



APPENDIX D  
**COMPREHENSIVE  
TRANSPORTATION  
REVIEW**





**Smithsonian Institution South  
Mall Campus Master Plan**

Comprehensive Transportation  
Review



Prepared for:  
Smithsonian Institution

Prepared by:  
Stantec Consulting Services, Inc.

October 24, 2017

## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>I</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 STRATEGIC PLANNING ELEMENTS .....</b>	<b>2</b>
2.1 PLANS/STUDIES REVIEWED .....	2
<b>3.0 ROADWAY CAPACITY &amp; OPERATIONS.....</b>	<b>5</b>
3.1 VEHICLE STUDY AREA.....	5
3.2 DATA COLLECTION AND HOURS OF ANALYSIS .....	6
3.2.1 Turning Movement Counts.....	7
3.2.2 Queuing .....	7
3.3 CAPACITY ANALYSIS METHODOLOGY .....	7
3.4 DEVELOPMENT SCENARIOS .....	8
3.4.1 2017 Existing Condition .....	8
3.4.2 2040 Background/No Build Condition .....	10
3.4.3 2040 Future Build Condition.....	13
3.4.4 2040 Build Condition with Mitigation.....	19
<b>4.0 BICYCLE &amp; PEDESTRIAN FACILITIES .....</b>	<b>22</b>
4.1 EXISTING FACILITIES .....	22
4.1.1 Bicycle.....	22
4.1.2 Pedestrian.....	26
4.2 PROPOSED PLANS.....	26
4.3 IMPACT OF PROPOSED EXPANSION ON EXISTING AND PROPOSED FACILITIES.....	26
<b>5.0 TRANSIT SERVICE .....</b>	<b>28</b>
<b>6.0 SITE ACCESS &amp; LOADING.....</b>	<b>29</b>
<b>7.0 PARKING AND PASSENGER LOADING .....</b>	<b>30</b>
7.1 PARKING.....	30
7.2 PASSENGER LOADING .....	31
<b>8.0 SAFETY .....</b>	<b>32</b>
8.1 SIGHT DISTANCE .....	32
<b>9.0 STREETScape &amp; THE PUBLIC REALM.....</b>	<b>33</b>
<b>10.0 CONCLUSION.....</b>	<b>34</b>

## LIST OF FIGURES

FIGURE 1: WASHINGTON & INDEPENDENCE AVE SW/HHS WEEKDAY .....	23
FIGURE 2: 4TH & E ST SW WEEKDAY .....	23
FIGURE 3: MARYLAND & INDEPENDENCE AVE WEEKDAY .....	23
FIGURE 4: L'ENFANT PLAZA / 7TH & C ST SW WEEKDAY .....	23
FIGURE 5: 7TH & E ST SW (4/1/2017 – 9/30/2017) WEEKDAY .....	23
FIGURE 6: 10TH ST & L'ENFANT PLAZA SW WEEKDAY .....	23
FIGURE 7: INDEPENDENCE AVE & L'ENFANT PLAZA SW/DOE WEEKDAY .....	23
FIGURE 8: USDA/12TH & INDEPENDENCE AVE SW WEEKDAY .....	23
FIGURE 9: JEFFERSON DRIVE & 14TH ST SW WEEKDAY .....	23
FIGURE 10: WASHINGTON & INDEPENDENCE AVE SW/HHS WEEKEND .....	24
FIGURE 11: 4TH & E ST SW WEEKEND .....	24
FIGURE 12: MARYLAND & INDEPENDENCE AVE SW WEEKEND .....	24
FIGURE 13: L'ENFANT PLAZA / 7TH & C ST S WEEKEND .....	24
FIGURE 14: 7TH & E ST SW (4/1/2017 – 9/30/2017) WEEKEND .....	24
FIGURE 15: 10TH ST & L'ENFANT PLAZA SW WEEKEND .....	24
FIGURE 16: INDEPENDENCE AVE & L'ENFANT PLAZA SW/DOE WEEKEND .....	24
FIGURE 17: USDA/12TH & INDEPENDENCE AVE SW WEEKEND .....	24
FIGURE 18: JEFFERSON DRIVE & 14TH ST SW WEEKEND .....	24
FIGURE 19: STUDY AREA PARKING REGULATIONS .....	30

## LIST OF TABLES

TABLE 1: STUDY AREA ROADWAY CHARACTERISTICS .....	6
TABLE 2: LOS CRITERIA FOR SIGNALIZED AND UNSIGNALIZED INTERSECTIONS .....	8
TABLE 3: 2017 EXISTING CONDITION INTERSECTION CAPACITY ANALYSIS .....	9
TABLE 4: HISTORICAL AADT .....	10
TABLE 5: GROWTH RATE .....	10
TABLE 6: 2040 BACKGROUND/NO BUILD INTERSECTION CAPACITY ANALYSIS .....	11
TABLE 6: MODE SPLIT (SOURCE: 2013 VISITOR EXPERIENCE SUMMARY REPORT) .....	14
TABLE 7: TRIP GENERATION AND MODE SPLIT .....	14
TABLE 9: TRIP DISTRIBUTION FOR TRANSIT AND WALKING/OTHER TRIPS .....	15
TABLE 10: TRIP DISTRIBUTION FOR VEHICULAR TRIPS .....	16
TABLE 11: 2040 BACKGROUND/NO BUILD AND 2040 BUILD INTERSECTION CAPACITY ANALYSES .....	17
TABLE 12: 2040 BACKGROUND/NO BUILD, 2040 BUILD, AND 2040 BUILD WITH MITIGATION INTERSECTION CAPACITY ANALYSES .....	20

## LIST OF APPENDICES

APPENDIX A: SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS LOADING DOCK CTR
APPENDIX B: STUDY AREA DATA
APPENDIX C: CAPACITY ANALYSIS
APPENDIX D: SYNCHRO OUTPUTS
APPENDIX E: PARKING

## Executive Summary

The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. The SI Master Plan is expected to be implemented over a 15- to 20-year timeframe. As part of the overall vision for the South Mall Campus, SI is proposing to add approximately 317,500 square feet of additional educational and support spaces, consolidate the existing loading areas adjacent to the Sackler Gallery (underground) and the Arts and Industry Building (at-grade) into a single loading driveway that would be accessed via a ramp at the intersection of Independence Avenue SW and 12th Street SW, on the west side of the Freer Gallery of Art, and to reconfigure the courtyard and garden space to provide more cohesive pedestrian connections between facilities.

It is anticipated that the proposed underground expansion of the South Mall Campus buildings to provide additional education and retail/service space will generate additional trips comprised of both visitors and employees. The other proposed enhancements, including the consolidation/relocation of the loading driveways and modifications to the gardens and courtyard, are not anticipated to generate additional trips. It should be noted that the analysis conducted for this CTR covers the expansion of facilities, with the assumption that the consolidated loading dock is in place. A separate CTR has been completed and submitted to DDOT for the analysis of the proposed consolidated loading dock. A copy of the loading dock CTR can be found in Appendix D.

## Methodology

Stantec Consulting Services, Inc. (Stantec) conducted the assessment of the proposed facility expansion based on Chapter 45 of the DDOT Design and Engineering Manual (DEM) and DDOT Guidelines for Comprehensive Transportation Review Requirements. The assessment includes:

- A review of several city-wide planning documents as well as local studies including the 2005 Bicycle Master Plan, 2009 Pedestrian Master Plan, moveDC, Southwest Ecodistrict Plan, Memorials & Museums Master Plan, Maryland Avenue SW Transportation Study, and Smithsonian Institution South Mall Campus Master Plan.
- A capacity analysis conducted on the Independence Avenue SW and Jefferson Drive SW corridors, including the signalized intersections at 14th Street SW, 12th Street SW, and 10th Street SW (L'Enfant Promenade/Plaza), 9th Street SW, and 7th Street SW for the 2017 Existing, 2040 No Build, and 2040 Build, and 2040 Build with Mitigation Conditions.
- An inventory of the current study area Capital Bikeshare network
- An assessment of the impact of the proposed facility expansion on existing and potential future pedestrian, bicycle, transit, and parking facilities.

- Development of recommendations to mitigate operational deficiencies.

### Conclusions and Recommendations

The proposed Smithsonian South Mall Campus expansion would have a negligible effect on the local roadway network, increasing overall vehicle volumes by approximately 1%. However, due to existing capacity deficiencies and future growth within the study area, the following minor mitigation measures are proposed to mitigate the small increases in delay generated by the proposed facility expansion:

#### Vehicle

1. Signal timing, phasing, and offset modifications, including an increase in cycle lengths from 110 seconds to 150 seconds in the PM peak hour. This would need to be conducted as a part of a wider signal retiming effort, which would likely be required in the future to accommodate background growth and other projects by 2040.
2. Modify the existing unsignalized intersection of SW Jefferson Drive and 12<sup>th</sup> Street SW from a two-way stop controlled intersection to an all-way stop controlled intersection. Modifying the SW Jefferson Drive eastbound shared thru-right movement from a free movement to a stop-controlled movement would grant more acceptable gaps for pedestrians to cross SW Jefferson Drive, along with reducing delay for right turning vehicles on 12<sup>th</sup> Street SW.
3. Modify the southbound 14<sup>th</sup> Street SW approach to Jefferson Drive to include a protected-permitted left-turn phase.

#### Pedestrian/Bicycle

1. Monitor utilization of onsite bicycle parking, as well as Capital Bikeshare stations within ¼ mile. If demand exceeds capacity install new bike racks and/or a Capital Bikeshare Station. If a new Capital Bikeshare Station is required, consider locating it near the intersection of 7<sup>th</sup> Street SW and Jefferson Drive SW to fill an existing gap in the system.
2. Upgrade all curb ramps connecting to/from the South Mall Campus to meet current ADA standards.
3. Provide a new crosswalk along the east side of the intersection of Independence Avenue SW and 12<sup>th</sup> Street SW.

### Passenger Loading

1. Monitor passenger loading areas to determine if they continue to meet SI needs without impacting traffic operations on Jefferson Drive SW or Independence Avenue SW.

### Loading

1. All deliveries made with trucks WB-50 or larger will be scheduled in advance. These deliveries will be scheduled to avoid the AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods, unless necessary. This would likely have a minimal impact on the South Mall Campus facilities, as the majority of deliveries with larger trucks currently occur during off-peak periods.
2. Deliveries made in vehicles larger than a single unit truck should enter from northbound 12<sup>th</sup> Street SW or eastbound Independence Avenue SW to avoid wide right-turns into the proposed driveway.
3. Right-turns on red should be restricted at the proposed driveway and the westbound Independence Avenue SW approach at the signalized intersection with 12<sup>th</sup> Street SW.

## 1.0 INTRODUCTION

The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. The SI Master Plan is expected to be implemented over a 15- to 20-year timeframe. As part of the overall vision for the South Mall Campus, SI is proposing to add approximately 317,500 square feet of additional educational and support spaces, consolidate the existing loading areas adjacent to the Sackler Gallery (underground) and the Arts and Industry Building (at-grade) into a single loading driveway that would be accessed via a ramp at the intersection of Independence Avenue SW and 12th Street SW, on the west side of the Freer Gallery of Art, and to reconfigure the courtyard and garden space to provide more cohesive pedestrian connections between facilities.

In addition to expanding and enhancing the campus, the consolidated loading areas is necessary because the current loading areas along Independence Avenue SW do not provide adequate space for larger vehicles. Large box trucks and tractor trailers often back into or out of the loading areas, creating disruptions to traffic flow on Independence Avenue SW. Large exhibition deliveries, which typically arrive in larger tractor trailers (WB-67), must park and load/unload on Independence Avenue SW, which exposes the exhibit materials to unnecessary risk. The proposed loading driveway would be able to accept all truck types (up to WB-67), as well as eliminate the need for trucks to back in to or out of the driveways, as occurs in the existing condition. Instead, trucks would be able to turn around within the underground loading area. A separate CTR was prepared in August 2017 to evaluate the loading dock consolidation, and a copy of the CTR can be found in Appendix A.

This assessment of the proposed facility expansion is based on Chapter 45 of the DDOT Design and Engineering Manual (DEM) and DDOT Guidelines for Comprehensive Transportation Review Requirements. It is anticipated that the proposed underground expansion of the South Mall Campus buildings to provide additional education and retail/service space will generate additional trips comprised of both visitors and employees. The other proposed enhancements, including the consolidation/relocation of the loading driveways and modifications to the gardens and courtyard, are not anticipated to generate additional trips. It should be noted that the analysis conducted for this CTR covers the expansion of facilities, with the assumption that the consolidated loading dock is in place. A separate CTR has been completed and submitted to DDOT for the analysis of the proposed consolidated loading dock.

## 2.0 STRATEGIC PLANNING ELEMENTS

Stantec reviewed several city-wide planning documents as well as local studies to determine how the proposed project considers District growth goals and objectives within the study area. These documents included the 2005 Bicycle Master Plan, 2009 Pedestrian Master Plan, moveDC, Southwest Ecodistrict Plan, Memorials & Museums Master Plan, Maryland Avenue SW Transportation Study, and Smithsonian Institution South Mall Campus Master Plan.

### 2.1 PLANS/STUDIES REVIEWED

*2005 Bicycle Master Plan.* This plan is a guide to establishing high-quality bicycle facilities and programs from 2005 to 2015 through facility improvements, policy changes, education, promotion, and enforcement. The plan shows that no dedicated bicycle facilities exist along Independence Avenue SW or 14th Street SW, resulting in bicycle levels of service (BLOS) of D and E, respectively. To correct these deficiencies, the plan proposes a bicycle lane on 14th Street SW and signed bicycle routes along Independence Avenue SW and 14th Street SW. A progress update to the plan can be found in an appendix of moveDC.

*2009 Pedestrian Master Plan.* This plan serves as the foundation for DDOT's pedestrian programs and represents the first comprehensive city-wide effort to address pedestrian safety challenges and related issues. The goals of the plan are to reduce the number of pedestrian fatalities and injuries associated with motor vehicle crashes and to increase pedestrian activity by creating a comfortable and accessible environment for walking throughout all parts of the District.

Through an analysis of existing conditions, the plan identified the segments of 14th Street SW and Independence Avenue SW within the study area to have medium-high pedestrian activity with medium-high pedestrian facility deficiencies. This process also identified Independence Avenue SW, from 15th Street SW to South Capitol St SW, as a priority corridor for improvements. However, no action was recommended at the time due to few pedestrian injuries occurring during the period from 2000 to 2006. A progress update to the plan can be found in an appendix of moveDC.

*moveDC.* Published in October 2014, moveDC was a collaborative effort led by DDOT to present a vision and improvement course for the District's transportation system over the next 25 years. MoveDC focuses on more travel options, reliability of transportation systems, safety for all, and efficiency of investments. The plan proposes more than 200 new miles of bicycle facilities, a 22-mile streetcar system with the possibility of extension lines, and more than 40 miles of High Capacity Transit. Within the study area specifically, the plan shows that the bicycle level of service (LOS) is D or better and proposes a cycle track on Independence Avenue SW. It also contains progress updates to the 2005 Bicycle and 2009 Pedestrian Master Plans as of December 2013.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Strategic Planning Elements  
October 24, 2017

*Southwest Ecodistrict Initiative.* Published by the National Capital Planning Commission (NCPC), the SW Ecodistrict Initiative is a comprehensive and forward-looking approach to urban sustainability and livability through transformation of the Maryland Avenue SW and 10th Street SW (L'Enfant Promenade and Plaza) area into a highly sustainable mixed-use community. The study area is bounded by Independence Avenue SW to the north, Maine Avenue SW to the south, 12th Street SW to the west, and 4th Street SW to the east. The plan examines the redevelopment of 12 sites and streetscaping of 10th Street SW to encourage a walkable neighborhood and economic growth. The U.S. General Services Administration (GSA) Regional Office Building (ROB) and Cotton Annex, located on D Street SW and 12th Street SW respectively, are two sites that are beginning the redevelopment process. Traffic studies for these developments were included in the 2030 Background/No Build Condition analysis.

*Memorials & Museums Master Plan.* The NCPC, in consultation with the U.S. Commission of Fine Arts and the National Capital Memorial Advisory Committee, developed a plan that shows how to meet demand for museums and commemorative works while protecting the National Mall and preserving other existing museum and memorial settings. The plan inventories existing, and forecasts future demand for memorials and museums, identifies and evaluates suitable sites for future memorials and museums, and establishes a zoning policy for siting. The plan is currently guiding the construction of the Dwight D. Eisenhower Memorial on a site adjacent to the study area, north of the U.S. Department of Education and across Independence Avenue SW from the National Air and Space Museum. A traffic study for this development was included in the 2030 Background /No Build Condition analysis.

*Maryland Avenue SW Transportation Study.* DDOT is currently studying the impacts on multi-modal operations, including vehicular, bus, rail, pedestrian, and bicycle, from the creation of a new Maryland Avenue SW corridor between 12th Street SW and 7th Street SW. The study examines three potential configurations of a future connection over the existing rail corridor. The plan would propose a new 11th Street SW that would connect to the study area and create a new intersection. To maintain optimal traffic flow, signal retiming at the study area intersections may be required along the corridor.

*Smithsonian Institution South Mall Campus Master Plan.* The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. Among these improvements is the consolidation of up to three loading docks/driveways along Independence Avenue SW into one new underground loading area and driveway. The new loading area would accept all truck types and eliminate the need for trucks to park or make any loading maneuvers within the roadway. Potential Impact of Proposed Driveway on Plans

Ultimately, the expanded facilities and consolidation of the loading driveways along Independence Avenue SW into one loading dock/driveway for the South Mall Campus would not affect the findings and recommendations of these planning documents and studies. In fact,

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Strategic Planning Elements  
October 24, 2017

the consolidation of the loading driveways would likely enhance pedestrian and bicycle operations along Independence Avenue SW by eliminating conflict points at the uncontrolled driveways. The proposed consolidated driveway would be signal controlled, and thus potential pedestrian and bicycle conflicts with trucks would be better controlled. Consolidating the driveways would also eliminate potential conflict points along the cycle track proposed on Independence Avenue SW in the moveDC plan.

## 3.0 ROADWAY CAPACITY & OPERATIONS

### 3.1 VEHICLE STUDY AREA

The study area is formally located in the Southwest Federal Center neighborhood, in Ward 6, between the National Mall and I-395. The neighborhood is primarily a business district and almost entirely occupied by offices for various branches of the U.S. Government and many of SI's museums. Bounded by Jefferson Drive SW to the north, Independence Avenue SW to the south, 14th Street SW to the west, and 7th Street SW to the east, the study area includes the South Mall Campus. The study area includes the following signalized intersections:

- Independence Avenue SW and 14th Street SW
- Independence Avenue SW and 12<sup>th</sup> Street SW
- Independence Avenue SW and L'Enfant Plaza SW
- Independence Avenue SW and 9<sup>th</sup> Street SW
- Independence Avenue SW and 7<sup>th</sup> Street SW
- Jefferson Drive SW and 14<sup>th</sup> Street SW
- Jefferson Drive SW and 12<sup>th</sup> Street SW
- Jefferson Drive SW and 7<sup>th</sup> Street SW

Characteristics of the study area roadways were obtained from maps on the DDOT website denoting functional classification, 2015 Average Annual Daily Traffic (AADT), speed limits, and truck routes/loading zones. This information is summarized in Table 1. The table also lists the number of lanes and parking types as observed during a roadway inventory.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

**Table 1: Study Area Roadway Characteristics**

Roadway	Functional Class	2015 AADT	Number of Lanes, Division	Parking Type	Speed Limit (mph)	Primary Truck Route/Designated Loading Zones?
<b>Jefferson Drive SW</b>	Local	6,300	1, Undivided	On-street 3 Hour Limit	15	No/No
<b>Independence Avenue SW</b>	Principal Arterial	27,500	8, Undivided	On-street Metered	25	Yes/No
<b>14<sup>th</sup> Street SW</b>	Principal Arterial	41,500	7, Divided south of Independence Avenue SW	On-street Metered Special Permit	25	Yes/No
<b>12<sup>th</sup> Street SW</b>	Local	15,800	5, Divided south of Independence Avenue SW	On-street Metered	25	Yes/No
<b>L'Enfant Plaza SW</b>	Local	4,400	2, Divided south of Independence Avenue SW	On-street Metered	25	No/No
<b>9<sup>th</sup> Street SW</b>	Local	21,300	1, Undivided	On-street Metered	25	Yes/No
<b>7<sup>th</sup> Street SW</b>	Principal Arterial	17,300	8, Undivided	On-street Metered	25	Yes/No

It should be noted that most on-street, metered parking in the study area is only permitted between specific hours. At all other times on arterials, the parking lane operates as a travel lane during peak commuting hours.

### 3.2 DATA COLLECTION AND HOURS OF ANALYSIS

Stantec conducted a comprehensive data collection program to establish “average day” baseline conditions for vehicular, transit, pedestrian, and cyclist traffic within the study area. The program consisted of manual turning movement counts and queuing and loading activity observations. All data were collected on a typical weekday when District schools and Congress were in session and there were no major special events on the National Mall.

Saturday data was also collected on September 30<sup>th</sup> and October 7<sup>th</sup>, 2017. No issues were noted with the data collected on Saturday, September 30<sup>th</sup> at the intersections on Independence Avenue SW & 9<sup>th</sup> Street SW and Independence Avenue SW & 7<sup>th</sup> Street SW. However, the intersections of Independence Avenue SW & 14<sup>th</sup> Street SW, Independence Avenue SW & 12<sup>th</sup> Street, and SW Independence Avenue SW & L'Enfant Plaza SW had inflated eastbound through volumes resulting from a baseball game occurring at Nationals Park in the Navy Yard neighborhood of Washington DC on Saturday, October 7<sup>th</sup>, 2017. Volumes are adjusted for the incoming traffic by balancing them with turning movement counts taken on Saturday September 30<sup>th</sup>, 2017.

### 3.2.1 Turning Movement Counts

Manual turning movement counts were collected during the PM peak period (3:30PM – 6:30PM) and Saturday peak period (12:00PM – 4:00PM) at the seven study intersections in September and October 2017. It should be noted that the weekday AM peak period is not included. Most of the SI facilities do not open until 10:00 AM, with the exception of the Smithsonian Institution Building (SIB), which opens at 8:30 AM. However, SI is planning to relocate many office staff from SIB to another location as part of the Master Plan. Therefore, the proposed modifications to the South Mall Campus are anticipated to have a negligible impact on the weekday AM peak hour operations of the adjacent roadway network.

The traffic counts include vehicles, heavy vehicles, buses, pedestrians, and bicyclists. Appendix B contains the raw count data. An analysis of this data revealed the PM peak hour to be 5:00PM – 6:00PM and the Saturday peak hour to be 3:00PM – 4:00PM.

### 3.2.2 Queuing

Queuing observations were conducted during the turning movement counts to determine if additional unmet demand would need to be considered in the traffic analysis. Despite clear peak hour directional volume (westbound in the PM), the results of the queue observations show minimal to no queuing was observed along Independence Avenue SW and Jefferson Drive SW. Therefore, it was determined that the traffic analysis did not need to consider additional unmet demand.

## 3.3 CAPACITY ANALYSIS METHODOLOGY

Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed using Synchro 9, which is based on the methodology of the 2010 Highway Capacity Manual (HCM 2010) to establish average volume to capacity (v/c) ratios, delays, and level of service (LOS) for each intersection. Roadway geometry, signal timing, and traffic data were entered into the model.

The v/c ratio relates the demand at an intersection (traffic volume) to the available capacity. The available capacity for each movement varies depending on number of lanes, lane width, perception/reaction time, green time, and cycle length, among others. A v/c ratio of 1.0 means that the demand for a specific turning movement is equal to the capacity. A movement with a v/c ratio at or over 1.0 is considered undesirable because the movement volume exceeds the capacity, which results in queuing, indicating unmet demand along that approach.

LOS is an evaluation of the quality of operation of an intersection and is a measure of the average delay a driver experiences while traveling through the intersection. LOS is dependent on a range of defined operating conditions such as traffic demand, lane geometry, and traffic signal timing and phasing.

LOS can range from A to F and is based on the average control delay per vehicle in seconds. For a signalized intersection, LOS A indicates operations with an average control delay less than 10 seconds per vehicle, while LOS F describes operations with an average control delay in excess of 80 seconds per vehicle or a v/c ratio greater than 1.0. For an unsignalized intersection, LOS A indicates operations with an average control delay less than 10 seconds per vehicle, while LOS F describes operations with an average control delay exceeding 50 seconds per vehicle or a v/c ratio greater than 1.0. The HCM 2010 delay criteria for signalized and unsignalized intersections are summarized in Table 2.

**Table 2: LOS Criteria for Signalized and Unsignalized Intersections**

Level of Service	Average Control Delay (seconds/vehicle)	
	Signalized	Unsignalized
<b>A</b>	Less than or equal to 10.0	Less than or equal to 10.0
<b>B</b>	> 10.0 and ≤ 20.0	>10.0 and ≤ 15.0
<b>C</b>	> 20.0 and ≤ 35.0	>15.0 and ≤ 25.0
<b>D</b>	> 35.0 and ≤ 55.0	>25.0 and ≤ 35.0
<b>E</b>	> 55.0 and ≤ 80.0	>35.0 and ≤ 50.0
<b>F</b>	Greater than 80.0 or v/c > 1.0	Greater than 50.0 or v/c > 1.0

Source: 2010 Highway Capacity Manual

While LOS D or better operations are generally deemed satisfactory from a traffic operations perspective, LOS E or F operations are often indicative of queuing and congestion. Improvements as recommended in this study seek to maintain or improve traffic operations to LOS D or better, as reported by HCM 2010.

Signal plans and timing directives were delivered by DDOT and were field-verified to accurately model signal operation type, phasing, detection, and cycle length in the HCM 2010 output files utilized for capacity analysis.

## 3.4 DEVELOPMENT SCENARIOS

### 3.4.1 2017 Existing Condition

2017 Existing Condition volumes for the PM and Saturday peak hours, shown in Exhibit 1 in Appendix C, were modeled in Synchro 9 to produce capacity analysis results, summarized in Exhibits 2 and 3 in Appendix C. All Synchro capacity analysis outputs are located in Appendix D. Table 3 summarizes the delay for all study area intersections in the PM and Saturday peak hours.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

**Table 3: 2017 Existing Condition Intersection Capacity Analysis**

Intersection	PM Peak	Hour	Saturday	Peak Hour
	Delay	Level of Service	Delay	Level of Service
14th Street SW & Jefferson Drive SW	17.4	B	10.2	B
12th Street SW & Jefferson Drive SW	0.7	A	2.9	A
7th Street SW & Jefferson Drive SW	8.8	A	9.3	A
14th Street SW & Independence Avenue SW	37.4	D	21.2	C
12th Street SW & Independence Avenue SW	47.1	D	15.4	B
Independence Avenue SW & L'Enfant Plaza	19.5	B	9.5	A
9th Street SW & Independence Avenue SW	20.0	B	9.2	A
7th Street SW & Independence Avenue SW	28.3	C	12.3	B

The results show that all lane groups in the study area intersections currently operate at LOS D or better with 95<sup>th</sup> percentile queuing (< 500 feet), except for the following:

### *SW Jefferson Drive & 14<sup>th</sup> Street SW*

- The eastbound shared through-right movement operates at LOS E during the PM peak hour.

### *Independence Avenue SW & 14<sup>th</sup> Street SW*

- The westbound shared left-through-right movement operates at LOS F during the PM peak hour.
- The southbound left turn movement operates at LOS E during the PM peak hour.

### *Independence Avenue SW & 12<sup>th</sup> Street SW*

- The westbound left-turn movement operates at LOS F and E during the PM and Saturday peak hours, respectively. The movement also has a 95<sup>th</sup> percentile queue length of over 500 feet during the PM peak hour.
- The westbound shared through-right movement operates at LOS F during the PM peak hour.

### *Independence Avenue SW & 7<sup>th</sup> Street SW*

- The Northbound left-turn movement operates at LOS E during the PM peak hour.

According to the table presented in Chapter 45 of the DDOT DEM, the threshold capacity for major arterials such as Independence Avenue SW, 14<sup>th</sup> Street SW, and 7<sup>th</sup> Street SW, is

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

approximately 45,000 vehicles per day. Using historical AADT data (2009-2013) provided on the DDOT website and presented in Table 4, Stantec estimated the current v/c ratio for these roadways to be 0.55, 0.91, and 0.39, respectively.

**Table 4: Historical AADT**

Year	Independence Avenue SW between 9 <sup>th</sup> Street SW and 12 <sup>th</sup> Street SW	14 <sup>th</sup> Street SW between C Street SW and Jefferson Drive SW	7 <sup>th</sup> Street SW between Jefferson Drive SW and Independence Avenue SW
2011	21.5	40.9	18.9
2012	21.3	N/A	18.7
2013	26.6	40.7	16.7
2014	27.1	40.8	17.0
2015	27.5	41.5	17.3
Average	24.8	41.0	17.7

Note: AADT in 1,000s

### 3.4.2 2040 Background/No Build Condition

The horizon year of 2040 was selected for the proposed project to correspond with the projected completion of the Smithsonian South Mall Campus construction. Stantec applied a background growth rate of 0.9 percent per year based on historical AADT data along a segment of Independence Avenue SW from 2009 to 2013 as reported by DDOT. This is the same growth rate that was applied to the Loading Dock CTR to be consistent. Table 5 shows this data. Exhibit 10 in Appendix C shows the projected background volumes within the study area.

**Table 5: Growth Rate**

Year	Independence Avenue SW between 9 <sup>th</sup> Street SW and 12 <sup>th</sup> Street SW AADT in 1,000	Difference %
2009	26.9	--
2010	26.2	-2.6%
2011	21.5	-17.9%
2012	21.3	-0.9%
2013	26.6	24.9%
Growth Rate	Total	-1.1%
	Average	0.875% ~ 0.9%

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

Three developments, previously discussed in Section 2.0 as part of the SW Ecodistrict Plan and Memorials & Museums Master Plan, and included in the Loading Dock CTR, are expected to have an impact on traffic volumes in the study area. These include the redevelopment of the GSA ROB and Cotton Annex as well as the construction of the Eisenhower Memorial. Since the GSA redevelopment projects are still in their scoping phase with DDOT, their trip generation, trip distribution, and corresponding mode splits were obtained from DDOT. Vehicular trip generation and distribution for the Eisenhower Memorial were obtained from the report entitled "Eisenhower Memorial Traffic Impact Study" by EarthTech and dated May 2006. Exhibits 5 through 10 in Appendix C show how all anticipated development trips were distributed through the existing roadway network.

Project background growth volumes and development volumes were summed to obtain 2040 No Build Condition volumes for the AM and PM peak hours, shown in Exhibit 11 in Appendix C. These volumes were modeled in Synchro 9 to produce capacity analysis results, summarized in Exhibit 11 in Appendix C. Table 6 summarizes the delay for all study area intersections in the PM and Saturday peak hours.

**Table 6: 2040 Background/No Build Intersection Capacity Analysis**

Intersection	PM Peak Hour		Saturday Peak Hour	
	Delay	Level of Service	Delay	Level of Service
14th Street SW & Jefferson Drive SW	43.7	D	13.1	B
12th Street SW & Jefferson Drive SW	0.7	A	4.0	A
7th Street SW & Jefferson Drive SW	10.0	A	10.4	B
14th Street SW & Independence Avenue SW	94.1	F	23.5	C
12th Street SW & Independence Avenue SW	130.2	F	20.4	C
Independence Avenue SW & L'Enfant Plaza	23.7	C	9.7	A
9th Street SW & Independence Avenue SW	26.9	C	10.0	A
7th Street SW & Independence Avenue SW	57.0	E	14.2	B

All Synchro capacity analysis outputs are located in Appendix D. Based on the results of the capacity analysis, all lane groups in the study area intersections would operate at LOS D or better with 95<sup>th</sup> percentile queuing of less than 500 feet in the 2040 horizon year, except for the following:

*SW Jefferson Drive & 14<sup>th</sup> Street SW*

- The eastbound shared through-right movement would operate at LOS F during the PM peak hour and has queue length of over 500 feet.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

- The northbound shared through-right movement would operate at LOS E and would have a 95<sup>th</sup> percentile queue length of over 550 feet during the PM peak hour
- The southbound left-turn lane would operate at LOS F and E during the PM and Saturday peak hours, respectively.

### *Independence Avenue SW & 14<sup>th</sup> Street SW*

- The westbound shared left-through-right movement would operate at LOS F during the PM peak hour.
- The northbound shared through-right movement would operate at LOS F during the PM peak hour and would have a 95<sup>th</sup> percentile queue length of over 600 feet.
- The southbound left turn movement would operate at LOS F during the PM peak hour.

### *Independence Avenue SW & 12<sup>th</sup> Street SW*

- The westbound left-turn movement would operate at LOS F and E during the PM and Saturday peak hours, respectively. The movement would also have a 95<sup>th</sup> percentile queue length of over 600 feet during the PM peak hour.
- The westbound shared through-right movement would operate at LOS F during the PM and Saturday peak hours. The movement would also have a 95<sup>th</sup> queue length of over 900 feet during the PM peak hour.
- The northbound shared through-right moment would operate at LOS E during the PM peak hour

### *Independence Avenue SW & L'Enfant Plaza*

- The northbound left-turn lane would operate at LOS E during the PM peak hour

### *Independence Avenue SW & 9<sup>th</sup> Street SW*

- The northbound shared left-through movement would operate at LOS F during the PM peak hour.

### *Independence Avenue SW & 7<sup>th</sup> Street SW*

- The eastbound left-through-right movement would operate at LOS F during the PM peak hour.
- The northbound left-turn movement would operate at LOS F during the PM peak hour.
- The southbound left turn lane would operate at LOS E during the PM peak hour.

### 3.4.3 2040 Future Build Condition

#### 3.4.3.1 Trip Generation

Stantec obtained facility entrance logs from SI for April 2016, which provide the number of people entering each facility (including visitors, staff, and volunteers) by hour, for each day of the month. It should be noted that the Freer Gallery was closed in April 2016; thus, data from April 2015 was utilized for that facility. A weekday average was calculated for each hour between 10:00 AM and 6:00 PM (facilities close at 5:30 PM) utilizing data from each Tuesday, Wednesday, and Thursday in April (See Exhibit 1 in Appendix B). A similar method was applied to calculate a Saturday average by using data from each Saturday in April.

It should be noted that the entrance log is only a record of people entering the facilities. Therefore, exiting volumes were estimated with the assumption that all people entering must exit within the same day. Information obtained from SI indicates that most visitors spend one to two hours at any one of the South Mall Campus facilities. Thus, an algorithm was developed to calculate the exiting volumes utilizing the following assumptions (see Exhibit 1):

- 10% of visitors leave within one hour;
- 40% of visitors leave within one to two hours;
- 40% of visitors leave within two to three hours;
- 10% of visitors leave after three hours; and,
- All remaining visitors and staff must leave during the 5:00 PM – 6:00 PM hour.

Based on data collected for the South Mall Campus Loading Dock CTR, the weekday PM peak hour of the adjacent roadway network was determined to be 5:00 PM – 6:00 PM. Utilizing the entrance log data shown in Exhibit 1, as well as the total square footage of all the South Mall Campus facilities (845,500 square feet), a rate of 1.90 person-trips per 1,000 square feet was calculated for the weekday PM peak hour. The data shows that 15% of trips would enter and 85% of trips would exit.

Adjacent roadway network volumes were not available for the Saturday peak hour, therefore the Saturday peak hour trip generation rate was calculated for the peak hour of person-trips at the facilities, which occurred between 2:00 PM and 3:00 PM. The resulting Saturday peak hour trip generation rate is 6.75 person-trips per 1,000 square feet. The data also shows that 54% of trips would enter and 46% of trips would exit.

##### 3.4.3.1.1 Mode Split Data

Mode split data was obtained from SI's 2013 Visitor Experience Summary Report (see Table 6). While the mode split estimates come from a survey of visitors, feedback from SI indicates that the non-auto mode split for employees and volunteers would likely be similar because parking is not provided for employees or volunteers. Furthermore, the 2013 survey was taken prior to an

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

expansion of Capital Bikeshare stations in the area. Therefore, DDOT has provided a recommendation to increase the bike mode share to 6%.

Furthermore, although it is expected that employees and volunteers would likely have a higher transit mode share and a lower walking mode share, both transit and walk trips would be reflected as pedestrian trips in the capacity analysis. Thus, their impact to the adjacent roadway network would be similar.

**Table 7: Mode Split (Source: 2013 Visitor Experience Summary Report)**

Mode of Transportation	Percentage of Trips
<b>Public Transit</b> (Bus, Metrorail, Commuter Rail)	49%
<b>Walking</b>	20%
<b>Vehicle</b>	23%
<b>Bike</b>	6%
<b>Other (Shuttle, Tour Bus, etc.)</b>	2%

### 3.4.3.1.2 Trip Generation and Mode Split Calculations

A person-trip generation and mode split estimate was calculated utilizing the information described above (Table 6). While transit, walking, and other non-auto modes will be represented in the analysis as person-trips walking to/from nearby transit stops or other major origins and destinations near the South Mall Campus, it is not appropriate to equate individual person-trips with vehicle trips. Information obtained from SI indicates an average group size of approximately three (3) people per vehicle. Thus, the number of vehicle person-trips was divided by three to estimate the number of new vehicle trips that would be generated by the expansion.

**Table 8: Trip Generation and Mode Split**

Existing Square Footage	Proposed Square Footage*	Additional Square Footage	PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total
<b>845,500</b>	1,163,000	317,500	91	511	602	1,149	995	2,144
<b>Public Transit (49%)</b>			45	251	295	563	487	1,051
<b>Walking (20%)</b>			18	102	120	230	199	429
<b>Bike (6%)</b>			5	31	36	69	60	129
<b>Other (2%)</b>			2	10	12	23	20	43
<b>Total Non-Auto Person Trips</b>			70	394	463	885	766	1,652
<b>Vehicle (23%)</b>			21	118	139	264	229	492
<b>Total New Vehicle Trips</b>			7	39	46	88	76	164

\*Includes expansion of existing facilities and opening of Arts and Industries Building as detailed in Master Plan Alternative F

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

### 3.4.3.1.3 Employees

As noted previously, it is anticipated that up to 200 office staff members that currently occupy a portion of the Castle building will be relocated off-site as part of the Master Plan. These employees have a typical "9 to 5" work schedule. The proposed expansion of the South Mall campus facilities would also likely require additional exhibit support staff and volunteers, although the exact number of additional staff is not known at this Master Plan level. However, it should be noted that the door count data includes visitors, staff, and volunteers. Therefore, it can be assumed that the trip generation figures shown in Table 2 include additional staff and volunteers. While it is likely that the staff and volunteers have a higher transit mode split, specific mode split data is not available. Therefore, the visitor mode split data was utilized to be conservative.

Furthermore, no PM peak hour credit was taken for the 200 existing employees that may potentially be relocated, due to the uncertainty around future staffing levels at this stage of the Master Plan effort. It is our opinion that this provides for a conservative analysis which is flexible to future Master Plan changes and likely represents a maximum trip generation rate.

### 3.4.3.2 Trip Distribution

#### 3.4.3.2.1 Non-Auto Trip Distribution

The traffic analysis considers all non-auto modes as pedestrian trips, but with distinct trip origins/destinations. Transit trips are assigned as pedestrian trips to and from adjacent bus stops and Metrorail stations. Walking and "Other" (bicycle, shuttle, tour bus, etc.) trips are assigned as pedestrian trips to and from other museums and attractions. A preliminary distribution of these trips is shown in Table 9.

**Table 7: Trip Distribution for Transit and Walking/Other Trips**

Trip Type	Origin/Destination	Percentage
<b>Transit</b>	Smithsonian Metro	40%
	L'Enfant Plaza Metro/VRE	30%
	Bus Stops on Independence Ave and Jefferson Dr (in front of site)	10%
	Bus Stop on 14th Street (at Jefferson Dr)	10%
	Bus Stop on 7th Street (at Jefferson Dr)	10%
<b>Walking/Other</b>	To/From North via National Mall	30%
	To/From West via Jefferson Drive	25%
	To/From East via Jefferson Drive	25%
	To/From South and West via Independence Avenue	10%
	To/From South and East via Independence Avenue	10%

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

### 3.4.3.2.2 Vehicle Trip Distribution

Vehicle trip distribution was estimated utilizing Google maps to plot the most direct route to the South Mall Campus from the surrounding DC metropolitan area and the 2014 Traffic Volume Map provided on DDOT's website. The resulting vehicle trip distributions are shown in Table 10. The South Mall Campus does not provide parking for visitors or staff; therefore, for the purposes of this analysis, it was assumed that the new vehicle trips would utilize existing on-street parking on Jefferson Drive and Independence Avenue.

**Table 8: Trip Distribution for Vehicular Trips**

Origin/Destination	Percentage
To/From the North and West via I-395 to 14th Street	45%
To/From South and East via I-695 to 12th Street	20%
To/From North via I-395 to 12th Street	15%
To/From North via 7th Street	1%
To/From South via 7th Street	1%
To/From North via 14th Street	7%
To/From West via Independence Avenue	7%
To/From East via Independence Avenue	4%

### 3.4.3.3 Loading Dock/Driveway Consolidation

The proposed loading dock/driveway would be located between the ramp to the 12<sup>th</sup> Street Expressway and the Freer Gallery of Art at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW. For the purpose of this CTR, Stantec utilized the results of the trip generation calculated as part of the Loading Dock CTR (see Appendix A).

### 3.4.3.4 2040 Build Condition Capacity Analysis

Stantec modeled the study area with the proposed Independence Avenue SW & 12th Street SW intersection configuration for the new loading dock in Synchro 9 for the 2040 Future Build Condition with optimized PM and Saturday timing plans to obtain capacity analysis results (Exhibits 2 and 3 in Appendix C). More detailed Synchro capacity analysis output is located in Appendix D. Table 9 summarizes the delay for all study area intersections in the PM and Saturday peak hours compared to the results from the 2040 Background/No Build Condition capacity analysis.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

**Table 11: 2040 Background/No Build and 2040 Build Intersection Capacity Analyses**

Intersection	2040 Background/No Build Condition				2040 Build Condition			
	PM Peak Hour		Saturday Peak Hour		PM Peak Hour		Saturday Peak Hour	
	Delay	Level of Service	Delay	Level of Service	Delay	Level of Service	Delay	Level of Service
<b>14th Street SW &amp; Jefferson Drive SW</b>	43.7	D	13.1	B	44.5	D	14.4	B
<b>12th Street SW &amp; Jefferson Drive SW</b>	0.7	A	4.0	A	1.2	A	121.6	F
<b>7th Street SW &amp; Jefferson Drive SW</b>	10.0	A	10.4	B	10.5	B	12.0	B
<b>14th Street SW &amp; Independence Avenue SW</b>	94.1	F	23.5	C	102.9	F	23.7	C
<b>12th Street SW &amp; Independence Avenue SW</b>	130.2	F	20.4	C	108.7	F	32.8	C
<b>Independence Avenue SW &amp; L'Enfant Plaza</b>	23.7	C	9.7	A	23.0	C	10.1	B
<b>9th Street SW &amp; Independence Avenue SW</b>	26.9	C	10.0	A	28.9	C	9.7	A
<b>7th Street SW &amp; Independence Avenue SW</b>	57.0	E	14.2	B	58.1	E	14.0	B

Based on the results of the capacity analysis, all lane groups in the study area intersections would operate at LOS D or better with 95<sup>th</sup> percentile queues of less than 500 feet, except for the following:

## SW Jefferson Drive & 14<sup>th</sup> Street SW

- The eastbound shared through-right movement would operate at LOS F during the PM peak hour and has queue length of over 500 feet.
- The northbound shared through-right movement would operate at LOS E and would have a 95<sup>th</sup> percentile queue length of over 550 feet during the PM peak hour
- The southbound left-turn lane would operate at LOS F and E during the PM and Saturday peak hours, respectively.

## SW Jefferson Drive & 12<sup>th</sup> Street SW



## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

- The northbound right-turn lane would operate at LOS F during the Saturday peak hour.

### *Independence Avenue SW & 14<sup>th</sup> Street SW*

- The westbound shared left-through-right movement would operate at LOS F during the PM peak hour and would have a 95<sup>th</sup> percentile queue length of over 750 feet.
- The northbound shared through-right movement would operate at LOS F during the PM peak hour and would have a 95<sup>th</sup> percentile queue length of over 600 feet.
- The southbound left turn movement would operate at LOS F during the PM peak hour.

### *Independence Avenue SW & 12<sup>th</sup> Street SW*

- The eastbound left-through-right movement would operate at LOS F during the PM peak hour.
- The westbound left-turn movement would operate at LOS F the PM and Saturday peak hours. The movement would also have a 95<sup>th</sup> percentile queue length of over 600 feet during the PM peak hour.
- The westbound shared through-right movement would operate at LOS F during the PM and Saturday peak hours. The movement would also have a 95<sup>th</sup> queue length of over 900 feet during the PM peak hour.
- The northbound shared U-turn-right movement would operate at LOS F during the PM peak hour.
- The northbound shared through-right moment would operate at LOS F during the PM peak hour.
- The southwestbound shared left-through-right movement would operate at LOS F during the PM peak hour.

### *Independence Avenue SW & L'Enfant Plaza*

- The northbound left-turn lane would operate at LOS E during the PM peak hour

### *Independence Avenue SW & 9<sup>th</sup> Street SW*

- The northbound shared left-through movement would operate at LOS F during the PM peak hour.

### *Independence Avenue SW & 7<sup>th</sup> Street SW*

- The eastbound left-through-right movement would operate at LOS F during the PM peak hour.
- The northbound left-turn movement would operate at LOS F during the PM peak hour.
- The southbound left turn lane would operate at LOS E during the PM peak hour.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

To accommodate the proposed driveway, restriping, signal equipment and sign installation, new curb ramps, and streetscaping would be required at the intersection of Independence Avenue SW & 12th Street SW. All roadway improvements would conform to DEM standards.

### 3.4.4 2040 Build Condition with Mitigation

The results of the 2040 Build Condition capacity analysis revealed the additional site generated trips, although relatively minor compared to the background volume, would result in an increase in delay and queuing at one or more turning movements at most study area intersections. This is primarily due to background growth in the study area that is anticipated to occur between 2017 and 2040. Therefore, mitigation measures are required. Given the built-out nature of the transportation network within the area, emphasis was placed on improving the overall intersection operations through adjustments to signal timing and phasing. In accordance with DDOT standards, mitigation measures were performed to any movements that exhibited at least one of the following results:

- Degradation of LOS to "E" or worse in future scenario.
- Increase in delay at intersection operating under LOS "E" or "F" of greater than 5 seconds, when compared to background scenario.
- Increase in 95% queue length of greater than 150 feet, when compared to background scenario.

Table 10 summarizes the delay for all study area intersections in the PM and Saturday peak hours compared to the results from the 2040 Background/No Build and 2040 Build Conditions capacity analyses.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

**Table 12: 2040 Background/No Build, 2040 Build, and 2040 Build with Mitigation Intersection Capacity Analyses**

Intersection	2040 Background/No Build Condition				2040 Build Condition				2040 Build with Mitigation Condition			
	PM Peak Hour		Saturday Peak Hour		PM Peak Hour		Saturday Peak Hour		PM Peak Hour		Saturday Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
<b>14th St SW &amp; Jefferson Dr SW</b>	43.7	D	13.1	B	44.5	D	14.4	B	26.3	C	16.9	B
<b>12th St SW &amp; Jefferson Dr SW</b>	0.7	A	4.0	A	1.2	A	121.6	F	8.9	A	9.6	A
<b>7th St SW &amp; Jefferson Dr SW</b>	10.0	A	10.4	B	10.5	B	12.0	B	19.4	B	11.2	B
<b>14th St SW &amp; Independence Ave SW</b>	94.1	F	23.5	C	102.9	F	23.7	C	88.5	F	25.2	C
<b>12th St SW &amp; Independence Ave SW</b>	130.2	F	20.4	C	108.7	F	32.8	C	133.6	F	30.6	C
<b>Independence Ave SW &amp; L'Enfant Plaza</b>	23.7	C	9.7	A	23.0	C	10.1	B	17.6	B	10.0	A
<b>9th St SW &amp; Independence Ave SW</b>	26.9	C	10.0	A	28.9	C	9.7	A	16.4	B	9.7	A
<b>7th St SW &amp; Independence Ave SW</b>	57.0	E	14.2	B	58.1	E	14.0	B	53.1	D	14.0	B

Recommended mitigation measures include:

- Signal timing, phasing, and offset modifications, including an increase in cycle lengths from 110 seconds to 150 seconds in the PM peak hour. This would need to be conducted as a part of a wider signal retiming effort, which would likely be required in the future to accommodate background growth and other projects by 2040.
- Modify the existing unsignalized intersection of SW Jefferson Drive and 12<sup>th</sup> Street SW from a two-way stop controlled intersection to an all-way stop controlled intersection. Modifying the SW Jefferson Drive eastbound shared thru-right movement from a free movement to a stop-controlled movement would grant more acceptable gaps for pedestrians to cross SW Jefferson Drive, along with reducing delay for right turning vehicles on 12<sup>th</sup> Street SW.
- Modify the southbound 14<sup>th</sup> Street SW approach to Jefferson Drive to include a protected-permitted left-turn phase.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Roadway Capacity & Operations  
October 24, 2017

Synchro 9 Outputs for the 2040 Build Condition with Mitigation Condition can be found in Appendix D. The results of the analysis, shown in Exhibits 2 and 3, reveal that the proposed mitigation measures would address the additional delay and queueing that was identified in the 2040 Build Condition capacity analysis, and would even improve operations when compared to the No Build Condition for many movements.

