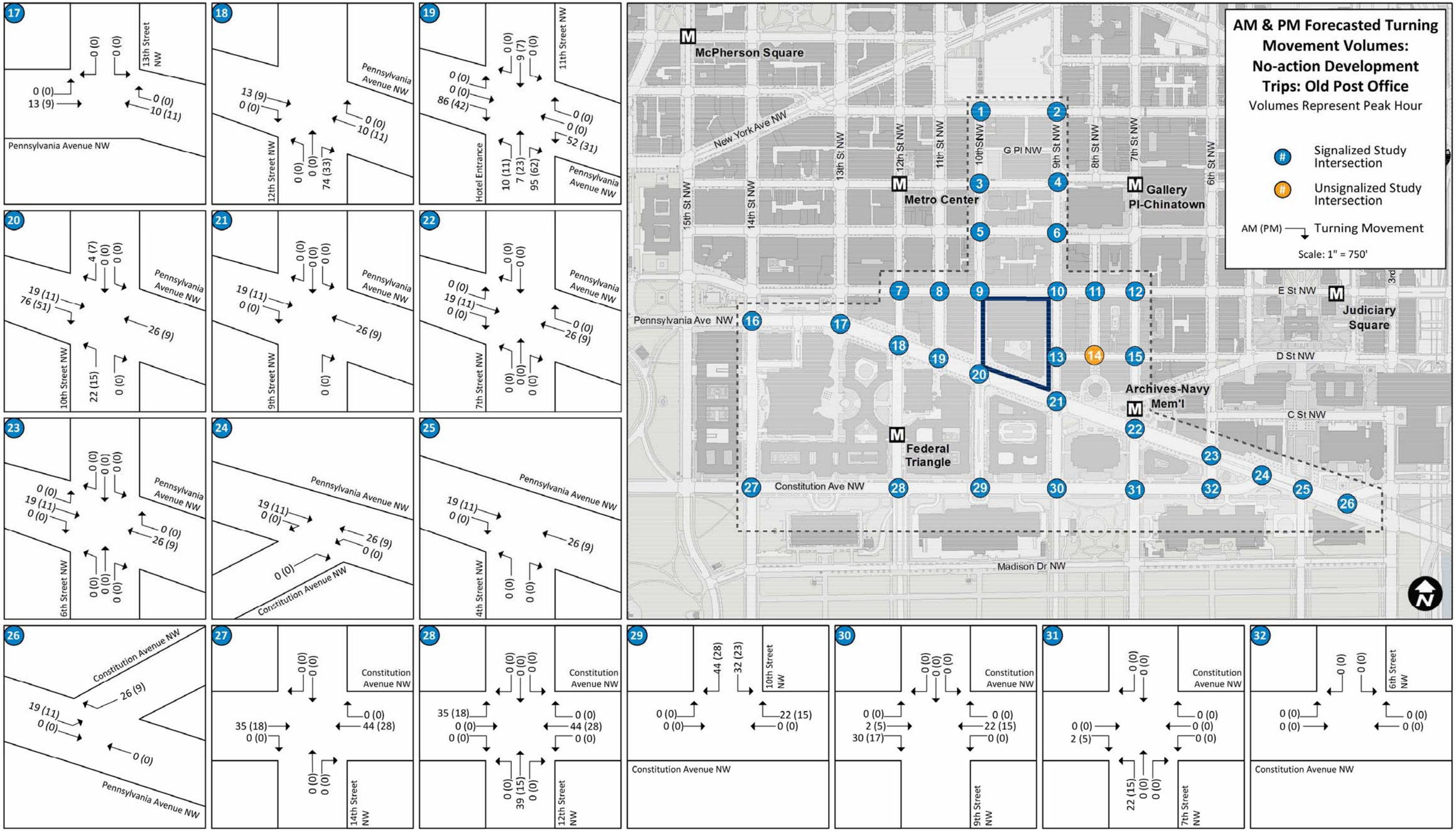
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11th Street NW
12th Street NW
Hotel Entrance
10th Street NW
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7th Street NW
6th Street NW
4th Street NW
14th Street NW
Constitution Avenue NW

Appendix B9

NCHRP 684 Worksheets

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

J Edgar Hoover Parcel

Prepared by

Louis Berger

for

GSA

October 2015

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	FBI Consolidation EIS	**Organization:**	GSA
Project Location:	JEH Parcel	**Performed By:**	LBG
Scenario Description:	Build - RFDS 2	**Date:**	
Analysis Year:	2025	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	1,416,348	SQ Feet	1595	1404	191
Retail	820	172,956	SQ Feet	218	135	83
Restaurant				0		
Cinema/Entertainment				0		
Residential	220	1,066	units	526	105	421
Hotel				0		
All Other Land Uses[2]				0		
Total				2339	1644	695

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		43	0	0	0	0
Retail	24		0	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	8	4	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	2,339	1,644	695
Internal Capture Percentage	7%	5%	12%
External Vehicle-Trips[3]	2,177	1,563	614
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	2%	23%
Retail	35%	31%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	3%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
[4]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	FBI Consolidation EIS	**Organization:**	GSA
Project Location:	JEH Parcel	**Performed By:**	LBG
Scenario Description:	No-action Alternative	**Date:**	
Analysis Year:	2025	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	1,416,348	SQ Feet	1665	283	1382
Retail	820	172,956	SQ Feet	865	424	441
Restaurant				0		
Cinema/Entertainment				0		
Residential	220	1,066	units	604	393	211
Hotel				0		
All Other Land Uses[2]				0		
Total				3134	1100	2034

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		34	0	0	16	0
Retail	9		0	0	115	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	8	42	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	3,134	1,100	2,034
Internal Capture Percentage	14%	20%	11%
External Vehicle-Trips[3]	2,686	876	1,810
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	6%	4%
Retail	18%	28%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	33%	24%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P
[4]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	FBI Consolidation EIS
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	1404	1404	1.00	191	191
Retail	1.00	135	135	1.00	83	83
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	105	105	1.00	421	421
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		53	120	0	2	0
Retail	24		11	0	12	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	8	4	84	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		43	0	0	0	0
Retail	56		0	0	2	0
Restaurant	197	11		0	5	0
Cinema/Entertainment	0	0	0		0	0
Residential	42	23	0	0		0
Hotel	42	5	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	32	1372	1404	1372	0	0
Retail	47	88	135	88	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	103	105	103	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	43	148	191	148	0	0
Retail	26	57	83	57	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	12	409	421	409	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	FBI Consolidation EIS
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	283	283	1.00	1382	1382
Retail	1.00	424	424	1.00	441	441
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	393	393	1.00	211	211
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		276	55	0	28	0
Retail	9		128	18	115	22
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	8	89	44	0		6
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		34	0	0	16	0
Retail	88		0	0	181	0
Restaurant	85	212		0	63	0
Cinema/Entertainment	17	17	0		16	0
Residential	161	42	0	0		0
Hotel	0	8	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	17	266	283	266	0	0
Retail	76	348	424	348	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	131	262	393	262	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	50	1332	1382	1332	0	0
Retail	124	317	441	317	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	50	161	211	161	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.