## 4.0 BICYCLE & PEDESTRIAN FACILITIES

The South Mall Campus is located in an area with extensive bicycle and pedestrian facilities. This section will evaluate these existing facilities, identify planned improvements, and recommend additional improvements if necessary.

### 4.1 EXISTING FACILITIES

#### 4.1.1 Bicycle

Bicycle facilities within a one-mile bikeshed of the study area were assessed. There are 27 Capital Bikeshare locations and dedicated bicycle lanes and/or bicycle street ROW provided on the following streets: 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, 15<sup>th</sup>, E, F, G, I, and Pennsylvania Avenue. Off-street bike trails exist throughout the areas of the National Mall, Tidal Basin, and Washington Channel. Bike routes and trails are signed on 4<sup>th</sup> Street SW and along the Washington Channel. There are no dedicated bicycle facilities along Independence Avenue SW. However, given the width of the sidewalks along this corridor, bicyclists were observed to ride both on street and on the sidewalks, particularly on the eastbound side.

##### 4.1.1.1 Capital Bikeshare Analysis

Capital bikeshare stations in a ¼-mile radius of the study area were assessed for their utilization. The results for the assessment can be seen in Figures 1 – 9 show the average count of available bike and bike docks on weekdays from April 1<sup>st</sup>, 2016 through October 31<sup>st</sup>, 2016. Figures 10 – 19 show the same data for weekends during the above time period. The red line is a count of available bikes at the station while the gray line is a count of available bike docks at the station. It should be noted that the bikeshare station at 7<sup>th</sup> & E St SW has been added in the past year and thus only data on from April 1<sup>st</sup>, 2017 through September 30<sup>th</sup>, 2017 could be provided.

Figure 1: Washington & Independence Ave SW/HHS Weekday

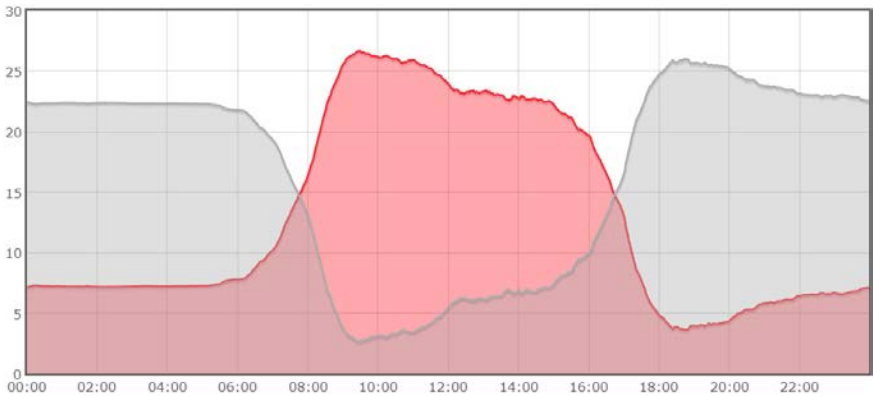


Figure 4: L'Enfant Plaza / 7th & C St SW Weekday

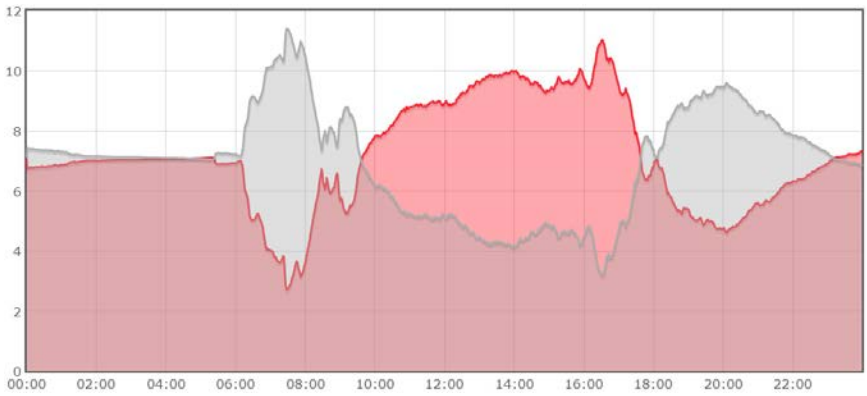


Figure 7: Independence Ave & L'Enfant Plaza SW/DOE Weekday

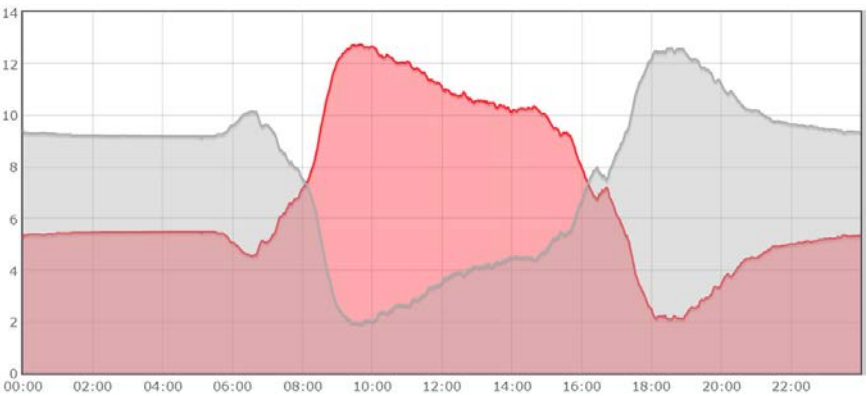


Figure 2: 4th & E St SW Weekday

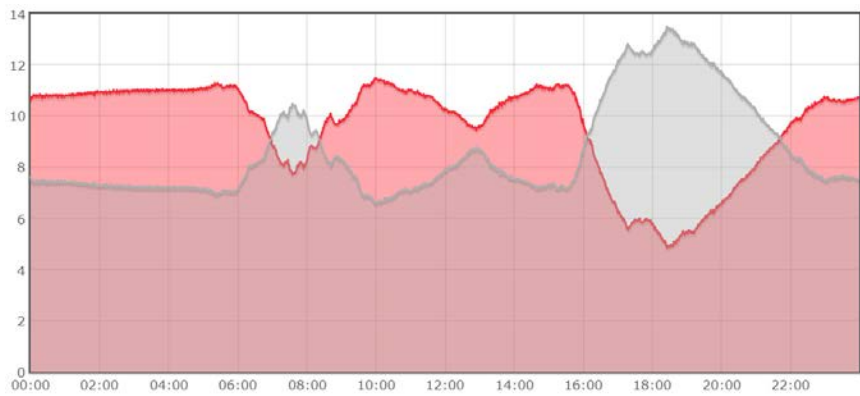


Figure 5: 7th & E St SW (4/1/2017 – 9/30/2017) Weekday

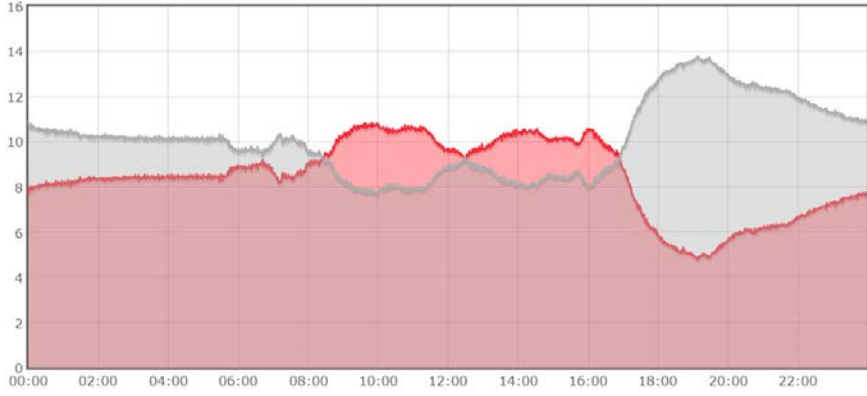


Figure 8: USDA/12th & Independence Ave SW Weekday

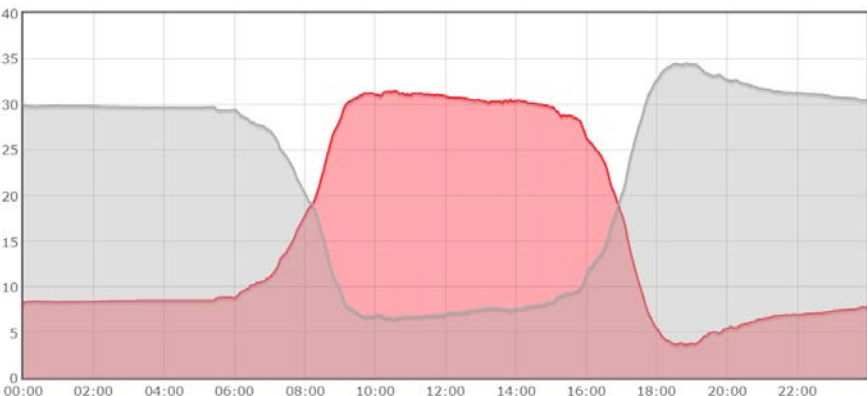


Figure 3: Maryland & Independence Ave Weekday

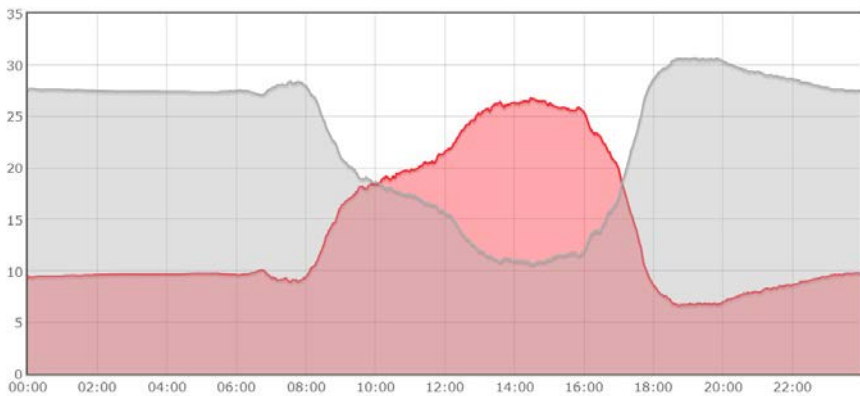


Figure 6: 10th St & L'Enfant Plaza SW Weekday

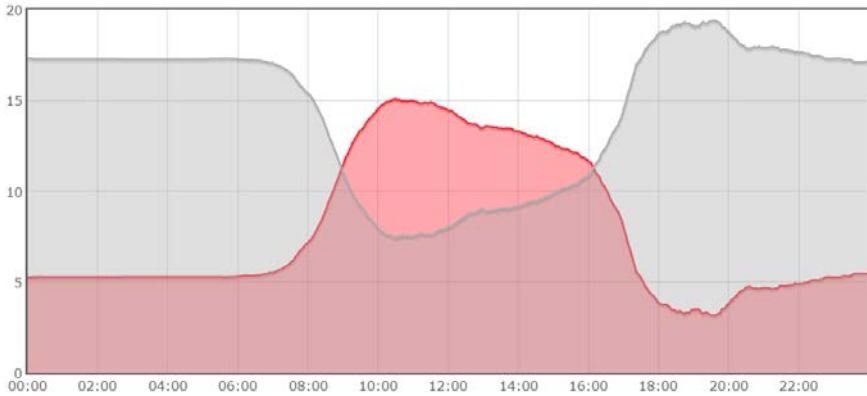


Figure 9: Jefferson Drive & 14th St SW Weekday

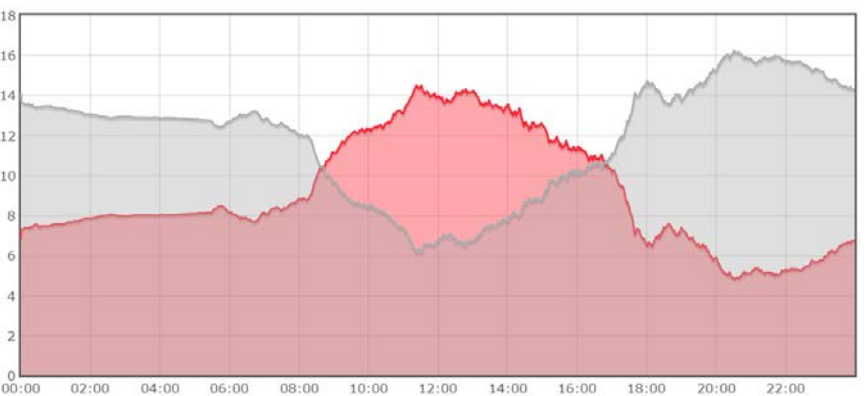


Figure 10: Washington & Independence Ave SW/HHS Weekend

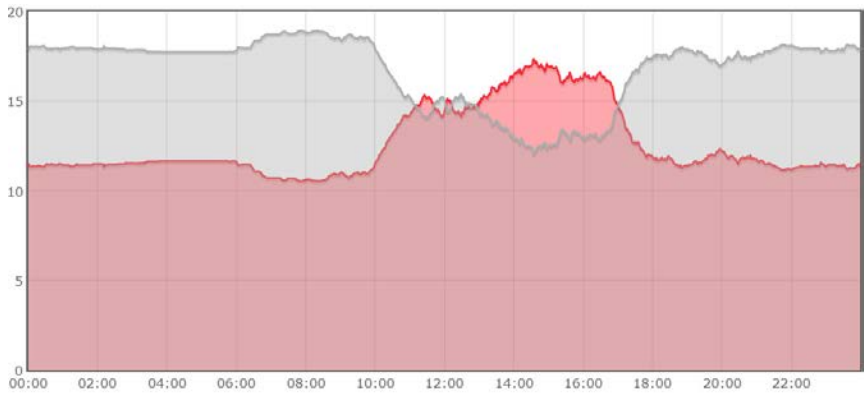


Figure 13: L'Enfant Plaza / 7th & C St S Weekend

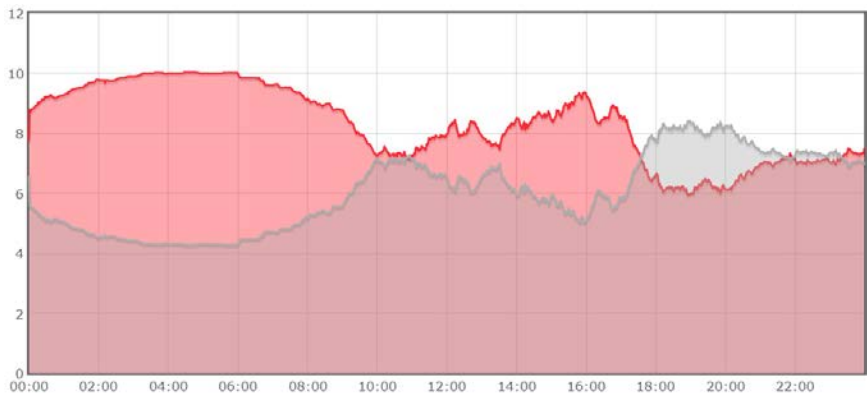


Figure 16: Independence Ave & L'Enfant Plaza SW/DOE Weekend

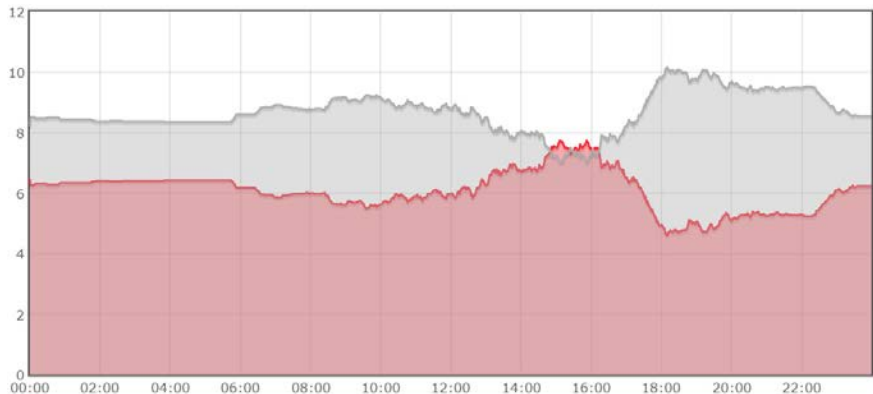


Figure 11: 4th & E St SW Weekend

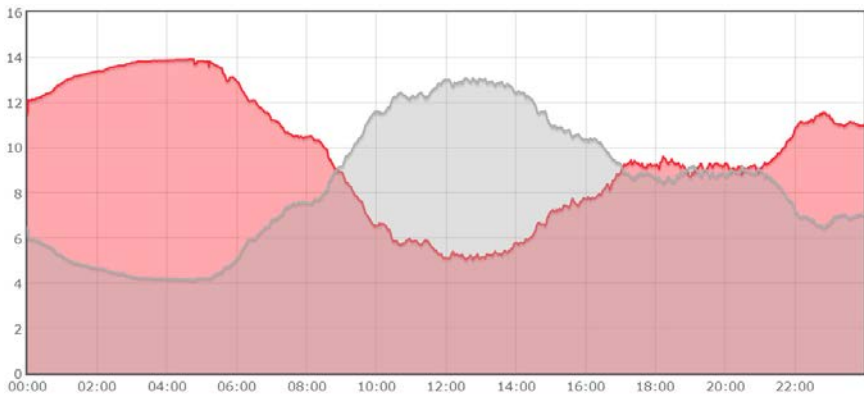


Figure 14: 7th & E St SW (4/1/2017 – 9/30/2017) Weekend

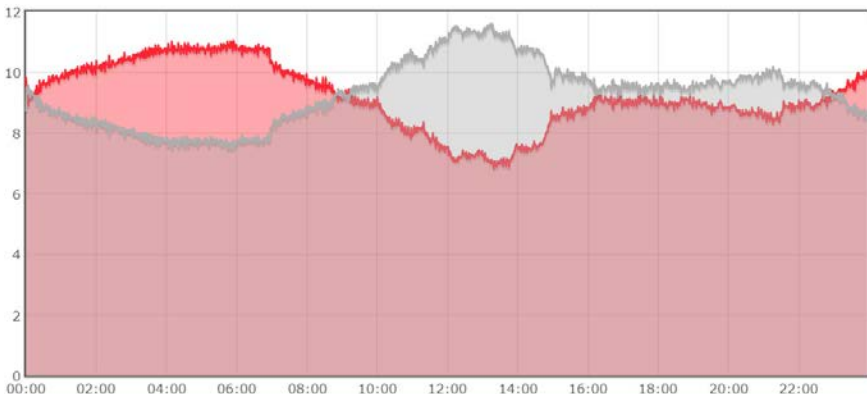


Figure 17: USDA/12th & Independence Ave SW Weekend

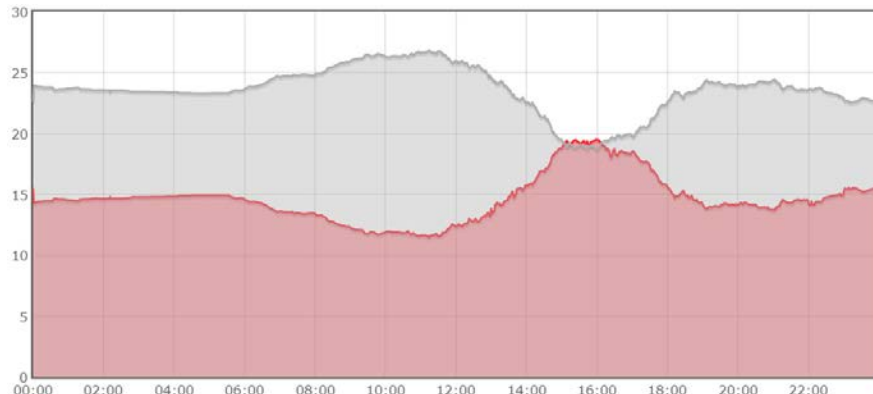


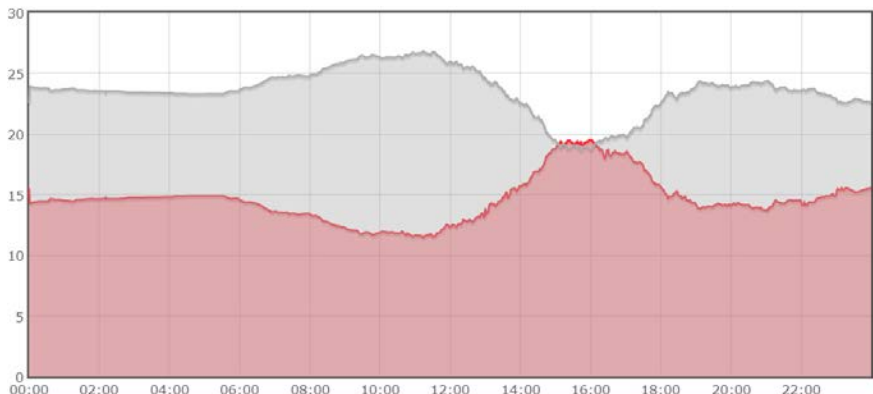
Figure 12: Maryland & Independence Ave SW Weekend



Figure 15: 10th St & L'Enfant Plaza SW Weekend



Figure 18: Jefferson Drive & 14th St SW Weekend



## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Bicycle & Pedestrian Facilities  
October 24, 2017

The data suggests that the number of available bikes peaks on an average weekday and weekend between 10:00 AM and 4:00 PM. This pattern is consistent with trip patterns for the office space adjacent to the study area during weekdays, as well as the museum operating hours. Furthermore, the patterns reveal that the stations are relatively under-utilized during off-peak hours, which would be consistent with the stations being located in an area of destination trips, rather than origin trips. The data also reveals that the number of available bikes never drops below four to five bicycles, and that, even at peak, most stations have at least five to ten available docks. There were no stations that experience complete utilization of all bicycles, or of all docks.

While current data shows available capacity, the proposed expansion is anticipated to generate up to 36 new bicycle trips on a weekday PM peak period and 129 new bicycle trips on a Saturday peak period. While not all bicycle trips would be bikeshare, based on current data, the number of available weekday PM and Saturday peak period bikes would be 48 and 241, respectively.

While it is unclear how future growth by 2040 may affect bikeshare demand, Smithsonian could monitor nearby Capital Bikeshare stations and install a new station if demand begins to exceed supply. If a South Mall Campus new Capital Bikeshare station is required, consideration should be given to placing it in proximity to the intersection of Jefferson Drive SW and 7<sup>th</sup> Street SW because the nearest Capital Bikeshare station is approximately 900 feet away from this intersection, the farthest location from a Capital Bikeshare station on the Smithsonian South Mall Campus.

### 4.1.1.2 Onsite and Employee Bicycle Parking

Bicycle racks are provided throughout the National Mall and adjacent to most Smithsonian properties. There are currently two bicycle racks providing approximately 24 bicycle parking spaces along Jefferson Drive SW on the South Mall Campus, and an additional bicycle parking area that provides approximately 10 bicycle parking spaces across Jefferson Drive SW from the campus. No bicycle parking is provided along Independence Avenue SW. All of the bicycle racks were observed to be approximately 50% utilized during an average weekday.

Similar to the Capital Bikeshare Stations, it is unclear how future demand will impact the existing bicycle facilities. The proposed expansion is anticipated to generate up to 36 new bicycle trips on a weekday PM peak period and 129 new bicycle trips on a Saturday peak period. While some trips would be made with Capital Bikeshare, additional private bicycle parking may be needed. Consideration should be given to providing sheltered and secured onsite parking for employees. SI could also consider monitoring bicycle rack usage after the proposed expansion is completed and install new bike racks as needed. If additional capacity is needed, consideration should be given to installing bicycle racks along Independence Avenue SW.

### 4.1.2 Pedestrian

Pedestrian facilities within a ¼-mile walkshed were also assessed. Sidewalks varying in width from nine to 16 feet are provided along all study area roadways. Wide and clearly striped crosswalks are provided at intersection approaches and two mid-block locations. Curb ramps and pedestrian countdown signal heads are provided at each crosswalk at each signalized intersection. Only two curb ramps at L'Enfant Plaza & Independence Avenue SW, three curb ramps at 12th Street SW & Jefferson Drive SW, and one each at the mid-block crosswalks on Jefferson Drive SW, have detectable warning surfaces. Smithsonian should identify crosswalks adjacent to the project site that need to be updated to current standards as the project moves from master planning to design.

Most pedestrian trips generated by the proposed expansion are anticipated to come from the National Mall. The South Mall Campus facilities and National Mall are interconnected by signalized crosswalks at 7<sup>th</sup> Street SW and 14<sup>th</sup> Street SW, as well as eleven (11) unsignalized crossings, which would easily accommodate existing and future pedestrian trips. Therefore, no additional modifications to pedestrian facilities are recommended.

## 4.2 PROPOSED PLANS

As previously discussed in Section 2.0, the 2005 Bicycle Master Plan shows that no dedicated bicycle facilities exist along Independence Avenue SW, resulting in a bicycle level of service (BLOS) of D. To correct this deficiency, the plan proposes a signed bicycle route and moveDC proposes a cycle track. According to the 2012 DC Bike Map, fair cycling conditions exist on Independence Avenue SW. Although the Bike Map also shows a Capital Bikeshare station on the west side of 12th Street SW, south of Independence Avenue SW, no evaluation of cycling conditions was made of 12th Street SW. As of 2015, no additional bicycle facilities are proposed for this intersection as shown and listed on the 2015 Proposed Bike Lanes Map and 2015 Bikeways Work Plan, respectively.

The 2009 Pedestrian Master Plan identifies segments of Independence Avenue SW within the study area to have medium-high pedestrian activity with medium-high pedestrian facility deficiencies. It suggests that the corridor be considered a candidate for priority corridor improvements, but does not recommend any improvement strategies.

## 4.3 IMPACT OF PROPOSED EXPANSION ON EXISTING AND PROPOSED FACILITIES

Expansion of the South Mall Campus facilities and construction of the proposed loading dock/driveway would not have a significant impact on existing or proposed pedestrian and bicycle facilities. The proposed South Mall Campus Master Plan includes connectivity enhancements between Jefferson Drive SW and Independence Avenue SW. Thus, these connectivity enhancements would reduce pedestrian demand on adjacent sidewalks,

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Bicycle & Pedestrian Facilities  
October 24, 2017

particularly along 12<sup>th</sup> Street SW. Furthermore, the bulk of pedestrian trips will be oriented to and from the National Mall, which has multiple signalized and unsignalized crosswalks across Jefferson Drive SW.

The proposed driveway would introduce a new curb cut adjacent to the signalized intersection of Independence Avenue SW and 12<sup>th</sup> Street SW. However, adequate transitions from sidewalk to street (curb ramps), pedestrian signal heads, and a clearly defined crosswalk will be provided across the driveway (see Appendix A). Furthermore, the driveway would enhance pedestrian and bicycle operations along the north side of Independence Avenue by eliminating up to three uncontrolled driveways and replacing them with a single signal-controlled driveway. This may be particularly desirable if a cycle track is to be constructed along Independence Avenue as identified in the moveDC plan.

## 5.0 TRANSIT SERVICE

Transit services within ¼-mile of the study area are provided by the following organizations:

*Washington Metropolitan Area Transit Authority (WMATA).* WMATA provides the most extensive services through its Metrorail and bus. Services generally begin at 5:00AM Monday through Friday and 7:00AM Saturdays and Sundays, and end at 12:00AM Sunday through Thursday and 3:00AM Friday and Saturday. The study area has one Metrorail station (Smithsonian) on the Blue, Silver, and Orange lines. Bus stops for the 16X, 52, and V1 routes are located at or near the intersection of Independence Avenue SW & 12th Street for connections to Metrorail via the Smithsonian station.

*DC Circulator (by WMATA and DDOT).* The DC Circulator's new National Mall Service operates from Union Station to various memorials and the Tidal Basin. From October to March, service begins at 7:00AM on weekdays and 9:00AM on weekends through 7:00PM daily. Service is extended one hour during the summer months from April to September. The study area has two stops on Jefferson Drive SW at 12th Street SW and near 7th Street SW. There is also another stop on Madison Drive NW at 12th Street NW.

*Maryland Transportation Authority (MTA).* The MTA runs many commuter bus lines into the District. Four routes, including the 230, 250, 630, and 725, have stops at the intersection of Independence Avenue SW and 12th Street SW. Connections to MTA are also available at the Smithsonian Metrorail station.

*Potomac and Rappahannock Transportation Commission (PRTC).* PRTC operates the OmniRide commuter bus service into the heart of the District. Routes that service the study area include GV-R and LR-R (including select trips around the National Mall). Bus stops are located at the intersection of Independence Avenue SW & 12th Street SW near the Smithsonian Metro station.

*Loudoun County.* Loudoun County operates the LC Transit Commuter Bus Routes that make daily trips from Arlington, VA to the District in the AM and from the District to Arlington, VA in the PM. Marked stops are provided at the intersections of Independence Avenue SW & 12th Street SW and Independence Avenue SW & 10th Street SW (L'Enfant Promenade).

The proposed expansion is anticipated to generate 295 new transit trips during the PM peak hour, and 1,051 new transit trips during the Saturday peak hour, the majority of which are anticipated to utilize Metro. The Smithsonian Metro station is directly across Jefferson Drive SW from the South Mall Campus, and would likely be capable of supporting the additional transit trips, as the transit trips peak on the weekends when the overall Metro system is running under capacity.

## 6.0 SITE ACCESS & LOADING

The SI South Mall Campus Master Plan seeks to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. These improvements include the consolidation of the existing loading driveways at the Sackler Gallery and Arts and Industry Building, as well as the potential consolidation of the HMSG loading dock at a future date, into one new underground loading area and driveway to be located between the ramp to the 12<sup>th</sup> Street Expressway and the Freer Gallery of Art. Additional information regarding the proposed loading facilities is included in the Loading Dock CTR (Appendix A).

## 7.0 PARKING AND PASSENGER LOADING

### 7.1 PARKING

An inventory of parking regulations was conducted on Tuesday, October 11, 2017. The data collection team denoted posted parking regulations by segment of the roadway, including restrictions on parking duration, loading zones, ADA parking spaces, bus stops, parking meters and kiosks, and street cleaning restrictions. Figure 19 summarizes the parking regulations for the study area network.

Figure 19: Study Area Parking Regulations

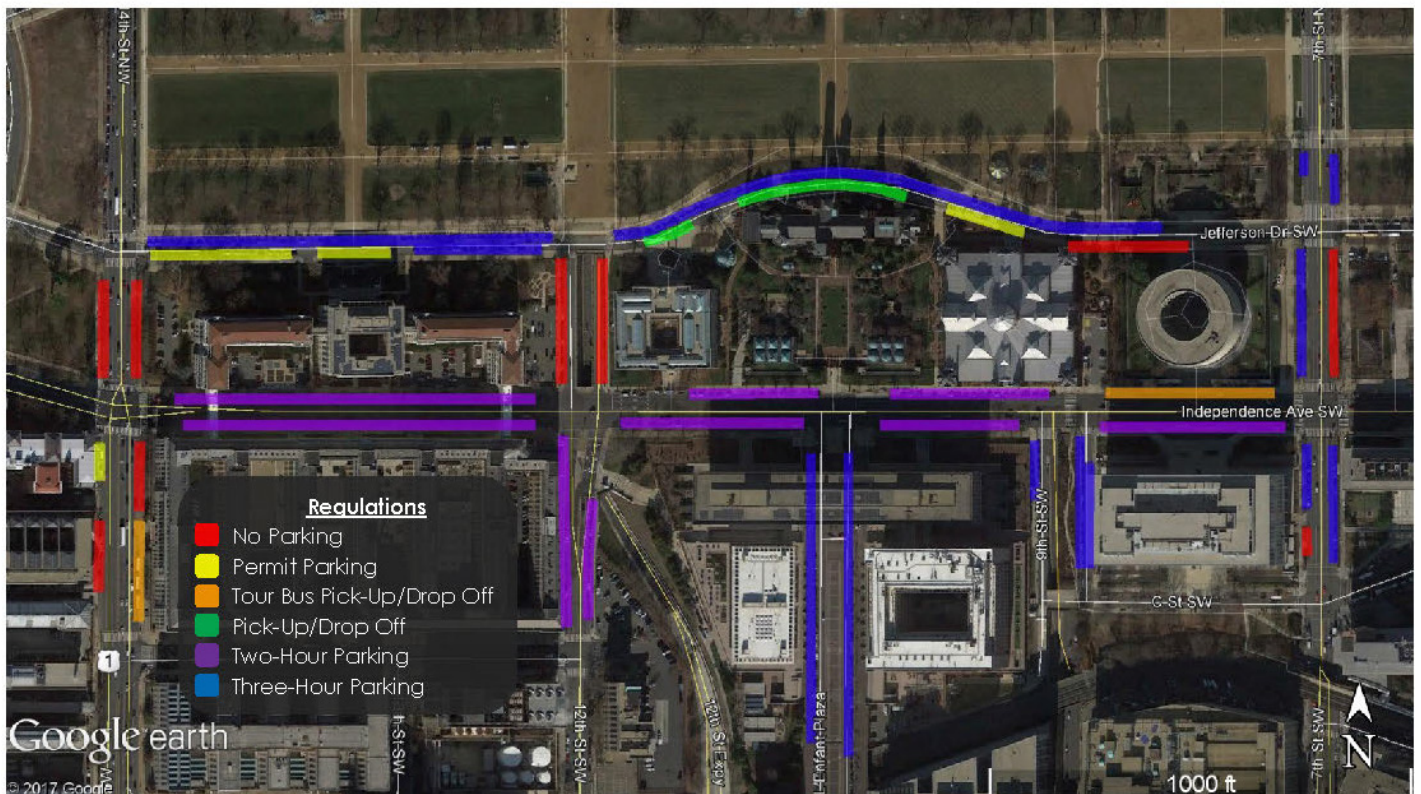


Exhibit 1 in Appendix E lists each segment inventoried for:

- Total number of on-street parking spaces;
- Number of permit spaces;
- Number of metered spaces; and,
- Number of ADA spaces.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Parking and Passenger Loading  
October 24, 2017

The primary parking for the South Mall Campus facilities is located along Jefferson Drive SW, between 14<sup>th</sup> Street SW and 7<sup>th</sup> Street SW. Parking is provided on at least one side of the roadway for most of the corridor, providing approximately 95 parking spaces. Metered parking also exists on Independence Avenue SW. However, parking is permitted for two hours during off-peak periods, from 9:30AM to 4:00PM Monday through Friday and from 7:00AM to 6:30PM Saturday. Parking is prohibited during the AM and PM peak periods, 7:00AM – 9:30AM and 4:00PM – 6:30PM, respectively. From 10<sup>th</sup> Street SW to 14<sup>th</sup> Street SW, parking is also prohibited from 10:00PM to 5:00AM on Tuesdays for street cleaning.

Some metered parking is available on 14<sup>th</sup> Street SW immediately north and south of Independence Avenue SW, but most spaces are reserved for special permits. No parking is provided on 7<sup>th</sup> Street SW. Metered parking on 12<sup>th</sup> Street SW does not have a time restriction. Independence Avenue SW, 14<sup>th</sup> Street SW, and 12<sup>th</sup> Street SW are designated snow emergency routes, on which parking is not permitted during snow emergencies.

While the proposed loading dock/driveway would not require any additional parking, the facility expansion would generate approximately 46 PM peak hour vehicle trips (7 in and 39 out) and 164 Saturday peak hour trips (88 in and 76 out). Since no additional parking will be provided as part of the South Mall Campus expansion, it was assumed that the additional vehicle trips would be absorbed by on-street parking, as well as nearby parking garages, such as L'Enfant Plaza and Capitol Plaza.

## 7.2 PASSENGER LOADING

Bus passenger loading occurs on Independence Avenue, during off-peak periods, as well as along the entire frontage of Jefferson Drive SW between 12<sup>th</sup> Street SW and 14<sup>th</sup> Street SW. Based on feedback from SI, the current loading areas meet the needs for the South Mall Campus. However, loading should be assessed in the future, after the South Mall Campus enhancements are completed to determine if changes to passenger loading are necessary.

Safety  
October 24, 2017

### 8.0 SAFETY

An inventory of the study area was conducted on October 11, 2017. In general, the study area has undivided, level roadways with 11-foot wide lanes and metered parking. Roadside features include wide sidewalks and streetscaping. Although all modes are encouraged to use the area, on-road traffic is mostly composed of passenger vehicles with some trucks, and off-road traffic is mostly composed of pedestrians. Traffic control includes signalized intersections supplemented with signage. Although there are no existing signs prohibiting right turns on red, the northbound 12<sup>th</sup> Street SW and 10<sup>th</sup> Street SW approaches have protected right turn signal indications.

Additional investigations of the intersections reveal:

- Striping is in good condition,
- Approaches have relatively little skew, if any,
- Excellent daylighting,
- Post-mounted signal heads, and
- Some roadside trees may obstruct sight distance.

The proposed facility expansion is not anticipated to impact traffic safety in and around the South Mall Campus. Enhancing connectivity through the South Mall Campus would encourage more pedestrian travel away from the roadways. Furthermore, consolidating loading areas to a signal-controlled location and closing the multiple existing curb cuts would reduce the likelihood of pedestrian and bicycle conflicts with vehicles.

### 8.1 SIGHT DISTANCE

AASHTO's A Policy on Geometric Design of Highways and Streets, 6th Edition, provides a method to calculate the required intersection sight distance for the three possible movements at an intersection: left turn, through, and right turn. Although these calculations are generally used for unsignalized intersections, they can also be applied to signalized intersections where right turns on red are permitted and consequently mimic yield-controlled conditions. Signal-controlled left turns are usually not analyzed. Therefore, according to AASHTO, the required sight distances for right turns at all three intersections is approximately 240 feet for passenger vehicles, 315 feet for single-unit trucks, and 390 feet for combination trucks for all approaches. Based on these parameters, sight distance from the proposed consolidated driveway meets the requirements. Please see Appendix A for more information regarding site distance for the proposed loading driveway.

## 9.0 STREETScape & THE PUBLIC REALM

It is anticipated that some removal or relocation of streetscaping will be necessary to accommodate the proposed driveway and the underground expansion. All modifications to streetscaping will conform to DEM standards. It should also be noted that the overall South Mall Campus Master Plan includes improving the Independence Avenue SW frontage with more street furniture and plantings, as well as enhancing the internal on-site connections between Independence Avenue SW and Jefferson Drive SW. Sidewalks on the SI side of Independence Avenue SW also follow NCPC streetscape standards for Mall Roads, including yellow aggregate concrete paving.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Conclusion  
October 24, 2017

### 10.0 CONCLUSION

The proposed Smithsonian South Mall Campus expansion would have a negligible effect on the local roadway network, increasing overall vehicle volumes by approximately 1%. However, due to existing capacity deficiencies and future growth within the study area, the following minor mitigation measures are proposed to mitigate the small increases in delay generated by the proposed facility expansion:

#### Vehicle

1. Signal timing, phasing, and offset modifications, including an increase in cycle lengths from 110 seconds to 150 seconds in the PM peak hour. This would need to be conducted as a part of a wider signal retiming effort, which would likely be required in the future to accommodate background growth and other projects by 2040.
2. Modify the existing unsignalized intersection of SW Jefferson Drive and 12<sup>th</sup> Street SW from a two-way stop controlled intersection to an all-way stop controlled intersection. Modifying the SW Jefferson Drive eastbound shared thru-right movement from a free movement to a stop-controlled movement would grant more acceptable gaps for pedestrians to cross SW Jefferson Drive, along with reducing delay for right turning vehicles on 12<sup>th</sup> Street SW.
3. Modify the southbound 14<sup>th</sup> Street SW approach to Jefferson Drive to include a protected-permitted left-turn phase.

#### Pedestrian/Bicycle

1. Monitor utilization of onsite bicycle parking, as well as Capital Bikeshare stations within ¼ mile. If demand exceeds capacity install new bike racks and/or a Capital Bikeshare Station. If a new Capital Bikeshare Station is required, consider locating it near the intersection of 7<sup>th</sup> Street SW and Jefferson Drive SW to fill an existing gap in the system.
2. Upgrade all curb ramps connecting to/from the South Mall Campus to meet current ADA standards.
3. Provide A new crosswalk along the east side of the intersection of Independence Avenue SW and 12<sup>th</sup> Street SW.

#### Passenger Loading

1. Monitor passenger loading areas to determine if they continue to meet SI needs without impacting traffic operations on Jefferson Drive SW or Independence Avenue SW.

#### Loading

1. All deliveries made with trucks WB-50 or larger will be scheduled in advance. These deliveries will be scheduled to avoid the AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN

Conclusion

October 24, 2017

periods, unless necessary. This would likely have a minimal impact on the South Mall Campus facilities, as the majority of deliveries with larger trucks currently occur during off-peak periods.

2. Deliveries made in vehicles larger than a single unit truck should enter from northbound 12<sup>th</sup> Street SW or eastbound Independence Avenue SW to avoid wide right-turns into the proposed driveway.
3. Right-turns on red should be restricted at the proposed driveway and the westbound Independence Avenue SW approach at the signalized intersection with 12<sup>th</sup> Street SW.

**APPENDIX A: SMITHSONIAN INSTITUTION  
SOUTH MALL CAMPUS LOADING DOCK  
CTR**

## **APPENDIX B: STUDY AREA DATA**

## **APPENDIX C: CAPACITY ANALYSIS**

## APPENDIX D: SYNCHRO OUTPUTS

## APPENDIX E: PARKING

**Smithsonian Institution South  
Mall Campus Master Plan –  
Consolidated Loading Dock  
and Driveway**

Comprehensive Transportation  
Review



Prepared for:  
Smithsonian Institution

Prepared by:  
Stantec Consulting Services, Inc.

August 31, 2017



## Table of Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>I</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 STRATEGIC PLANNING ELEMENTS .....</b>	<b>3</b>
2.1 PLANS/STUDIES REVIEWED .....	3
2.2 POTENTIAL IMPACT OF PROPOSED DRIVEWAY ON PLANS .....	5
<b>3.0 ROADWAY CAPACITY &amp; OPERATIONS .....</b>	<b>6</b>
3.1 VEHICLE STUDY AREA .....	6
3.2 DATA COLLECTION AND HOURS OF ANALYSIS .....	7
3.2.1 Turning Movement Counts .....	7
3.2.2 Queuing .....	7
3.2.3 Loading Activities .....	7
3.3 ANALYSIS METHODOLOGY .....	7
3.4 DEVELOPMENT SCENARIOS .....	8
3.4.1 2015 Existing Condition .....	8
3.4.2 2030 Background/No Build Condition .....	9
3.4.3 2030 Future Build Condition .....	11
<b>4.0 BICYCLE &amp; PEDESTRIAN FACILITIES .....</b>	<b>13</b>
4.1 EXISTING FACILITIES .....	13
4.2 PROPOSED PLANS .....	13
4.3 IMPACT OF PROPOSED DRIVEWAY ON EXISTING AND PROPOSED FACILITIES .....	14
<b>5.0 TRANSIT SERVICE .....</b>	<b>15</b>
<b>6.0 SITE ACCESS &amp; LOADING .....</b>	<b>16</b>
6.1.1 Existing Loading Activity .....	16
6.1.2 Existing and Future Loading Needs and Alternatives .....	16
6.1.3 Future Loading Activity .....	17
6.1.4 Project Phasing .....	18
6.1.5 Loading Management Plan .....	18
6.1.6 Impacts to 12 <sup>th</sup> Street Intersection .....	20
<b>7.0 PARKING .....</b>	<b>21</b>
<b>8.0 SAFETY .....</b>	<b>22</b>
8.1 SIGHT DISTANCE .....	22
8.2 CRASH ANALYSIS .....	23
<b>9.0 STREETScape &amp; THE PUBLIC REALM .....</b>	<b>24</b>
<b>10.0 CONCLUSION .....</b>	<b>25</b>

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

## LIST OF TABLES

Table 1: Study Area Roadway Characteristics.....	6
Table 2: LOS Criteria for Signalized Intersections.....	8
Table 3: Historical AADT .....	9
Table 4: Growth Rate .....	10
Table 5: Crash Summary, 01/2012 to 12/2014.....	23

## LIST OF APPENDICES

APPENDIX A: STUDY AREA DATA
APPENDIX B: CAPACITY ANALYSIS
APPENDIX C: SYNCHRO OUTPUT
APPENDIX D: LOADING ALTERNATIVES
APPENDIX E: INTERSECTION CONCEPT WITH TRUCK TURNING MOVEMENTS
APPENDIX F: PARKING
APPENDIX G: SAFETY

## **Executive Summary**

The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. The SI Master Plan is expected to be implemented over a 15 to 20 year timeframe. As part of the overall vision for the South Campus, SI is proposing to consolidate the existing loading areas adjacent to the Sackler Gallery and the Arts and Industry Building into a single two-way loading driveway and underground facility that would be accessed via a ramp at the intersection of Independence Avenue SW and 12th Street SW, on the west side of the Freer Gallery of Art. The consolidation of these two loading driveways would eliminate breaks in the current campus site plan, allowing for a cohesive connection across the entire campus for visitors, and will provide the Smithsonian with an underground loading area that provides adequate space to separate collections loading from food and garbage loading and that allows for large trucks to maneuver below grade rather than in the street.

Although the Master Plan will be implemented over a 15 to 20 year timeframe, the construction of the new loading dock, as well as renovations to the Castle are anticipated to begin early in the Plan's implementation. Upon completion of the proposed loading driveway (estimated by 2025), the existing loading driveway between the Freer and Sackler Galleries, as well as the Arts and Industry Building parking/loading driveway, would be deactivated and closed to all deliveries. However, these driveways may be reactivated on a temporary basis for construction access and staging during the South Mall Campus renovations. Furthermore, while the removal of the Hirshhorn Museum and Sculpture Garden (HMSG) loading dock is not included as part of this proposal at this time, the proposed loading driveway would be designed to accommodate a future connection. Additional analysis would be conducted to determine if the building could be connected to the proposed loading driveway under the 9<sup>th</sup> Street tunnel in the future. Such a project is currently anticipated to be roughly twenty years away.

The proposed loading driveway would be able to accept all truck types (up to WB-67), as well as eliminate the need for trucks to back into or out of the driveways, as occurs in the existing condition. Because all deliveries are scheduled, the design of the proposed loading driveway will include a security booth to help maintain safety and to check identification. Given the proximity of the proposed loading driveway to the existing signalized intersection of Independence Avenue SW and 12th Street SW, a separate actuated signal phase would be required to provide dedicated green time to the driveway.

It should be noted that this report has been prepared to evaluate the impacts of the proposed loading driveway only. If the driveway is determined to be acceptable, based on this analysis and further coordination with the District of Columbia Department of Transportation (DDOT), a

## **SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY**

separate Comprehensive Transportation Review will be conducted to evaluate the impacts of the remaining components of the Master Plan which will be submitted to NCPC for review in 2018.

### **Methodology**

Stantec Consulting Services, Inc. (Stantec) conducted the assessment of the proposed loading driveway based on Chapter 45 of the DDOT Design and Engineering Manual (DEM) and DDOT Guidelines for Comprehensive Transportation Review Requirements. The assessment includes:

- A review of several city-wide planning documents as well as local studies including the 2005 Bicycle Master Plan, 2009 Pedestrian Master Plan, moveDC, Southwest Ecodistrict Plan, Memorials & Museums Master Plan, Maryland Avenue SW Transportation Study, and Smithsonian Institution South Mall Campus Master Plan.
- A capacity analysis that was conducted on the Independence Avenue SW corridor, including the signalized intersections at 14th Street SW, 12th Street SW, and 10th Street SW (L'Enfant Promenade/Plaza) for the 2015 Existing, 2030 No Build, and 2030 Build Conditions.
- An assessment of the impact of the proposed driveway on existing and potential future pedestrian, bicycle, transit, and parking facilities.
- Analysis of crash records for the three signalized study area intersections.
- Development of recommendations to mitigate operational deficiencies.

### **Conclusions and Recommendations**

The proposed consolidation of up to three loading driveways along Independence Avenue SW into one loading dock/driveway at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW would have an overall negligible impact on the study area roadway network, and may improve safety by reducing opportunities for conflicts with trucks.

The analysis of the proposed loading driveway revealed the following:

1. Recommendations in city-wide planning documents and studies would not be affected by the proposed driveway.
2. Design of the new driveway would require elements for pedestrians such as adequate transitions from sidewalk to street (curb ramps), pedestrian signal heads, and a clearly defined crosswalk.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

3. The new driveway is not expected to generate any new auto, transit, pedestrian, or bicycle trips. It is expected to divert two inbound and three outbound existing truck trips and generate one inbound and one outbound truck trip in both AM and PM peak hours.
4. The additional signal phase required for the driveway would cause degradation in the operation of the eastbound Independence Avenue SW approach from a volume-to-capacity (v/c) ratio of 0.88 during the 2030 Future No Build Condition AM peak hour to a v/c ratio of 1.04 during the 2030 Future Build Condition. The loading driveway has a negligible impact on PM peak hour operations.
5. The driveway would enhance pedestrian and bicycle operations along the north side of Independence Avenue SW by eliminating up to three uncontrolled driveways, over time, and replacing them with a single signal-controlled driveway.
6. A crosswalk could be provided across the east leg of the intersection.
7. Four metered parking spaces and some streetscaping on the westbound Independence Avenue SW approach at the intersection with 12th Street SW would need to be removed or relocated to accommodate the new driveway.
8. The existing bus stop on the northeast corner of the intersection would need to be shifted approximately 40 feet east.

To address the deficiencies, the following measures are recommended:

1. All deliveries made with trucks WB-50 or larger will be scheduled in advance and will avoid deliveries between 6:30 AM and 9:30 AM, as well as between 3:30 PM and 6:30 PM to correspond with peak volume periods at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW.
2. Deliveries made in box trucks (such as UPS, FedEx, DHL, etc.) and WB-40 (food deliveries) will be encouraged to avoid the AM (6:30 AM – 9:30 AM) and PM (3:30 PM – 6:30 PM) peak periods. However, specific restrictions cannot be placed on these types of deliveries.
3. SI will work with DDOT during events in the City to restrict or hold deliveries.
4. If pedestrian and/or vehicle congestion on Independence Avenue SW results in queuing that extends to upstream intersections, SI will hold trucks within the loading area until conditions improve. SI will also coordinate with DDOT and/or the MPD during emergencies to hold deliveries within the loading area.
5. Trash and recycling pick-up will be scheduled for off-peak periods.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Introduction  
August 31, 2017

## 1.0 INTRODUCTION

The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. The SI Master Plan is expected to be implemented over a 15 to 20 year timeframe. As part of the overall vision for the South Campus, SI is proposing to consolidate the existing loading areas adjacent to the Sackler Gallery (underground) and the Arts and Industry Building (at-grade) into a single loading driveway that would be accessed via a ramp at the intersection of Independence Avenue SW and 12th Street SW, on the west side of the Freer Gallery of Art. The consolidation of these two loading driveways would eliminate breaks in the current campus site plan, allowing for a cohesive connection across the entire campus for visitors, and will provide the Smithsonian with an underground loading area that provides adequate space to separate collections loading from food and garbage loading and that allows for large trucks to maneuver below grade rather than in the street.

Furthermore, the current loading areas along Independence Avenue SW do not provide adequate space for larger vehicles. Large box trucks and tractor trailers often back into or out of the loading areas, creating disruptions to traffic flow on Independence Avenue SW. Large exhibition deliveries, which typically arrive in larger tractor trailers (WB-67), must park and load/unload on Independence Avenue SW, which exposes the exhibit materials to unnecessary risk. The proposed loading driveway would be able to accept all truck types (up to WB-67), as well as eliminate the need for trucks to back in to or out of the driveways, as occurs in the existing condition. Instead, trucks would be able to turn around within the underground loading area. In addition, because all deliveries are scheduled, the design of the proposed loading driveway will include a security booth to help maintain safety and to check identification.

Although the Master Plan will be implemented over a 15 to 20 year timeframe, the construction of the new loading dock, as well as renovations to the Castle are anticipated to begin early in the Plan's implementation. Upon completion of the proposed loading driveway (estimated by 2025), the existing loading driveway between the Freer and Sackler Galleries, as well as the Arts and Industry Building parking/loading driveway, would be deactivated and closed to all deliveries. However, these driveways may be reactivated on a temporary basis for construction access and staging during the South Mall Campus renovations. Furthermore, while the removal of the Hirshhorn Museum and Sculpture Garden (HMSG) loading dock is not included as part of this proposal at this time, the proposed loading driveway would be designed to accommodate a future connection. Additional analysis would be conducted to determine if the building could be connected to the proposed loading driveway under the 9<sup>th</sup> Street tunnel in the future. Such a project is currently anticipated to be roughly twenty years away.

## **SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY**

Introduction

August 31, 2017

Given the proximity of the proposed loading driveway to the existing signalized intersection of Independence Avenue SW and 12<sup>th</sup> Street SW, a separate actuated signal phase would be required to provide dedicated green time to the driveway. Therefore, an assessment of the impact of the loading driveway and the additional signal phase is required. It should be noted that this report has been prepared to evaluate the impacts of the proposed loading driveway only, as it is a critical component to the overall South Mall Campus Master Plan. If the driveway is determined to be acceptable, based on this analysis and further coordination with the District of Columbia Department of Transportation (DDOT), a separate Comprehensive Transportation Review will be conducted to evaluate the impacts of the remaining components of the Master Plan.

This assessment of the proposed consolidated loading driveway is based on Chapter 45 of the DDOT Design and Engineering Manual (DEM) and DDOT Guidelines for Comprehensive Transportation Review Requirements.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Strategic Planning Elements  
August 31, 2017

## 2.0 STRATEGIC PLANNING ELEMENTS

Stantec reviewed several city-wide planning documents as well as local studies to determine how the proposed loading driveway considers District growth goals and objectives within the study area. These documents included the 2005 Bicycle Master Plan, 2009 Pedestrian Master Plan, moveDC, Southwest Ecodistrict Plan, Memorials & Museums Master Plan, Maryland Avenue SW Transportation Study, and Smithsonian Institution South Mall Campus Master Plan.

### 2.1 PLANS/STUDIES REVIEWED

*2005 Bicycle Master Plan.* This plan is a guide to establishing high-quality bicycle facilities and programs from 2005 to 2015 through facility improvements, policy changes, education, promotion, and enforcement. The plan shows that no dedicated bicycle facilities exist along Independence Avenue SW or 14th Street SW, resulting in bicycle levels of service (BLOS) of D and E, respectively. To correct these deficiencies, the plan proposes a bicycle lane on 14th Street SW and signed bicycle routes along Independence Avenue SW and 14th Street SW. A progress update to the plan can be found in an appendix of moveDC.

*2009 Pedestrian Master Plan.* This plan serves as the foundation for DDOT's pedestrian programs and represents the first comprehensive city-wide effort to address pedestrian safety challenges and related issues. The goals of the plan are to reduce the number of pedestrian fatalities and injuries associated with motor vehicle crashes and to increase pedestrian activity by creating a comfortable and accessible environment for walking throughout all parts of the District.

Through an analysis of existing conditions, the plan identified the segments of 14th Street SW and Independence Avenue SW within the study area to have medium-high pedestrian activity with medium- high pedestrian facility deficiencies. This process also identified Independence Avenue SW, from 15th Street SW to South Capitol St SW, as a priority corridor for improvements. However, no action was recommended at the time due to few pedestrian injuries occurring during the period from 2000 to 2006. A progress update to the plan can be found in an appendix of moveDC.

*moveDC.* Published in October 2014, moveDC was a collaborative effort led by DDOT to present a vision and improvement course for the District's transportation system over the next 25 years. MoveDC focuses on more travel options, reliability of transportation systems, safety for all, and efficiency of investments. The plan proposes more than 200 new miles of bicycle facilities, a 22-mile streetcar system with the possibility of extension lines, and more than 40 miles of High Capacity Transit. Within the study area specifically, the plan shows that the bicycle level of service (LOS) is D or better and proposes a cycle track on Independence Avenue SW. It also contains progress updates to the 2005 Bicycle and 2009 Pedestrian Master Plans as of December 2013.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Strategic Planning Elements  
August 31, 2017

*Southwest Ecodistrict Initiative.* Published by the National Capital Planning Commission (NCPC), the SW Ecodistrict Initiative is a comprehensive and forward-looking approach to urban sustainability and livability through transformation of the Maryland Avenue SW and 10th Street SW (L'Enfant Promenade and Plaza) area into a highly sustainable mixed-use community. The study area is bounded by Independence Avenue SW to the north, Maine Avenue SW to the south, 12th Street SW to the west, and 4th Street SW to the east. The plan examines the redevelopment of 12 sites and streetscaping of 10th Street SW to encourage a walkable neighborhood and economic growth. The U.S. General Services Administration (GSA) Regional Office Building (ROB) and Cotton Annex, located on D Street SW and 12th Street SW respectively, are two sites that are beginning the redevelopment process. Traffic studies for these developments were included in the 2030 Background/No Build Condition analysis.

*Memorials & Museums Master Plan.* The NCPC, in consultation with the U.S. Commission of Fine Arts and the National Capital Memorial Advisory Committee, developed a plan that shows how to meet demand for museums and commemorative works while protecting the National Mall and preserving other existing museum and memorial settings. The plan inventories existing, and forecasts future demand for memorials and museums, identifies and evaluates suitable sites for future memorials and museums, and establishes a zoning policy for siting. The plan is currently guiding the construction of the Dwight D. Eisenhower Memorial on a site adjacent to the study area, north of the U.S. Department of Education and across Independence Avenue SW from the National Air and Space Museum. A traffic study for this development was included in the 2030 Background /No Build Condition analysis.

*Maryland Avenue SW Transportation Study.* DDOT is currently studying the impacts on multi-modal operations, including vehicular, bus, rail, pedestrian, and bicycle, from the creation of a new Maryland Avenue SW corridor between 12th Street SW and 7th Street SW. The study examines three potential configurations of a future connection over the existing rail corridor. The plan would propose a new 11th Street SW that would connect to the study area and create a new intersection. To maintain optimal traffic flow, signal retiming at the study area intersections may be required along the corridor.

*Smithsonian Institution South Mall Campus Master Plan.* The Smithsonian Institution (SI) South Mall Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. Among these improvements is the consolidation of up to three loading docks/driveways along Independence Avenue SW into one new underground loading area and driveway. The new loading area would accept all truck types and eliminate the need for trucks to park or make any loading maneuvers within the roadway.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Strategic Planning Elements  
August 31, 2017

## 2.2 POTENTIAL IMPACT OF PROPOSED DRIVEWAY ON PLANS

Ultimately, the consolidation of the loading driveways along Independence Avenue SW into one loading dock/driveway for the South Mall Campus would not affect the findings and recommendations of these planning documents and studies. In fact, the consolidation of the loading driveways would likely enhance pedestrian and bicycle operations along Independence Avenue SW by eliminating conflict points at the uncontrolled driveways. The proposed consolidated driveway would be signal controlled, and thus potential pedestrian and bicycle conflicts with trucks would be better controlled. Consolidating the driveways would also eliminate potential conflict points along the cycle track proposed on Independence Avenue SW in the moveDC plan.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

## 3.0 ROADWAY CAPACITY & OPERATIONS

### 3.1 VEHICLE STUDY AREA

Located on SI's South Mall Campus in the southwest quadrant of the District, the study area is formally located in the Southwest Federal Center neighborhood, in Ward 6, between the National Mall and I-395. The neighborhood is primarily a business district and almost entirely occupied by offices for various branches of the U.S. Government and many of SI's museums. The South Mall Campus is bounded by Jefferson Drive SW to the north, Independence Avenue SW to the south, 12th Street SW to the west, and 7th Street SW to the east. The proposed loading dock/driveway would be located between the ramp to the 12th Street Expressway and the Freer Gallery of Art at the intersection of Independence Avenue SW & 12th Street SW. Therefore the study area consists of a short section of Independence Avenue SW corridor, including the signalized intersections at 14th Street SW, 12th Street SW, and 10th Street SW (L'Enfant Promenade/Plaza), shown in Figure 1 in Appendix A.

Characteristics of the study area roadways were obtained from maps on the DDOT website denoting functional classification, 2013 Average Annual Daily Traffic (AADT), speed limits, and truck routes/loading zones. This information is summarized in **Table 1**. The table also lists the number of lanes and parking types as observed during a roadway inventory.

**Table 1: Study Area Roadway Characteristics**

Roadway	Functional Class	2013 AADT	Number of Lanes, Division	Parking Type	Speed Limit (mph)	Primary Truck Route/Designated Loading Zones?
<b>Independence Avenue SW</b>	Principal Arterial	26,600	8, Undivided	On-street Metered	25	Yes/No
<b>14<sup>th</sup> Street SW</b>	Principal Arterial	40,700	7, Divided south of Independence Avenue SW	On-street Metered Special Permit	25	Yes/No
<b>12<sup>th</sup> Street SW</b>	Local	11,100	5, Divided south of Independence Avenue SW	On-street Metered	25	Yes/No
<b>10<sup>th</sup> Street SW (L'Enfant Promenade)</b>	Collector	4,200	2, Divided	On-street Metered	25	No/No

It should be noted that most on-street, metered parking in the study area is only permitted between the hours of 9:30AM – 4:00PM. At all other times, the parking lane operates as a travel lane. See Section 7.0 for more details on parking regulations.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

## 3.2 DATA COLLECTION AND HOURS OF ANALYSIS

Stantec conducted a comprehensive data collection program to establish “average day” baseline conditions for vehicular, transit, pedestrian, and cyclist traffic within the study area. The program consisted of manual turning movement counts and queuing and loading activity observations. All data were collected on typical weekdays when District schools and Congress were in session and there were no major special events on the National Mall.

### 3.2.1 Turning Movement Counts

Manual turning movement counts were collected during the AM peak period (6:00AM – 10:00AM) and PM peak period (3:00PM – 7:00PM) at the three study intersections in September and December 2015. Appendix A contains the raw count data. An analysis of this data revealed the AM peak hour to be 8:00AM – 9:00AM and the PM peak hour to be 5:00PM – 6:00PM.

### 3.2.2 Queuing

Queuing observations were conducted during the December 2015 turning movement counts in order to determine if additional unmet demand would need to be considered in the traffic analysis. Despite clear peak hour directional volume (eastbound in the AM, westbound in the PM), the results of the queue observations show minimal to no queuing was observed along Independence Avenue SW. Therefore, it was determined that the traffic analysis did not need to consider additional unmet demand. Appendix A contains the queue observation data.

### 3.2.3 Loading Activities

Stantec also observed loading activities at the three existing SI loading driveways from Thursday, September 24, 2015 to Wednesday, September 30, 2015, during a 12-hour period from 7:00AM to 7:00PM. This activity was documented in a memo addressed to DDOT from Stantec entitled “Loading Dock Trip Generation Analysis” (Appendix A). The data show that SI received approximately two inbound trips and three outbound trips during both AM and PM peak hours.

## 3.3 ANALYSIS METHODOLOGY

Capacity analysis, a procedure used to estimate the traffic-carrying ability of roadway facilities over a range of defined operating conditions, was performed for study area intersections using Synchro 9 traffic analysis software. This software package provides average control delay and level of service (LOS) for each lane group and for the overall intersection. LOS is an evaluation of the quality of operation of an intersection and is a measure of the average delay a driver experiences while traveling through the intersection. LOS is dependent upon a range of defined operating conditions such as traffic demand, lane geometry, and traffic signal timing and phasing.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

Utilizing Synchro instead of the more basic Highway Capacity Software (HCS) is preferable for transportation networks with a series of closely-spaced signalized intersections, such as the Independence Avenue corridor. Under these conditions, Synchro is able to more accurately model the effects that the traffic operations (such as poor LOS or extensive queuing) at one intersection have on operations at an adjacent intersection. Furthermore, HCS cannot analyze complex intersections with more than four legs.

LOS can range from A to F and is based on the average control delay per vehicle. For a signalized intersection, LOS A indicates operations with an average control delay less than 10 seconds per vehicle, while LOS F describes operations with an average control delay in excess of 80 seconds per vehicle, or a volume-to-capacity (v/c) ratio greater than 1.0. **Table 2** summarizes the 2010 Highway Capacity Manual (HCM) delay criteria for signalized intersections.

**Table 2: LOS Criteria for Signalized Intersections**

Level of Service	Average Control Delay (seconds/vehicle)
<b>A</b>	Less than or equal to 10.0
<b>B</b>	> 10.0 and ≤ 20.0
<b>C</b>	> 20.0 and ≤ 35.0
<b>D</b>	> 35.0 and ≤ 55.0
<b>E</b>	> 55.0 and ≤ 80.0
<b>F</b>	Greater than 80.0 or v/c > 1.0

Source: 2010 Highway Capacity Manual

While LOS D or better operations are generally deemed satisfactory from a traffic operations perspective, LOS E or F operations are often indicative of queuing and congestion. Improvements as recommended in this study seek to maintain or improve traffic operations to LOS D or better, as reported by Synchro.

Signal plans and timing directives were delivered by DDOT and were field-verified in order to accurately model signal operation type, phasing, detection, and cycle length in the Synchro files utilized for capacity analysis.

## 3.4 DEVELOPMENT SCENARIOS

### 3.4.1 2015 Existing Condition

2015 Existing Condition volumes for the AM and PM peak hours, shown in Exhibit 1 in Appendix B, were modeled in Synchro 9 to produce capacity analysis results, summarized in Exhibit 2 in Appendix B. All Synchro capacity analysis outputs are located in Appendix C. The results show

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

that all lane groups in the study area intersections currently operate at LOS D or better with 95<sup>th</sup> percentile queuing (< 500 feet), except for the following:

### *Independence Avenue SW & 14th Street SW*

- The northbound through movement generates a 95<sup>th</sup> percentile queue approximately 517 feet in the AM peak hour.
- The southbound left turn movement operates at LOS E during the AM peak period with 95<sup>th</sup> percentile queues that may exceed capacity of the turn lane.
- The westbound through movement operates at LOS F during the PM peak hour.

According to the table presented in Chapter 45 of the DDOT DEM, the threshold capacity for major arterials such as Independence Avenue SW and 14th Street SW is approximately 45,000 vehicles per day. Using historical AADT data (2009-2013) provided on the DDOT website and presented in **Table 3**, Stantec estimated the current v/c ratio for these roadways to be 0.54 and 0.90, respectively.

**Table 3: Historical AADT**

Location	Independence Avenue SW between 9 <sup>th</sup> Street SW and 12 <sup>th</sup> Street SW	14 <sup>th</sup> Street SW between C Street SW and Jefferson Drive SW
Year	AADT in 1,000	AADT in 1,000
2009	26.9	45.8
2010	26.2	N/A
2011	21.5	40.9
2012	21.3	N/A
2013	26.6	40.7
Average	24.5	42.5

### 3.4.2 2030 Background/No Build Condition

The horizon year of 2030 was selected for the proposed project in order to correspond with the SI South Mall Campus Master Plan horizon year of the same. Stantec applied a background growth rate of 0.9 percent per year based on historical AADT data along a segment of Independence Avenue SW from 2009 to 2013 as reported by DDOT. **Table 4** shows this data. Exhibit 3 in Appendix B shows the projected background volumes within the study area.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

**Table 4: Growth Rate**

Location	Independence Avenue SW between 9 <sup>th</sup> Street SW and SW 12 <sup>th</sup> Street	
Year	AADT in 1,000	Difference %
2009	26.9	--
2010	26.2	-2.6%
2011	21.5	-17.9%
2012	21.3	-0.9%
2013	26.6	24.9%
Growth Rate	Total	-1.1%
	Average	0.875% ~ 0.9%

Three developments, previously discussed in Section 2.0 as part of the SW Ecodistrict Plan and Memorials & Museums Master Plan, are expected to have an impact on traffic volumes in the study area. These include the redevelopment of the GSA ROB and Cotton Annex as well as the construction of the Eisenhower Memorial. Since the GSA redevelopment projects are still in their scoping phase with DDOT, their trip generation, trip distribution, and corresponding mode splits were obtained from DDOT. Vehicular trip generation and distribution for the Eisenhower Memorial were obtained from the report entitled "Eisenhower Memorial Traffic Impact Study" by EarthTech and dated May 2006. Exhibits 4 through 9 in Appendix B show how all anticipated development trips were distributed through the existing roadway network.

Project background growth volumes and development volumes were summed to obtain 2030 No Build Condition volumes for the AM and PM peak hours, shown in Exhibit 10 in Appendix B. These volumes were modeled in Synchro 9 to produce capacity analysis results, summarized in Exhibit 11 in Appendix B. All Synchro capacity analysis outputs are located in Appendix C. Based on the results of the capacity analysis, all lane groups in the study area intersections would operate at LOS D or better with 95<sup>th</sup> percentile queuing of less than 500 feet in the 2030 horizon year, except for the following:

### *Independence Avenue SW & 14<sup>th</sup> Street SW*

- The eastbound shared through/right movement would operate at LOS F during the AM peak period with 95<sup>th</sup> percentile queues exceeding 500 feet.
- The westbound through movement would continue to operate at LOS F with 95<sup>th</sup> percentile queues exceeding 500 feet during the PM peak hour.
- The northbound through movement would generate a 95<sup>th</sup> percentile queue that would exceed 500 feet in the AM peak hour.
- The southbound left turn would operate at LOS F during the AM peak period.
- The intersection would operate at an overall LOS E during the AM peak hour.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

### 3.4.3 2030 Future Build Condition

The proposed loading dock/driveway would be located between the ramp to the 12th Street Expressway and the Freer Gallery of Art at the intersection of Independence Avenue SW & 12th Street SW. For the purpose of this CTR, Stantec assumed the following based on a memorandum previously submitted to DDOT entitled "Loading Dock Trip Generation Analysis" (Appendix A):

- The proposed consolidated driveway is not anticipated to generate additional auto, pedestrian, bicycle, or transit trips. However, the driveway is anticipated to generate one new truck trip per peak period and divert two inbound and three outbound existing truck trips per peak period.
- Given that the proposed consolidated loading driveway will primarily be utilized by delivery vehicles that currently service the existing loading areas, trip distribution is based on existing patterns.
- Given the proximity of the proposed loading dock/driveway to the existing signalized intersection, a vehicle-actuated signal phase would be added to the existing signal timing to service the proposed driveway. The driveway would only receive a green signal if a vehicle is detected, thus minimizing the impact of an additional signal phase on the operation of the other intersection movements.
- The analysis includes truck trips from the HMSG loading area. However, it is unclear at this time whether the HMSG loading area would be closed and consolidated with the proposed. If it is not part of the consolidation overall driveway truck trips would likely be slightly less than analyzed in this study.

Exhibits 12 through 14 in Appendix B show existing truck trip diversion and new truck trip distribution based on the District's Truck Route Map and existing trip patterns. These volumes were added to the roadway network to obtain 2030 Future Build Condition volumes, shown in Exhibit 15 in Appendix B.

Stantec modeled the proposed Independence Avenue SW & 12th Street SW intersection configuration in Synchro 9 for the 2030 Future Build Condition with optimized AM and PM timing plans to obtain capacity analysis results (Exhibit 16 in Appendix B). More detailed Synchro capacity analysis output is located in Appendix C. Based on the results of the capacity analysis, all lane groups in the study area intersections would operate at LOS D or better with 95<sup>th</sup> percentile queues of less than 500 feet, except for the following:

#### *Independence Avenue SW & 14th Street SW*

- The eastbound shared through/right movement would continue to operate at LOS F during the AM peak period with 95<sup>th</sup> percentile queues exceeding 500 feet.
- The westbound through movement would continue to operate at LOS F with 95<sup>th</sup> percentile queues exceeding 500 feet during the PM peak hour.
- The northbound through movement would continue to generate a 95<sup>th</sup> percentile queue that would exceed 500 feet in the AM peak hour.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Roadway Capacity & Operations  
August 31, 2017

- The southbound left turn would continue to operate at LOS F during the AM peak period.
- The intersection would continue to operate at an overall LOS E during the AM peak hour.

### *Independence Avenue SW & 12th Street SW*

- The eastbound shared left/through/right movements would operate at LOS F during the AM peak hour due to a v/c ratio greater than 1.0. However, delay would increase to 34.0 seconds per vehicle (LOS C).
- The proposed loading dock/driveway southbound shared left/through/right movements would operate at LOS E during both AM and PM peak hours.

The capacity analysis results show that all movements at all study area intersections operate within six seconds of additional delay compared to the 2030 Background/No Build Condition. In fact, some movements would see a reduction in delay due to an optimization of signal phase lengths. However, the analysis results also show that the additional signal phase for the proposed driveway would result in a v/c ratio greater than 1.0 for the eastbound Independence Avenue SW approach in the AM peak hour. Therefore, it is recommended that SI consider restricting deliveries to the extent possible during the AM peak hour (8:00 AM – 9:00 AM) in order to ensure that the additional driveway phase is not actuated during this time. It should also be noted that the proposed driveway would operate at LOS E in both AM and PM peak hours. However, this is solely due to control delay and not related to volume, since only three inbound and four outbound trips would be expected during each peak hour. The loading driveway would have ample room to accommodate any minor queuing that may occur.

To accommodate the proposed driveway, restriping, signal equipment and sign installation, new curb ramps, and streetscaping would be required at the intersection of Independence Avenue SW & 12th Street SW. All roadway improvements would conform to DEM standards.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Bicycle & Pedestrian Facilities  
August 31, 2017

## 4.0 BICYCLE & PEDESTRIAN FACILITIES

Because the proposed consolidated loading driveway is not anticipated to generate additional pedestrian or bicycle trips, this CTR only evaluates pedestrian and bicycle circulation and safety at the intersection of Independence Avenue SW & 12th Street SW to ensure that safe and efficient pedestrian facilities are provided under the proposed condition.

### 4.1 EXISTING FACILITIES

Sidewalks varying in width from nine to 16 feet are provided along both sides of Independence Avenue SW and 12<sup>th</sup> Street SW. Within the area of the proposed driveway, a 15-foot sidewalk is provided along the north side of Independence Avenue SW. However, given the placement of concrete security barriers, the effective width is approximately nine to ten feet. Furthermore, this sidewalk narrows to approximately six feet (effective width) due to an existing drop-off area located at the main entrance to the Freer Gallery of Art, approximately 90 feet east of the proposed driveway location. A 12-foot sidewalk is also provided along the east side of the 12<sup>th</sup> Street Expressway ramp that connects Independence Avenue SW to Jefferson Drive SW.

Wide and clearly striped crosswalks are provided across the northbound, southbound, and eastbound approaches to the intersection. No crosswalk is provided across the westbound approach at the proposed driveway location. Curb ramps and pedestrian countdown signal heads are provided at each crosswalk. However, the curb ramps do not have detectable warning surfaces.

There are no dedicated bicycle facilities within the vicinity of the proposed loading driveway. However, given the width of the sidewalks in this area, bicyclists were observed to ride both on street and on the sidewalks, particularly on the south side of Independence Avenue SW.

### 4.2 PROPOSED PLANS

As previously discussed in Section 2.0, the 2005 Bicycle Master Plan shows that no dedicated bicycle facilities exist along Independence Avenue SW, resulting in a bicycle level of service (BLOS) of D. To correct this deficiency, the plan proposes a signed bicycle route and moveDC proposes a cycle track. However, according to the 2012 DC Bike Map, fair cycling conditions exist on Independence Avenue SW. Although the Bike Map also shows a Capital Bikeshare station on the west side of 12th Street SW, south of Independence Avenue SW, no evaluation of cycling conditions was made of 12th Street SW. As of 2015, no additional bicycle facilities are proposed for this intersection as shown and listed on the 2015 Proposed Bike Lanes Map and 2015 Bikeways Work Plan, respectively.

The 2009 Pedestrian Master Plan identifies segments of Independence Avenue SW within the study area to have medium-high pedestrian activity with medium-high pedestrian facility

## **SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY**

Bicycle & Pedestrian Facilities  
August 31, 2017

deficiencies. It suggests that the corridor be considered a candidate for priority corridor improvements, but does not recommend any improvement strategies.

### **4.3 IMPACT OF PROPOSED DRIVEWAY ON EXISTING AND PROPOSED FACILITIES**

Construction of the proposed loading dock/driveway would not have a significant impact on existing or proposed pedestrian and bicycle facilities. The proposed driveway would introduce a new curb cut adjacent to the signalized intersection of Independence Avenue SW and 12<sup>th</sup> Street SW. However, adequate transitions from sidewalk to street (curb ramps), pedestrian signal heads, and a clearly defined crosswalk will be provided across the driveway (see Appendix E). Furthermore, the driveway would enhance pedestrian and bicycle operations along the north side of Independence Avenue by eliminating up to three uncontrolled driveways and replacing them with a single signal-controlled driveway. This may be particularly desirable if a cycle track was to be constructed along Independence Avenue as identified in the moveDC plan.

The sidewalk connecting Independence Avenue SW with Jefferson Drive SW would remain. The proposed South Mall Campus Master Plan also includes several improvements to pedestrian flow between Jefferson Drive SW and Independence Avenue SW. Thus, it is likely that these improvements would reduce pedestrian demand on this sidewalk section. Finally, the proposed modifications to the intersection of S 12<sup>th</sup> Street SW and Independence Avenue SW introduce the opportunity to provide a new crosswalk across the westbound approach (see Appendix E).

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Transit Service  
August 31, 2017

### 5.0 TRANSIT SERVICE

Transit services within the study area are provided by the following organizations:

- *Washington Metropolitan Area Transit Authority (WMATA)*. WMATA provides the most extensive services through its Metrorail and bus. Services generally begin at 5:00AM Monday through Friday and 7:00AM Saturdays and Sundays, and end at 12:00AM Sunday through Thursday and 3:00AM Friday and Saturday. The study area contains three Metrorail stations on the Blue, Silver, Orange, Yellow, and Green lines, including Smithsonian (Blue, Silver, Orange), L'Enfant Plaza (transfer station; Blue, Silver, Orange, Yellow, Green), and Federal Center SW (Blue, Silver, Orange). L'Enfant Plaza station also provides connections to the Virginia Railway Express. Bus stops for the 11Y, 13Y, 16X, and V1 routes are located at or near the intersection of Independence Avenue SW & 14<sup>th</sup> Street SW. Bus stops for the 16X, 52, and V1 routes are located at or near the intersection of Independence Avenue SW & 12<sup>th</sup> Street for connections to Metrorail via the Smithsonian station.
- *Maryland Transportation Authority (MTA)*. The MTA runs many commuter bus lines into the District. Four routes, including the 230, 250, 630, and 725, have stops at the intersection of Independence Avenue SW and 12th Street SW. Connections to MTA are also available at the Smithsonian and L'Enfant Plaza Metro stations.
- *Potomac and Rappahannock Transportation Commission (PRTC)*. The PRTC, in conjunction with the Northern Virginia Transportation Commission (NVTC), operates the Virginia Railway Express, which services parts of northeastern Virginia into northern Washington, DC. A connection to Metrorail and WMATA bus routes is provided via a stop at the L'Enfant Plaza Metro station. PRTC also operates the OmniRide commuter bus service into the heart of the District. Routes that service the study area include GV-R, MN-R, DC-R, LR-R (including select trips around the National Mall), R1-R, and MC-R. Bus stops are located on 14th Street SW, at the intersection of Independence Avenue SW & 12th Street SW near the Smithsonian Metro station, and the L'Enfant Plaza Metro station.
- *Loudoun County*. Loudoun County operates the LC Transit Commuter Bus Routes that make daily trips from Arlington, VA to the District in the AM and from the District to Arlington, VA in the PM. Marked stops are provided at the intersections of Independence Avenue SW & 12th Street SW and Independence Avenue SW & 10th Street SW (L'Enfant Promenade).

The proposed consolidated driveway would not generate additional transit trips and is not anticipated to affect most existing bus stops adjacent to the intersection of Independence Avenue SW & 12th Street SW. However, the existing bus stop located on the northeast corner of the intersection will most likely need to be relocated approximately 40 feet east of the new driveway to provide a safe area for boarding and alighting passengers. This would require relocation of the bus service sign only.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Site Access & Loading  
August 31, 2017

### 6.0 SITE ACCESS & LOADING

The SI South Mall Campus Master Plan seeks to enhance the user experience by providing seamless connections between the various South Mall Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. These improvements include the consolidation of the existing loading driveways at the Sackler Gallery and Arts and Industry Building, as well as the potential consolidation of the HMSG loading dock at a future date, into one new underground loading area and driveway to be located between the ramp to the 12<sup>th</sup> Street Expressway and the Freer Gallery of Art.

Typically, DDOT requires an examination of the site to determine if an existing alley or side street can be used for loading activities to avoid the necessity of a new curb cut. However, neither available alley nor side street exists. Therefore, a new curb cut must be requested.

#### 6.1.1 Existing Loading Activity

Existing site loading occurs across three driveways along Independence Avenue. A study of existing loading activities over a typical week is contained in the memorandum entitled “Loading Dock Trip Generation Analysis” in Appendix A. Although the exact purpose of each truck entering the loading areas was not noted during the observations, based on notes made by the data collection team, the trucks observed (excluding the exhibit deliveries) consisted of typical deliveries (Fed-Ex, UPS), food delivery, and maintenance (including trash). These were typically made using box trucks, vans, and small trucks (WB-40 or smaller). Typically, an exhibit is delivered via tractor trailer (WB-50 or larger); however, these deliveries are infrequent (one per month or less) and typically scheduled during off-peak periods.

#### 6.1.2 Existing and Future Loading Needs and Alternatives

The location, configuration, and size of the existing loading facilities presents circulation, materials handling, and security deficiencies, most which are related to how a vehicle accesses the loading facilities. The limited size of the existing facilities requires large box trucks and small tractor-trailers (WB-40s) to back in from Independence Avenue, which interrupts traffic and pedestrian flow. Larger trucks (WB-50 or larger) must park and unload on the street, introducing security concerns and potentially exposing exhibit materials to weather conditions. Furthermore, the location of the existing loading facilities block east / west pedestrian circulation on the site and preclude several of the accessibility and connectivity goals of the new Master Plan.

The existing loading facilities do not meet Smithsonian Institution Facilities Design Standards or DC loading requirements, and do not meet any of the design criteria for future servicing of the museums, which include two-way traffic, on-site vehicle turn around, and height clearance and sizing for large vehicles.

While several loading facility alternatives were considered, there are multiple challenges to locating a new loading facility on the site (see Appendix D). These include limited space available at-grade, existing below-grade structures and footprints, and the extensive

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Site Access & Loading  
August 31, 2017

dimensional requirements for a ramp, truck apron, and loading dock to accommodate the design vehicle, which is a WB-67. The maximum slope for a ramp to below-grade loading is 12%, per section 11-2204 of the DC zoning code, requiring an at-grade footprint that would have significant impact to overall site circulation if not placed on the perimeter of the South Mall campus.

Several possible locations were examined, both above and below-grade, but it was determined that there were no design solutions utilizing existing curb-cut locations that met the design criteria for future servicing of the museums, which include two-way traffic, on-site vehicle turn around, height clearance, accommodation of large vehicles, limited visual impact, accommodation of future circulation, and constructability.

Reuse of the existing curb cut and existing ramp between the Freer and the Sackler Galleries (Scheme A in Appendix D) would not accommodate two-way traffic, would require extensive renovations that would impact adjacent program, would worsen east-west circulation, have a large visual impact, and would be difficult to construct. In order to accommodate a WB-67, the ramp would have to be approximately 184 feet long at a 12% grade, cutting through a large section of the Quad, before being able to pass underground. This scheme would also require extensive modifications to the existing galleries under the Quad.

Reuse of the existing curb cut with a new ramp between the Freer and the Quad (Scheme B in Appendix D), would similarly require extensive renovations and an increase in footprint that would prevent east-west circulation, decrease the size of the Haupt Garden, and worsen many of the circulation and site planning conditions that the Master Plan sought to improve.

Placement of a ramp west of the Freer to a new below-grade dock (Freer Ramp in Appendix D), would satisfy all the service loading requirements of the project, accommodate larger vehicles, and facilitate the programmatic and circulation goals of the Master Plan. This is the proposed option for servicing, in short, because it is the only place that meets the design criteria, and accommodates that goals of the Master Plan. The full off-street accommodation of large delivery vehicles will also reduce the impact of service vehicles on Independence Avenue.

### 6.1.3 Future Loading Activity

It is anticipated that future loading activity would be similar to the existing condition. The proposed expansion of the dining and retail spaces within the South Campus may lead to additional food deliveries (see Appendix A). However, the overall net increase in activity may be negligible. Consolidating the existing loading driveways would reduce overall delivery trips by eliminating the need for the same delivery vehicle to serve three separate driveways. These repeat trips are included in the trip estimates to be conservative because vehicles were not tracked between driveways (see Appendix A). However, it is likely overall delivery trips would be less than analyzed because of the inclusion of the repeat trips. Secondly, the additional food/retail delivery trips would likely also be balanced by the reduction in deliveries that would result from the removal of office staff from the Castle building to an offsite location.

It should also be noted that it is unclear at this time if the HMSG loading area would be consolidated with the proposed driveway because of the need to construct and underground connection under the 9<sup>th</sup> Street tunnel. The capacity analysis conducted for this report assumes the inclusion of truck trips from the HMSG loading area. However, if the HMSG loading area is not

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Site Access & Loading  
August 31, 2017

consolidated, overall truck trips entering and exiting the proposed loading driveway would be slightly less than estimated.

The proposed driveway would provide adequate maneuvering space for all anticipated types of trucks to preclude the need to maneuver within the public right of way. Appendix E contains loading diagrams for various heavy vehicle sizes from a single unit trucks to a WB-67.

The loading diagrams show that the underground loading area would be able to accommodate trucks up to WB-67, preventing the need for trucks to maneuver into or out of the driveway onto Independence Avenue SW as occurs in the existing condition. However, according to Figure 2-15 in AASHTO's A Policy on Geometric Design of Highways and Streets, 6th Edition, right-turning tractor trailers (WB-40 and larger) from westbound Independence Avenue SW would have to make wide turns and cross westbound lanes to their left. While this likely occurs in the existing condition at the three loading driveways, it is not desirable, particularly at a signalized intersection. Therefore, since SI controls and schedules all deliveries to the South Mall Campus facilities, it is recommended that all deliveries made in trucks larger than a single unit be required to enter the loading driveway from northbound 12<sup>th</sup> Street SW or eastbound Independence Avenue SW.

### 6.1.4 Project Phasing

The proposed loading driveway would be constructed as part of the larger Castle Revitalization Project expected to begin phased construction in approximately 2022. Upon completion of the proposed loading driveway (estimated by 2025), the existing loading driveway between the Freer and Sackler Galleries, as well as the Arts and Industry Building parking/loading driveway, would be deactivated and closed to all deliveries. However, these driveways may be reactivated on a temporary basis for construction access and staging during the South Mall Campus renovations, and would be fully removed by 2030. The existing AIB parking and loading area would be used until its permanent use as a museum facility is funded and the necessary permanent loading facilities are constructed and connected to the new underground space at the west end of the Castle. The designation of a permanent use for the AIB awaits action by Congress. Legislation has been introduced that would designate it as a Latino Museum. Furthermore, the feasibility of closing and consolidating the HMSG loading area is still being assessed; however, it would likely not be closed until 2035 or later because a tunnel under the 9<sup>th</sup> Street tunnel would be required to connect the HMSG to the proposed loading driveway.

### 6.1.5 Loading Management Plan

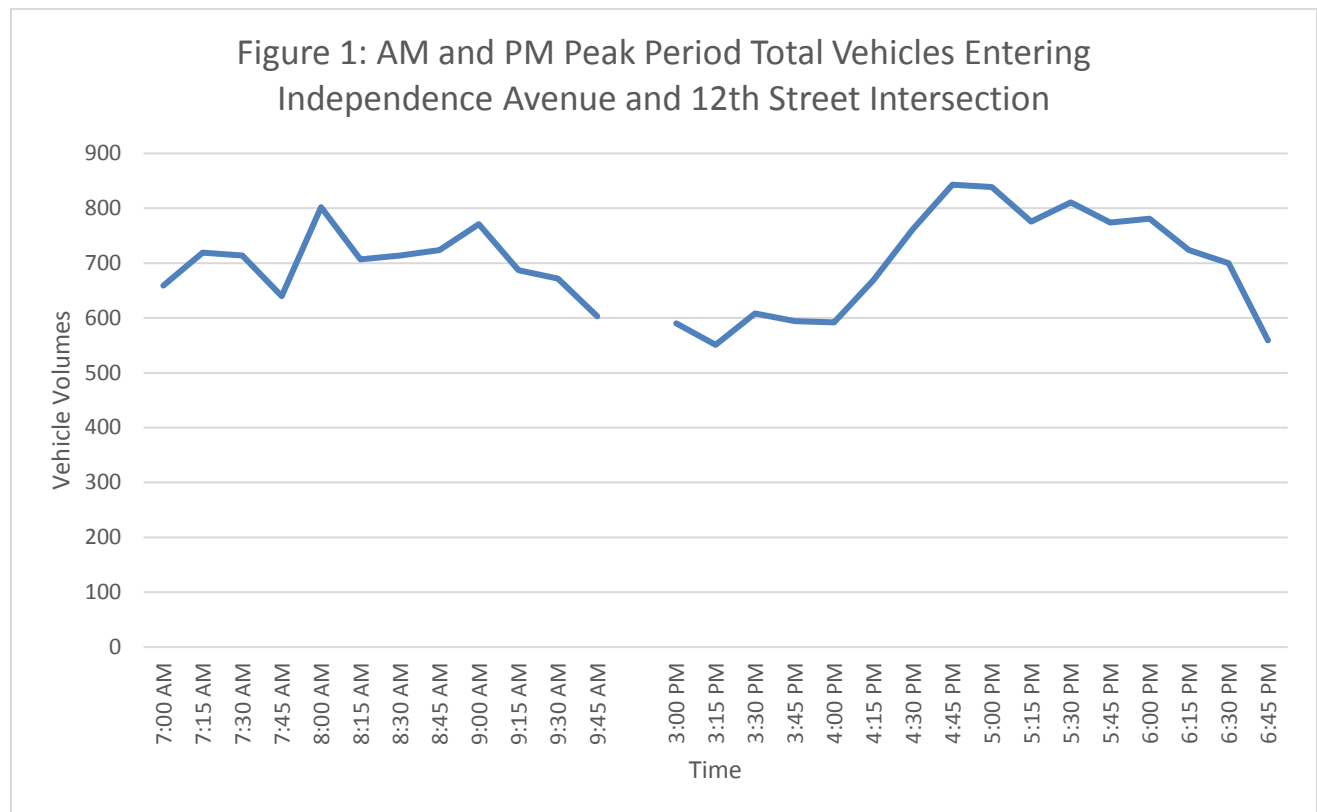
Based on feedback provided by SI, the following strategies would be utilized to reduce the impact of the loading driveway on peak period traffic on Independence Boulevard:

1. All deliveries made with trucks WB-50 or larger will be scheduled in advance.  
Figure 1 depicts the distribution of vehicle volume entering the intersection of

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Site Access & Loading  
August 31, 2017

Independence Avenue SW and 12<sup>th</sup> Street SW over the AM (7:00 AM – 10:00 AM) and PM (3:00 PM – 7:00 PM) peak periods. Based on the volume distribution trends. It is recommended that all trucks WB-50 or larger avoid deliveries between 6:30 AM and 9:30 AM, as well as between 3:30 PM and 6:30 PM to correspond with peak volume periods at the intersection.



- Deliveries made in box trucks (such as UPS, FedEx, DHL, etc.) and WB-40 (food deliveries) will be encouraged to avoid the AM (6:30 AM – 9:30 AM) and PM (3:30 PM – 6:30 PM) peak periods. However, specific restrictions cannot be placed on these types of deliveries.
- SI will work with DDOT during events in the City to restrict or hold deliveries.
- If pedestrian and/or vehicle congestion on Independence Avenue SW results in queuing that extends to upstream intersections, SI will hold trucks within the loading area until conditions improve. SI will also coordinate with DDOT and/or the MPD during emergencies to hold deliveries within the loading area.
- Trash and recycling pick-up will be scheduled for off-peak periods.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Site Access & Loading  
August 31, 2017

### 6.1.6 Impacts to 12<sup>th</sup> Street Intersection

Given the proximity of the proposed driveway to the signalized intersection of Independence Avenue SW & 12th Street SW, it is anticipated that the driveway would operate under signal control. Vehicle detection would be provided so that the phase serving the driveway would only be activated if a vehicle is present. Because right turns on red would be prohibited, intersection sight distance is not applicable. The proposed driveway would also require that the westbound Independence Avenue approach be signed for “No Right Turn On Red”.

The proposed design of the east side of the intersection is contained in the truck turning template diagrams in Appendix E. The proposed driveway would require the relocation of some signal equipment and streetscaping. A crosswalk would be maintained along the north side of Independence Avenue SW, and a new crosswalk across the east leg of the intersection could be added.

No access for private/visitor vehicles would be provided. For security reasons, all deliveries to SI are required to be scheduled in advance, providing the flexibility to direct deliveries to off-peak periods if possible. A guard would be posted to turn away vehicles without advanced arrangements.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Parking  
August 31, 2017

### 7.0 PARKING

An inventory of parking regulations was conducted on Tuesday, December 8, 2015. The data collection team denoted posted parking regulations by segment of the roadway, including restrictions on parking duration, loading zones, ADA parking spaces, bus stops, parking meters and kiosks, and street cleaning restrictions.

Exhibit 17 in Appendix F lists each segment inventoried for:

- Total number of on-street parking spaces;
- Number of permit spaces;
- Number of metered spaces; and,
- Number of ADA spaces.

Notes regarding the parking restrictions are listed in the last column. Typically, metered parking on Independence Avenue SW is permitted for two hours during the period from 9:30AM to 4:00PM Monday through Friday and from 7:00AM to 6:30PM Saturday. Parking is prohibited during the AM and PM peak periods, 7:00AM – 9:30AM and 4:00PM – 6:30PM, respectively. From 10th Street SW to 14th Street SW, parking is also prohibited from 10:00PM to 5:00AM on Tuesdays for street cleaning.

Some metered parking is available on 14th Street SW immediately north and south of Independence Avenue SW, but most spaces are reserved for special permits. Metered parking on 12th Street SW does not have a time restriction. Independence Avenue SW, 14th Street SW, and 12th Street SW are designated snow emergency routes, on which parking is not permitted during snow emergencies.

The proposed loading dock/driveway would not require any additional parking. However, it is anticipated that four metered parking space on the westbound Independence Avenue SW approach at the intersection with 12th Street SW would need to be removed to accommodate the new driveway and relocated bus stop.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Safety  
August 31, 2017

### 8.0 SAFETY

An inventory of the study area was conducted on December 8, 2015. In general, the study area has undivided, level roadways with 11-foot wide lanes and metered parking. Roadside features include wide sidewalks and streetscaping. Although all modes are encouraged to use the area, on-road traffic is mostly composed of passenger vehicles with some trucks, and off-road traffic is mostly composed of pedestrians. Traffic control includes signalized intersections supplemented with signage. Although there are no existing signs prohibiting right turns on red, the northbound 12<sup>th</sup> Street SW and 10<sup>th</sup> Street SW approaches have protected right turn signal indications.

Additional investigations of the intersections reveal:

- Striping is in good condition,
- Approaches have relatively little skew, if any,
- Excellent daylighting,
- Post-mounted signal heads, and
- Some roadside trees may obstruct sight distance.

### 8.1 SIGHT DISTANCE

AASHTO's A Policy on Geometric Design of Highways and Streets, 6th Edition, provides a method to calculate the required intersection sight distance for the three possible movements at an intersection: left turn, through, and right turn. Although these calculations are generally used for unsignalized intersections, they can also be applied to signalized intersections where right turns on red are permitted and consequently mimic yield-controlled conditions. Signal-controlled left turns are usually not analyzed. Therefore, according to AASHTO, the required sight distances for right turns at all three intersections is approximately 240 feet for passenger vehicles, 315 feet for single-unit trucks, and 390 feet for combination trucks for all approaches.

Sketches 1 through 4 in Appendix G illustrate the sight distance triangles for right turns at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW. Sight distance for passenger vehicles is shown in red, while the sight distance for single-unit trucks and combination trucks is shown in yellow and blue, respectively. Sketches 1 and 2 reveal that existing sight distance is adequate for vehicles on all approaches except the SB approach due to the retaining wall for the 12<sup>th</sup> Street Expressway. In addition, sight distance for single-unit and combination trucks on the NB 12<sup>th</sup> Street SW approach is blocked due to the pedestrian archway just west of the intersection.

Sketches 3 and 4 illustrate the approximate sight distances for the SB loading dock/driveway and relocated WB Independence Avenue SW approaches. Sketch 3 shows that the sight distance at the approximate location of the new driveway may be partially obstructed by trees, although this is not expected to have a significant impact on driveway operations because all movements from the driveway would be signal-controlled. Sketch 4 shows that although the

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Safety  
August 31, 2017

stop bar would be relocated approximately 20 feet east, the sight distance would not be affected.

### 8.2 CRASH ANALYSIS

To supplement the roadway inventory, Stantec received crash analysis summaries (Appendix G) from DDOT for the three study area intersections for the three-year period between January 2012 and December 2014 to evaluate any existing safety deficiencies at the study intersections. The analyses, further summarized in **Table 5**, revealed most crashes at the intersections are rear-end and sideswipe with property damage only.

**Table 5: Crash Summary, 01/2012 to 12/2014**

Intersection Independence Avenue SW @	Total Crashes	Total Rear-End	Total Sideswipe	Total Ped/ Bike	Total Fatal	Total Injury	Total PDO
14 <sup>th</sup> Street SW	62	17 (27.4%)	31 (50.0%)	2	0 (0.0%)	11 (17.7%)	51 (82.3%)
12 <sup>th</sup> Street SW	53	10 (18.9%)	19 (35.8%)	7	0 (0.0%)	18 (34.0%)	35 (66.0%)
10 <sup>th</sup> Street SW (L'Enfant Promenade)	8	1 (12.5%)	3 (37.5%)	0	0 (0.0%)	2 (25.0%)	6 (75.0%)

According to the Highway Safety Manual (HSM), rear-end and sideswipe crashes are most commonly caused by inappropriate approach speeds, poor visibility of signals, unexpected lane changes on approach, unexpected stops on approach, and/or excessive speed.

A speed study performed in 2006 by DDOT shows that all study area roadways experience excessive speeding. Although the posted speed limit is 25 mph on all study area roadways, 85th percentile speed is greater than 35 mph. In addition, the roadways can potentially experience peak period directional congestion, which can generate unexpected lane changes and stops on the approaches. Lastly, the intersections are wide and drivers may not anticipate post-mounted signals, especially in high-tourist areas, due to placement at the intersection, resulting in last-minute braking. Considering these factors, the data does not identify a specific safety deficiency, and thus no additional safety enhancements are proposed.

Furthermore, it is unlikely the proposed loading dock/driveway would contribute to an increase in crashes. In fact, the proposed driveway would consolidate three uncontrolled driveways to a single signal-controlled driveway. This would reduce vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle conflicts and would also provide for enhanced control of these types of conflicts at the proposed driveway location. In addition, the proposed loading driveway would be located diagonally across from the Smithsonian Metro station entrance, where the highest concentration of pedestrians is experienced at the intersection.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Streetscape & the Public Realm  
August 31, 2017

### 9.0 STREETScape & THE PUBLIC REALM

It is anticipated that some removal or relocation of streetscaping will be necessary to accommodate the proposed driveway. All modifications to streetscaping will conform to DEM standards. It should also be noted that the overall South Mall Campus Master Plan includes improving the Independence Avenue SW frontage with more street furniture and plantings, as well as enhancing the internal on-site connections between Independence Avenue SW and Jefferson Drive SW. Sidewalks on the SI side of Independence Avenue SW also follow NCPC streetscape standards for Mall Roads, including yellow aggregate concrete paving.

# SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Conclusion  
August 31, 2017

## 10.0 CONCLUSION

In conclusion, the proposed consolidation of the loading driveways along Independence Avenue SW into one loading dock/driveway at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW would have an overall negligible impact on the study area roadway network.

The analysis of the proposed loading driveway revealed the following:

1. Recommendations in city-wide planning documents and studies would not be affected by the proposed driveway.
2. Design of the new driveway would require safety elements for pedestrians to maintain the goals and objectives presented in the 2005 Bicycle Master Plan, 2009 Pedestrian Master Plan, and moveDC, such as adequate transitions from sidewalk to street (curb ramps), pedestrian signal heads, and a clearly defined crosswalk.
3. The new driveway is not expected to generate any new auto, transit, pedestrian, or bicycle trips. It is expected to divert two inbound and three outbound existing truck trips and generate one inbound and one outbound truck trip in both AM and PM peak hours.
4. The additional signal phase required for the driveway would cause degradation in the operation of the eastbound Independence Avenue SW approach from a volume-to-capacity (v/c) ratio of 0.88 during the 2030 Future No Build Condition AM peak hour to a v/c ratio of 1.04 during the 2030 Future Build Condition. The loading driveway has a negligible impact on PM peak hour operations.
5. The driveway would enhance pedestrian and bicycle operations along the north side of Independence Avenue SW by eliminating up to three uncontrolled driveway and replacing them with a single signal-controlled driveway. This may be particularly desirable if a cycle track was to be constructed along Independence Avenue SW as identified in the moveDC plan.
6. A crosswalk could be provided across the east leg of the intersection.
7. Four metered parking spaces and some streetscaping on the westbound Independence Avenue SW approach at the intersection with 12<sup>th</sup> Street SW would need to be removed or relocated to accommodate the new driveway.
8. The existing bus stop on the northeast corner of the intersection would need to be shifted approximately 40 feet east.

## SMITHSONIAN INSTITUTION SOUTH MALL CAMPUS MASTER PLAN – CONSOLIDATED LOADING DOCK AND DRIVEWAY

Conclusion  
August 31, 2017

To address the deficiencies, the following measures are recommended:

1. All deliveries made with trucks WB-50 or larger will be scheduled in advance and will avoid deliveries between 6:30 AM and 9:30 AM, as well as between 3:30 PM and 6:30 PM to correspond with peak volume periods at the intersection of Independence Avenue SW & 12<sup>th</sup> Street SW.
2. Deliveries made in box trucks (such as UPS, FedEx, DHL, etc.) and WB-40 (food deliveries) will be encouraged to avoid the AM (6:30 AM – 9:30 AM) and PM (3:30 PM – 6:30 PM) peak periods. However, specific restrictions cannot be placed on these types of deliveries.
3. SI will work with DDOT during events in the City to restrict or hold deliveries.
4. If pedestrian and/or vehicle congestion on Independence Avenue SW results in queuing that extends to upstream intersections, SI will hold trucks within the loading area until conditions improve. SI will also coordinate with DDOT and/or the MPD during emergencies to hold deliveries within the loading area.
5. Trash and recycling pick-up will be scheduled for off-peak periods.



## **APPENDIX A: STUDY AREA DATA**



---

To:	Jonathan Rogers	From:	Adam Catherine
	DDOT		Stantec
File:	2028110978	Date:	October 20, 2015

---

**Reference: Loading Dock Trip Generation Analysis**

The Smithsonian Institution (SI) South Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. As part of the overall vision for the South Campus, SI is proposing to consolidate three existing loading areas along Independence Avenue into a single loading driveway that would be accessed via a ramp at the intersection of Independence Avenue and 12<sup>th</sup> Street, on the west side of the Freer Gallery (see **Attachment A**). The consolidation of the three existing loading driveways would eliminate breaks in the current campus site plan, allowing for a cohesive connection across the entire campus for visitors. In addition, the new loading driveway would be able to accept all truck types, as well as eliminate the need for trucks to back in to or out of the driveways, as occurs in the existing condition.

This memorandum summarizes the analysis that was performed to estimate the number of AM peak hour, PM peak hour, and weekday loading trips that would be consolidated at the new driveway location. It should be noted that the proposed loading driveway consolidation is not anticipated to generate additional personal auto (car), transit, pedestrian, or bicycle trips.

**Existing Conditions**

Observations of the existing loading areas were conducted from 7:00 AM – 7:00 PM for a period of seven days between Thursday, September 24 and Wednesday, September 30, 2015. Field data collection technicians noted the arrival and departure times of each vehicle, the vehicle type (van, box truck, or tractor trailer), the direction from which they entered and the direction to which they exited, as well as if the vehicle needed to back into or out of the loading area. The raw data is contained in **Attachment B**, and a summary of the data is shown in **Table 1**.

In addition to the loading area data, turning movement counts were conducted at the signalized intersections of Independence Avenue and 12<sup>th</sup> Street, and Independence Avenue and L'Enfant Plaza on Tuesday, September 29 from 7:00 AM – 10:00 AM and 3:00 PM – 7:00 PM. The turning movement counts were used to determine the AM and PM peak hours of Independence Avenue for the purposes of the truck trip generation analysis, and will also be used to conduct the capacity analysis for the existing and proposed conditions.

The data shown in **Table 1** reveals that the majority of truck activity occurs on weekday, off-peak periods. No deliveries were recorded on Saturday, and only two were recorded on Sunday. It should also be noted that almost 60% of all the delivery vehicles either back into or out of the existing loading driveways, thus impeding traffic flow on Independence Avenue.

**Design with community in mind**

ca:\1925\2028110978\corresp\scoping\20151009\_truck\_trip\_gen\_memo.docx

**Reference: Loading Dock Trip Generation Analysis**

**Table 1: Summary of Existing Loading Area Activity**

<b>Total Number of Vehicles over 7-Day Count Period</b>	<b>142</b>	
Number of Vehicles Arriving/Departing on a Weekday	140	99%
Number of Vehicles Arriving/Departing on a Weekend	2	1%
<b>Average Duration of Loading Area Activity (per Vehicle)</b>	<b>38 min</b>	
Vehicles Backing Into Loading Dock	62	44%
Vehicles Backing out of Loading Dock	19	13%
Vehicles Entering From WB Independence Ave*	110	80%
Vehicles Entering From EB Independence Ave*	29	20%
Vehicles Departing to WB Independence Ave*	87	64%
Vehicles Departing to EB Independence Ave*	50	36%
<b>Highest Number of Trips During AM Peak Hour of Independence Avenue (8:00 AM - 9:00 AM)</b>	<b>6</b>	
<b>Entering</b>	<b>3</b>	<b>50%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Exiting</b>	<b>3</b>	<b>50%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Highest Number of Trips During PM Peak Hour of Independence Avenue (4:45 PM - 5:45 PM)</b>	<b>5</b>	
<b>Entering</b>	<b>2</b>	<b>40%</b>
Van	0	
Box Truck	2	
Tractor Trailer	0	
<b>Exiting</b>	<b>3</b>	<b>60%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Highest Number of Weekday Trips</b>	<b>96</b>	
<b>Entering</b>	<b>48</b>	<b>50%</b>
Van	6	
Box Truck	34	
Tractor Trailer	8	
<b>Exiting</b>	<b>48</b>	<b>50%</b>
Van	6	
Box Truck	34	
Tractor Trailer	8	

\*The total number of entering and departing vehicles is slightly less than the total vehicles recorded because of vehicle arrivals/departures that occurred before or after the count period.

**Reference: Loading Dock Trip Generation Analysis**

The AM peak hour, PM peak hour, and weekday trips shown in **Table 1** represent the highest number of trips that were recorded on any given weekday during the duration of the counts. This will provide a conservative analysis of the proposed condition.

**Estimate of Future Loading Activity**

In addition to the consolidated loading driveway, the Master Plan includes an expansion of the South Campus facilities to provide additional user amenities, such as dining and shopping. While the exact square footages of the retail/dining areas are unclear at this time, an increase in loading driveway activity is anticipated. SI provided Stantec with an estimate of food-related delivery activity at the National Museum of the American Indian (NMAI), which has facilities similar to those anticipated for the South Campus.

**Table 2: Estimate of Future Loading Area Activity**

Weekday Trips			Existing	New	Future
	Entering	Total	48	13	61
		Van	6	0	6
		Box Truck	34	13	47
		Tractor Trailer	8	0	8
	Exiting	Total	48	12	60
		Van	6	0	6
		Box Truck	34	12	46
		Tractor Trailer	8	0	8
	<b>Total</b>		<b>96</b>	<b>25</b>	<b>121</b>
AM Peak Hour Trips	Entering	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	Exiting	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	<b>Total</b>		<b>6</b>	<b>2</b>	<b>8</b>
PM Peak Hour Trips	Entering	Total	2	1	3
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	0	0	0
	Exiting	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	<b>Total</b>		<b>5</b>	<b>2</b>	<b>7</b>



October 20, 2015  
Jonathan Rogers  
Page 4 of 4

**Reference: Loading Dock Trip Generation Analysis**

The data provided by NMAI indicates that there are approximately 25 food-related deliveries on a typical weekday, which primarily utilize box trucks. However, SI did not have logs to identify the time or duration of the deliveries. Therefore, the NMAI data was applied to the ratio of peak hour to daily trips, obtained from the South Campus data, to estimate the number of additional deliveries that would occur at the consolidated driveway location. **Table 2** provides the total AM peak hour, PM peak hour, and weekday trips that would be experienced in the proposed condition.

**Trip Arrival and Distribution Patterns**

It is assumed that the distribution of both existing and new trips would follow the existing distribution pattern shown in **Table 1**. However, it should be noted the proposed consolidated loading area is being designed so that trucks of all types can enter the facility and use an L-shaped loading area within the site to back into the dock, thereby eliminating the backing activity that currently occurs on Independence Avenue (see **Attachment A**).

**Conclusions and Next Steps**

This memorandum summarizes the analysis that was performed to estimate the number of AM peak hour, PM peak hour, and weekday truck loading trips that would be consolidated at the new driveway location. The results of the analysis indicate that the majority of trips occur on weekdays and during off-peak periods. The data also reveals that almost 60% of the loading trips require a vehicle to back into or out of the loading dock, thus blocking traffic on Independence Avenue.

Based on the results of the trip estimate, the proposed consolidated driveway would experience approximately 121 daily trips, with a minimal amount occurring during the AM peak hour (8) and PM peak hour (7). The proposed loading driveway would also eliminate backing activity that currently occurs on Independence Avenue. However, due to its proximity to the intersection of Independence Avenue and 12<sup>th</sup> Street, a capacity analysis must be performed to determine if an actuated traffic signal phase for the new driveway could be provided without significantly impacting intersection operations.

**STANTEC CONSULTING SERVICES INC.**

Adam Catherine  
Associate  
Phone: (856) 234-0800 ext 8542  
Fax: (856) 234-5926  
Adam.Catherine@stantec.com

Attachment: Attachment A: Proposed Loading Dock Plan  
Attachment B: Existing Delivery Data

Design with community in mind

ca uz\1925\2028110978\corresp\scoping\20151009\_truck\_trip\_gen\_memorandum.docx

Attachment B  
 Smithsonian South Campus Loading Dock  
 Vehicle Counts  
 Thursday, September 24, 2015 - Wednesday, September 30, 2015

Vehicle	Day	Date	Time In	Time Out	Duration (min)	Vehicle Type	Pull In	Back In	Pull Out	Back Out	Entering From WB	Entering From EB	Departing to WB	Departing to EB
1	Thursday	9/24/2015	7:44 AM	9:15 AM	31	Box Truck	1		1		1		1	
2	Thursday	9/24/2015	8:45 AM	10:31 AM	46	Box Truck	1		1		1			
3	Thursday	9/24/2015	9:32 AM	10:46 AM	74	Van	1		1			1		1
4	Thursday	9/24/2015	9:36 AM	9:47 AM	11	Box Truck		1	1		1			1
5	Thursday	9/24/2015	9:45 AM	9:52 AM	7	Box Truck		1	1		1		1	
6	Thursday	9/24/2015	11:31 AM	11:49 AM	18	Box Truck		1	1		1			1
7	Thursday	9/24/2015	1:01 PM	1:12 PM	11	Van	1		1			1	1	
8	Thursday	9/24/2015	3:42 PM	3:52 PM	10	Tractor Trailer		1	1		1			1
9	Friday	9/25/2015	6:47 AM	7:08 AM	21	Tractor Trailer		1	1		1		1	
10	Friday	9/25/2015	7:42 AM	7:58 AM	16	Box Truck	1		1		1		1	
11	Friday	9/25/2015	8:04 AM	8:32 AM	28	Tractor Trailer		1	1		1		1	
12	Friday	9/25/2015	8:20 AM	8:41 AM	21	Box Truck	1		1		1		1	
13	Friday	9/25/2015	9:03 AM	9:10 AM	7	Box Truck	1		1		1		1	
14	Friday	9/25/2015	9:06 AM	9:23 AM	17	Box Truck	1		1		1		1	
15	Friday	9/25/2015	9:11 AM	9:23 AM	12	Box Truck	1		1		1			1
16	Friday	9/25/2015	9:43 AM	9:55 AM	12	Tractor Trailer		1	1		1			1
17	Friday	9/25/2015	9:49 AM	9:55 AM	6	Box Truck	1		1		1			1
18	Friday	9/25/2015	10:20 AM	10:46 AM	26	Box Truck	1		1		1		1	
19	Friday	9/25/2015	10:20 AM	10:39 AM	19	Box Truck		1	1			1		1
20	Friday	9/25/2015	10:23 AM	11:29 AM	6	Box Truck	1		1		1			1
21	Friday	9/25/2015	10:27 AM	10:46 AM	19	Tractor Trailer		1	1			1	1	
22	Friday	9/25/2015	10:49 AM	11:12 AM	23	Tractor Trailer		1	1		1			1
23	Friday	9/25/2015	11:10 AM	12:05 PM	55	Box Truck	1		1		1		1	
24	Friday	9/25/2015	11:13 AM	12:07 PM	54	Box Truck	1		1		1		1	
25	Friday	9/25/2015	11:17 AM	12:40 PM	83	Tractor Trailer		1	1		1		1	
26	Friday	9/25/2015	11:30 AM	12:13 PM	43	Box Truck	1		1		1		1	
27	Friday	9/25/2015	11:57 AM	12:52 PM	55	Box Truck	1		1		1			1
28	Friday	9/25/2015	12:20 PM	1:50 PM	90	Tractor Trailer		1	1		1		1	
29	Friday	9/25/2015	12:30 PM	1:11 PM	41	Box Truck	1		1		1			1
30	Friday	9/25/2015	12:46 PM	1:31 PM	45	Box Truck	1		1			1	1	
31	Friday	9/25/2015	1:04 PM	1:51 PM	47	Box Truck	1		1			1	1	
32	Friday	9/25/2015	1:33 PM	2:13 PM	40	Tractor Trailer		1	1		1			1
33	Friday	9/25/2015	1:43 PM	2:13 PM	30	Tractor Trailer		1	1		1			1
34	Friday	9/25/2015	1:44 PM	-	-	Box Truck	1		1		1			
35	Friday	9/25/2015	1:46 PM	-	-	Box Truck	1		1		1			
36	Friday	9/25/2015	2:05 PM	2:11 PM	6	Box Truck	1		1				1	
37	Friday	9/25/2015	2:43 PM	2:54 PM	11	Box Truck	1		1		1		1	
38	Friday	9/25/2015	2:44 PM	2:58 PM	14	Box Truck	1		1			1	1	
39	Friday	9/25/2015	2:55 PM	3:05 PM	10	Box Truck		1	1		1		1	
40	Friday	9/25/2015	3:30 PM	5:22 PM	112	Box Truck	1		1		1		1	
41	Friday	9/25/2015	5:21 PM	5:42 PM	21	Tractor Trailer		1	1		1			1
42	Sunday	9/27/2015	10:59 AM	11:50 AM	51	Van	1		1				1	
43	Sunday	9/27/2015	12:37 PM	3:32 PM	175	Van	1		1			1	1	
44	Monday	9/28/2015	7:12 AM	7:24 AM	12	Box Truck	1		1		1		1	
45	Monday	9/28/2015	7:45 AM	8:23 AM	38	Tractor Trailer		1	1		1			1
46	Monday	9/28/2015	8:04 AM	8:38 AM	34	Box Truck	1		1			1	1	
47	Monday	9/28/2015	8:50 AM	9:31 AM	41	Tractor Trailer	1		1		1			1
48	Monday	9/28/2015	8:52 AM	9:01 AM	9	Box Truck		1	1		1		1	
49	Monday	9/28/2015	9:02 AM	9:09 AM	7	Box Truck	1		1			1	1	
50	Monday	9/28/2015	9:11 AM	9:32 AM	21	Tractor Trailer		1	1		1		1	
51	Monday	9/28/2015	9:36 AM	9:54 AM	18	Box Truck	1		1		1			1
52	Monday	9/28/2015	10:08 AM	10:18 AM	10	Box Truck		1	1		1		1	
53	Monday	9/28/2015	10:12 AM	12:35 PM	143	Box Truck	1		1		1		1	
54	Monday	9/28/2015	11:50 AM	12:40 PM	50	Box Truck	1		1		1		1	
55	Monday	9/28/2015	12:27 PM	12:57 PM	30	Box Truck	1		1		1		1	
56	Monday	9/28/2015	12:49 PM	1:10 PM	21	Box Truck	1		1			1		1
57	Monday	9/28/2015	1:51 PM	1:37 PM	46	Box Truck	1		1		1			1
58	Monday	9/28/2015	1:25 PM	1:34 PM	9	Tractor Trailer		1	1		1		1	
59	Monday	9/28/2015	1:45 PM	1:51 PM	6	Box Truck	1		1		1			1
60	Monday	9/28/2015	1:47 PM	1:56 PM	9	Box Truck	1		1				1	
61	Monday	9/28/2015	2:07 PM	2:17 PM	10	Box Truck	1		1		1			1
62	Monday	9/28/2015	3:18 PM	3:24 PM	6	Box Truck	1		1		1		1	



Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	470	62	15	122	6	0	245	8	0	79	29
07:15	0	474	67	22	156	3	0	326	10	1	90	37
07:30	0	537	71	21	110	3	0	263	10	0	106	21
07:45	0	558	64	20	145	3	0	353	14	0	117	35
08:00	0	577	52	35	118	1	0	361	14	1	143	48
08:15	0	657	56	31	126	5	0	408	9	0	150	56
08:30	0	546	30	33	103	2	0	370	11	0	162	65
08:45	0	506	46	23	127	7	0	396	14	0	142	61
09:00	0	552	43	34	146	3	0	377	5	0	126	81
09:15	0	494	29	36	97	9	1	414	12	0	104	66
09:30	0	512	30	27	82	3	0	365	6	1	90	33
09:45	0	445	42	26	103	5	2	280	7	1	116	40
Peak Hour	0	2286	184	122	474	15	0	1535	48	1	597	230
15:00	0	257	26	29	261	8	0	80	10	1	112	23
15:15	0	306	49	35	286	10	1	117	7	1	89	22
15:30	0	184	30	27	307	5	1	66	2	0	118	20
15:45	0	189	22	43	331	10	0	72	5	3	154	32
16:00	0	281	57	52	362	8	1	68	7	3	245	27
16:15	0	370	92	51	457	6	0	101	4	2	281	30
16:30	0	366	65	26	344	6	0	117	3	0	189	25
16:45	0	356	87	39	314	3	0	81	4	2	204	27
17:00	0	358	92	34	331	11	0	117	12	1	210	23
17:15	0	373	87	38	360	6	0	127	5	0	229	22
17:30	0	368	77	26	332	0	1	130	6	0	207	19
17:45	0	370	96	38	421	4	0	99	13	2	226	22
18:00	0	389	85	29	422	8	0	65	2	3	123	51
18:15	0	326	54	23	366	11	0	96	3	2	213	43
18:30	0	309	50	32	400	11	0	106	8	3	172	29
18:45	0	230	43	17	395	9	1	98	4	2	148	23
Peak Hour	0	1469	352	136	1444	21	1	473	36	3	872	86

Passenger Cars

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	6	2	3	9	0	0	0	0	1	1	7
07:15	0	9	3	3	8	1	0	1	0	0	1	3
07:30	0	2	3	4	6	1	1	1	0	1	0	8
07:45	0	7	1	4	13	0	2	3	0	1	1	4
08:00	0	8	2	6	5	1	0	1	0	1	2	4
08:15	0	4	3	4	6	0	1	2	0	0	0	2
08:30	0	5	3	8	9	1	3	1	0	3	0	5
08:45	0	6	3	5	5	0	2	2	0	0	2	4
09:00	0	3	0	4	9	0	1	4	0	1	1	1
09:15	0	0	3	4	6	1	0	2	0	0	1	6
09:30	0	3	1	5	8	0	1	3	0	2	0	1
09:45	0	6	2	3	3	1	0	1	0	1	3	4
Peak Hour	0	23	11	23	25	2	6	6	0	4	4	15
15:00	0	3	2	2	6	0	0	0	0	0	7	2
15:15	0	5	1	2	3	0	2	0	0	0	5	2
15:30	0	3	2	5	4	0	0	1	0	1	7	2
15:45	0	7	0	0	3	0	1	1	1	3	7	5
16:00	0	4	1	5	4	0	0	2	0	2	3	2
16:15	0	5	2	5	3	0	1	3	0	4	7	9
16:30	0	8	2	3	8	0	3	2	0	2	3	5
16:45	0	3	2	4	3	0	2	3	0	1	8	4
17:00	0	2	3	0	1	0	1	2	0	2	15	5
17:15	0	7	1	1	8	0	2	1	1	2	6	1
17:30	0	4	2	3	10	0	0	3	0	2	5	3
17:45	0	1	2	4	7	0	1	1	0	5	4	6
18:00	0	2	2	2	6	0	2	2	0	4	0	1
18:15	0	3	1	0	3	0	1	1	0	0	2	2
18:30	0	4	1	3	2	0	2	1	0	3	0	5
18:45	0	1	3	2	6	0	0	0	0	2	2	1
Peak Hour	0	14	8	8	26	0	4	7	1	11	30	15

Heavy Vehicles

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	0	476	64	18	131	6	0	245	8	1	80	36	1065
07:15	0	483	70	25	164	4	0	327	10	1	91	40	1215
07:30	0	539	74	25	116	4	1	264	10	1	106	29	1169
07:45	0	565	65	24	158	3	2	356	14	1	118	39	1345
08:00	0	585	54	41	123	2	0	362	14	2	145	52	1380
08:15	0	661	59	35	132	5	1	410	9	0	150	58	1520
08:30	0	551	33	41	112	3	3	371	11	3	162	70	1360
08:45	0	512	49	28	132	7	2	398	14	0	144	65	1351
09:00	0	555	43	38	155	3	1	381	5	1	127	82	1391
09:15	0	494	32	40	103	10	1	416	12	0	105	72	1285
09:30	0	515	31	32	90	3	1	368	6	3	90	34	1173
09:45	0	451	44	29	106	6	2	281	7	2	119	44	1091
Peak Total	0	2309	195	145	499	17	6	1541	48	5	601	245	5611
PHF	#DIV/0!	0.873	0.826	0.884	0.945	0.607	0.500	0.940	0.857	0.417	0.927	0.875	0.923
%HV	#DIV/0!	1.0%	5.6%	15.9%	5.0%	11.8%	100.0%	0.4%	0.0%	80.0%	0.7%	6.1%	0.0%
15:00	0	260	28	31	267	8	0	80	10	1	119	25	829
15:15	0	311	50	37	289	10	3	117	7	1	94	24	943
15:30	0	187	32	32	311	5	1	67	2	1	125	22	785
15:45	0	196	22	43	334	10	1	73	6	6	161	37	889
16:00	0	285	58	57	366	8	1	70	7	5	248	29	1134
16:15	0	375	94	56	460	6	1	104	4	6	288	39	1433
16:30	0	374	67	29	352	6	3	119	3	2	192	30	1177
16:45	0	359	89	43	317	3	2	84	4	3	212	31	1147
17:00	0	360	95	34	332	11	1	119	12	3	225	28	1220
17:15	0	380	88	39	368	6	2	128	6	2	235	23	1277
17:30	0	372	79	29	342	0	1	133	6	2	212	22	1198
17:45	0	371	98	42	428	4	1	100	13	7	230	28	1322
18:00	0	391	87	31	428	8	2	67	2	7	123	52	1198
18:15	0	329	55	23	359	11	1	97	3	2	215	45	1140
18:30	0	313	51	35	402	11	2	107	8	6	172	34	1141
18:45	0	231	46	19	401	9	1	98	4	4	150	24	987
Peak Total	0	1483	360	144	1470	21	5	480	37	14	902	101	5017
PHF	#DIV/0!	0.976	0.918	0.857	0.859	0.477	0.625	0.902	0.712	0.500	0.960	0.902	0.949
%HV	#DIV/0!	0.9%	2.2%	5.6%	1.8%	0.0%	80.0%	1.5%	2.7%	78.6%	3.3%	14.9%	0.0%

Total Vehicles

Start Date: 12/8/2015  
Start Time: 7:00:00 AM  
Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound				14th St, SW Southbound				Independence Ave, SW Eastbound				Independence Ave, SW Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	7	0	0	0	11	0	2	0	7	0	0	0	25
07:15	1	0	0	18	2	3	1	6	0	2	2	4	0	2	0	40
07:30	0	0	0	15	0	0	0	12	0	2	0	3	0	1	0	54
07:45	0	0	0	21	1	0	0	20	0	6	0	5	0	1	0	50
08:00	0	0	0	15	0	1	0	8	0	1	0	3	0	2	0	60
08:15	0	1	0	8	0	3	0	5	0	3	0	3	0	0	0	54
08:30	0	0	0	12	1	0	0	5	0	5	0	10	0	1	0	47
08:45	0	0	0	7	0	0	0	5	1	2	0	8	0	1	0	54
09:00	0	0	0	6	2	1	0	8	0	0	0	10	0	1	0	42
09:15	0	0	0	3	0	1	0	5	0	4	1	7	0	1	0	28
09:30	0	0	0	0	0	0	0	13	0	1	0	7	0	0	0	26
09:45	0	1	0	4	0	0	0	2	1	2	0	11	0	0	0	9
Peak Total	0	1	0	42	1	4	0	23	1	11	0	24	0	4	0	215
15:00	1	0	0	34	0	0	0	17	0	0	0	6	0	0	0	24
15:15	0	0	0	27	0	1	0	2	0	0	0	4	0	2	0	22
15:30	0	0	0	12	0	0	0	7	0	0	0	10	0	0	0	9
15:45	0	1	0	28	0	0	0	3	0	0	0	16	0	1	0	9
16:00	0	0	0	25	0	0	0	1	0	1	0	15	0	3	0	27
16:15	0	0	0	75	0	2	0	1	0	1	0	10	0	3	0	30
16:30	0	2	0	47	0	1	0	10	0	0	0	37	0	2	0	8
16:45	0	1	0	49	0	1	0	14	0	0	0	7	0	7	0	11
17:00	0	0	0	26	0	0	0	12	0	0	0	4	0	8	1	14
17:15	0	1	0	99	0	1	1	18	0	1	0	11	0	3	1	8
17:30	0	1	1	44	0	1	1	9	0	0	0	9	0	6	0	14
17:45	1	0	0	25	0	0	0	7	0	0	0	3	0	6	0	4
18:00	0	0	0	38	0	0	0	11	0	1	0	2	0	4	1	7
18:15	2	0	0	32	0	1	0	4	0	0	0	6	0	1	1	4
18:30	0	1	0	14	0	0	0	13	1	1	0	6	0	1	0	1
18:45	0	0	0	10	0	0	0	6	0	2	0	4	0	2	0	1
Peak Total	1	2	1	194	0	2	2	46	0	1	0	27	0	23	2	40

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave at 12th St, SW

Start Time	12th St, NW Northbound			12th St, NW Southbound			Independence Eastbound			Independence Ave SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	19	27	13	0	0	0	13	324	49	40	153	21	659
07:15	13	30	8	0	3	1	6	361	45	30	198	24	719
07:30	22	60	20	0	4	2	15	356	38	35	142	20	714
07:45	11	32	25	0	2	0	5	285	49	36	160	35	640
08:00	32	80	31	3	2	1	13	359	37	33	180	31	802
08:15	46	44	21	2	2	2	7	324	32	32	160	35	707
08:30	44	44	23	2	5	2	11	308	40	37	168	30	714
08:45	44	32	34	3	4	3	17	351	25	37	142	32	724
09:00	49	66	39	1	4	1	4	357	22	35	155	38	771
09:15	31	21	49	0	4	4	10	281	28	47	174	38	687
09:30	67	31	45	0	3	4	13	284	15	30	157	23	672
09:45	36	54	48	5	4	1	5	276	19	30	102	23	603
Peak Total	166	200	109	10	13	8	48	1342	134	139	650	128	2947
PHF	0.902	0.625	0.801	0.833	0.650	0.667	0.706	0.935	0.838	0.939	0.903	0.914	0.919
15:00	25	39	61	1	6	2	8	209	14	34	160	31	590
15:15	17	24	55	4	5	2	10	192	12	30	169	31	551
15:30	29	40	63	3	7	2	8	184	24	44	183	21	608
15:45	26	36	52	1	3	5	3	213	15	35	179	26	594
16:00	25	31	34	3	5	3	3	221	6	51	184	26	592
16:15	30	47	55	1	0	0	3	229	8	56	226	14	669
16:30	44	43	71	0	1	2	2	243	14	69	249	24	762
16:45	51	59	88	3	6	8	2	242	10	78	262	34	843
17:00	30	35	78	4	5	4	0	217	6	73	348	39	839
17:15	25	47	56	3	5	2	0	196	8	84	307	43	776
17:30	18	84	54	2	4	3	0	238	3	93	278	34	811
17:45	20	42	56	3	6	0	0	215	5	84	294	49	774
18:00	21	61	72	1	2	2	2	156	0	94	322	48	781
18:15	26	29	44	1	4	2	4	205	2	101	270	36	724
18:30	19	29	63	1	1	2	24	179	0	96	257	29	700
18:45	21	30	53	0	0	1	10	156	0	55	216	17	559
Peak Total	93	208	244	12	20	9	0	866	22	334	1227	165	3200
PHF	0.775	0.619	0.782	0.750	0.833	0.563	#DIV/0!	0.910	0.688	0.898	0.881	0.842	0.954

Vehicles

Start Date: 9/29/2015  
Start Time: 7:00:00 AM  
Site Code: Independence Ave at 12th St, SW

Start Time	12th St, NW Northbound				12th St, NW Southbound				Independence Eastbound				Independence Ave SW Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	0	0	1	0	33	0	1	0	50	0	2	0	41
07:15	0	0	3	0	0	4	0	6	0	4	0	68	0	6	0	22
07:30	0	1	0	0	0	3	0	31	0	5	0	76	0	3	0	38
07:45	0	0	0	0	0	9	0	21	0	6	2	102	0	8	0	46
08:00	0	0	1	0	1	3	0	35	0	0	0	90	0	2	0	34
08:15	0	0	0	0	0	5	0	25	0	5	0	121	0	1	0	21
08:30	0	1	0	0	0	13	0	32	0	7	0	102	0	5	0	39
08:45	0	2	0	2	0	9	0	24	0	4	1	104	0	2	0	46
09:00	0	0	2	3	1	6	0	26	0	4	0	80	0	2	0	43
09:15	0	0	0	0	0	8	0	11	0	1	0	33	0	5	0	14
09:30	0	0	0	0	0	6	0	8	0	2	0	72	0	5	0	28
09:45	0	0	0	0	0	1	0	16	0	0	0	58	0	5	0	20
Peak Total	0	3	1	2	1	30	0	116	0	16	1	417	0	10	0	140
15:00	0	1	0	0	0	2	1	22	0	4	0	37	0	1	0	62
15:15	1	0	0	0	1	1	0	27	0	21	0	21	0	2	0	50
15:30	0	0	0	2	0	0	0	32	0	8	0	49	0	3	0	59
15:45	1	0	0	0	0	1	0	24	0	10	0	39	0	3	0	45
16:00	0	0	0	0	0	1	0	8	0	0	0	26	0	1	0	39
16:15	0	0	0	0	0	0	0	0	0	1	0	5	0	1	0	0
16:30	1	0	4	3	0	0	0	5	0	0	0	20	0	1	0	48
16:45	0	0	6	0	0	0	0	23	0	1	0	12	0	8	0	95
17:00	0	1	3	0	0	0	0	6	0	1	0	32	0	5	0	86
17:15	0	1	1	0	0	4	0	12	0	14	0	11	0	3	0	83
17:30	0	1	2	0	0	0	0	20	0	0	0	12	0	4	0	76
17:45	0	1	2	0	0	3	0	13	0	1	0	4	0	3	0	40
18:00	0	1	5	0	0	0	0	1	0	1	0	10	0	3	0	37
18:15	0	1	0	0	0	0	0	2	0	0	0	22	0	2	0	33
18:30	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	30
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Peak Total	0	4	8	0	0	7	0	51	0	16	0	59	0	15	0	285

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: PEAK-HOUR COUNT AT L'ENFANT

Start Time	L'Enfant Plaza Northbound		Independence Ave Eastbound		Independence Ave Westbound		Total
	Left	Right	Thru	Right	Left	Thru	
07:00	8	8	293	42	12	218	581
07:15	10	21	349	14	19	245	658
07:30	10	19	332	37	20	180	598
07:45	13	23	305	14	17	223	595
08:00	11	33	361	23	18	216	662
08:15	12	45	348	15	19	235	674
08:30	17	24	300	27	7	229	604
08:45	16	50	376	20	22	200	684
09:00	19	29	377	25	15	204	669
09:15	18	26	317	13	18	224	616
09:30	3	21	310	17	4	186	541
09:45	7	17	294	16	5	145	484
Peak Total	56	152	1385	85	66	880	2624
PHF	0.824	0.760	0.921	0.787	0.750	0.936	0.959
15:00	10	16	252	19	10	218	525
15:15	16	15	238	16	14	204	503
15:30	21	20	231	25	15	248	560
15:45	15	16	236	23	12	231	533
16:00	15	19	242	22	7	252	557
16:15	27	9	271	17	15	323	662
16:30	32	18	303	15	17	316	701
16:45	23	15	299	22	8	353	720
17:00	46	34	286	20	18	412	816
17:15	66	4	261	10	12	381	734
17:30	54	13	259	14	9	365	714
17:45	60	4	251	10	11	346	682
18:00	59	14	226	10	8	419	736
18:15	25	11	255	5	4	369	669
18:30	14	6	245	3	6	362	636
18:45	9	5	203	3	2	293	515
Peak Total	226	55	1057	54	50	1504	2946
PHF	0.856	0.404	0.924	0.675	0.694	0.913	0.903

Vehicles

Start Date: 9/29/2015  
Start Time: 7:00:00 AM  
Site Code: PEAK-HOUR COUNT AT L'ENFANT AND INDEPENDENCE

Start Time	L'Enfant Plaza Northbound				L'Enfant Plaza Southbound				Independence Ave Eastbound				Independence Ave Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	7	0	0	0	2	0	0	1	0	0	3	0	4
07:30	0	0	0	10	0	0	0	13	0	7	0	11	1	6	0	28
07:45	1	0	2	20	0	0	0	16	0	2	0	7	2	8	0	21
08:00	0	2	0	0	0	0	0	1	0	1	1	8	1	5	0	14
08:15	0	0	1	11	0	0	0	7	0	2	1	9	0	3	0	17
08:30	0	1	0	9	0	0	0	19	0	3	2	24	0	4	0	25
08:45	1	2	0	7	0	0	0	13	0	3	0	12	0	8	0	13
09:00	0	0	0	8	0	0	0	1	0	2	3	5	0	4	0	10
09:15	0	0	0	35	0	0	0	0	0	2	0	12	0	2	0	5
09:30	0	0	0	7	0	0	0	7	0	0	0	30	0	0	0	0
09:45	0	0	0	10	0	0	0	0	0	0	0	34	0	0	0	0
Peak Total	1	5	1	27	0	0	0	40	0	9	4	53	1	20	0	69
15:00	0	0	0	4	0	0	0	8	0	5	0	42	0	2	0	16
15:15	0	0	0	4	0	0	0	35	0	2	1	28	0	5	0	2
15:30	0	1	0	27	0	0	0	36	0	3	0	58	0	2	0	31
15:45	0	1	0	12	0	0	0	26	0	10	0	39	0	3	0	1
16:00	0	0	0	20	0	0	0	17	0	1	0	65	4	9	0	3
16:15	0	0	0	14	0	0	0	1	0	3	0	63	0	1	0	0
16:30	0	1	0	26	0	0	0	16	0	0	0	83	3	2	0	2
16:45	2	1	0	23	0	0	0	2	0	2	0	35	3	5	0	0
17:00	0	1	1	3	0	0	0	20	0	2	0	68	0	4	0	0
17:15	0	0	0	5	0	0	0	22	0	5	0	23	5	2	0	5
17:30	0	1	0	1	0	0	0	8	0	2	0	38	2	1	0	2
17:45	0	3	0	1	0	0	0	2	0	4	0	25	4	0	0	0
18:00	0	0	0	1	0	0	0	0	0	1	0	14	1	0	0	0
18:15	0	0	0	3	0	0	0	0	0	0	0	31	0	0	0	0
18:30	9	0	0	10	0	0	0	0	0	0	0	17	0	0	0	0
18:45	4	0	1	6	0	0	0	0	0	0	0	11	0	3	0	0
Peak Total	0	5	1	10	0	0	0	52	0	13	0	154	11	7	0	7

Bicycles and Peds

Ronald Catterton

Ronald Catterton

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	62	3	Right turns left
	SB	26	0	
	EB	28	0	
	WB	12	0	
7:30 AM	NB	60	14	U-TURN MESSED UP TRAFFIC
	SB	21	4	Left turns left
	EB	32	0	
	WB	12	0	
7:45 AM	NB	58	2	Right turns left
	SB	13	0	
	EB	20	0	
	WB	13	0	
8:00 AM	NB	50	0	
	SB	15	4	Left turns left

7:00 AM 10 seconds  
8:00 AM 12 seconds

Signal - SB Lead left time

	EB	16	0	
	WB	15	0	
8:15 AM	NB	45	0	
	SB	16	4	left Turns left
	EB	10	0	
	WB	20	0	
8:30 AM	NB	43	0	
	SB	19	9	left Turns left.
	EB	10	0	
	WB	31	0	
8:45 AM	NB	45	0	
	SB	15	3	left Turns left
	EB	12	0	
	WB	30	0	
9:00 AM	NB	45	0	
	SB	11	1	11 15 11
	EB	15	0	
	WB	29	0	

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: \_\_\_\_\_

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	15	0	
	SB	13	0	
	EB	0	0	
	WB	33	0	
4:30 PM	NB	16	0	
	SB	16	0	
	EB	2	0	
	WB	25	0	
4:45 PM	NB	23	0	
	SB	18	0	
	EB	4	0	
	WB	38	0	
5:00 PM	NB	30	0	
	SB	24	0	

4:00 pm  
5:00 pm

18 sec  
18 sec.

Signal - SB Lead  
Left time

	EB	6	0	
	WB	33	0	
5:15 PM	NB	15	0	
	SB	21	0	
	EB	2	0	
	WB	32	0	
5:30 PM	NB	18	0	
	SB	27	0	
	EB	6	0	
	WB	32	0	
5:45 PM	NB	8	0	
	SB	11	0	
	EB	6	0	
	WB	38	0	
6:00 PM	NB	16	0	
	SB	30	0	
	EB	4	0	
	WB	31	0	

Babinda Connor

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	3	0	
	SB	0	0	
	EB	24	0	
	WB	2	0	
7:30 AM	NB	5	0	
	SB	0	0	
	EB	7	0	
	WB	4	0	
7:45 AM	NB	0	0	
	SB	0	0	
	EB	1	0	
	WB	10	0	
8:00 AM	NB	10	0	
	SB	1	0	

# 12<sup>th</sup> @ Independence

	EB	17	0	
	WB	4	0	
8:15 AM	NB	3	0	
	SB	0	0	
	EB	12	6	All remaining were left turns in queue
	WB	9	0	
8:30 AM	NB	7	0	
	SB	0	0	
	EB	28	1	One left turn vehicle remaining
	WB	6	0	All lefts were in queue. All went through.
8:45 AM	NB	17	0	
	SB	0	0	
	EB	36	1	One through did not get through
	WB	2	0	both were lefts and got through
9:00 AM	NB	2	0	
	SB	4	0	
	EB	8	0	
	WB	4	0	

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	5	0	
	SB	0	0	
	EB	25	0	
	WB	14	0	
4:30 PM	NB	10	0	
	SB	1	0	
	EB	32	2	The remaining were rights behind a stopped bus.
	WB	19	0	
4:45 PM	NB	6	0	
	SB	0	0	
	EB	40	0	
	WB	22	0	
5:00 PM	NB	10	0	
	SB	0	0	

# 12<sup>th</sup> St @ Independence

	EB	13	1	Bus stopped in right lane
	WB	20	0	
5:15 PM	NB	6	0	
	SB	1	0	
	EB	17	1	Bus stopped Right Lane
	WB	16	0	
5:30 PM	NB	4	0	
	SB	0	0	
	EB	28	1	Uber in right lane
	WB	19	0	
5:45 PM	NB	5	0	
	SB	0	0	
	EB	15	0	
	WB	19	0	
6:00 PM	NB	3	0	
	SB	0	0	
	EB	14	0	
	WB	16	0	

Brenda Connor

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Pic 1 EB  
2 NB  
3 WB



Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	0	0	
	<del>SB</del>	<del>0</del>	<del>0</del>	<del>2 made rights on red</del>
	EB	4	0	
	WB	18	0	
7:30 AM	NB	0	0	2 made rights on red
	<del>SB</del>	<del>0</del>	<del>0</del>	X
	EB	5	0	
	WB	21	0	
7:45 AM	NB	8	0	
	<del>SB</del>	<del>0</del> 1	<del>0</del>	>
	EB	11	0	
	WB	12	2	All left turns - thru's All get thru & rights
8:00 AM	NB	6	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	X

L Enfort @ Ind.

	EB	3	0	
	WB	22	0	
8:15 AM	NB	1 <del>scribble</del>	0	<del>scribble</del>
	<del>SB</del>	X	X	X
	EB	6	0	
	WB	33	1	Left-turn vehicle
8:30 AM	NB	4	0	
	<del>SB</del>	X	X	X
	EB	4	0	
	WB	28	0	
8:45 AM	NB	6	0	
	<del>SB</del>	X	X	X
	EB	2	0	
	WB	24	0	
9:00 AM	NB	<del>scribble</del> 2	0	
	<del>SB</del>	X	X	X
	EB	7	0	
	WB	18	0	

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	0	0	
	<del>SB</del>	<del>7</del>	<del>7</del>	<del>7</del>
	EB	21	0	
	WB	2	0	
4:30 PM	NB	2	0	
	<del>SB</del>	<del>7</del>	<del>7</del>	<del>7</del>
	EB	11	0	
	WB	15	0	
4:45 PM	NB	5	0	
	<del>SB</del>	<del>7</del>	<del>7</del>	<del>7</del>
	EB	5	0	
	WB	17	0	
5:00 PM	NB	4	0	
	<del>SB</del>	<del>7</del>	<del>7</del>	<del>7</del>

# La'Entant Independence

	EB	4	0	
	WB	18	0	
5:15 PM	NB	7	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	4	0	
	WB	28	0	
5:30 PM	NB	1	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	5	0	
	WB	11	0	
5:45 PM	NB	0	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	6	0	
	WB	8	0	
6:00 PM	NB	3	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	7	0	
	WB	5	0	

## **APPENDIX B: CAPACITY ANALYSIS**

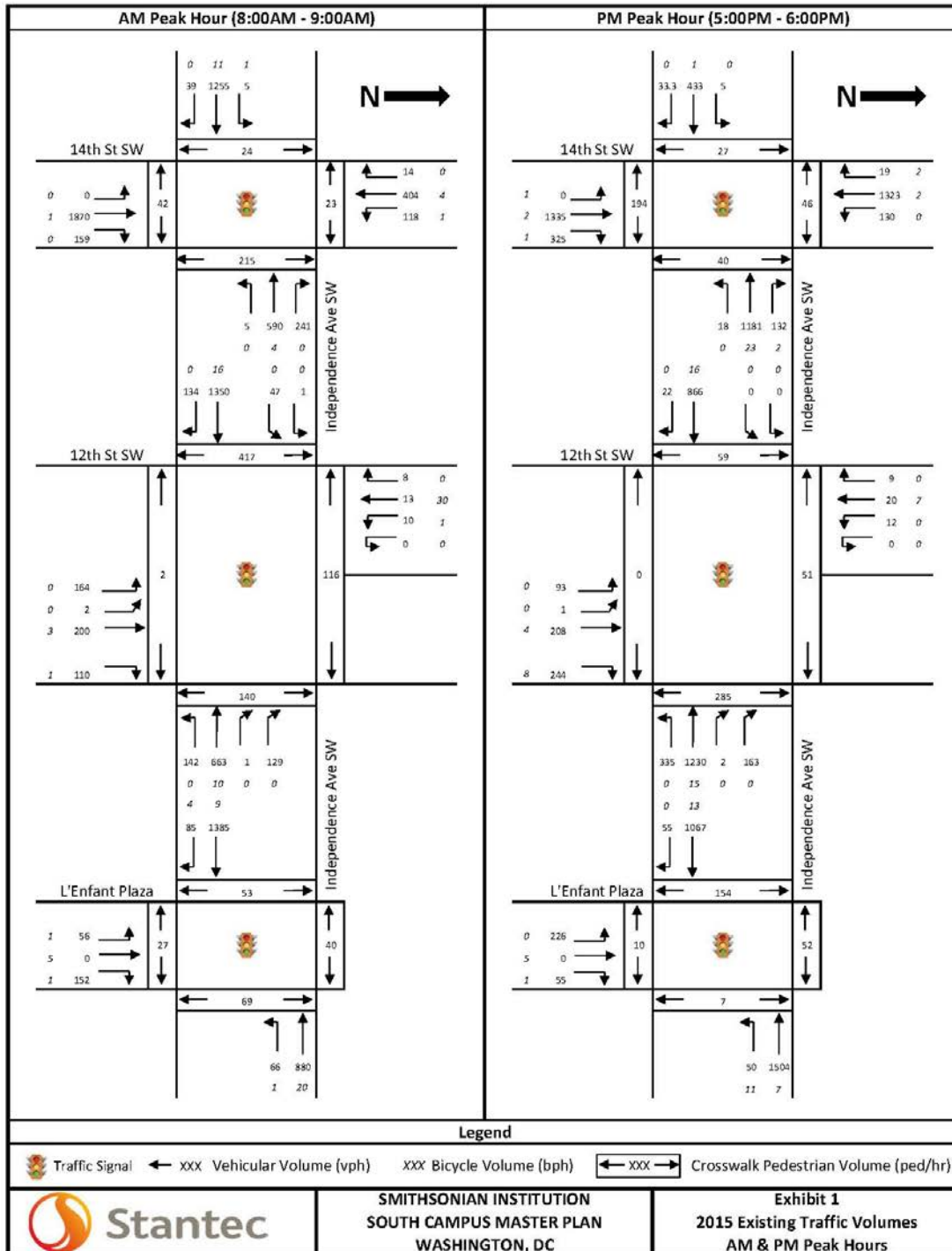
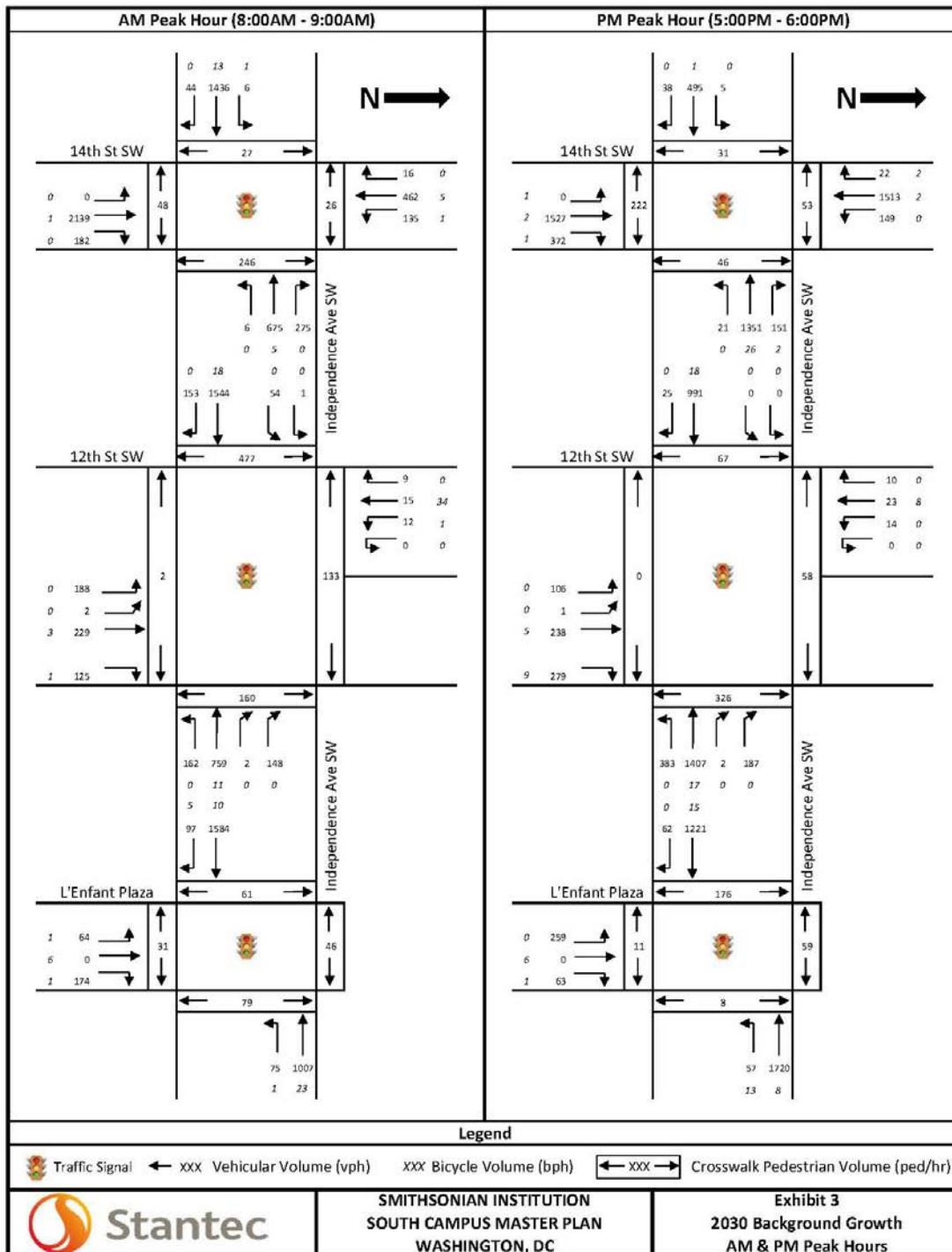
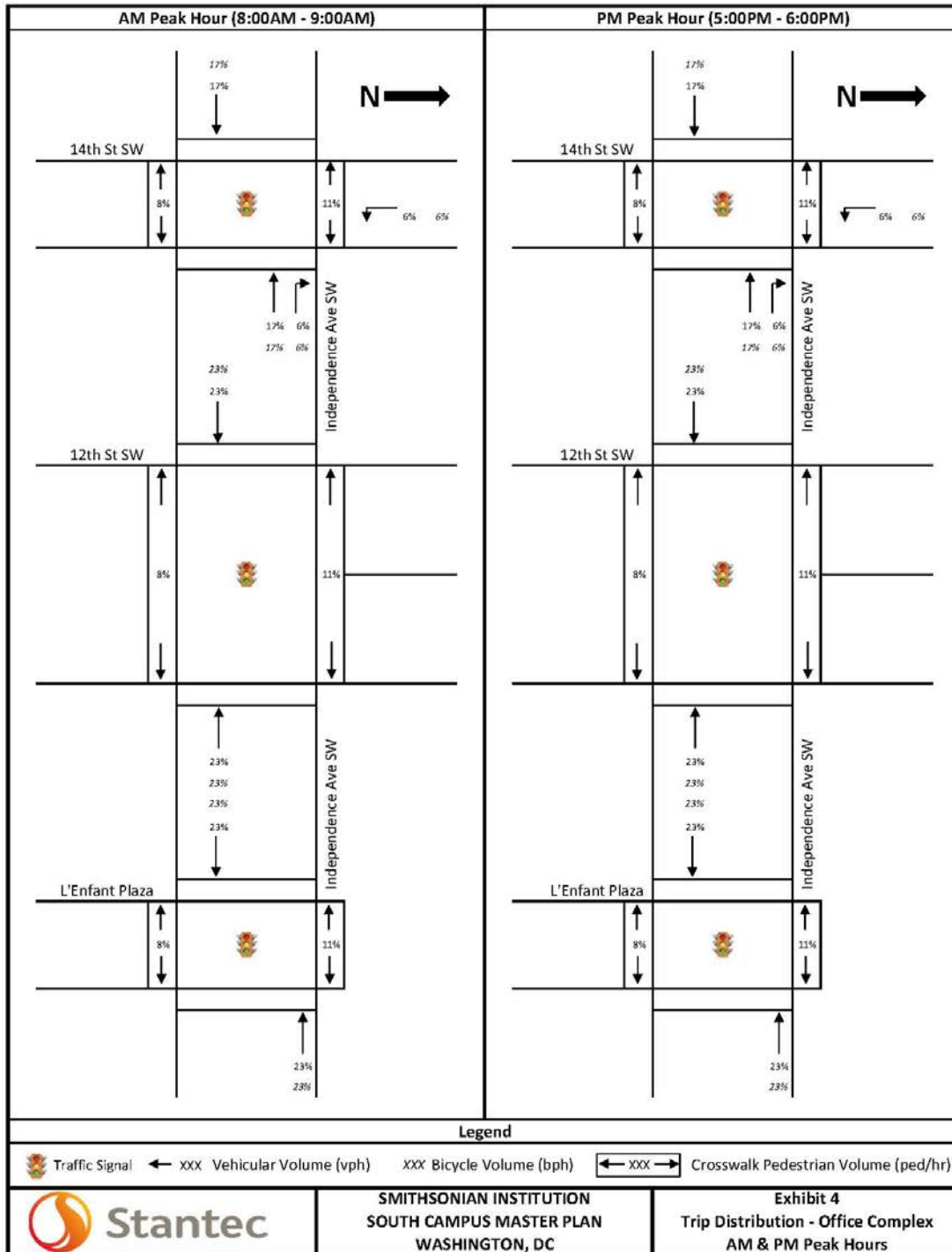


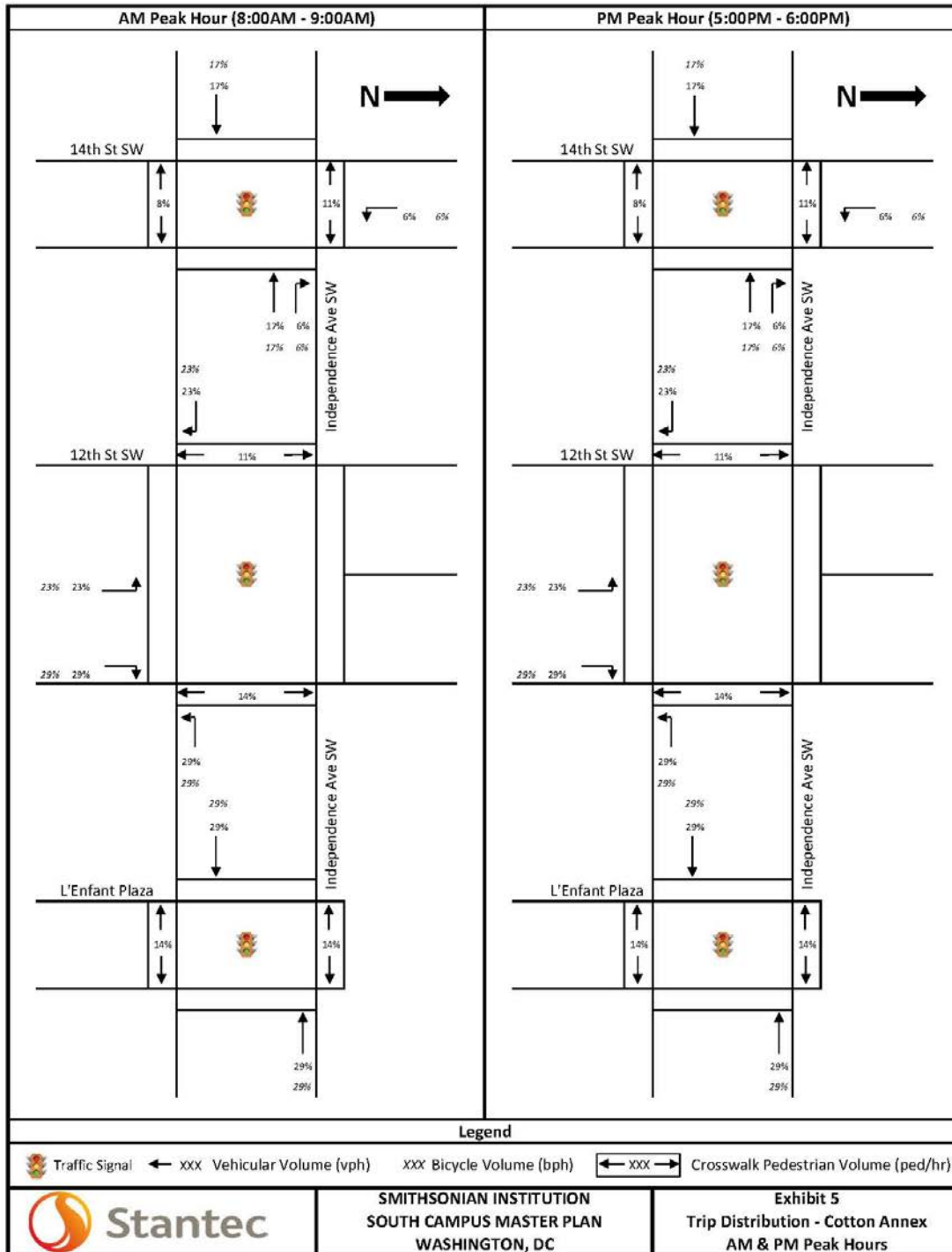
Exhibit 2  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2015 Existing Condition

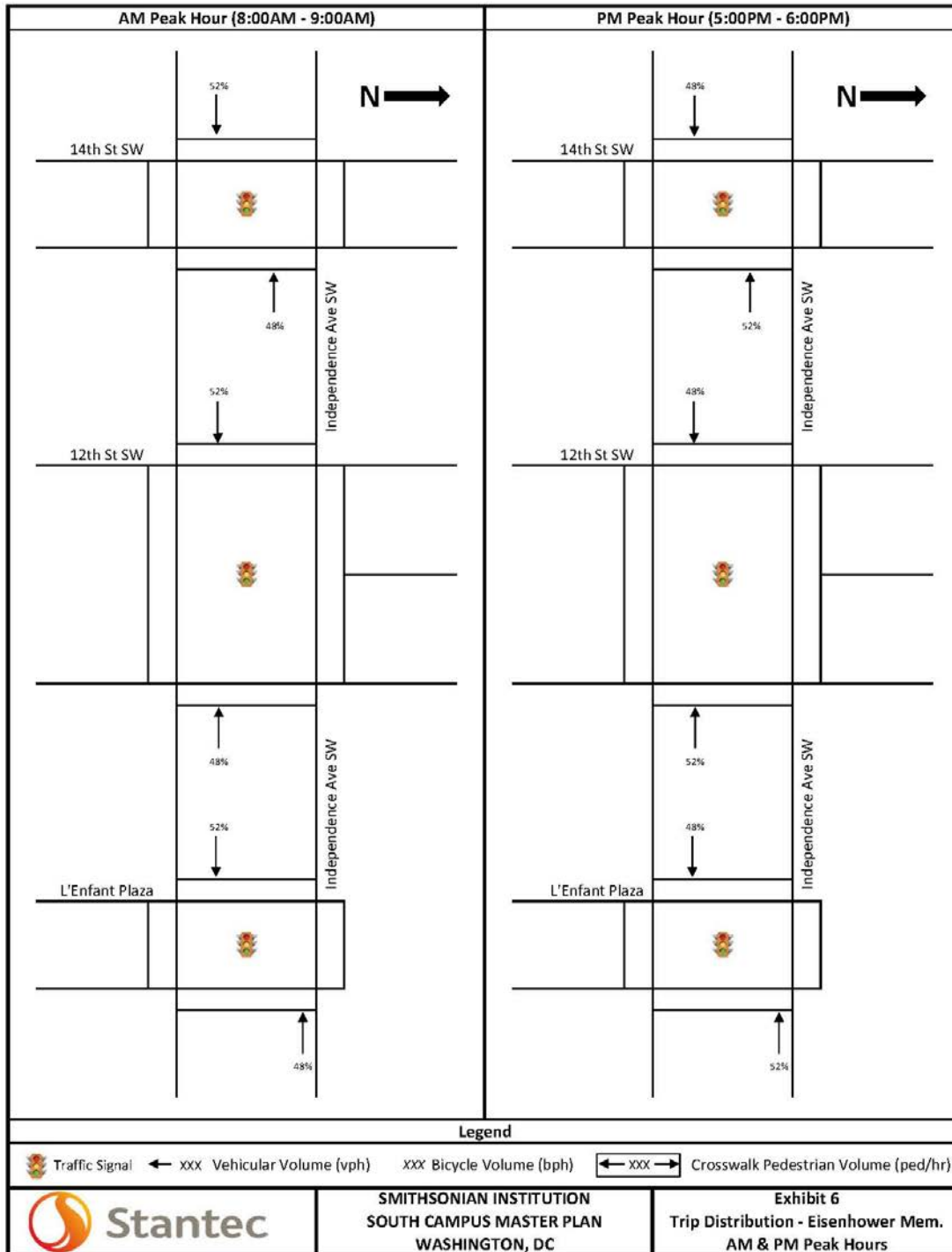
Intersection	Lane Group	AM Peak Hour (8:00AM - 9:00AM)				Lane Group	PM Peak Hour (5:00PM - 6:00PM)			
		v/c Ratio	Delay (sec)	Level of Service	50th %ile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %ile Queue Length (ft)
14th Street SW & Independence Avenue SW <i>Signalized</i>	EB-TR	0.95	51.4	D	354	EB-TR	0.40	31.7	C	100
	WB-T	0.48	41.1	D	147	WB-T	1.01	54.4	F	~343
	WB-R	0.51	30.9	C	102	WB-R	0.31	8.1	A	19
	NB-T	0.85	29.4	C	447	NB-T	0.65	26.1	C	279
	NB-R	0.31	9.9	A	32	NB-R	0.47	14.1	B	88
	SB-L	0.83	61.6	E	47	SB-L	0.46	18.2	B	37
	SB-TR	0.17	10.0	A	48	SB-TR	0.48	11.8	B	181
	Intersection	-	35.4	D	-	Intersection	-	28.2	C	-
12th Street SW & Independence Avenue SW <i>Signalized</i>	EB-LTR	0.72	6.8	A	38	EB-LTR	0.47	30.3	C	171
	WB-L	0.57	35.0	D	53	WB-L	0.66	23.7	C	70
	WB-LTR	0.39	5.1	A	34	WB-LTR	0.68	11.6	B	121
	NB-L	0.38	16.0	B	103	NB-L	0.20	21.9	C	52
	NB-TR	0.49	18.3	B	142	NB-TR	0.54	30.5	C	153
	NB-R	0.16	1.3	A	0	NB-R	0.27	2.6	A	1
	SB-LTR	0.08	0.4	A	0	SB-LTR	0.10	0.4	A	0
	Intersection	-	8.6	A	-	Intersection	-	18.8	B	-
L'Enfant Plaza & Independence Avenue SW <i>Signalized</i>	EB-TR	0.50	3.4	A	25	EB-TR	0.42	20.9	C	225
	WB-LT	0.35	8.9	A	79	WB-LT	0.57	12.0	B	163
	NB-L	0.14	34.7	C	33	NB-L	0.60	44.6	D	159
	NB-R	0.30	16.9	B	47	NB-R	0.10	6.1	A	0
	Intersection	-	6.8	A	-	Intersection	-	17.8	B	-

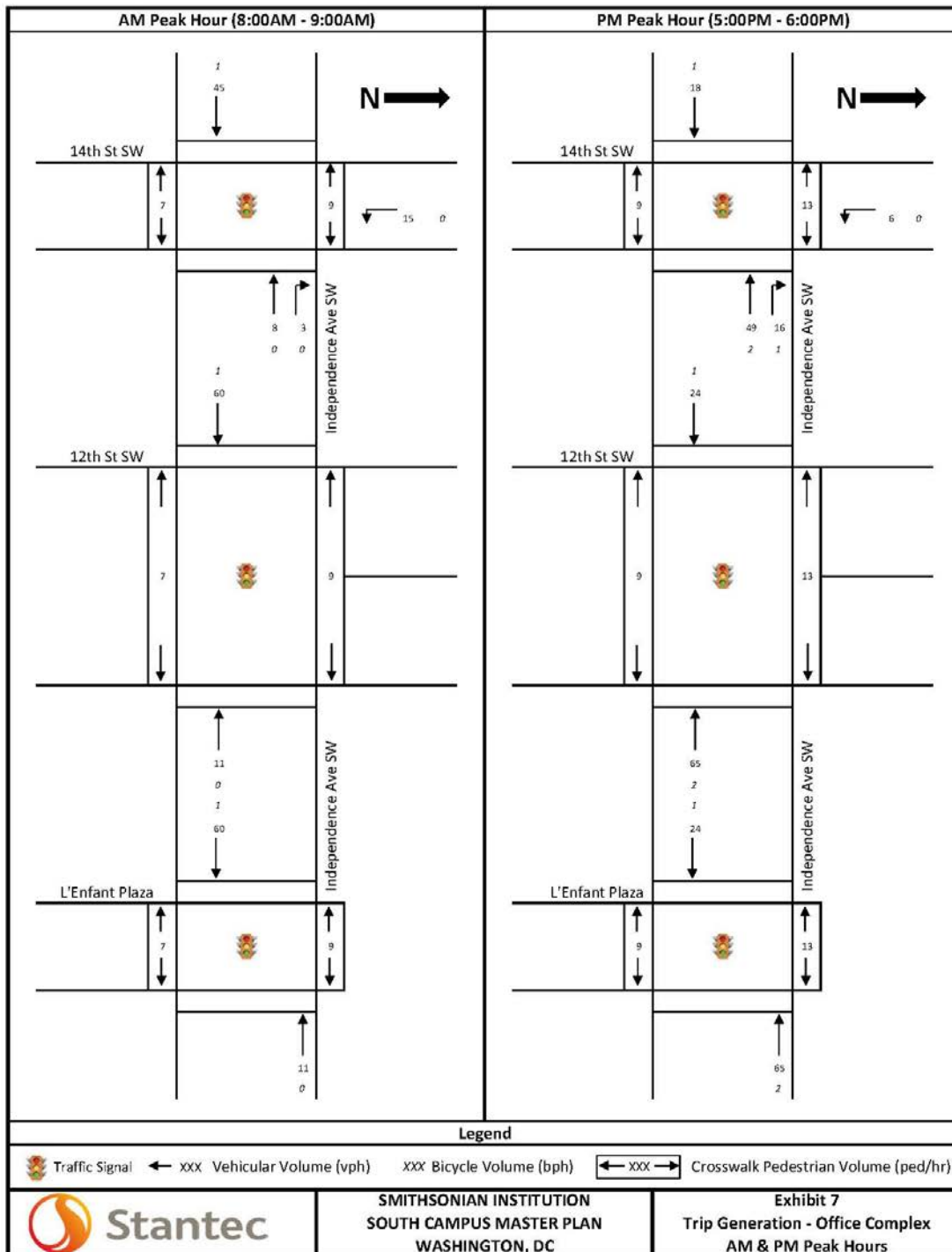
v/c ratio = volume/capacity ratio  
Source: Synchro 9

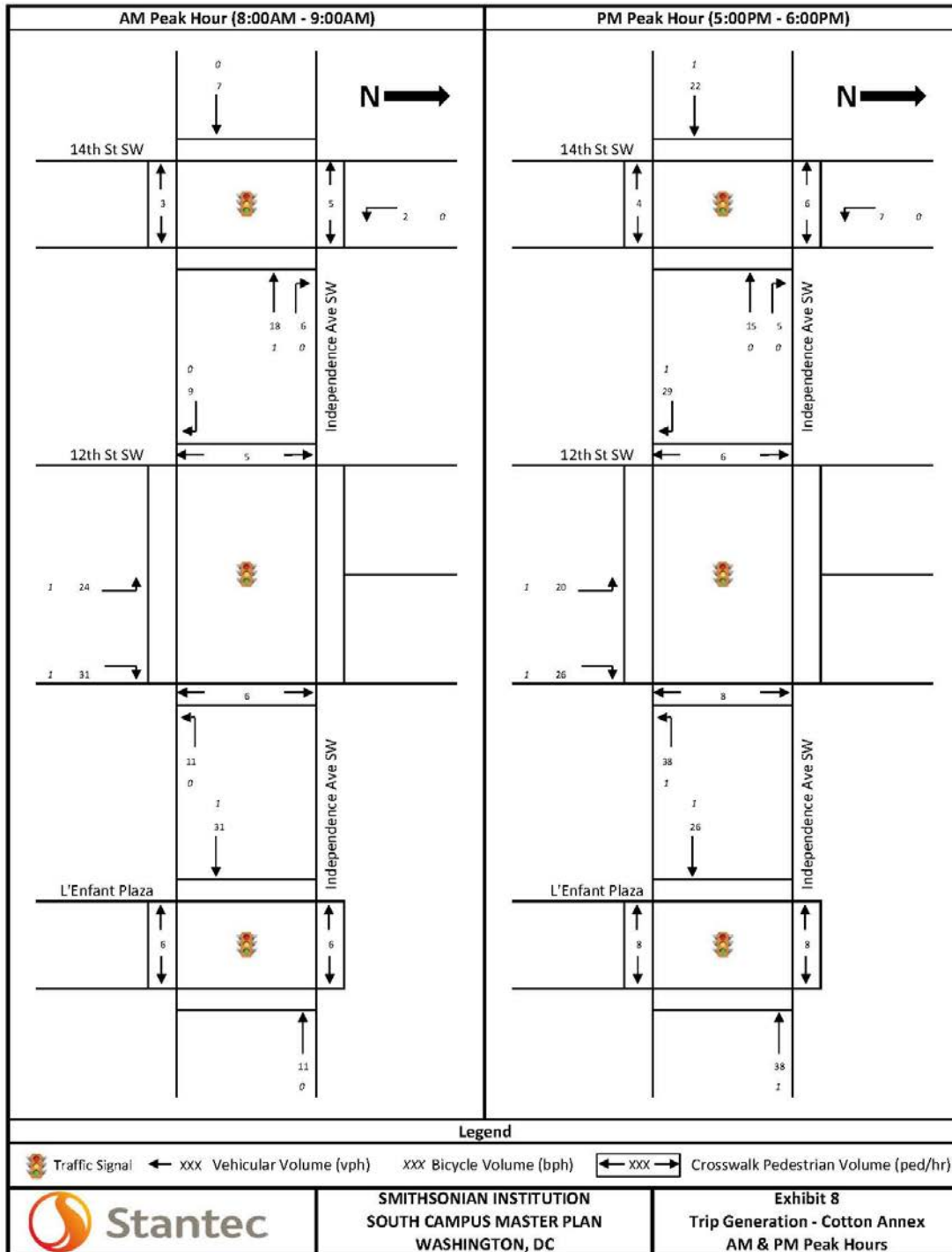


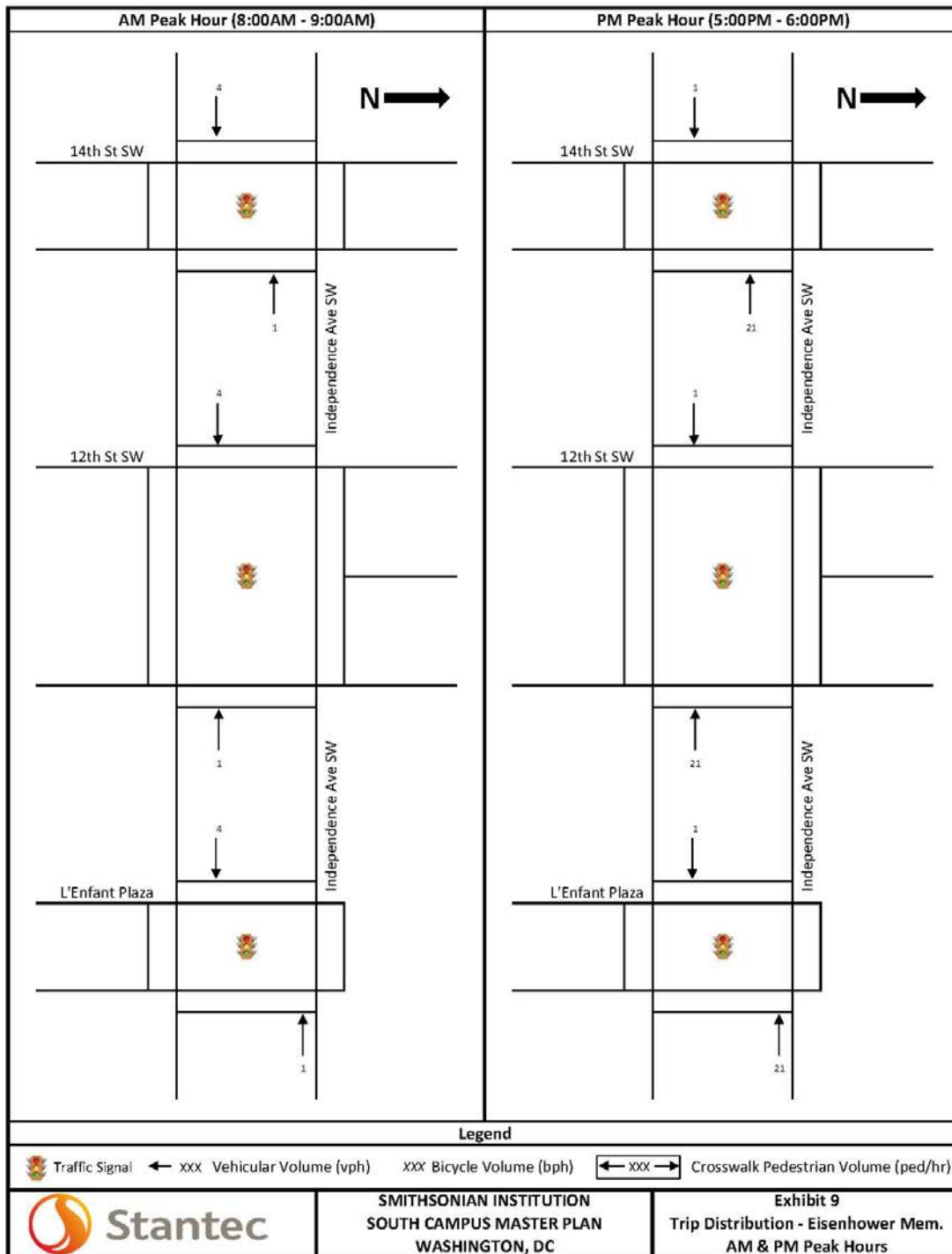












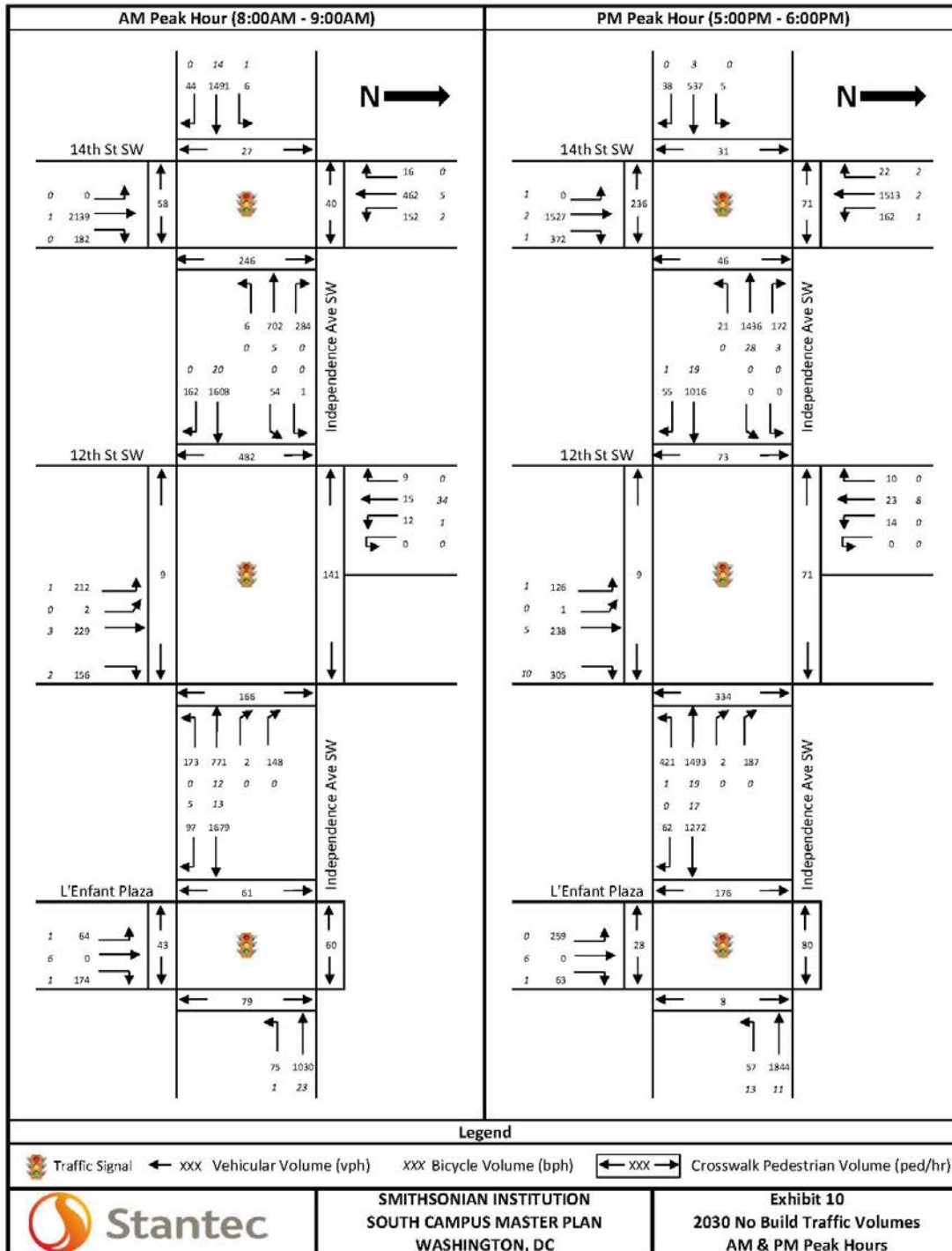
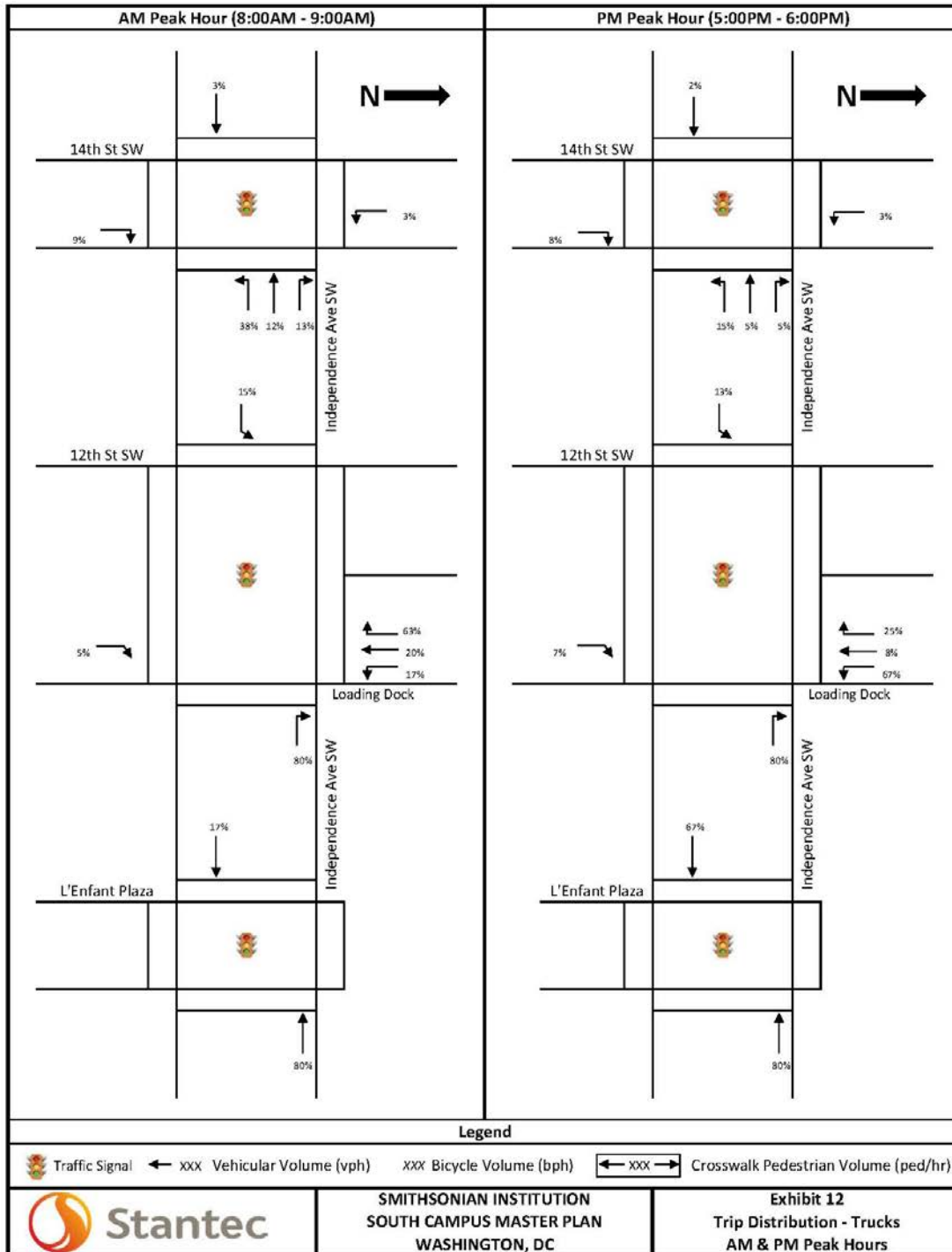
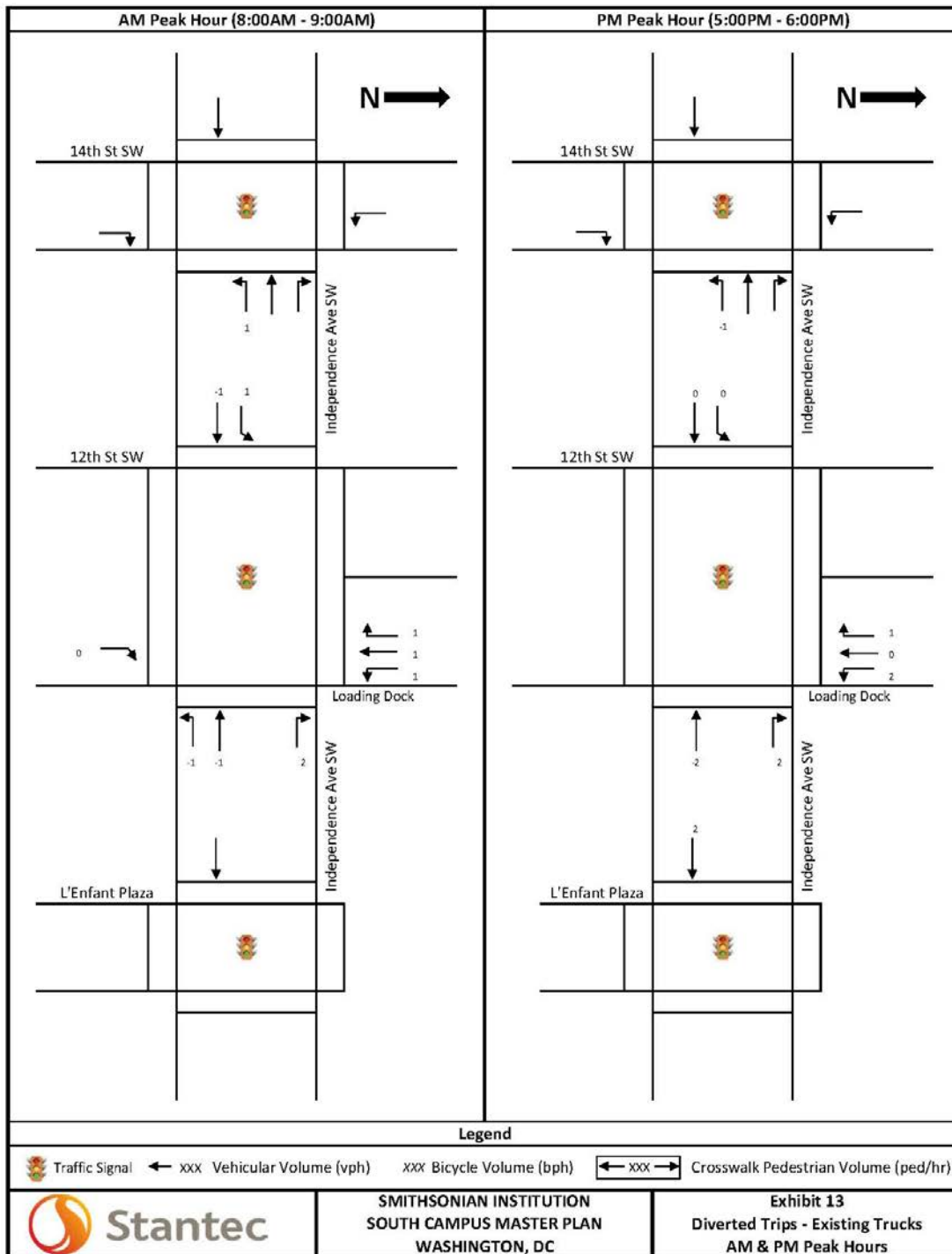


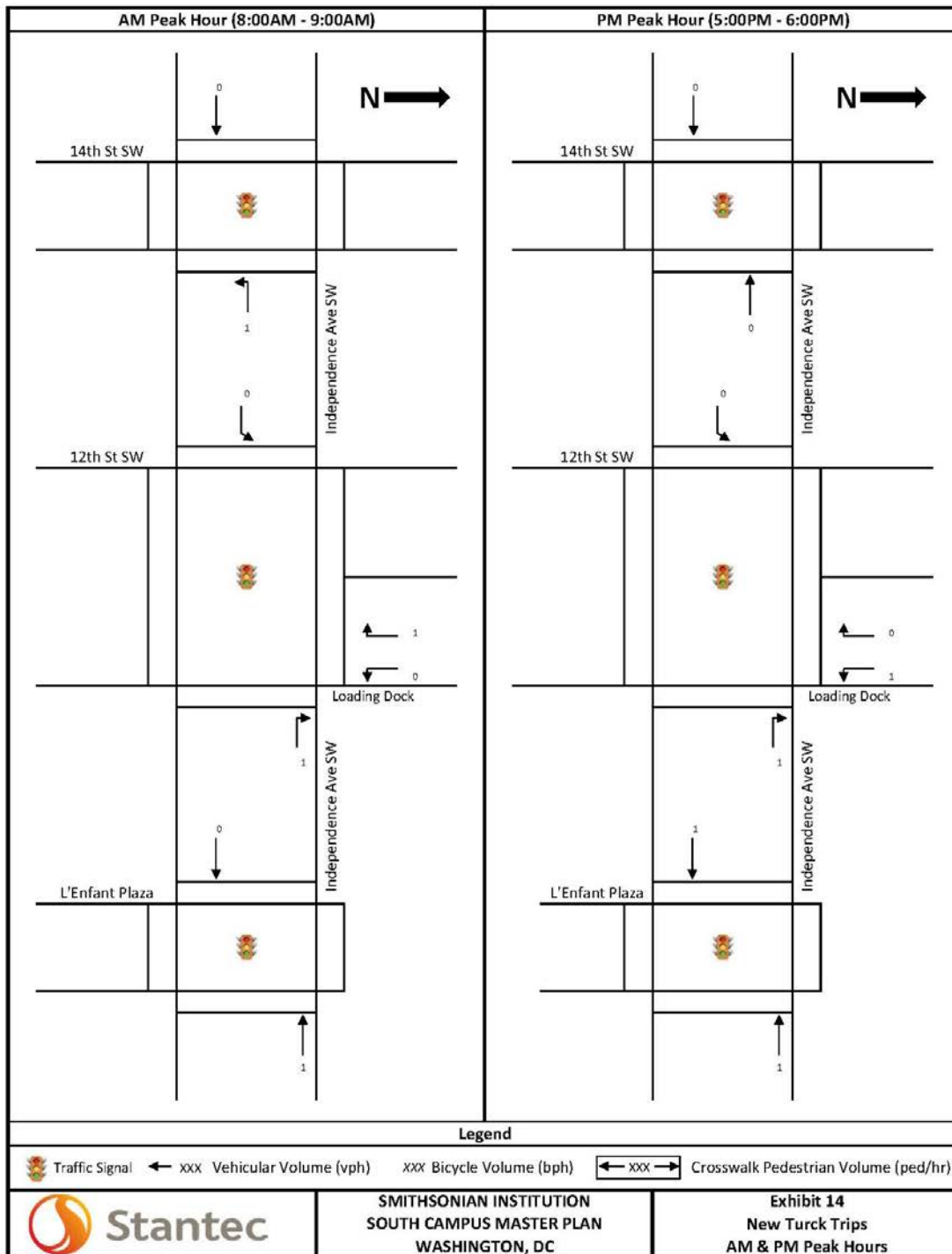
Exhibit 11  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2030 No Build Condition

Intersection	Lane Group	AM Peak Hour (8:00AM - 9:00AM)					Lane Group	PM Peak Hour (5:00PM - 6:00PM)				
		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)
14th Street SW & Independence Avenue SW <i>Signalized</i>	EB-TR	1.13	104.0	F	~506	#604	EB-TR	0.53	34.2	C	130	169
	WB-T	0.63	43.5	D	191	232	WB-T	1.23	135.0	F	~497	#601
	WB-R	0.61	34.4	C	13	240	WB-R	0.40	7.4	A	22	m37
	NB-T	0.97	41.2	D	568	#704	NB-T	0.74	28.4	C	338	397
	NB-R	0.36	11.5	B	43	98	NB-R	0.56	19.9	B	145	242
	SB-L	1.07	119.9	F	~86	#225	SB-L	0.60	30.4	C	65	139
	SB-TR	0.19	10.2	B	56	74	SB-TR	0.55	12.8	B	221	261
Intersection	-	57.3	E	-	-	Intersection	-	50.5	D	-	-	
12th Street SW & Independence Avenue SW <i>Signalized</i>	EB-LTR	0.88	9.3	A	45	m44	EB-LTR	0.57	32.3	C	208	242
	WB-L	0.73	47.3	D	86	#203	WB-L	0.88	43.5	D	118	#325
	WB-LTR	0.47	5.7	A	41	49	WB-LTR	0.87	18.6	B	219	290
	NB-L	0.49	17.5	B	137	216	NB-L	0.27	17.5	B	72	125
	NB-TR	0.58	19.5	B	169	261	NB-TR	0.67	27.9	C	196	303
	NB-R	0.23	1.4	A	0	0	NB-R	0.32	2.0	A	11	46
	SB-LTR	0.09	0.4	A	0	0	SB-LTR	0.11	0.8	A	0	3
Intersection	-	10.8	B	-	-	Intersection	-	24.3	C	-	-	
L'Enfant Plaza & Independence Avenue SW <i>Signalized</i>	EB-TR	0.61	3.9	A	36	39	EB-TR	0.49	21.4	C	270	305
	WB-LT	0.42	9.5	A	95	113	WB-LT	0.74	16.4	B	227	258
	NB-L	0.16	35.0	D	38	76	NB-L	0.66	46.2	D	184	279
	NB-R	0.35	20.6	C	65	121	NB-R	0.12	8.0	A	4	34
Intersection	-	7.5	A	-	-	Intersection	-	20.3	C	-	-	

v/c ratio = volume/capacity ratio  
Source: Synchro 9







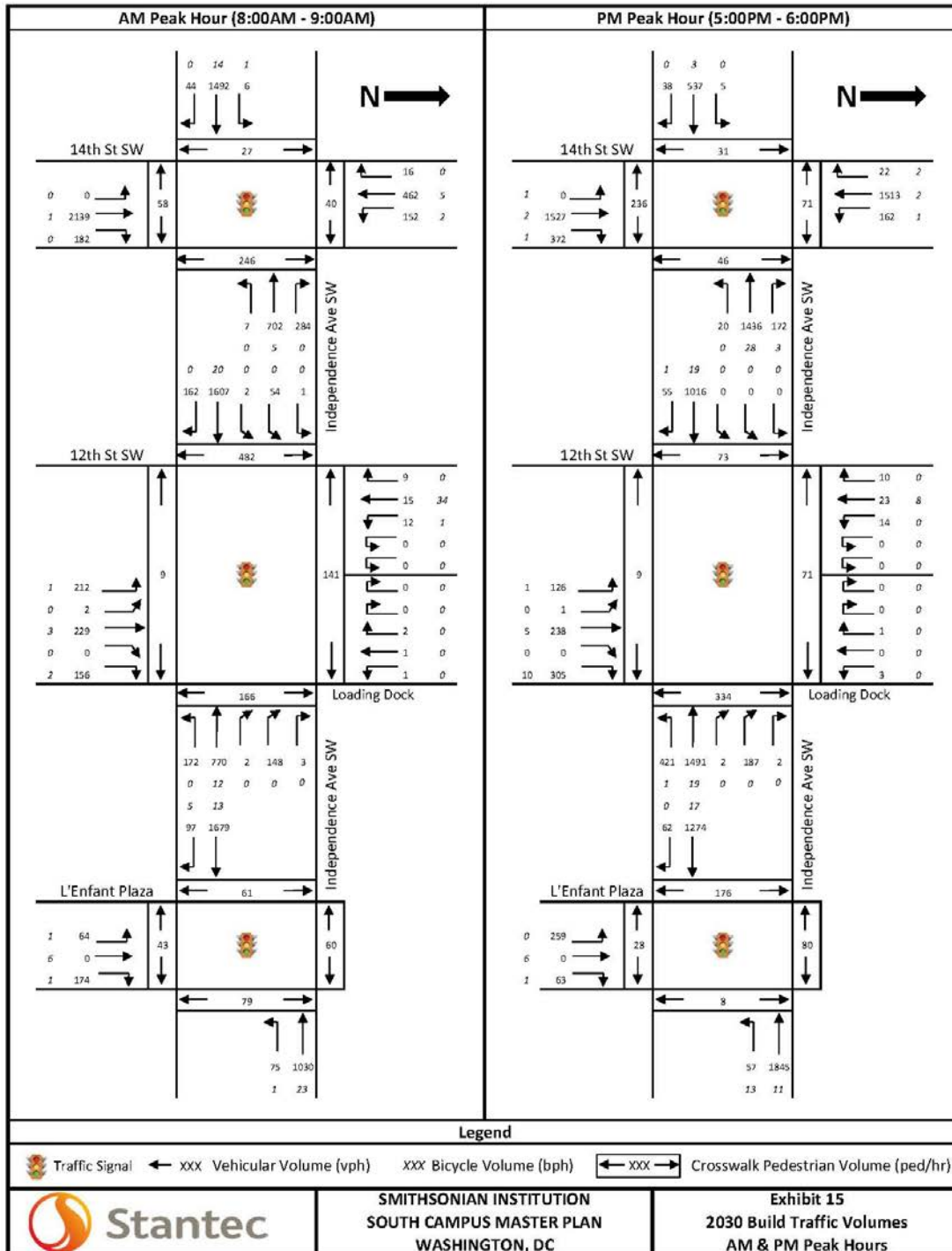


Exhibit 16  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2030 Build Condition

Intersection	Lane Group	AM Peak Hour (8:00AM - 9:00AM)					Lane Group	PM Peak Hour (5:00PM - 6:00PM)				
		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)
14th Street SW & Independence Avenue SW Signalized	EB-TR	1.13	104.3	F	~506	#605	EB-TR	0.53	34.2	C	130	169
	WB-T	0.64	42.5	D	205	242	WB-T	1.23	135.0	F	~497	#577
	WB-R	0.61	34.8	D	151	255	WB-R	0.40	5.1	A	13	m26
	NB-T	0.97	41.2	C	568	#704	NB-T	0.74	28.4	C	338	397
	NB-R	0.36	11.5	B	43	98	NB-R	0.56	19.9	B	145	242
	SB-L	1.07	119.9	F	~86	#225	SB-L	0.60	30.4	C	65	139
	SB-TR	0.19	10.2	B	56	74	SB-TR	0.55	12.8	B	221	261
	Intersection	-	57.3	E	-	-	Intersection	-	50.4	D	-	-
12th Street SW & Independence Avenue SW Signalized	EB-LTR	1.04	34.0	F	~440	m375	EB-LTR	0.48	25.7	C	165	236
	WB-L	0.77	53.3	D	87	#212	WB-L	0.93	48.5	D	190	#444
	WB-LTR	0.53	10.5	B	71	84	WB-LTR	0.85	12.6	B	124	#308
	NB-L	0.57	19.2	B	145	227	NB-L	0.33	21.3	C	78	135
	NB-TR	0.59	19.5	B	156	242	NB-TR	0.60	29.2	C	158	245
	NB-R	0.25	1.4	A	0	1	NB-R	0.40	3.7	A	41	94
	SB-LTR	0.09	0.4	A	0	0	SB-LTR	0.12	0.5	A	0	0
	Loading-LTR	0.11	57.2	E	3	15	Loading-LTR	0.11	56.8	E	3	15
L'Enfant Plaza & Independence Avenue SW Signalized	Intersection	-	25.0	C	-	-	Intersection	-	19.9	B	-	-
	EB-TR	0.61	3.2	A	22	m25	EB-TR	0.49	11.7	B	237	68
	WB-LT	0.42	9.5	A	95	113	WB-LT	0.74	16.4	B	227	258
	NB-L	0.16	35.0	D	38	76	NB-L	0.66	46.2	D	184	279
	NB-R	0.35	20.6	C	65	121	NB-R	0.12	8.0	A	4	34
	Intersection	-	7.0	A	-	-	Intersection	-	16.6	B	-	-

v/c ratio = volume/capacity ratio  
Source: Synchro 9

## **APPENDIX C: SYNCHRO OUTPUT**

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	1255	39	5	590	241	0	1870	159	118	404	14
Future Volume (vph)	5	1255	39	5	590	241	0	1870	159	118	404	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4967	0	0	4764	1422	0	4964	1524	1452	4571	0
Flt Permitted		0.937			0.894					0.075		
Satd. Flow (perm)	0	4654	0	0	4259	1366	0	4964	1081	115	4571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				123			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	23		42	42		23	24		215	215		24
Confl. Bikes (#/hr)			11			4			1			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1411	0	0	646	262	0	2033	173	128	454	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		0.95			0.48	0.51		0.85	0.31	0.83	0.17	
Control Delay		51.4			41.1	30.9		29.4	9.9	61.6	10.0	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		51.4			41.1	30.9		29.4	9.9	61.6	10.0	
LOS		D			D	C		C	A	E	A	
Approach Delay		51.4			38.2			27.9			21.3	
Approach LOS		D			D			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.95											
Intersection Signal Delay:	35.4					Intersection LOS: D						

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Intersection Capacity Utilization 99.0%  
Analysis Period (min) 15

ICU Level of Service F

Splits and Phases: 1: 14th St SW & Independence Ave SW



2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Group												
Lane Configurations			4111		1	4111				2	1	1
Traffic Volume (vph)	1	47	1350	134	142	663	1	129	164	2	200	110
Future Volume (vph)	1	47	1350	134	142	663	1	129	164	2	200	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	11
Satd. Flow (prot)	0	0	5937	0	1407	3883	0	0	0	1695	1663	1440
Flt Permitted			0.854		0.085	0.901				0.950		
Satd. Flow (perm)	0	0	5056	0	126	3502	0	0	0	1101	1663	1440
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			26			21					3	35
Link Speed (mph)			35			35					30	
Link Distance (ft)			1110			590					162	
Travel Time (s)			21.6			11.5					3.7	
Confl. Peds. (#/hr)	116	116		2			116	116	417			140
Confl. Bikes (#/hr)				16			10	10				3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%	3%	3%	3%	0%	3%	3%
Shared Lane Traffic (%)					10%							10%
Lane Group Flow (vph)	0	0	1665	0	139	877	0	0	0	180	229	108
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA	pt+ov
Protected Phases			6		5	2			4	4!	4!	4 5!
Permitted Phases	6	6			2							
Minimum Split (s)	42.0	42.0	42.0		19.0	61.0			36.0	36.0	36.0	
Total Split (s)	55.0	55.0	55.0		19.0	74.0			36.0	36.0	36.0	
Total Split (%)	50.0%	50.0%	50.0%		17.3%	67.3%			32.7%	32.7%	32.7%	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0	
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5	
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5	
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Act Effct Green (s)			50.0		69.0	69.0				30.5	30.5	49.5
Actuated g/C Ratio			0.45		0.63	0.63				0.28	0.28	0.45
v/c Ratio			0.72		0.57	0.39				0.38	0.49	0.16
Control Delay			6.8		35.0	5.1				14.0	16.4	0.5
Queue Delay			0.0		0.0	0.0				2.0	1.8	0.7
Total Delay			6.8		35.0	5.1				16.0	18.3	1.3
LOS			A		D	A				B	B	A
Approach Delay			6.8			9.2					13.9	
Approach LOS			A			A					B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	57 (52%), Referenced to phase 2:WBT and 6:EBTL, Start of Green											
Natural Cycle:	100											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.72											
Intersection Signal Delay:	8.6											
						Intersection LOS: A						

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

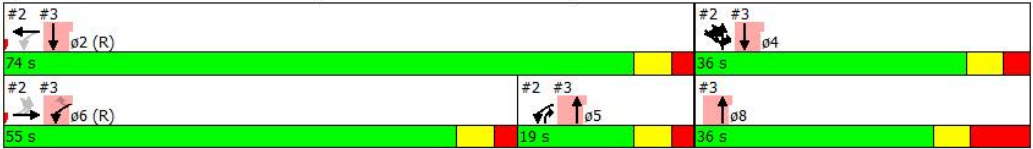
	SEL	SER	SER2	ø8
Lane Group				
Lane Configurations	RT			
Traffic Volume (vph)	10	13	8	
Future Volume (vph)	10	13	8	
Ideal Flow (vphpl)	1900	1900	1900	
Lane Width (ft)	14	14	14	
Satd. Flow (prot)	1299	0	0	
Flt Permitted	0.984			
Satd. Flow (perm)	1222	0	0	
Right Turn on Red			Yes	
Satd. Flow (RTOR)	99			
Link Speed (mph)	30			
Link Distance (ft)	395			
Travel Time (s)	9.0			
Confl. Peds. (#/hr)	140		417	
Confl. Bikes (#/hr)		30	30	
Peak Hour Factor	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	10%	0%	
Shared Lane Traffic (%)				
Lane Group Flow (vph)	34	0	0	
Turn Type	Prot			
Protected Phases	4!			8
Permitted Phases				
Minimum Split (s)	36.0			36.0
Total Split (s)	36.0			36.0
Total Split (%)	32.7%			33%
Yellow Time (s)	4.0			4.0
All-Red Time (s)	3.0			6.5
Lost Time Adjust (s)	-1.5			
Total Lost Time (s)	5.5			
Lead/Lag				
Lead-Lag Optimize?				
Act Effect Green (s)	30.5			
Actuated g/C Ratio	0.28			
v/c Ratio	0.08			
Control Delay	0.4			
Queue Delay	0.0			
Total Delay	0.4			
LOS	A			
Approach Delay	0.4			
Approach LOS	A			
Intersection Summary				

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour











Intersection Capacity Utilization 96.6%	ICU Level of Service F
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

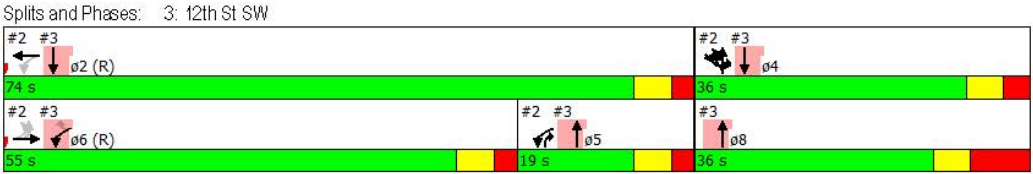
2015 Existing  
AM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	476	0	0	289				
Future Volume (vph)	0	0	476	0	0	289				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1773	1837	4868	0	0	3271				
Flt Permitted										
Satd. Flow (perm)	1773	1837	4868	0	0	3271				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	517	0	0	314				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					61.0	36.0	19.0	36.0
Total Split (s)	55.0	55.0					74.0	36.0	19.0	36.0
Total Split (%)	50.0%	50.0%					67%	33%	17%	33%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effct Green (s)			46.0			110.0				
Actuated g/C Ratio			0.42			1.00				
v/c Ratio			0.25			0.10				
Control Delay			21.3			0.0				
Queue Delay			0.0			0.0				
Total Delay			21.3			0.0				
LOS			C			A				
Approach Delay			21.3			0.0				
Approach LOS			C			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 57 (52%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 100										
Control Type: Pretimed										
Maximum v/c Ratio: 0.72										
Intersection Signal Delay: 13.3						Intersection LOS: B				
Intersection Capacity Utilization 16.7%						ICU Level of Service A				
Analysis Period (min) 15										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

! Phase conflict between lane groups.



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1385	85	66	880	56	152	
Future Volume (vph)	1385	85	66	880	56	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5940	0	0	5905	1805	1615	
Flt Permitted				0.758	0.950		
Satd. Flow (perm)	5940	0	0	4487	1673	1441	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	17					58	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		27	27		53	69	
Confl. Bikes (#/hr)		9				5	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1532	0	0	986	58	158	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.50			0.35	0.14	0.30	
Control Delay	3.4			8.9	34.7	16.9	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.4			8.9	34.7	16.9	
LOS	A			A	C	B	
Approach Delay	3.4			8.9	21.7		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 67 (61%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min): 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 Ø2 (R)	 Ø4	 Ø9
61.5 s	4 s 30 s	14.5 s
 Ø6 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	433	33	18	1181	132	0	1335	325	130	1323	19
Future Volume (vph)	5	433	33	18	1181	132	0	1335	325	130	1323	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4741	0	0	4644	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.898			0.925					0.105		
Satd. Flow (perm)	0	4262	0	0	4293	1209	0	4964	1481	175	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				139			151		2	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	46		194	194		46	27		40	40		27
Confl. Bikes (#/hr)			1			23			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	496	0	0	1262	139	0	1405	342	137	1413	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.40			1.01	0.31		0.65	0.47	0.46	0.48	
Control Delay		31.7			54.4	8.1		26.1	14.1	18.2	11.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		31.7			54.4	8.1		26.1	14.1	18.2	11.8	
LOS		C			D	A		C	B	B	B	
Approach Delay		31.7			49.8			23.8			12.4	
Approach LOS		C			D			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 110												
Control Type: Pretimed												
Maximum v/c Ratio: 1.01												
Intersection Signal Delay: 28.2	Intersection LOS: C											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

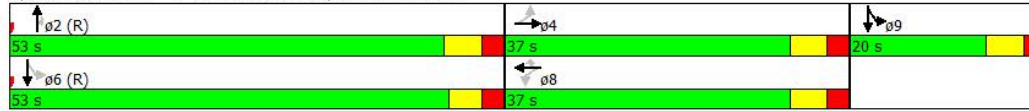
1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour

Intersection Capacity Utilization 88.3%  
Analysis Period (min) 15

ICU Level of Service E

Splits and Phases: 1: 14th St SW & Independence Ave SW



2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	↑↑↑↑		↙	↑↑↑↑				↘	↑	↘	↘	
Traffic Volume (vph)	866	22	335	1230	2	163	93	1	208	244	12	20
Future Volume (vph)	866	22	335	1230	2	163	93	1	208	244	12	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	14	14
Satd. Flow (prot)	5896	0	1393	4060	0	0	0	1678	1568	1426	1281	0
Flt Permitted			0.225	0.855				0.950			0.985	
Satd. Flow (perm)	5896	0	330	3478	0	0	0	1548	1568	1426	1159	0
Right Turn on Red		Yes				Yes				Yes		
Satd. Flow (RTOR)	5			1					8	35	99	
Link Speed (mph)	35			35					30		30	
Link Distance (ft)	1110			590					162		395	
Travel Time (s)	21.6			11.5					3.7		9.0	
Confl. Peds. (#/hr)					51	51	59			285	285	
Confl. Bikes (#/hr)		16			15	15				4		7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Shared Lane Traffic (%)			17%							14%		
Lane Group Flow (vph)	935	0	293	1529	0	0	0	99	255	221	43	0
Turn Type	NA		pm+pt	NA			Split	Split	NA	pt+ov	Prot	
Protected Phases	6		5	2			4	4!	4!	4 5!	4!	
Permitted Phases			2									
Minimum Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (%)	38.2%		27.3%	65.5%			34.5%	34.5%	34.5%		34.5%	
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0		4.0	
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0		3.0	
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5		-1.5	
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5		5.5	
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Act Effct Green (s)	37.0		67.0	67.0				32.5	32.5	62.5	32.5	
Actuated g/C Ratio	0.34		0.61	0.61				0.30	0.30	0.57	0.30	
v/c Ratio	0.47		0.66	0.68				0.20	0.54	0.27	0.10	
Control Delay	30.3		23.7	11.6				19.0	25.1	2.0	0.4	
Queue Delay	0.0		0.0	0.0				2.9	5.4	0.6	0.0	
Total Delay	30.3		23.7	11.6				21.9	30.5	2.6	0.4	
LOS	C		C	B				C	C	A	A	
Approach Delay	30.3			13.6					18.3		0.4	
Approach LOS	C			B					B		A	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green												
Natural Cycle: 110												
Control Type: Pretimed												
Maximum v/c Ratio: 0.68												
Intersection Signal Delay: 18.8	Intersection LOS: B											

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour



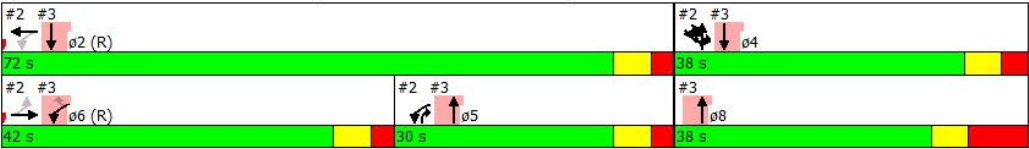
Lane Group	SER2	ø8
Lane Configurations		
Traffic Volume (vph)	9	
Future Volume (vph)	9	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	14	
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	59	
Confl. Bikes (#/hr)	7	
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Yellow Time (s)	4.0	
All-Red Time (s)	6.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour











Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



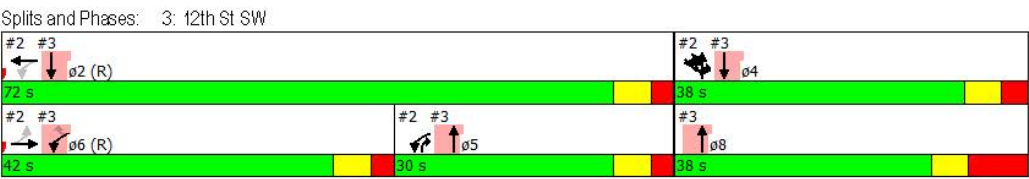
3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	546	0	0	377				
Future Volume (vph)	0	0	546	0	0	377				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1739	1801	4916	0	0	3303				
Flt Permitted										
Satd. Flow (perm)	1739	1801	4916	0	0	3303				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	575	0	0	397				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6l		5 8			2 4l	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (%)	38.2%	38.2%					65%	35%	27%	35%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effect Green (s)			63.0			110.0				
Actuated g/C Ratio			0.57			1.00				
v/c Ratio			0.20			0.12				
Control Delay			11.6			0.1				
Queue Delay			0.0			0.0				
Total Delay			11.6			0.1				
LOS			B			A				
Approach Delay			11.6			0.1				
Approach LOS			B			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 110										
Control Type: Pretimed										
Maximum v/c Ratio: 0.68										
Intersection Signal Delay: 6.9						Intersection LOS: A				
Intersection Capacity Utilization 14.7%						ICU Level of Service A				
Analysis Period (min) 15										
! Phase conflict between lane groups.										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1067	55	50	1504	226	55	
Future Volume (vph)	1067	55	50	1504	226	55	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5862	0	0	5854	1805	1615	
Flt Permitted				0.827	0.950		
Satd. Flow (perm)	5862	0	0	4850	1415	1580	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					61	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		10	10		157	7	
Confl. Bikes (#/hr)		13					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1247	0	0	1727	251	61	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	60.5		15.5	60.5	30.0	15.5	4.0
Total Split (%)	55.0%		14.1%	55.0%	27.3%	14.1%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	55.5			66.0	25.5	37.5	
Actuated g/C Ratio	0.50			0.60	0.23	0.34	
v/c Ratio	0.42			0.57	0.60	0.10	
Control Delay	20.9			12.0	44.6	6.1	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	20.9			12.0	44.6	6.1	
LOS	C			B	D	A	
Approach Delay	20.9			12.0	37.1		
Approach LOS	C			B	D		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 71.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

→ ø2 (R) 60.5 s	→ ø4 4 s 30 s	↖ ø9 15.5 s
↖ ø6 (R) 60.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	6	1491	44	6	702	284	0	2139	182	152	462	16
Future Volume (vph)	6	1491	44	6	702	284	0	2139	182	152	462	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4961	0	0	4759	1422	0	4964	1524	1452	4570	0
Flt Permitted		0.936			0.806					0.075		
Satd. Flow (perm)	0	4644	0	0	3836	1339	0	4964	1050	115	4570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				122			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	40		58	58		40	27		246	246		27
Confl. Bikes (#/hr)			14			5			1			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1676	0	0	770	309	0	2325	198	165	519	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		1.13			0.63	0.61		0.97	0.36	1.07	0.19	
Control Delay		104.0			43.5	34.4		41.2	11.5	119.9	10.2	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		104.0			43.5	34.4		41.2	11.5	119.9	10.2	
LOS		F			D	C		D	B	F	B	
Approach Delay		104.0			40.9			38.9			36.7	
Approach LOS		F			D			D			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	120											
Control Type:	Pre-timed											
Maximum v/c Ratio:	1.13											
Intersection Signal Delay:	57.3						Intersection LOS: E					

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Intersection Capacity Utilization 108.9%  
Analysis Period (min) 15

ICU Level of Service G

Splits and Phases: 1: 14th St SW & Independence Ave SW



2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	↖	↗	→	↘	↙	←	↖	↗	↘	↙	↑	↗
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations			4111		1	4111				1	1	1
Traffic Volume (vph)	1	54	1608	162	173	771	2	148	212	2	229	156
Future Volume (vph)	1	54	1608	162	173	771	2	148	212	2	229	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	11
Satd. Flow (prot)	0	0	5931	0	1407	3851	0	0	0	1694	1653	1440
Flt Permitted			0.835		0.073	0.876				0.950		
Satd. Flow (perm)	0	0	4945	0	108	3377	0	0	0	1072	1653	1440
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			26			10					3	35
Link Speed (mph)			35			35					30	
Link Distance (ft)			1110			590					162	
Travel Time (s)			21.6			11.5					3.7	
Confl. Peds. (#/hr)	141	141		9	9		141	141	482			166
Confl. Bikes (#/hr)							12	12				3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%	3%	3%	3%	0%	3%	3%
Shared Lane Traffic (%)					10%							10%
Lane Group Flow (vph)	0	0	1984	0	169	1020	0	0	0	232	266	153
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA	pt+ov
Protected Phases			6		5	2			4	4!	4!	4 5!
Permitted Phases	6	6			2							
Minimum Split (s)	42.0	42.0	42.0		19.0	61.0			36.0	36.0	36.0	
Total Split (s)	55.0	55.0	55.0		19.0	74.0			36.0	36.0	36.0	
Total Split (%)	50.0%	50.0%	50.0%		17.3%	67.3%			32.7%	32.7%	32.7%	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0	
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5	
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5	
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Act Effct Green (s)			50.0		69.0	69.0				30.5	30.5	49.5
Actuated g/C Ratio			0.45		0.63	0.63				0.28	0.28	0.45
v/c Ratio			0.88		0.73	0.47				0.49	0.58	0.23
Control Delay			9.3		47.3	5.7				15.8	18.1	0.8
Queue Delay			0.0		0.0	0.0				1.7	1.4	0.6
Total Delay			9.3		47.3	5.7				17.5	19.5	1.4
LOS			A		D	A				B	B	A
Approach Delay			9.3			11.7					14.5	
Approach LOS			A			B					B	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 57 (52%), Referenced to phase 2:WBT and 6:EBTL, Start of Green												
Natural Cycle: 100												
Control Type: Pretimed												
Maximum v/c Ratio: 0.88												
Intersection Signal Delay: 10.8	Intersection LOS: B											

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

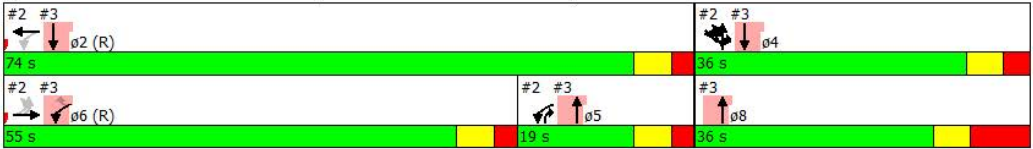
	SEL	SER	SER2	ø8
Lane Group	SEL	SER	SER2	ø8
Lane Configurations	RT			
Traffic Volume (vph)	12	15	9	
Future Volume (vph)	12	15	9	
Ideal Flow (vphpl)	1900	1900	1900	
Lane Width (ft)	14	14	14	
Satd. Flow (prot)	1311	0	0	
Flt Permitted	0.984			
Satd. Flow (perm)	1215	0	0	
Right Turn on Red			Yes	
Satd. Flow (RTOR)	99			
Link Speed (mph)	30			
Link Distance (ft)	395			
Travel Time (s)	9.0			
Confl. Peds. (#/hr)	166		482	
Confl. Bikes (#/hr)				
Peak Hour Factor	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	10%	0%	
Shared Lane Traffic (%)				
Lane Group Flow (vph)	39	0	0	
Turn Type	Prot			
Protected Phases	4!			8
Permitted Phases				
Minimum Split (s)	36.0			36.0
Total Split (s)	36.0			36.0
Total Split (%)	32.7%			33%
Yellow Time (s)	4.0			4.0
All-Red Time (s)	3.0			6.5
Lost Time Adjust (s)	-1.5			
Total Lost Time (s)	5.5			
Lead/Lag				
Lead-Lag Optimize?				
Act Effect Green (s)	30.5			
Actuated g/C Ratio	0.28			
v/c Ratio	0.09			
Control Delay	0.4			
Queue Delay	0.0			
Total Delay	0.4			
LOS	A			
Approach Delay	0.4			
Approach LOS	A			
Intersection Summary				

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour











Intersection Capacity Utilization 103.4%	ICU Level of Service G
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

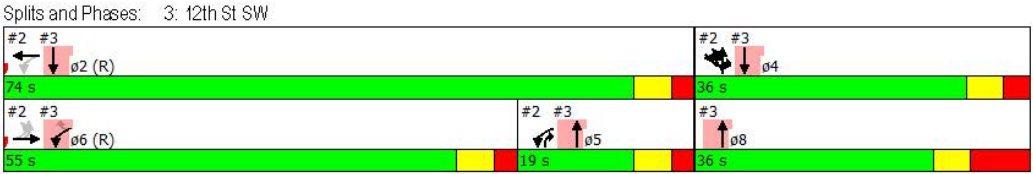
2030 No Build  
AM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	599	0	0	350				
Future Volume (vph)	0	0	599	0	0	350				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1773	1837	4868	0	0	3271				
Flt Permitted										
Satd. Flow (perm)	1773	1837	4868	0	0	3271				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	651	0	0	380				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					61.0	36.0	19.0	36.0
Total Split (s)	55.0	55.0					74.0	36.0	19.0	36.0
Total Split (%)	50.0%	50.0%					67%	33%	17%	33%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effct Green (s)			46.0			110.0				
Actuated g/C Ratio			0.42			1.00				
v/c Ratio			0.32			0.12				
Control Delay			22.0			0.0				
Queue Delay			0.0			0.0				
Total Delay			22.1			0.0				
LOS			C			A				
Approach Delay			22.1			0.0				
Approach LOS			C			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 57 (52%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 100										
Control Type: Prelimed										
Maximum v/c Ratio: 0.88										
Intersection Signal Delay: 14.0						Intersection LOS: B				
Intersection Capacity Utilization 19.1%						ICU Level of Service A				
Analysis Period (min) 15										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

! Phase conflict between lane groups.



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1679	97	75	1030	64	174	
Future Volume (vph)	1679	97	75	1030	64	174	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5928	0	0	5905	1805	1615	
Flt Permitted				0.734	0.950		
Satd. Flow (perm)	5928	0	0	4347	1654	1418	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	16					46	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		43	43		61	79	
Confl. Bikes (#/hr)		13				6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1850	0	0	1151	67	181	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.61			0.42	0.16	0.35	
Control Delay	3.9			9.5	35.0	20.6	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.9			9.5	35.0	20.6	
LOS	A			A	D	C	
Approach Delay	3.9			9.5	24.5		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 67 (61%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 ø2 (R)	 ø4	 ø9
61.5 s	4 s 30 s	14.5 s
 ø6 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Future Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4748	0	0	4646	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.821			0.921					0.083		
Satd. Flow (perm)	0	3898	0	0	4280	1170	0	4964	1469	139	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				164			107			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	71		236	136		71	31		46	46		31
Confl. Bikes (#/hr)			3			28			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	610	0	0	1534	181	0	1607	392	171	1616	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.53			1.23	0.40		0.74	0.56	0.60	0.55	
Control Delay		34.2			135.0	7.4		28.4	19.9	30.4	12.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		34.2			135.0	7.4		28.4	19.9	30.4	12.8	
LOS		C			F	A		C	B	C	B	
Approach Delay		34.2			121.5			26.8			14.4	
Approach LOS		C			F			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 120												
Control Type: Pretimed												
Maximum v/c Ratio: 1.23												
Intersection Signal Delay: 50.5	Intersection LOS: D											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	






1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour

Intersection Capacity Utilization 93.0%  
Analysis Period (min) 15

ICU Level of Service F

Splits and Phases: 1: 14th St SW & Independence Ave SW

 02 (R) 53 s	 04 37 s	 09 20 s
 06 (R) 53 s	 08 37 s	

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	↑↑↑↑		↙	↑↑↑↑				↘	↑	↘	↘	
Traffic Volume (vph)	1016	55	421	1493	2	187	126	1	238	305	14	23
Future Volume (vph)	1016	55	421	1493	2	187	126	1	238	305	14	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	14	14
Satd. Flow (prot)	5861	0	1393	4060	0	0	0	1678	1534	1426	1265	0
Flt Permitted			0.164	0.776				0.950			0.985	
Satd. Flow (perm)	5861	0	240	3156	0	0	0	1516	1534	1426	1140	0
Right Turn on Red		Yes				Yes				Yes		
Satd. Flow (RTOR)	11							10		35		99
Link Speed (mph)	35			35				30				30
Link Distance (ft)	1110			590				162				395
Travel Time (s)	21.6			11.5				3.7				9.0
Confl. Peds. (#/hr)		9	9		71	71	73			334	334	
Confl. Bikes (#/hr)		19			19	19				5		8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Shared Lane Traffic (%)			19%							17%		
Lane Group Flow (vph)	1127	0	359	1855	0	0	0	134	306	266	50	0
Turn Type	NA		pm+pt	NA			Split	Split	NA	pt+ov	Prot	
Protected Phases	6		5	2			4	4!	4!	4 5!	4!	
Permitted Phases			2									
Minimum Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (%)	38.2%		27.3%	65.5%			34.5%	34.5%	34.5%		34.5%	
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0		4.0	
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0		3.0	
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5		-1.5	
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5		5.5	
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Act Effct Green (s)	37.0		67.0	67.0				32.5	32.5	62.5	32.5	
Actuated g/C Ratio	0.34		0.61	0.61				0.30	0.30	0.57	0.30	
v/c Ratio	0.57		0.88	0.87				0.27	0.67	0.32	0.11	
Control Delay	32.3		43.5	18.6				17.5	27.9	2.0	0.8	
Queue Delay	0.0		0.0	0.0				3.0	3.8	0.4	0.0	
Total Delay	32.3		43.5	18.6				20.6	31.6	2.3	0.8	
LOS	C		D	B				C	C	A	A	
Approach Delay	32.3			22.6					18.5		0.8	
Approach LOS	C			C					B		A	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.88											
Intersection Signal Delay:	24.3						Intersection LOS: C					

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour



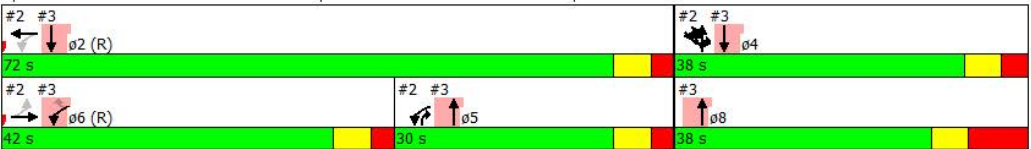
Lane Group	SER2	ø8
Lane Configurations		
Traffic Volume (vph)	10	
Future Volume (vph)	10	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	14	
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	73	
Confl. Bikes (#/hr)	8	
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Yellow Time (s)	4.0	
All-Red Time (s)	6.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour











Intersection Capacity Utilization 107.1%	ICU Level of Service G
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



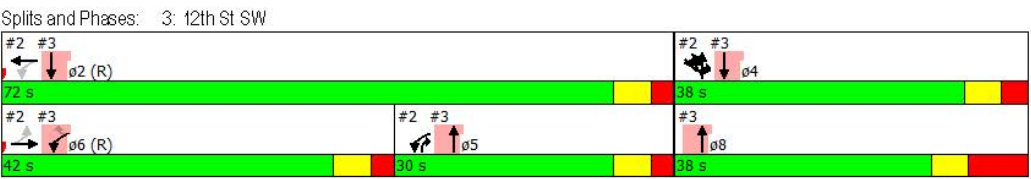
3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	670	0	0	499				
Future Volume (vph)	0	0	670	0	0	499				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1739	1801	4916	0	0	3303				
Flt Permitted										
Satd. Flow (perm)	1739	1801	4916	0	0	3303				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	705	0	0	525				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (%)	38.2%	38.2%					65%	35%	27%	35%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effect Green (s)			59.0			110.0				
Actuated g/C Ratio			0.54			1.00				
v/c Ratio			0.27			0.16				
Control Delay			14.1			0.1				
Queue Delay			0.0			0.0				
Total Delay			14.2			0.1				
LOS			B			A				
Approach Delay			14.2			0.1				
Approach LOS			B			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 110										
Control Type: Pretimed										
Maximum v/c Ratio: 0.88										
Intersection Signal Delay: 8.2						Intersection LOS: A				
Intersection Capacity Utilization 20.4%						ICU Level of Service A				
Analysis Period (min) 15										
! Phase conflict between lane groups.										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1272	62	57	1844	259	63	
Future Volume (vph)	1272	62	57	1844	259	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5843	0	0	5860	1805	1615	
Flt Permitted				0.801	0.950		
Satd. Flow (perm)	5843	0	0	4697	1368	1572	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					60	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		28	28		176	8	
Confl. Bikes (#/hr)		17				6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1482	0	0	2112	288	70	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	61.5		13.5	61.5	31.0	13.5	4.0
Total Split (%)	55.9%		12.3%	55.9%	28.2%	12.3%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			65.0	26.5	36.5	
Actuated g/C Ratio	0.51			0.59	0.24	0.33	
v/c Ratio	0.49			0.74	0.66	0.12	
Control Delay	21.4			16.4	46.2	8.0	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	21.4			16.4	46.2	8.0	
LOS	C			B	D	A	
Approach Delay	21.4			16.4	38.7		
Approach LOS	C			B	D		
Intersection Summary							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 ø2 (R)	 ø4	 ø9
61.5 s	4 s 31 s	13.5 s
 ø6 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	6	1492	44	7	702	284	0	2139	182	152	462	16
Future Volume (vph)	6	1492	44	7	702	284	0	2139	182	152	462	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4961	0	0	4750	1422	0	4964	1524	1452	4570	0
Flt Permitted		0.936			0.799					0.075		
Satd. Flow (perm)	0	4644	0	0	3799	1339	0	4964	1050	115	4570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				122			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	40		58	58		40	27		246	246		27
Confl. Bikes (#/hr)			14			5			1			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1677	0	0	771	309	0	2325	198	165	519	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		1.13			0.64	0.61		0.97	0.36	1.07	0.19	
Control Delay		104.3			42.5	34.8		41.2	11.5	119.9	10.2	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		104.3			42.5	34.8		41.2	11.5	119.9	10.2	
LOS		F			D	C		D	B	F	B	
Approach Delay		104.3			40.3			38.9			36.7	
Approach LOS		F			D			D			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	120											
Control Type:	Pre-timed											
Maximum v/c Ratio:	1.13											
Intersection Signal Delay:	57.3											
Intersection LOS:	E											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour




Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour




















Intersection Capacity Utilization 108.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: 14th St SW & Independence Ave SW

 ø2 (R) 58 s	 ø4 40 s	 ø9 12 s
 ø6 (R) 58 s	 ø8 40 s	











2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

														
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR		
Lane Configurations														
Traffic Volume (vph)	54	2	1607	162	172	770	2	151	212	2	229	1		
Future Volume (vph)	54	2	1607	162	172	770	2	151	212	2	229	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	10	12	10	10	10	10	10	10	11	11	11	12		
Satd. Flow (prot)	0	0	5929	0	1407	3843	0	0	0	1694	1775	0		
Flt Permitted			0.819		0.083	0.875				0.950				
Satd. Flow (perm)	0	0	4854	0	123	3366	0	0	0	1072	1775	0		
Right Turn on Red			Yes											
Satd. Flow (RTOR)			24											
Link Speed (mph)			35			35					30			
Link Distance (ft)			1110			590					162			
Travel Time (s)			21.6			11.5					3.7			
Confl. Peds. (#/hr)	141			9	9		141	141	482					
Confl. Bikes (#/hr)							12	12						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	1%	100%	1%	1%	3%	3%	3%	3%	3%	0%	3%	100%		
Shared Lane Traffic (%)					10%									
Lane Group Flow (vph)	0	0	1984	0	168	1022	0	0	0	232	250	0		
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA			
Protected Phases			6		5	2			4	4!	4!			
Permitted Phases	6	6			2									
Detector Phase	6	6	6		5	2			4	4	4			
Switch Phase														
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0			7.0	7.0	7.0			
Minimum Split (s)	42.0	42.0	42.0		17.0	61.0			32.0	32.0	32.0			
Total Split (s)	48.0	48.0	48.0		18.0	66.0			32.0	32.0	32.0			
Total Split (%)	43.6%	43.6%	43.6%		16.4%	60.0%			29.1%	29.1%	29.1%			
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0			
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0			
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5			
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5			
Lead/Lag	Lead	Lead	Lead		Lag									
Lead-Lag Optimize?	Yes	Yes	Yes		Yes									
Recall Mode	C-Max	C-Max	C-Max		Max	C-Max			Max	Max	Max			
Act Effect Green (s)			43.0		61.0	61.0				26.5	26.5			
Actuated g/C Ratio			0.39		0.55	0.55				0.24	0.24			
v/c Ratio			1.04		0.77	0.53				0.57	0.59			
Control Delay			34.0		53.3	10.5				17.6	17.8			
Queue Delay			0.0		0.0	0.0				1.7	1.6			
Total Delay			34.0		53.3	10.5				19.2	19.5			
LOS			C		D	B				B	B			
Approach Delay			34.0			16.5					14.7			
Approach LOS			C			B					B			
Intersection Summary														
Area Type:	Other													
Cycle Length: 110														
Actuated Cycle Length: 110														
Offset: 62 (56%), Referenced to phase 2:WBT and 6:EBTL, Start of Green														

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

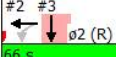

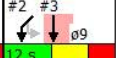


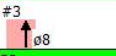
								
Lane Group	NBR2	SEL	SER	SER2	SWL2	SWL	SWR	ø8
Lane Configurations								
Traffic Volume (vph)	156	12	15	9	1	1	2	
Future Volume (vph)	156	12	15	9	1	1	2	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	14	14	10	10	10	
Satd. Flow (prot)	1516	1311	0	0	0	807	0	
Flt Permitted		0.984				0.976		
Satd. Flow (perm)	1516	1215	0	0	0	807	0	
Right Turn on Red	Yes			Yes				
Satd. Flow (RTOR)	116	169						
Link Speed (mph)		30				15		
Link Distance (ft)		395				273		
Travel Time (s)		9.0				12.4		
Confl. Peds. (#/hr)	166	166		482				
Confl. Bikes (#/hr)	3							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	0%	10%	0%	100%	100%	100%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	170	39	0	0	0	4	0	
Turn Type	pt+ov	Prot			Perm	Prot		
Protected Phases	4 5!	4!				9		8
Permitted Phases					9			
Detector Phase	4 5	4			9	9		
Switch Phase								
Minimum Initial (s)		7.0			5.0	5.0		5.0
Minimum Split (s)		32.0			12.0	12.0		32.0
Total Split (s)		32.0			12.0	12.0		32.0
Total Split (%)		29.1%			10.9%	10.9%		29%
Yellow Time (s)		4.0			4.0	4.0		4.0
All-Red Time (s)		3.0			3.0	3.0		6.5
Lost Time Adjust (s)		-1.5				0.0		
Total Lost Time (s)		5.5				7.0		
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode		Max			None	None		Max
Act Effect Green (s)	44.5	26.5				5.0		
Actuated g/C Ratio	0.40	0.24				0.05		
w/c Ratio	0.25	0.09				0.11		
Control Delay	0.9	0.4				57.2		
Queue Delay	0.6	0.0				0.0		
Total Delay	1.4	0.4				57.2		
LOS	A	A				E		
Approach Delay		0.4				57.3		
Approach LOS		A				E		
Intersection Summary								

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 25.0	Intersection LOS: C
Intersection Capacity Utilization 113.4%	ICU Level of Service H
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock

					
66 s		32 s		12 s	
					
48 s		18 s		32 s	

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour



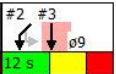

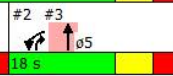

							ø2	ø4	ø5	ø8	ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	↰	↱	↕		↰	↱					
Traffic Volume (vph)	0	0	600	0	0	350					
Future Volume (vph)	0	0	600	0	0	350					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900					
Lane Width (ft)	10	11	11	11	10	10					
Satd. Flow (prot)	1773	1837	4868	0	0	3271					
Flt Permitted											
Satd. Flow (perm)	1773	1837	4868	0	0	3271					
Right Turn on Red		Yes		Yes							
Satd. Flow (RTOR)											
Link Speed (mph)	20		30			30					
Link Distance (ft)	188		380			162					
Travel Time (s)	6.4		8.6			3.7					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92					
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%					
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	652	0	0	380					
Turn Type	Prot	Perm	NA			NA					
Protected Phases	6!		8 5			2 4 9!	2	4	5	8	9
Permitted Phases		6									
Detector Phase	6	6	8 5			2 4 9					
Switch Phase											
Minimum Initial (s)	10.0	10.0					10.0	7.0	5.0	5.0	5.0
Minimum Split (s)	42.0	42.0					61.0	32.0	17.0	32.0	12.0
Total Split (s)	48.0	48.0					66.0	32.0	18.0	32.0	12.0
Total Split (%)	43.6%	43.6%					60%	29%	16%	29%	11%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5	3.0
Lost Time Adjust (s)	-1.5	-1.5									
Total Lost Time (s)	5.0	5.0									
Lead/Lag	Lead	Lead							Lag		
Lead-Lag Optimize?	Yes	Yes							Yes		
Recall Mode	C-Max	C-Max					C-Max	Max	Max	Max	None
Act Effect Green (s)			41.0			110.0					
Actuated g/C Ratio			0.37			1.00					
v/c Ratio			0.36			0.12					
Control Delay			25.7			0.0					
Queue Delay			0.1			0.0					
Total Delay			25.8			0.0					
LOS			C			A					
Approach Delay			25.8			0.0					
Approach LOS			C			A					
Intersection Summary											
Area Type:	Other										
Cycle Length:	110										
Actuated Cycle Length:	110										
Offset:	62 (56%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle:	105										
Control Type:	Actuated-Coordinated										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 19.1%	ICU Level of Service A
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 3: 12th St SW

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1679	97	75	1030	64	174	
Future Volume (vph)	1679	97	75	1030	64	174	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5928	0	0	5905	1805	1615	
Flt Permitted				0.734	0.950		
Satd. Flow (perm)	5928	0	0	4347	1654	1418	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	16					46	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		43	43		61	79	
Confl. Bikes (#/hr)		13				6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1850	0	0	1151	67	181	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.61			0.42	0.16	0.35	
Control Delay	3.2			9.5	35.0	20.6	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.2			9.5	35.0	20.6	
LOS	A			A	D	C	
Approach Delay	3.2			9.5	24.5		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 75 (68%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 02 (R)	 04	 09
61.5 s	4 s 30 s	14.5 s
 06 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Future Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4748	0	0	4646	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.821			0.921					0.083		
Satd. Flow (perm)	0	3898	0	0	4280	1170	0	4964	1469	139	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				164			107			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	71		236	136		71	31		46	46		31
Confl. Bikes (#/hr)			3			28			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	610	0	0	1534	181	0	1607	392	171	1616	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.53			1.23	0.40		0.74	0.56	0.60	0.55	
Control Delay		34.2			135.0	5.1		28.4	19.9	30.4	12.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		34.2			135.0	5.1		28.4	19.9	30.4	12.8	
LOS		C			F	A		C	B	C	B	
Approach Delay		34.2			121.3			26.8			14.4	
Approach LOS		C			F			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 120												
Control Type: Pretimed												
Maximum v/c Ratio: 1.23												
Intersection Signal Delay: 50.4	Intersection LOS: D											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour






Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: 14th St SW & Independence Ave SW

 02 (R)	 04	 09
53 s	37 s	20 s
 06 (R)	 08	
53 s	37 s	

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2	SEL
Lane Configurations			↖	↗				↖	↗		↖	↗
Traffic Volume (vph)	1016	55	421	1493	2	189	126	1	238	1	305	14
Future Volume (vph)	1016	55	421	1493	2	189	126	1	238	1	305	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	12	11	14
Satd. Flow (prot)	5861	0	1393	4057	0	0	0	1678	1758	0	1501	1262
Flt Permitted			0.167	0.772				0.950				0.985
Satd. Flow (perm)	5861	0	244	3138	0	0	0	1516	1758	0	1501	1138
Right Turn on Red		Yes									Yes	
Satd. Flow (RTOR)	10										141	169
Link Speed (mph)	35			35					30			30
Link Distance (ft)	1110			590					162			395
Travel Time (s)	21.6			11.5					3.7			9.0
Confl. Peds. (#/hr)		9	9		71	71	73				334	334
Confl. Bikes (#/hr)		19			19	19					5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	100%	4%	40%
Shared Lane Traffic (%)			19%									
Lane Group Flow (vph)	1127	0	359	1857	0	0	0	134	252	0	321	50
Turn Type	NA		pm+pt	NA			Split	Split	NA		pt+ov	Prot
Protected Phases	6		5	2			4	4!	4!		4 5!	4!
Permitted Phases			2									
Detector Phase	6		5	2			4	4	4		4 5	4
Switch Phase												
Minimum Initial (s)	10.0		5.0	10.0			7.0	7.0	7.0			7.0
Minimum Split (s)	39.0		21.0	60.0			32.0	32.0	32.0			32.0
Total Split (s)	39.0		27.0	66.0			32.0	32.0	32.0			32.0
Total Split (%)	35.5%		24.5%	60.0%			29.1%	29.1%	29.1%			29.1%
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0			4.0
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0			3.0
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5			-1.5
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5			5.5
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Recall Mode	C-Max		Max	C-Max			Max	Max	Max			Max
Act Effect Green (s)	43.6		70.6	70.6				26.5	26.5		53.5	26.5
Actuated g/C Ratio	0.40		0.64	0.64				0.24	0.24		0.49	0.24
v/c Ratio	0.48		0.93	0.85				0.33	0.60		0.40	0.12
Control Delay	25.7		48.5	12.6				17.9	24.3		3.5	0.5
Queue Delay	0.0		0.0	0.0				3.4	4.9		0.2	0.0
Total Delay	25.7		48.5	12.6				21.3	29.2		3.7	0.5
LOS	C		D	B				C	C		A	A
Approach Delay	25.7			18.4					16.1			0.5
Approach LOS	C			B					B			A
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 22 (20%), Referenced to phase 2:WBTL and 6:EBT, Start of Green												

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

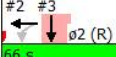




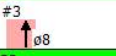
Lane Group	SER	SER2	SWL2	SWL	SWR	ø8
Lane Configurations						
Traffic Volume (vph)	23	10	3	0	1	
Future Volume (vph)	23	10	3	0	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	14	14	10	10	10	
Satd. Flow (prot)	0	0	0	826	0	
Flt Permitted				0.964		
Satd. Flow (perm)	0	0	0	826	0	
Right Turn on Red	Yes					
Satd. Flow (RTOR)						
Link Speed (mph)	15					
Link Distance (ft)	362					
Travel Time (s)	16.5					
Confl. Peds. (#/hr)	73					
Confl. Bikes (#/hr)	8	8				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	40%	0%	100%	100%	100%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	
Turn Type			Perm	Prot		
Protected Phases				9	8	
Permitted Phases			9			
Detector Phase			9	9		
Switch Phase						
Minimum Initial (s)			5.0	5.0	5.0	
Minimum Split (s)			12.0	12.0	32.0	
Total Split (s)			12.0	12.0	32.0	
Total Split (%)			10.9%	10.9%	29%	
Yellow Time (s)			4.0	4.0	4.0	
All-Red Time (s)			3.0	3.0	6.5	
Lost Time Adjust (s)			0.0			
Total Lost Time (s)			7.0			
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode			None	None	None	
Act Effect Green (s)			5.0			
Actuated g/C Ratio			0.05			
v/c Ratio			0.11			
Control Delay			56.8			
Queue Delay			0.0			
Total Delay			56.8			
LOS			E			
Approach Delay			56.8			
Approach LOS			E			
Intersection Summary						

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 116.5%	ICU Level of Service H
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

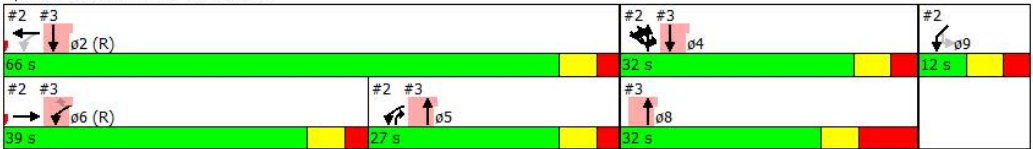
							ø2	ø4	ø5	ø8	ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	↰	↱	↕	↕	↰	↱					
Traffic Volume (vph)	0	0	671	0	0	499					
Future Volume (vph)	0	0	671	0	0	499					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900					
Lane Width (ft)	10	11	11	11	10	10					
Satd. Flow (prot)	1739	1801	4916	0	0	3303					
Flt Permitted											
Satd. Flow (perm)	1739	1801	4916	0	0	3303					
Right Turn on Red		Yes		Yes							
Satd. Flow (RTOR)											
Link Speed (mph)	20		30			30					
Link Distance (ft)	188		380			162					
Travel Time (s)	6.4		8.6			3.7					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95					
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	706	0	0	525					
Turn Type	Prot	Perm	NA			NA					
Protected Phases	6!		8 5			2 4!	2	4	5	8	9
Permitted Phases		6									
Detector Phase	6	6	8 5			2 4					
Switch Phase											
Minimum Initial (s)	10.0	10.0					10.0	7.0	5.0	5.0	5.0
Minimum Split (s)	39.0	39.0					60.0	32.0	21.0	32.0	12.0
Total Split (s)	39.0	39.0					66.0	32.0	27.0	32.0	12.0
Total Split (%)	35.5%	35.5%					60%	29%	25%	29%	11%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5	3.0
Lost Time Adjust (s)	-1.5	-1.5									
Total Lost Time (s)	5.0	5.0									
Lead/Lag	Lead	Lead							Lag		
Lead-Lag Optimize?	Yes	Yes							Yes		
Recall Mode	C-Max	C-Max					C-Max	Max	Max	None	None
Act Effct Green (s)			50.0			106.6					
Actuated g/C Ratio			0.45			0.97					
v/c Ratio			0.32			0.16					
Control Delay			19.6			0.1					
Queue Delay			0.1			0.0					
Total Delay			19.7			0.1					
LOS			B			A					
Approach Delay			19.7			0.1					
Approach LOS			B			A					
<b>Intersection Summary</b>											
Area Type:	Other										
Cycle Length: 110											
Actuated Cycle Length: 110											
Offset: 22 (20%), Referenced to phase 2:WBL and 6:EBT, Start of Green											
Natural Cycle: 105											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.93											

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 3: 12th St SW



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1274	62	57	1845	259	63	
Future Volume (vph)	1274	62	57	1845	259	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5843	0	0	5860	1805	1615	
Flt Permitted				0.801	0.950		
Satd. Flow (perm)	5843	0	0	4697	1368	1572	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					60	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		28	28		176	8	
Confl. Bikes (#/hr)		17				6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1485	0	0	2113	288	70	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	61.5		13.5	61.5	31.0	13.5	4.0
Total Split (%)	55.9%		12.3%	55.9%	28.2%	12.3%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			65.0	26.5	36.5	
Actuated g/C Ratio	0.51			0.59	0.24	0.33	
v/c Ratio	0.49			0.74	0.66	0.12	
Control Delay	11.7			16.4	46.2	8.0	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	11.7			16.4	46.2	8.0	
LOS	B			B	D	A	
Approach Delay	11.7			16.4	38.7		
Approach LOS	B			B	D		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 29 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 02 (R)	 04	 09
61.5 s	4 s 31 s	13.5 s
 06 (R)		
61.5 s		

## **APPENDIX D: LOADING ALTERNATIVES**

**DATE:** January 18, 2017  
**TO:** Bjarke Ingels Group, Smithsonian  
**FROM:** Jonathan Parker, Kleinfelder  
**SUBJECT:** South Mall Master Plan – Loading Dock Design Vehicle

For Kleinfelder's report in February 2014, the geometric proof-of-concept for the proposed materials management design for the South Mall Master Plan was based on the movement of the largest truck and the movement of the largest object expected to come and go from any of the museums. The largest vehicle is expected to be a long-haul semi-truck like those used by specialty art shipping companies. The conceptual ramp, truck apron, and loading dock layout was based on a WB-67. The question has recently been raised as to whether it is possible to plan around a vehicle other than a WB-67. The reduction

### Operational Reductions

Operationally, moving to a smaller design vehicle would exclude receiving large art delivery trucks for Collections in the loading dock. These deliveries would need to continue to be made on the street. Though infrequent, they are valuable deliveries. Delivery on the street exposes collections to greater risk for security, screening, handling, and environmental conditions. It is difficult to quantify the potential cost of not making improvements to materials handling for Collections.



Fig 1. Collections Delivery on Independence Ave Fig 2. Collections Delivery down Quad ramp  
from <http://artists-in-dialogue2.blogspot.com/2011/01/welcome-arrivals.html>

It is possible that food service would take advantage of the accommodation of large vehicles in the below-grade dock as well and employee WB-67s or WB-50s for occasional delivery.

If the design-vehicle were reduced, it would be to a WB-40, which is referred to as a city sized semi, and typically used by food service operators and vendors such as Sysco, Sodexho, Coca-Cola, Frito-Lay, and Poland Springs. The tractor and trailer typically measure 45' long.

The operational implications of the smaller design vehicle should be weighed against the dimensional implications of planning for a smaller design vehicle.

### Dimensional Reductions – the Ramp

The ramp requirements for smaller delivery vehicles is equivalent to those for a WB-67. The slope of the ramp would not be reduced by reducing the size of the design vehicle. The overall length of the ramp to achieve desired dock elevation would not be reduced. With the traffic on Independence Avenue

and the likely length of the ramp, we would strongly recommend maintaining two-way traffic for all but the WB-67 on the ramp, therefore the width of the truck ramp would not be reduced either. The radius of the turn in the ramp to accommodate two-way traffic of WB-40s and large box trucks is adequate to accommodate the one-way at-a-time turning of a WB-67 on the ramp. (See Figures 3 and 4)

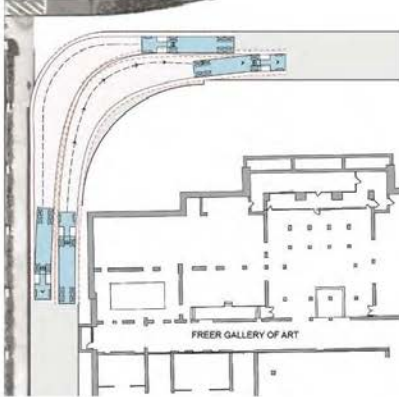


Fig 3. WB-40 two-way traffic at turn in ramp.

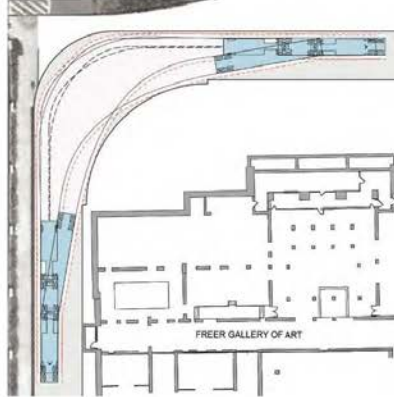


Fig 4. WB-67 one-way traffic at turn in ramp.

#### Dimensional Reductions – the Truck Apron and Loading Dock

The additional dimensional requirements for accommodating a large semi over a small semi are partially achieved by overlapping with space that is already being provided for smaller vehicles.

The width of the truck apron that is provided in order to accommodate roll-off vehicle pickup of compactors is adequate to accommodate the wide swings in the 3-point turning of a WB-67. (See dimension A in Figure 5)

A program for sizing the required number of delivery and recycling bays for materials management has not been developed, so it is unknown whether the truck apron length to accommodate the total number of recommended bays would be shorter or longer than the truck apron length needed for a WB-67. (See dimension B1 and B2 in Figure 5)

The square footage at the dock for unloading large semis would be removed, but square footage, equipment, and distribution paths would need to be added to accommodate receiving art deliveries at-grade and transporting them horizontally and vertically to collections receiving. (See C in Figure 5)

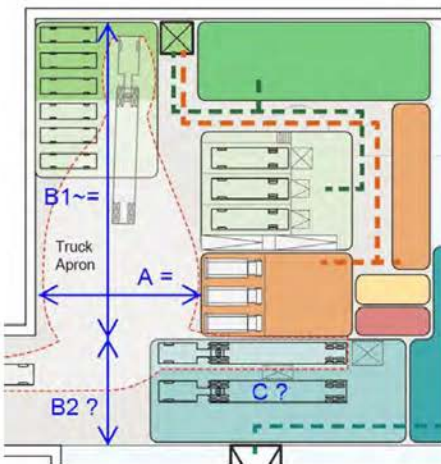


Fig 5. Truck Apron and Loading Dock

**Conclusions**

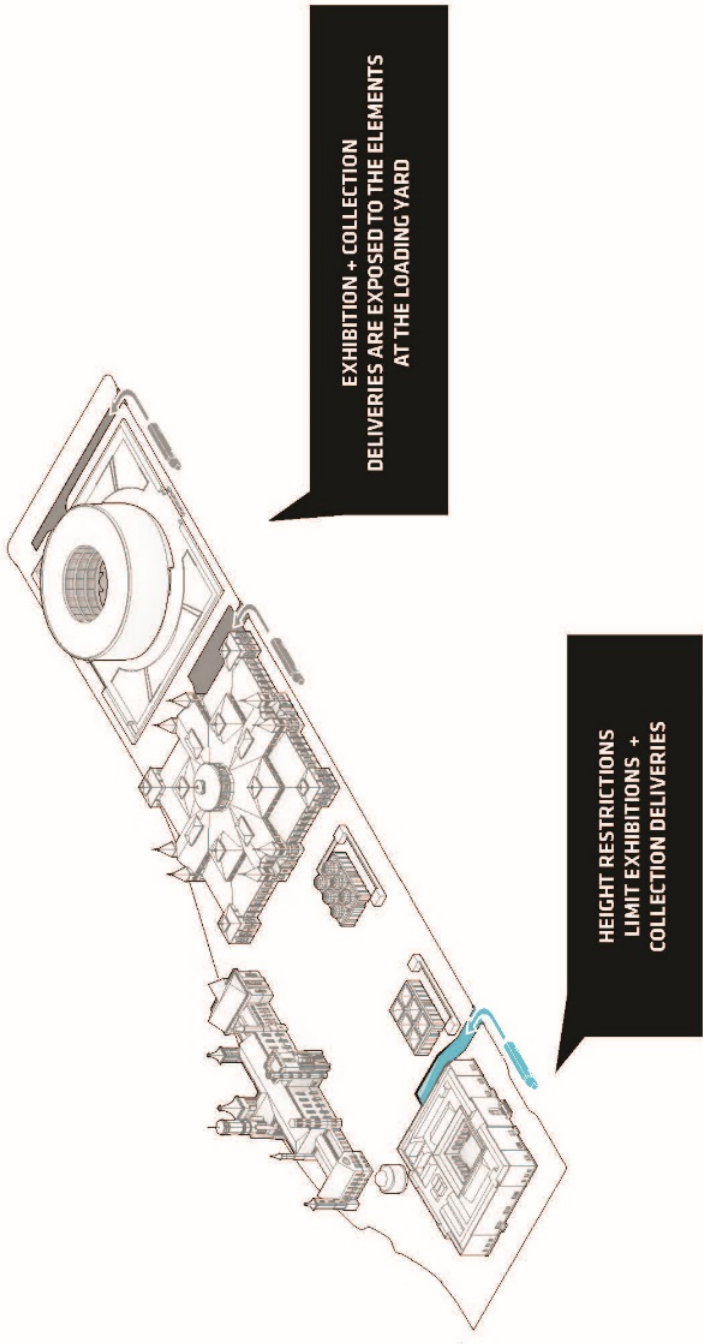
The footprint and dimensions of the ramp would see little if any reduction from switching from a WB-67 for the design vehicle to a WB-40. The size of the truck apron below-grade may see some moderate reduction, but that would depend on a more detailed programming effort also showing a need for fewer delivery, service, and recycling bays. The square footage for the large bays themselves would result in a reduction, however square footage, equipment, and distribution paths would need to be added to accommodate receiving art deliveries at-grade and transporting them horizontally and vertically to collections receiving.

The value of substantially improving the handling and receiving of collections by accommodating large semi-trucks in the below-grade dock should be weighed against the minimal to moderate potential reductions in footprint and dimensions of not designing for a WB-67.

**SMITHSONIAN SOUTH CAMPUS  
LOADING FACILITIES**  
DATE: SEP. 29 2016

**BIG**

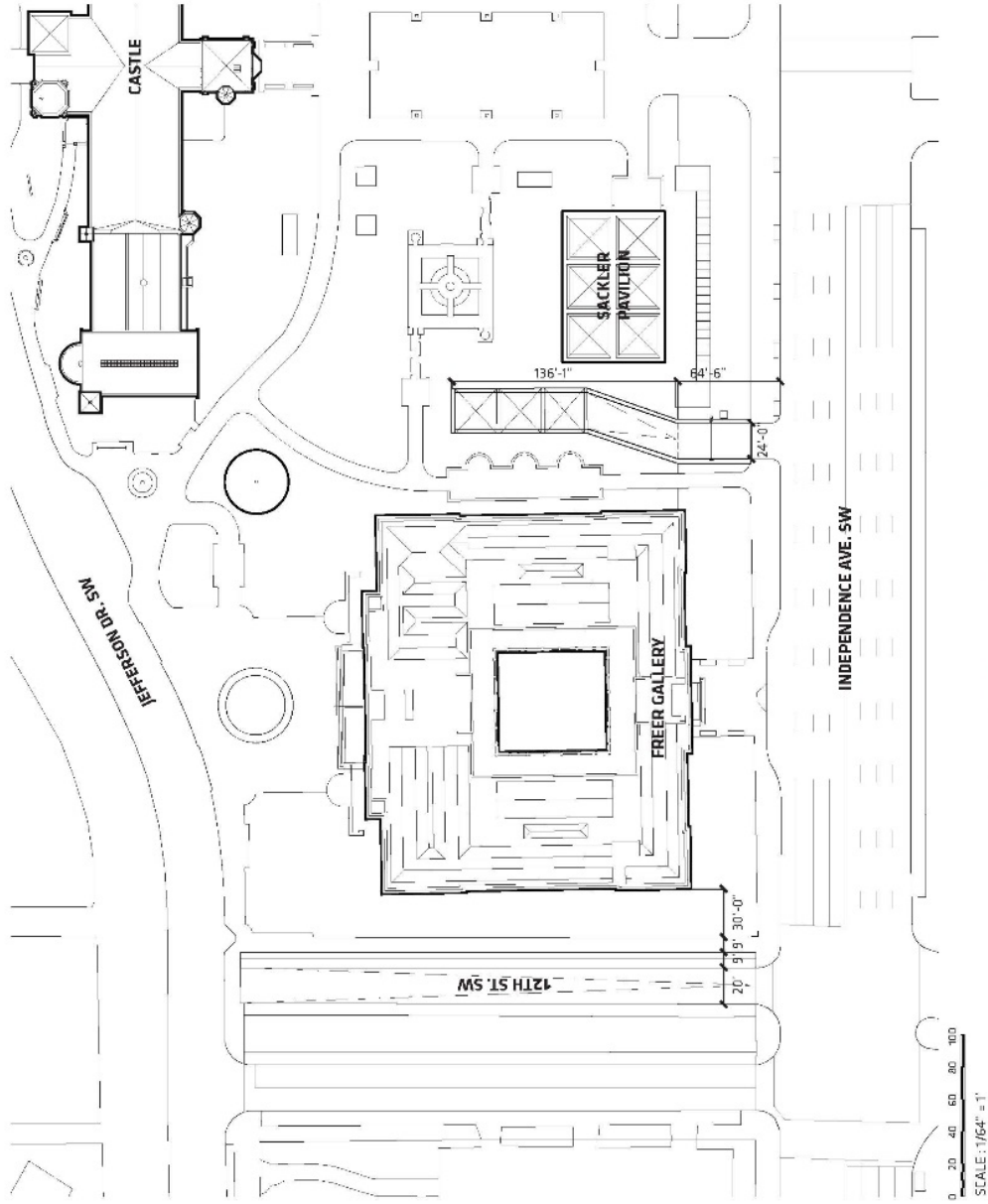
## **EXISTING CURB CUTS & LOADING FACILITIES**



EXISTING CURB CUTS AND LOADING FACILITIES

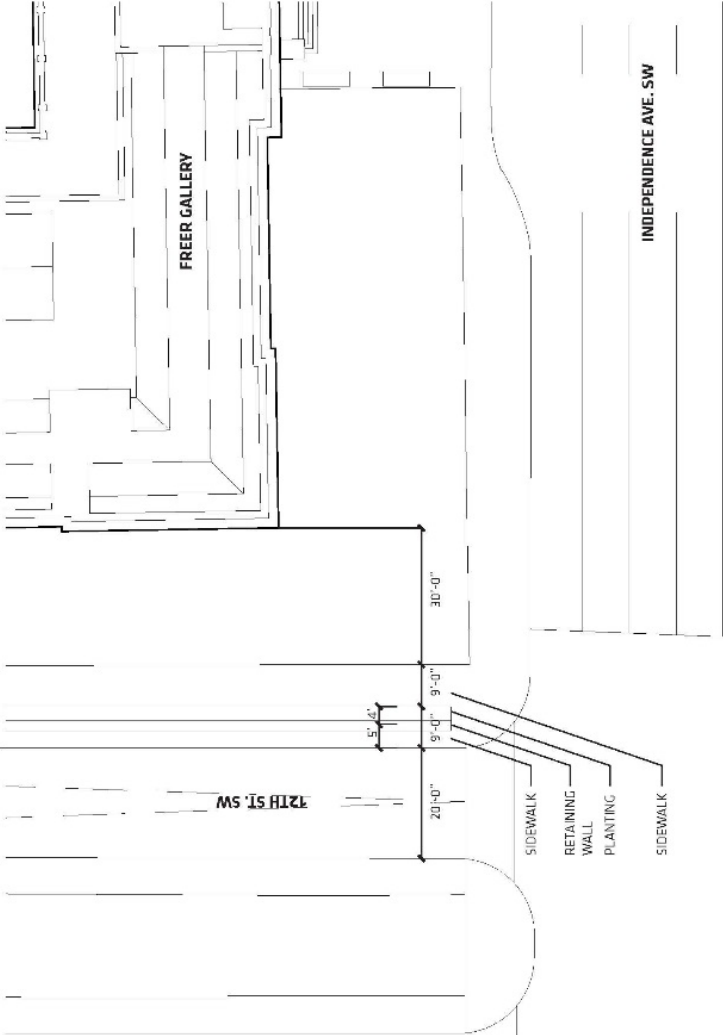
- The 3 existing loading facilities require large vehicles to back in from the street because of limited turn around area. The largest vehicles and deliveries must unload on the street because they do not fit into the dock.

EXISTING CURB CUT | LOADING FACILITIES: QUAD COMPLEX



EXISTING CURB CUT & RAMP AT GRADE

EXISTING CURB CUT | LOADING FACILITIES: QUAD COMPLEX

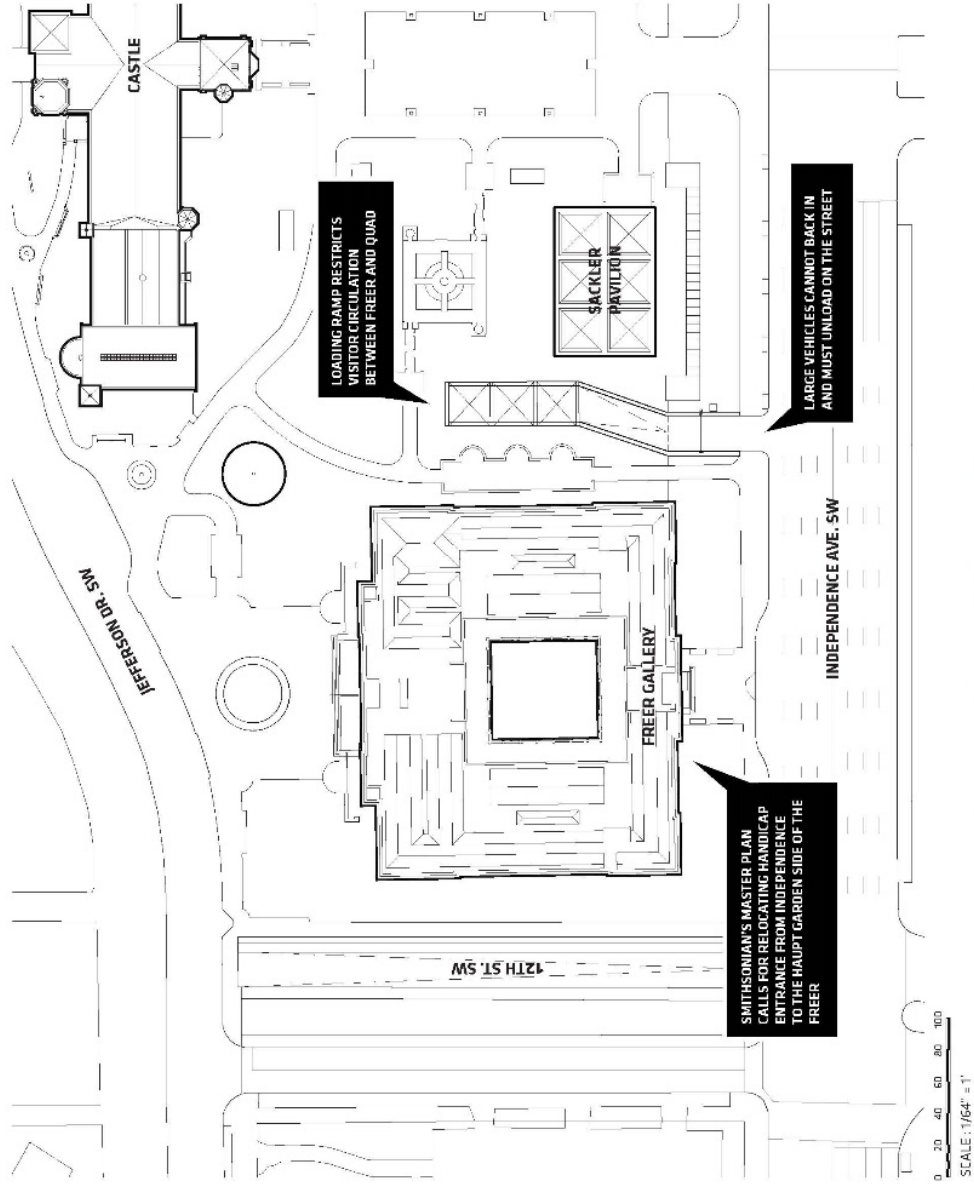


EXISTING DIMENSIONS

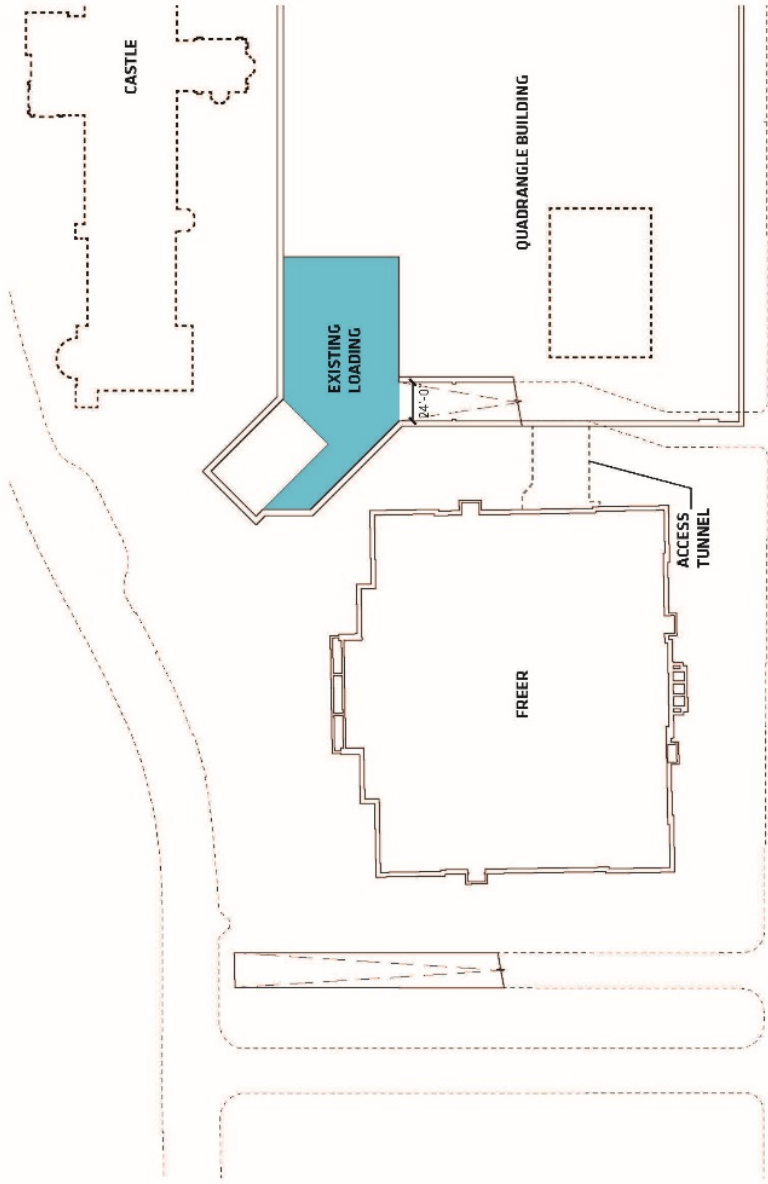


PERSPECTIVE @ 12TH ST. SW & INDEPENDENCE AVE. SW

EXISTING CURB CUT | LOADING FACILITIES: QUAD COMPLEX

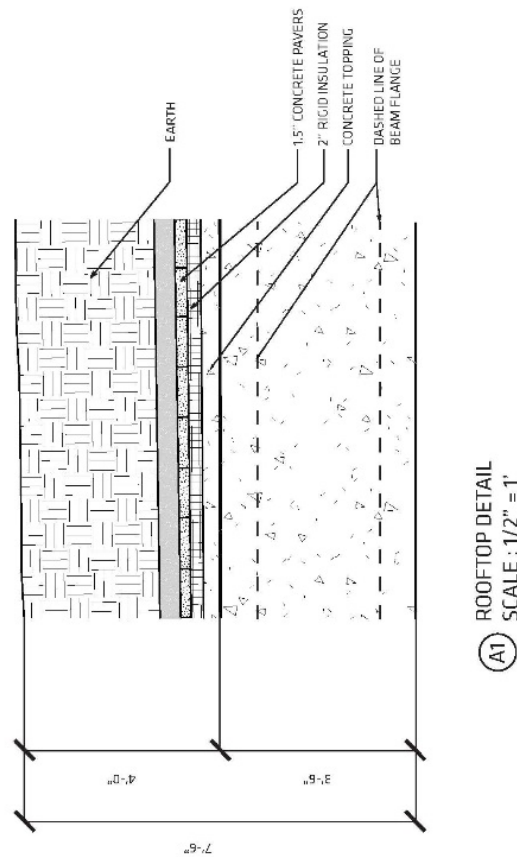


EXISTING CURB CUT & RAMP AT GRADE

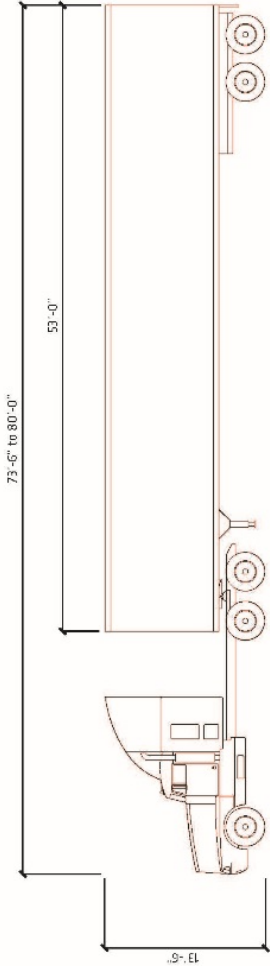


**EXISTING RAMP & LOADING FACILITY BELOW GRADE**

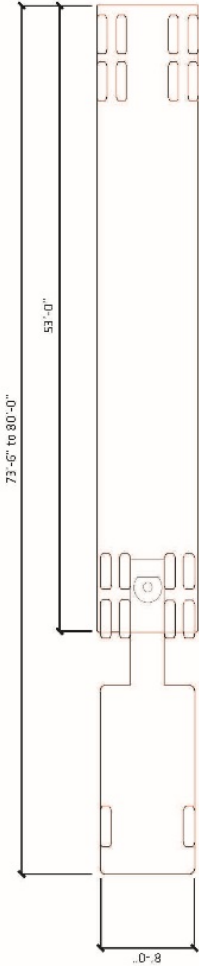




SECTION DETAIL @ A1



ART HAULER WITH LOW-BAY TRAILER

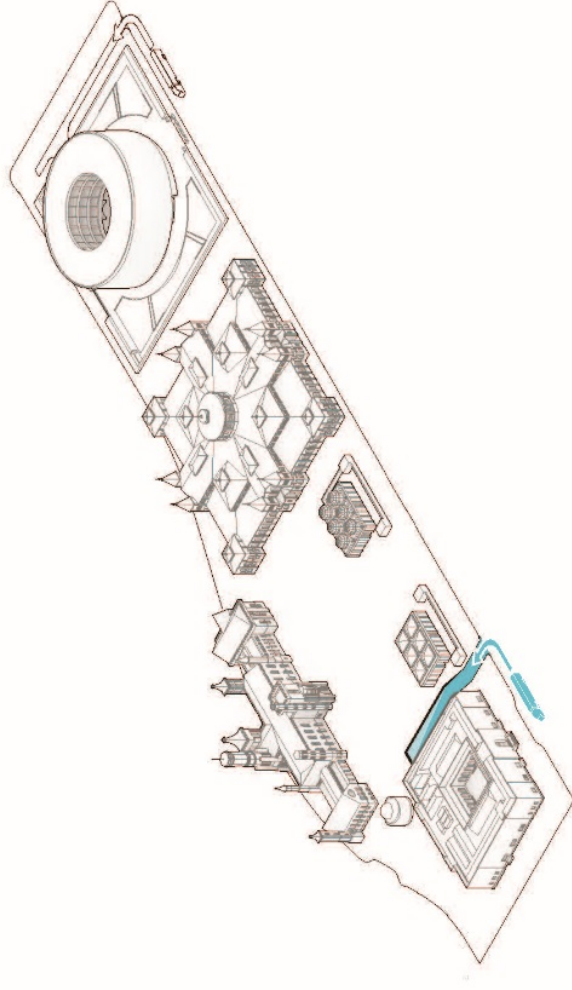


ART HAULER WITH LOW-BAY TRAILER

STANDARD DIMENSION WB-67

## SCHEME A

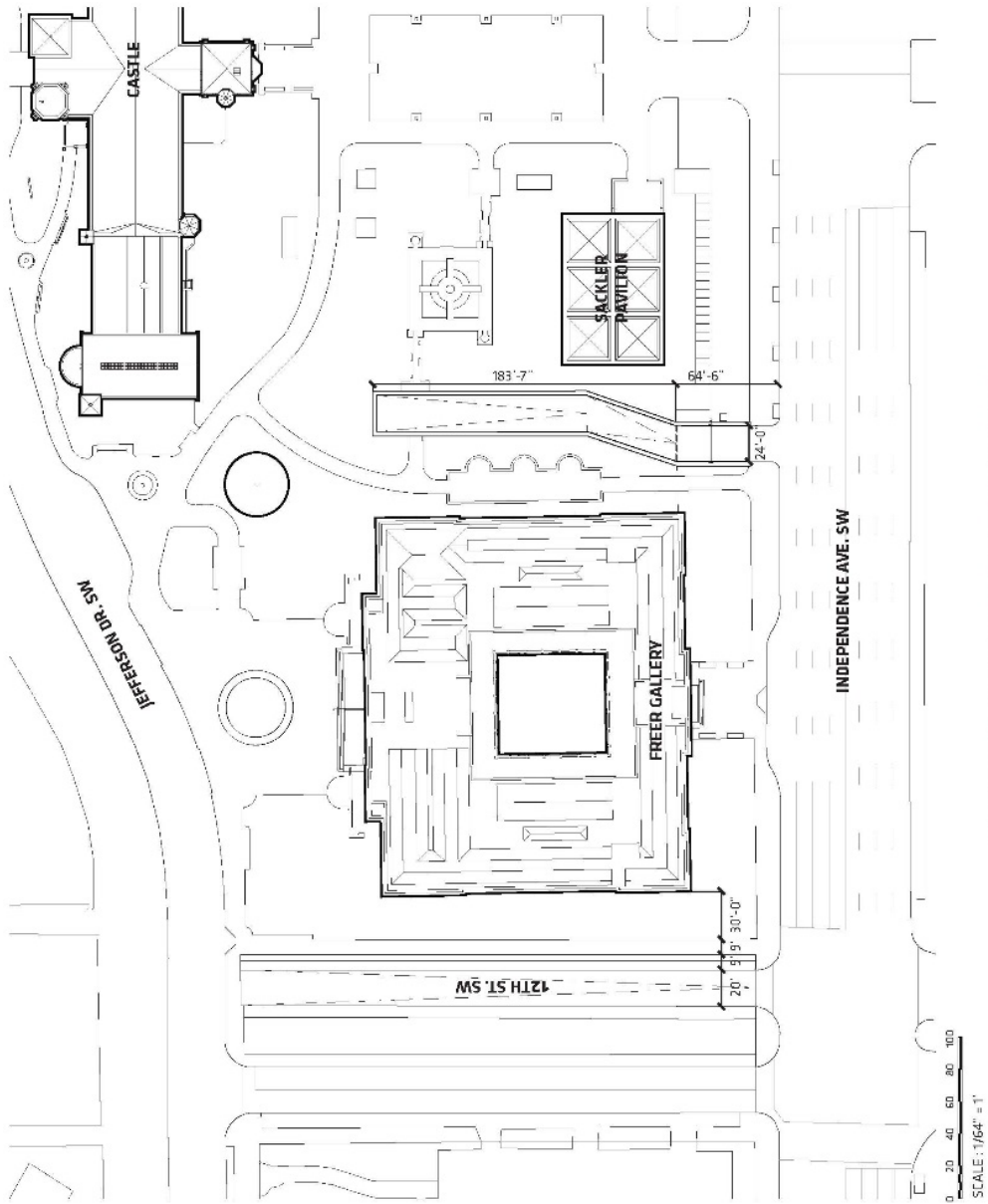
SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



SCHEME A CURB CUT AND LOADING FACILITY

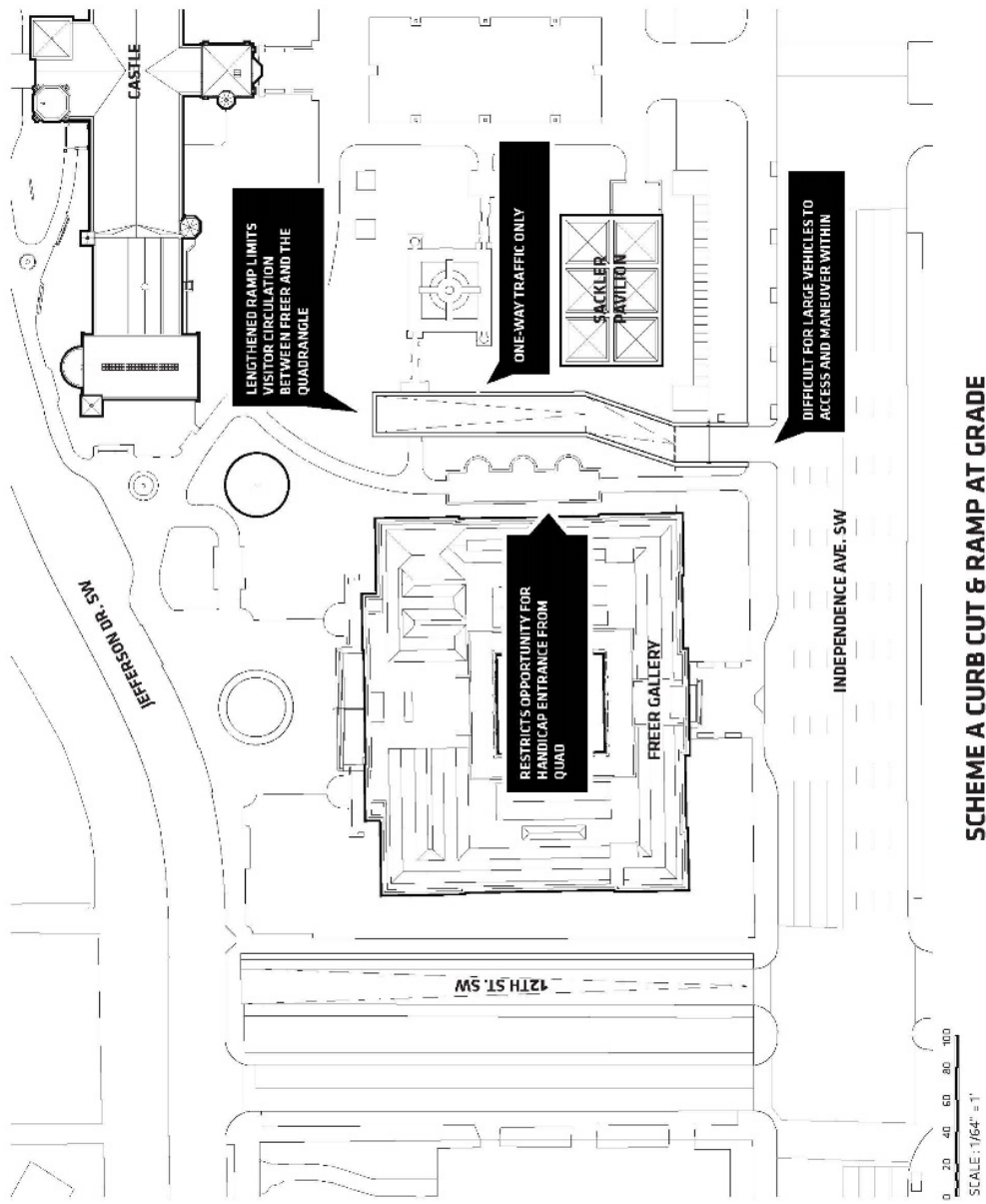
- Reuse of the existing curb cut and ramp requires an expansion of the ramp and expansion of the below grade loading complex. Scheme A would limit vehicle traffic to one-way, and interfere with the Master Plan's East/West circulation.

SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX

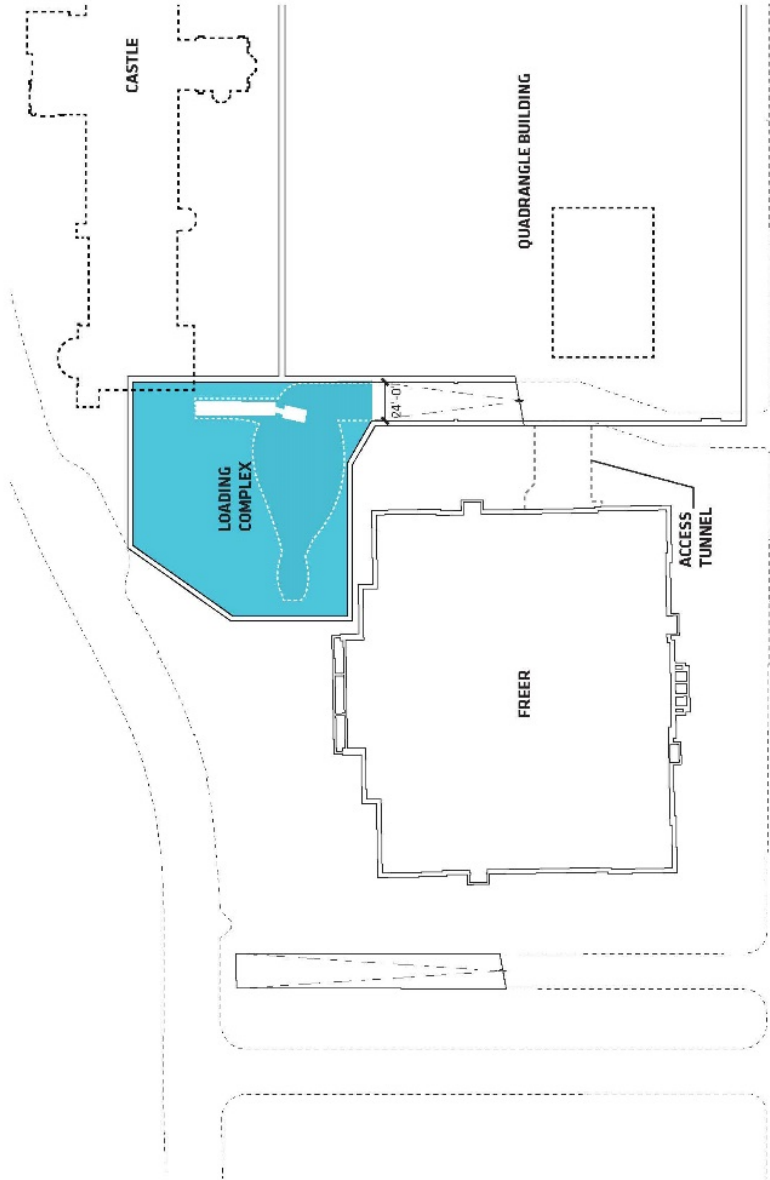


SCHEME A CURB CUT & RAMP AT GRADE

SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX

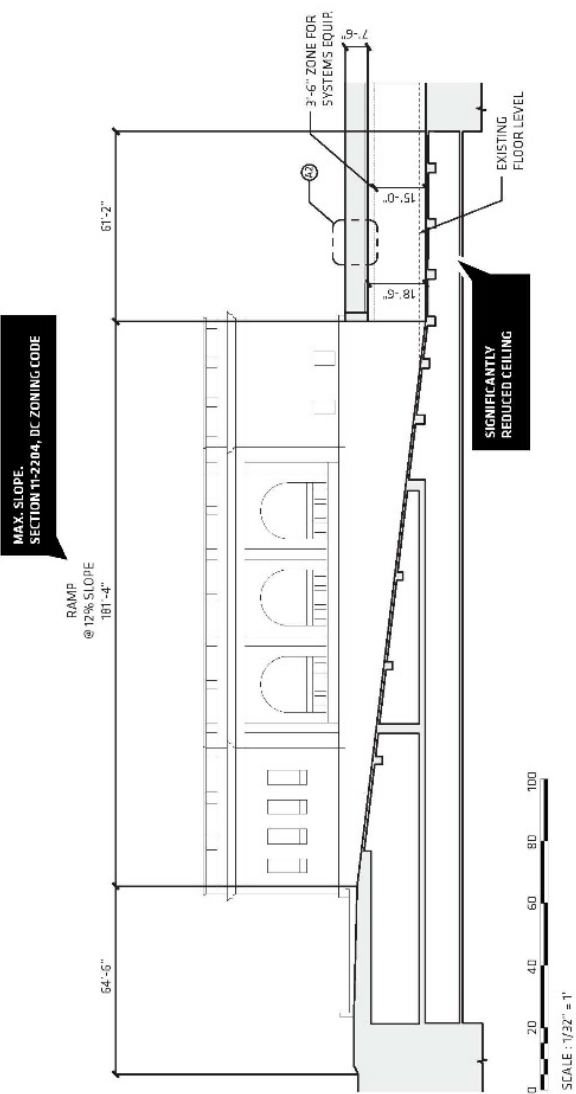


SCHEME A CURB CUT & RAMP AT GRADE



SCHEME A RAMP & LOADING FACILITY BELOW GRADE

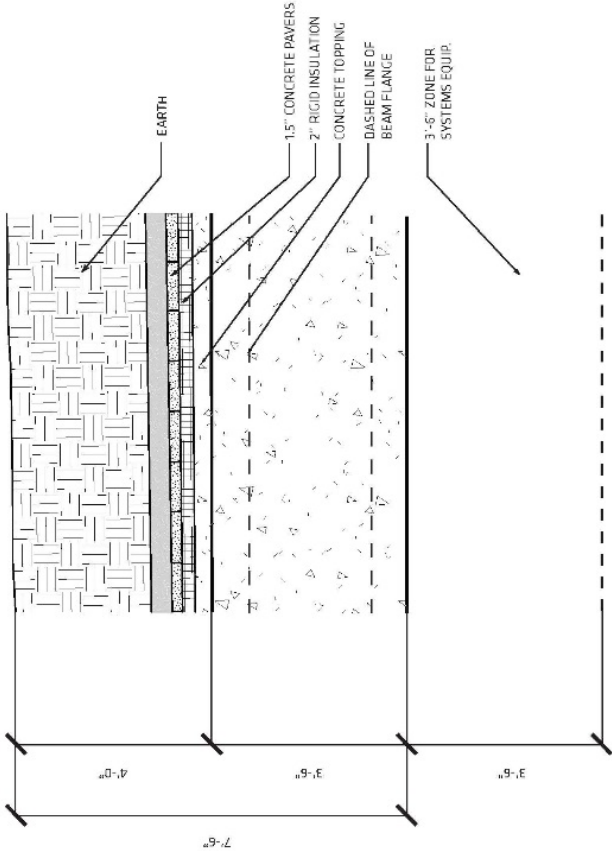
SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



- Scheme A requires the expansion of below grade loading support areas to provide increased maneuvering clearance. The floor of the loading dock will need to be lowered. The alteration will greatly reduce the ceiling height in floor level below loading dock

SCHEME A LOADING FACILITY SECTION

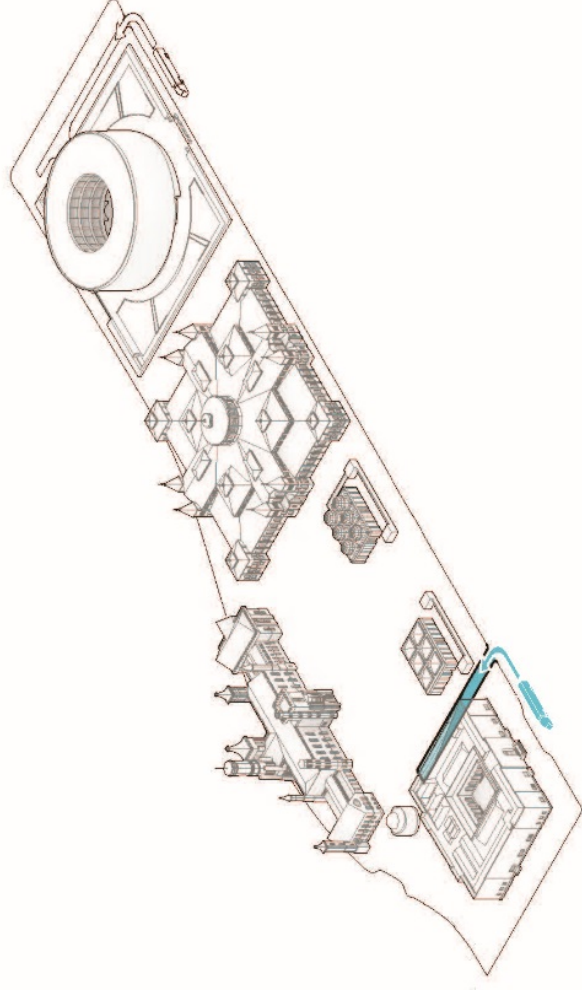
SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



ROOFTOP DETAIL  
SCALE : 1/2" = 1'

SECTION DETAIL @ A2

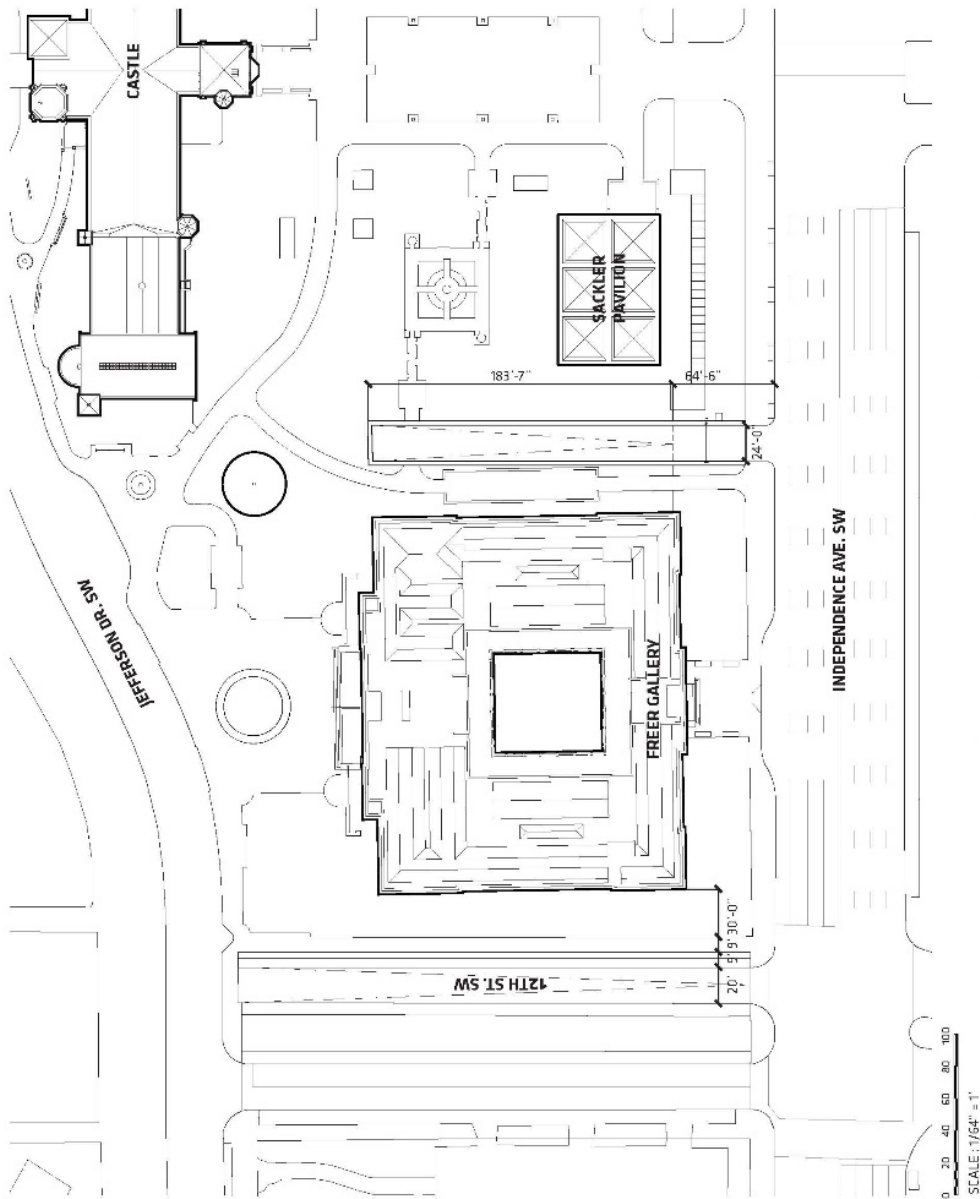
## SCHEME B



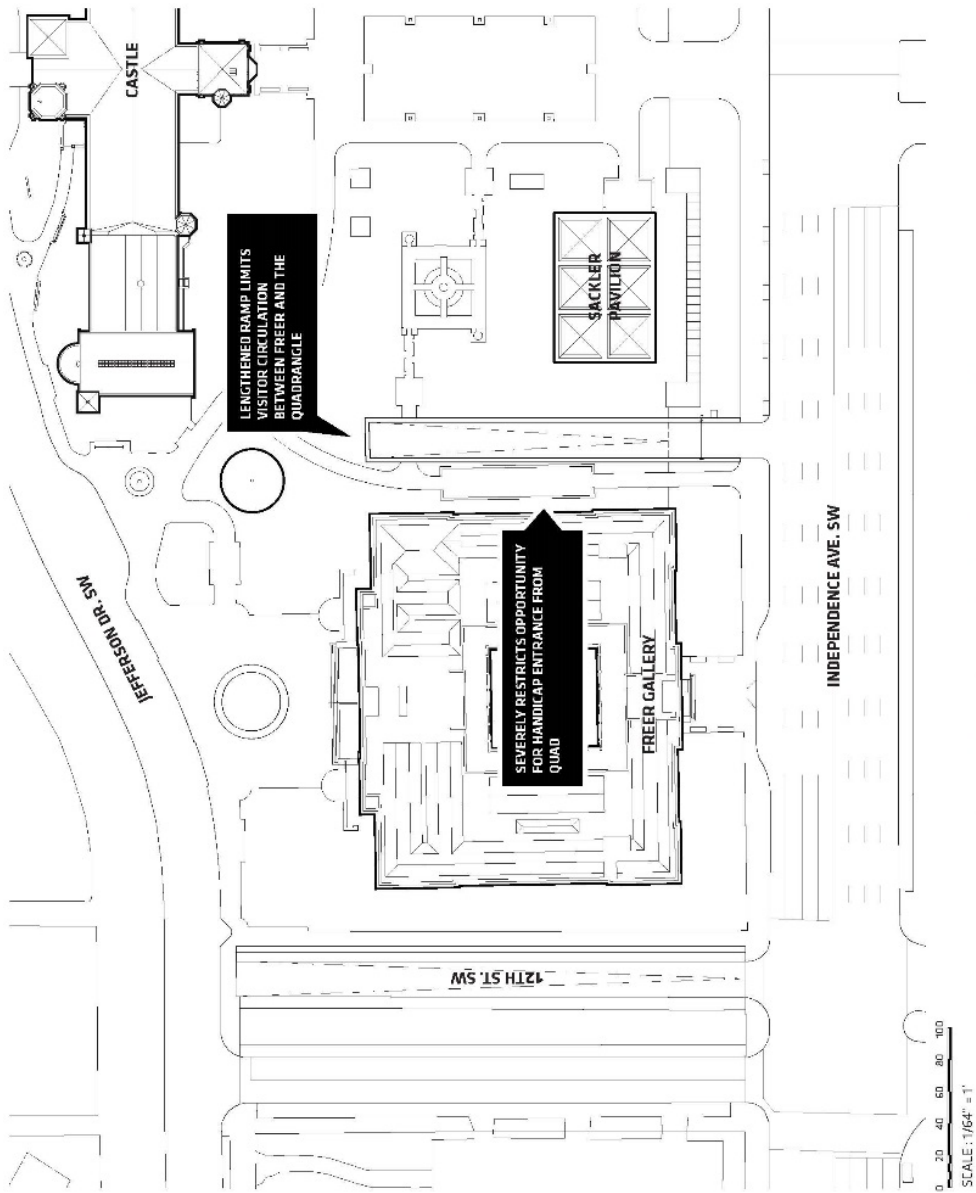
#### SCHEME B CURB CUT AND LOADING FACILITY

- Widening of the existing curb cut and new ramp would maintain approximate location of existing curb cut. The new ramp would allow for two-way traffic, but require an expansion of below grade complex.

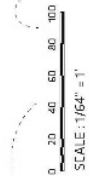
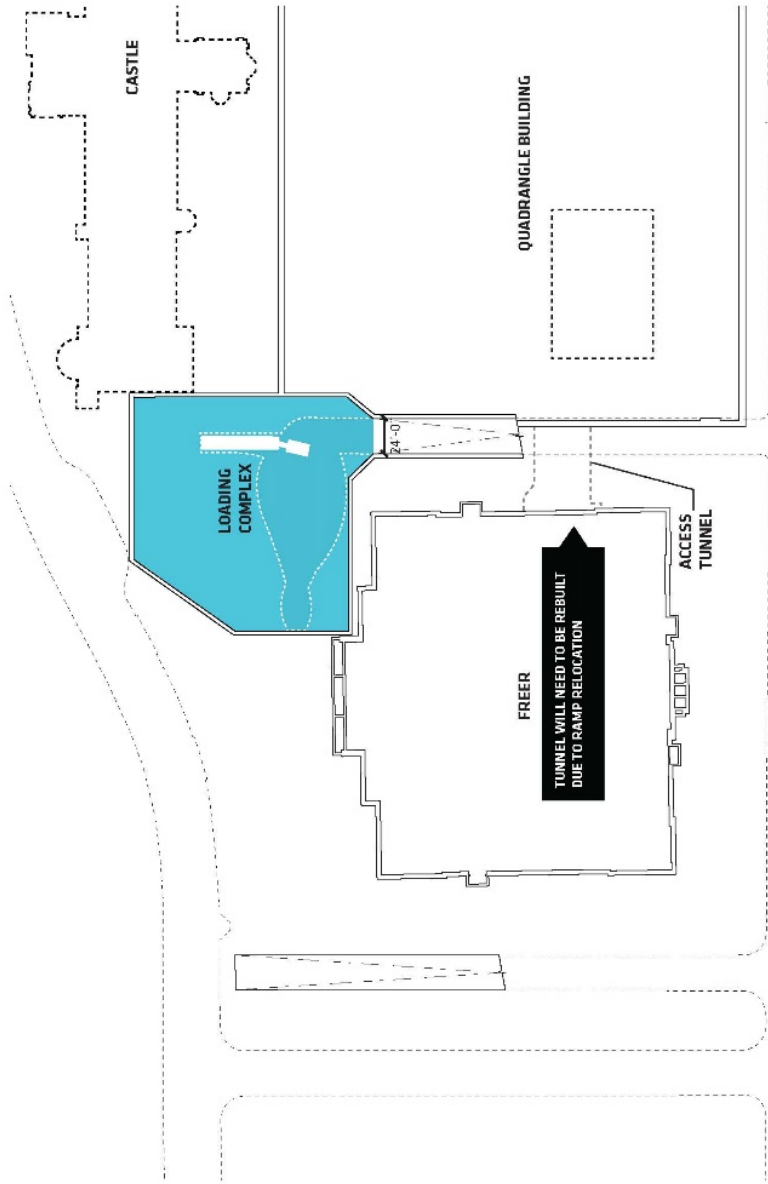
SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX



SCHEME B CURB CUT & RAMP AT GRADE

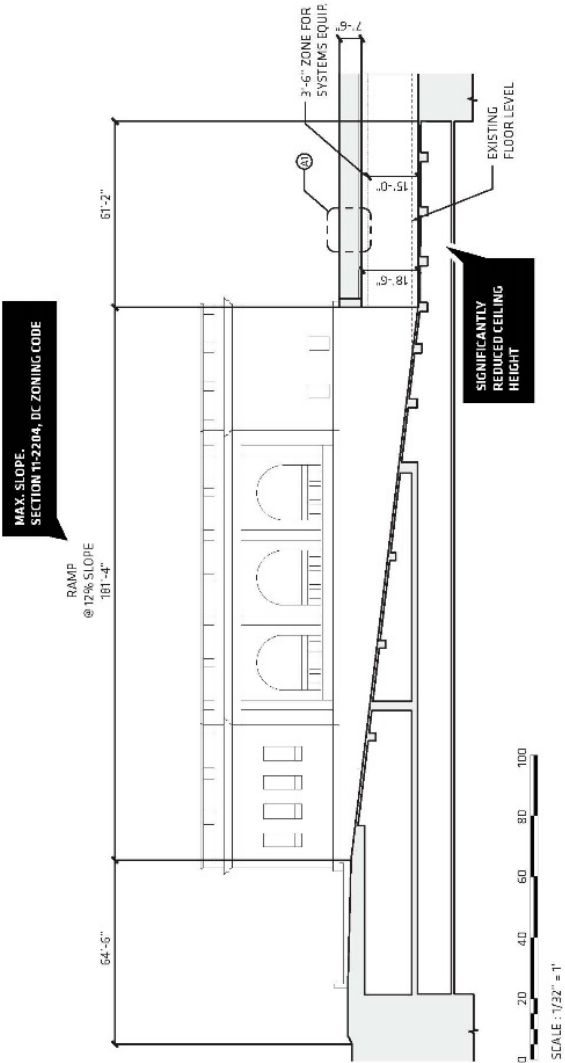


SCHEME B CURB CUT & RAMP AT GRADE



SCHEME B RAMP & LOADING FACILITY BELOW GRADE

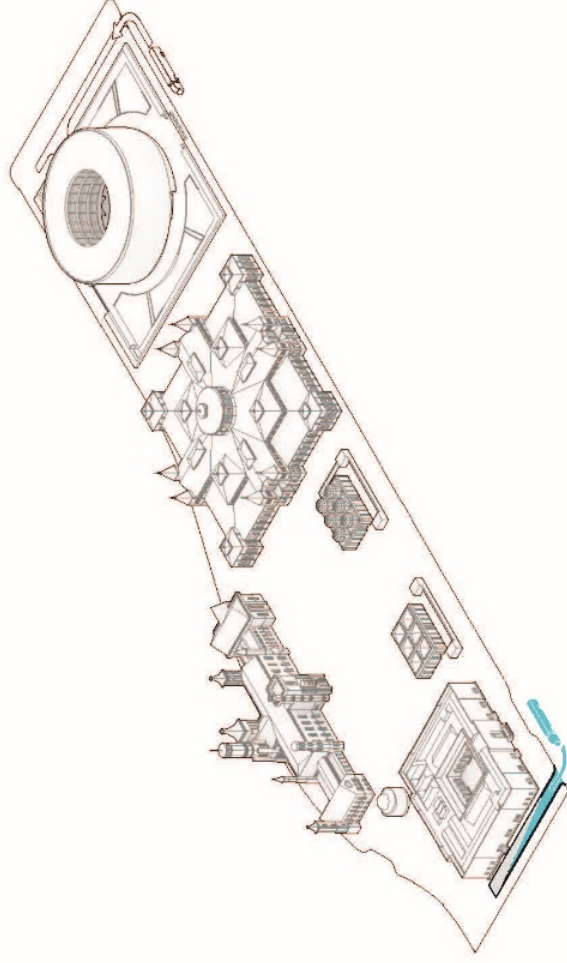
SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX



- Scheme B requires the expansion of below grade loading support areas to provide increased maneuvering clearance. The floor of the loading dock will need to be lowered. The alteration will greatly reduce the ceiling height in floor level below loading dock

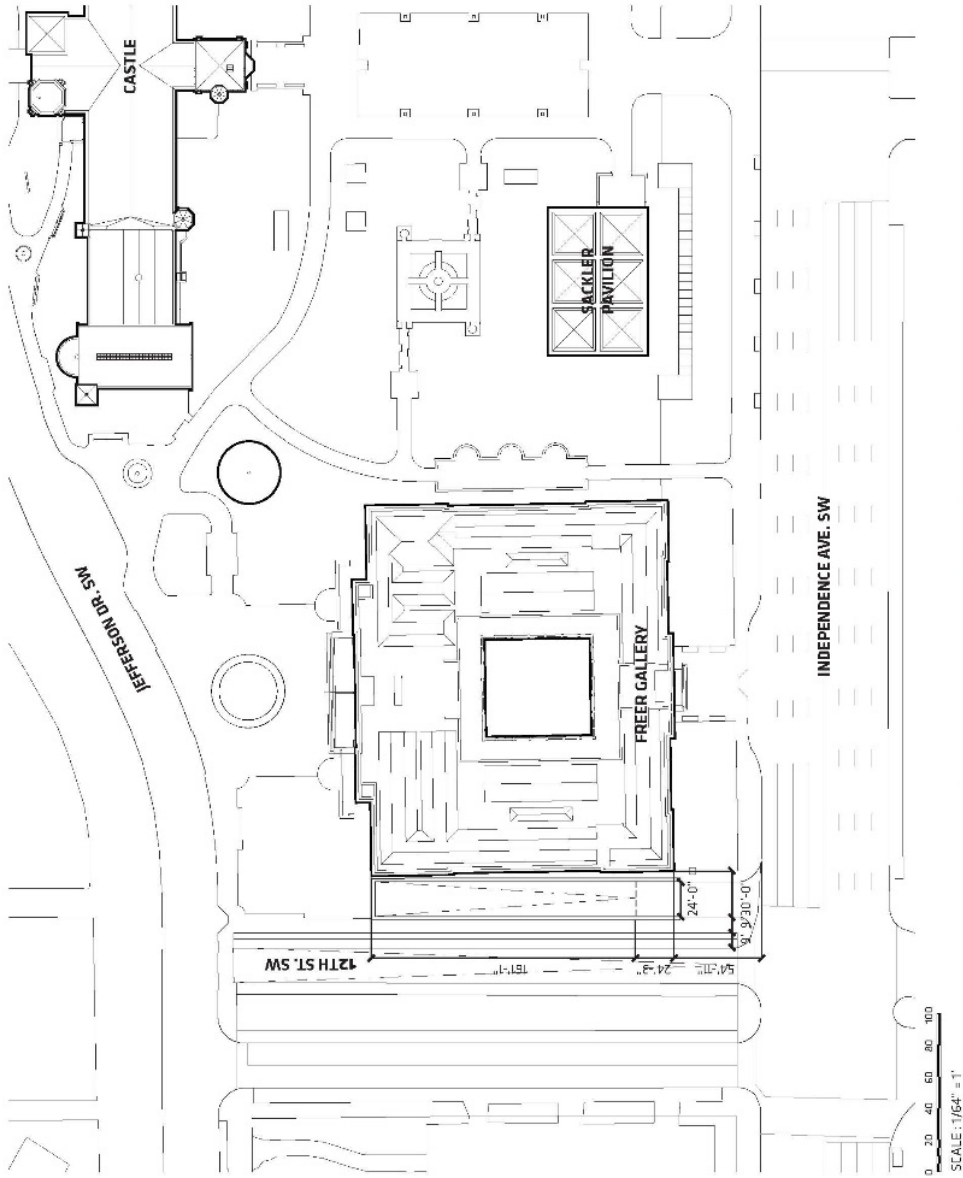
SCHEME B LOADING FACILITY SECTION

## **FREER RAMP**



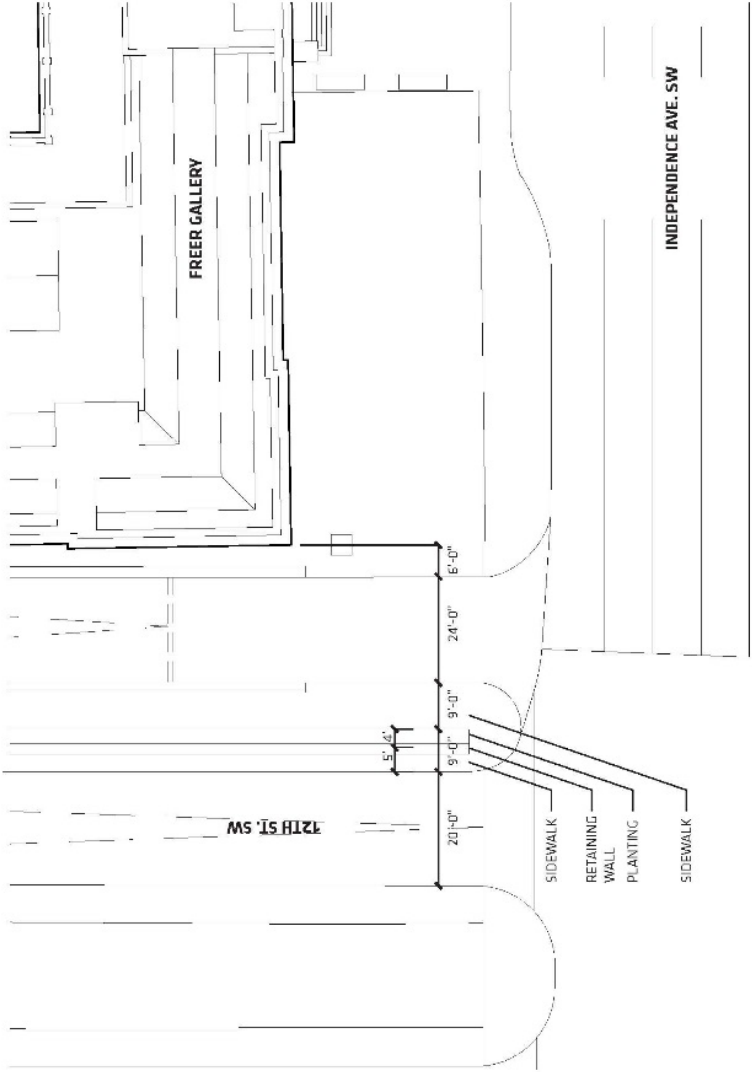
#### FREER CURB CUT AND LOADING FACILITY

- A new curb cut and ramp would allow for the consolidation of existing curb cuts and loading facilities and allow two-way traffic. Scheme allows for East/West circulation across the Campus

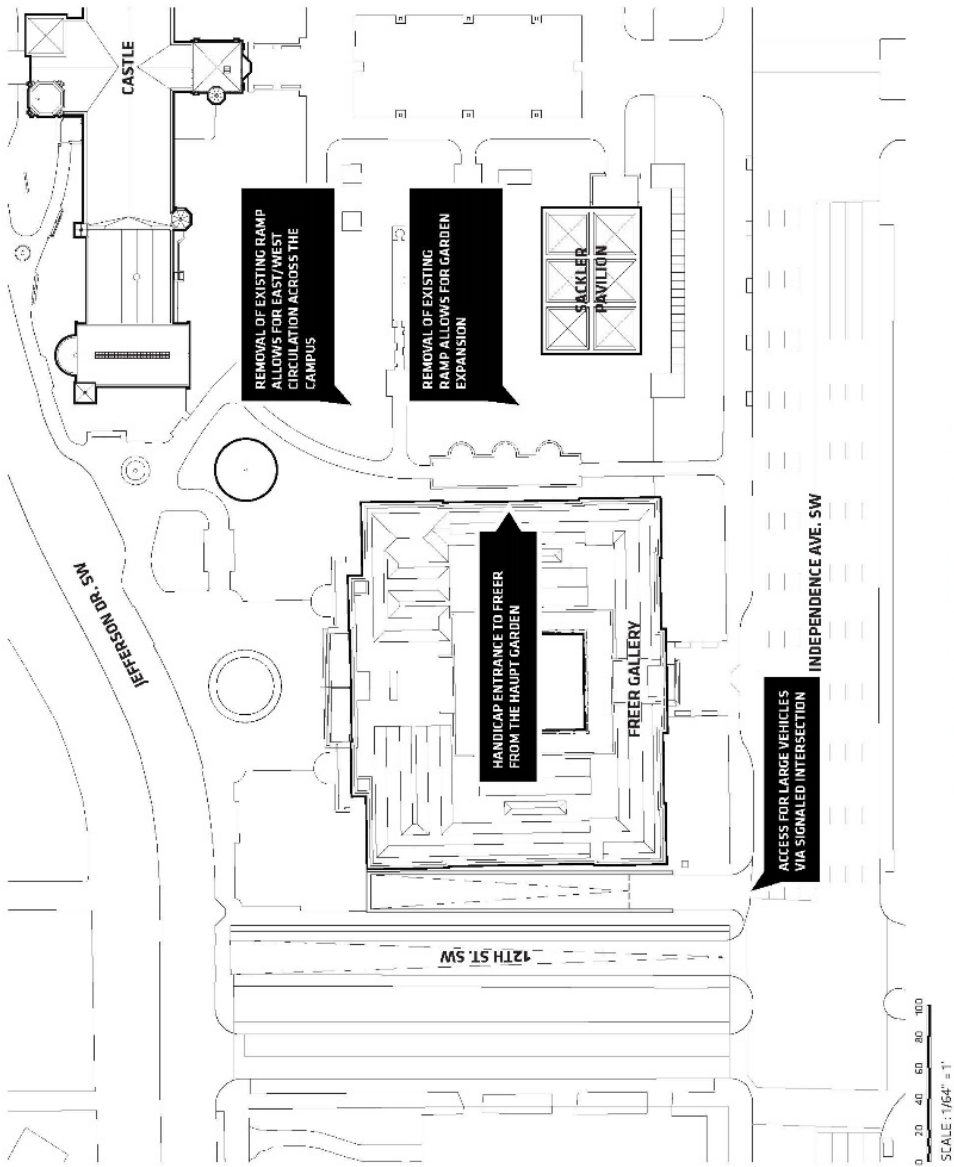


FREER CURB CUT & RAMP AT GRADE

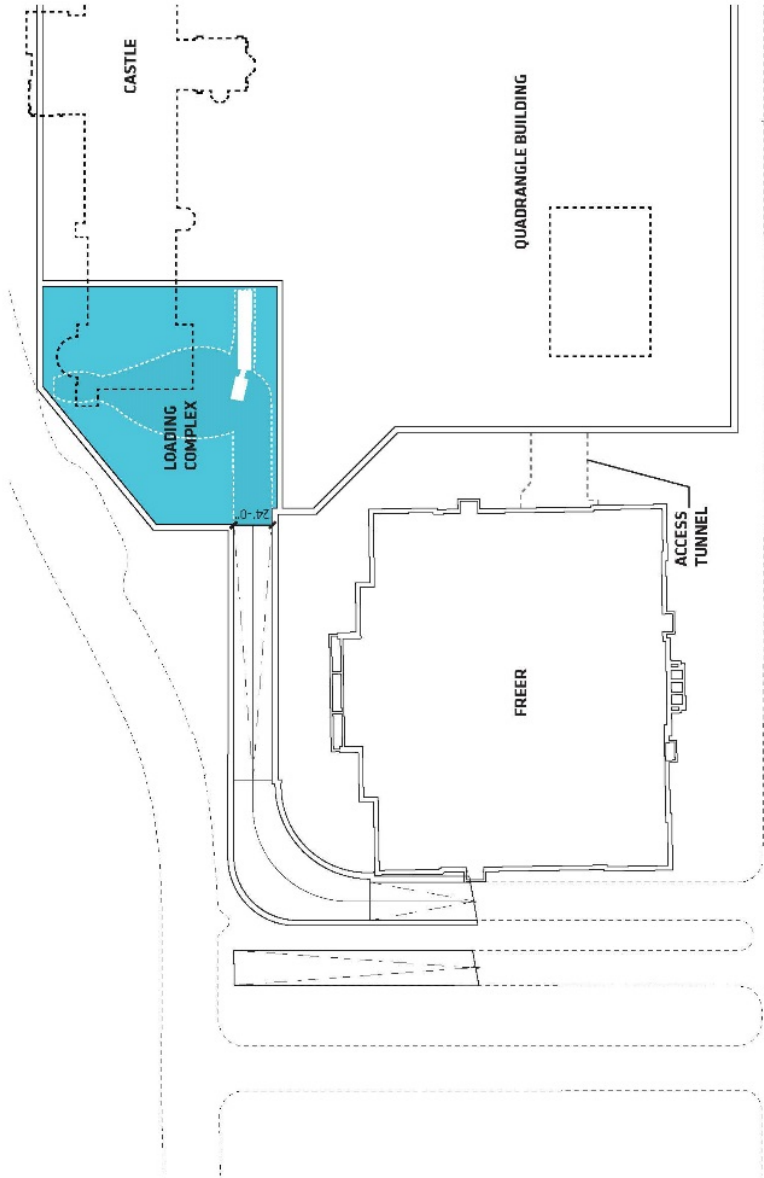
SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX



PROPOSED DIMENSIONS

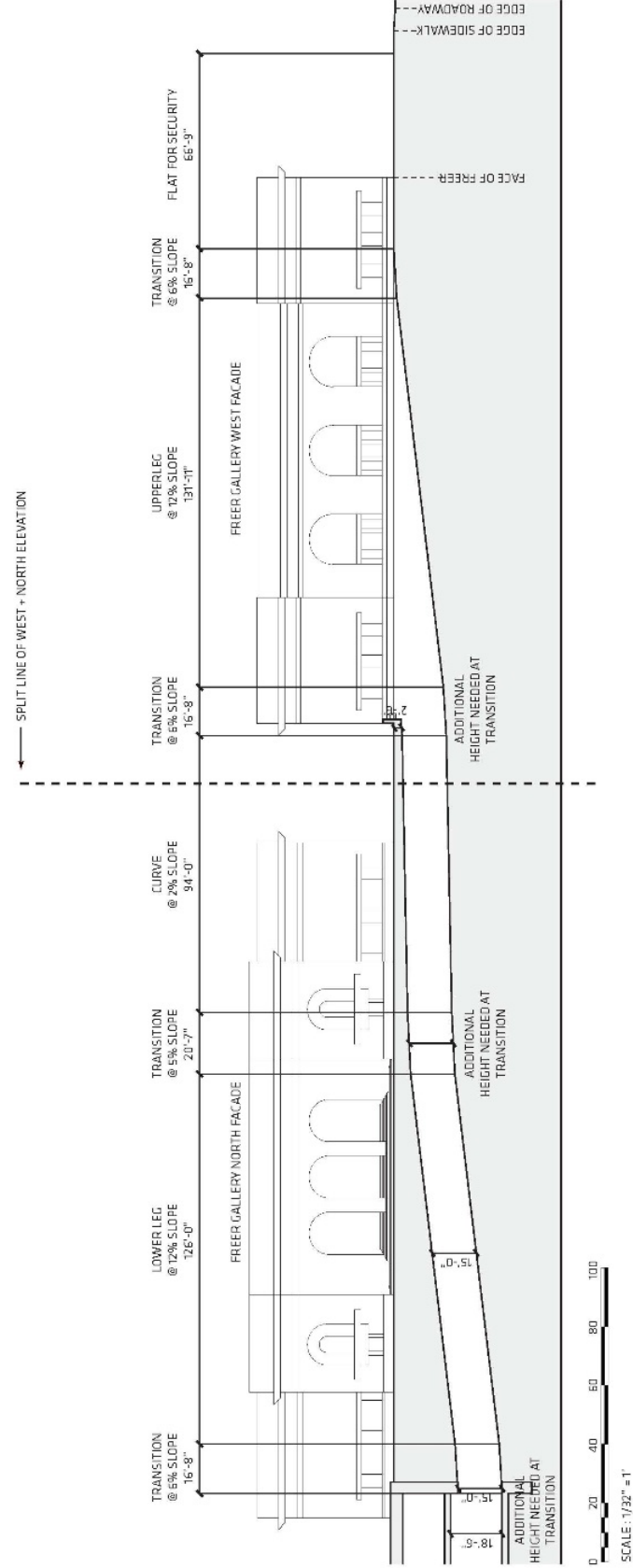


FREER CURB CUT & RAMP AT GRADE

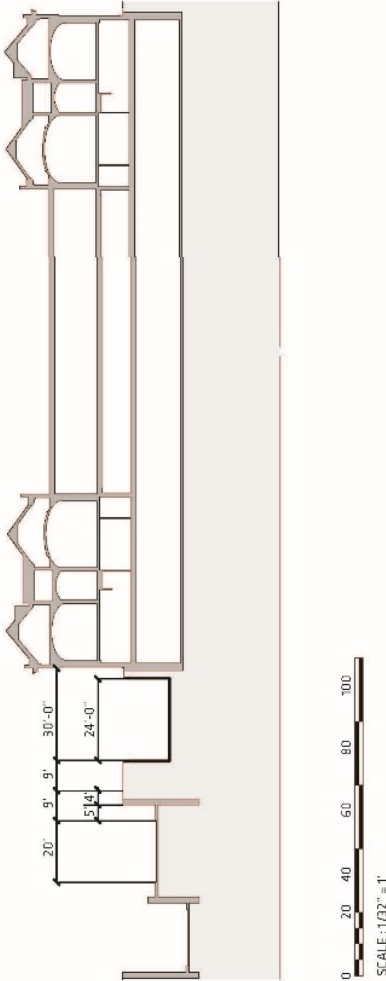


**FREER RAMP & LOADING FACILITY BELOW GRADE**

FREER CURB CUT | LOADING FACILITIES: QUAD COMPLEX

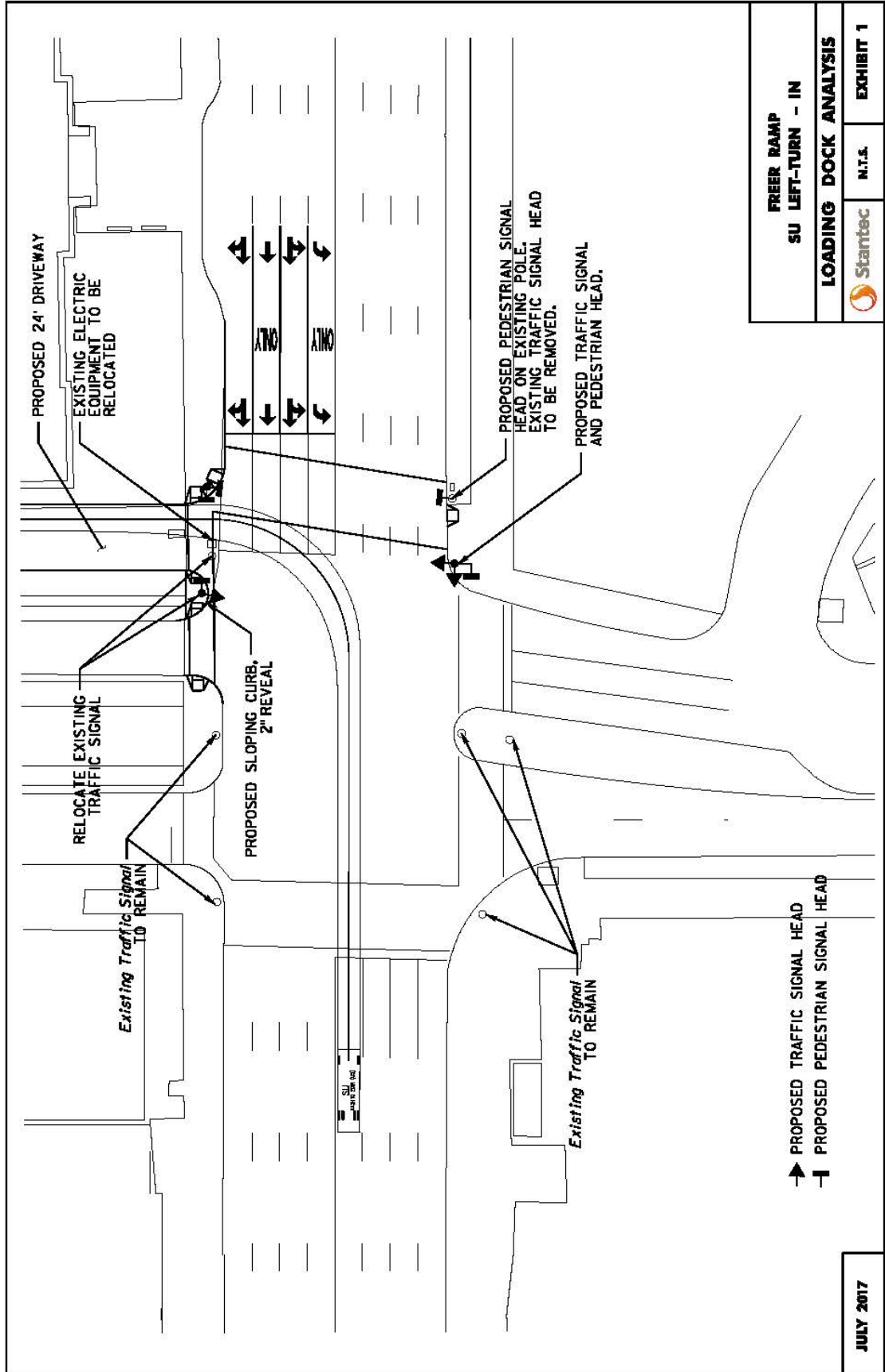


FREER LOADING FACILITY SECTION

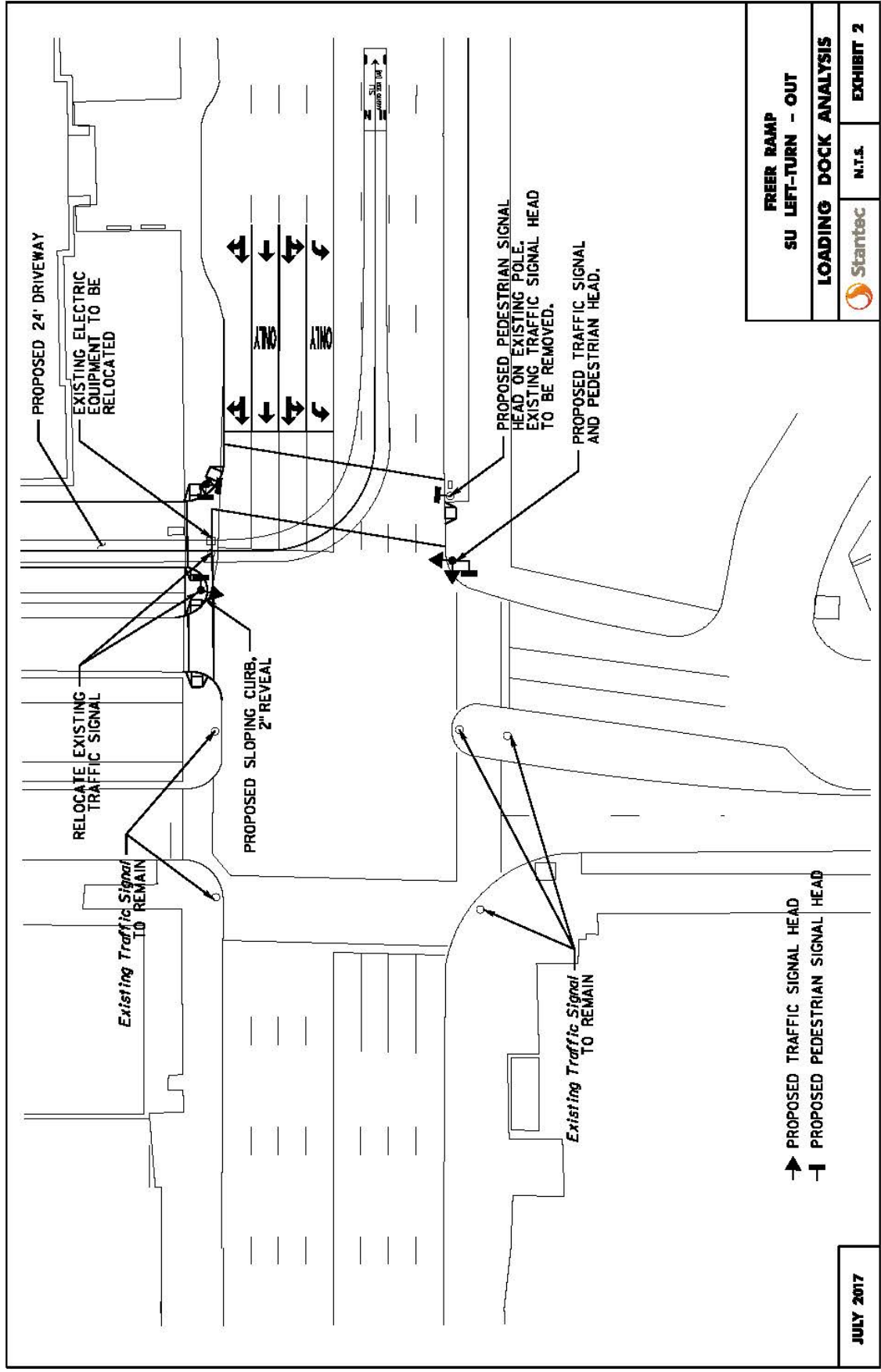


FREER LOADING RAMP SECTION

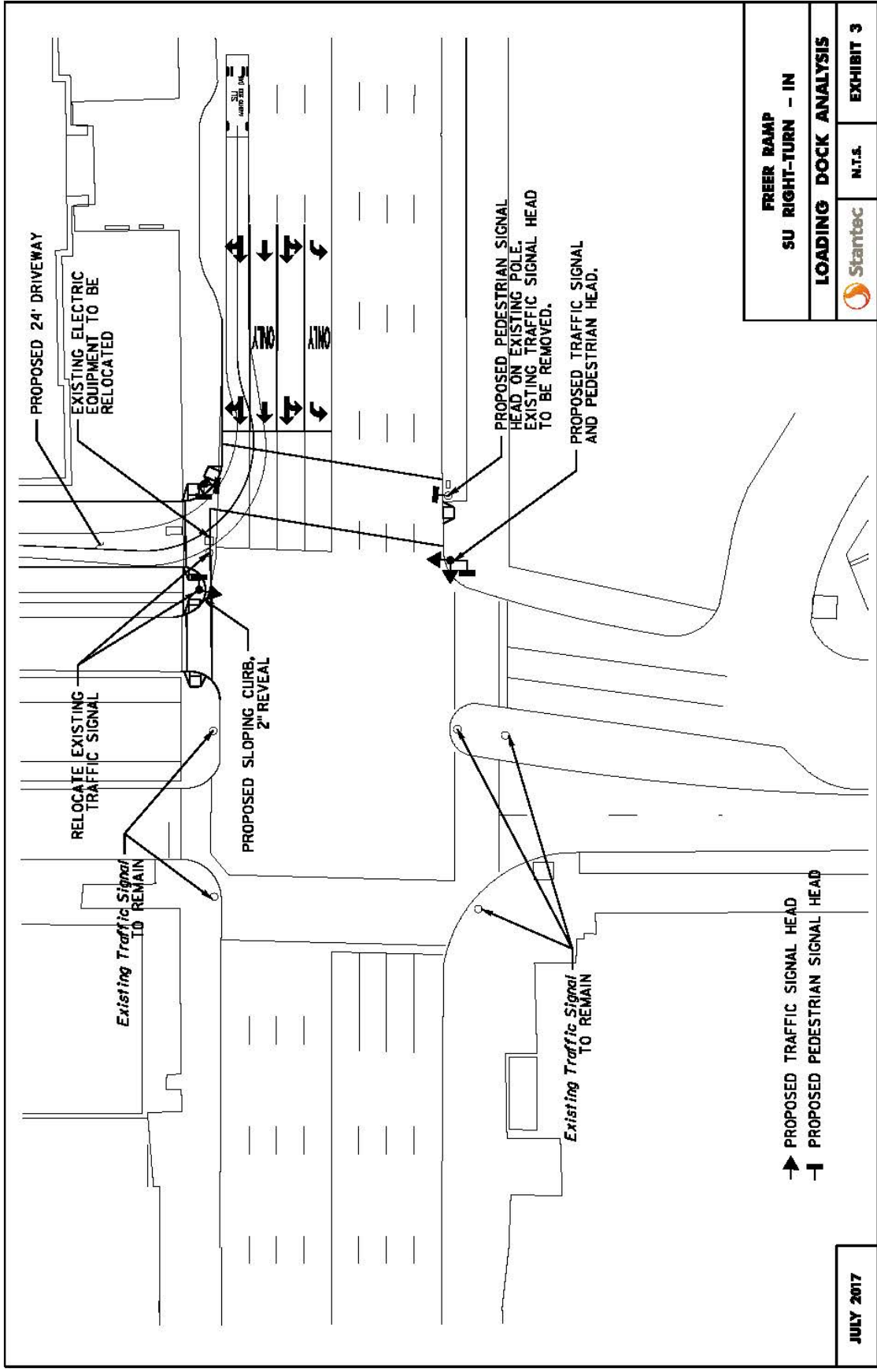
**APPENDIX E:  
INTERSECTION CONCEPT  
WITH TRUCK TURNING  
DIAGRAMS**



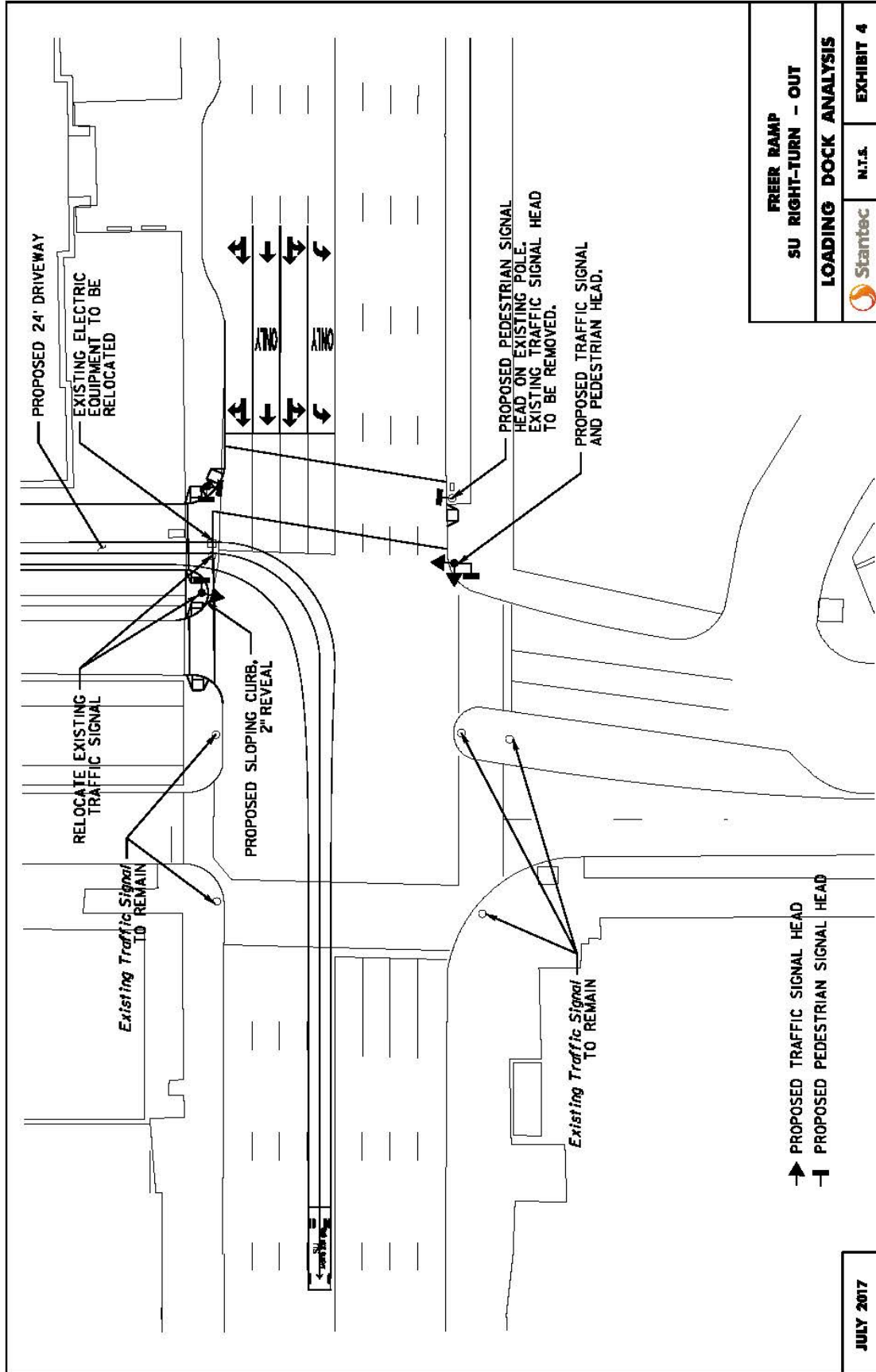
FREER RAMP		
SU LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 1



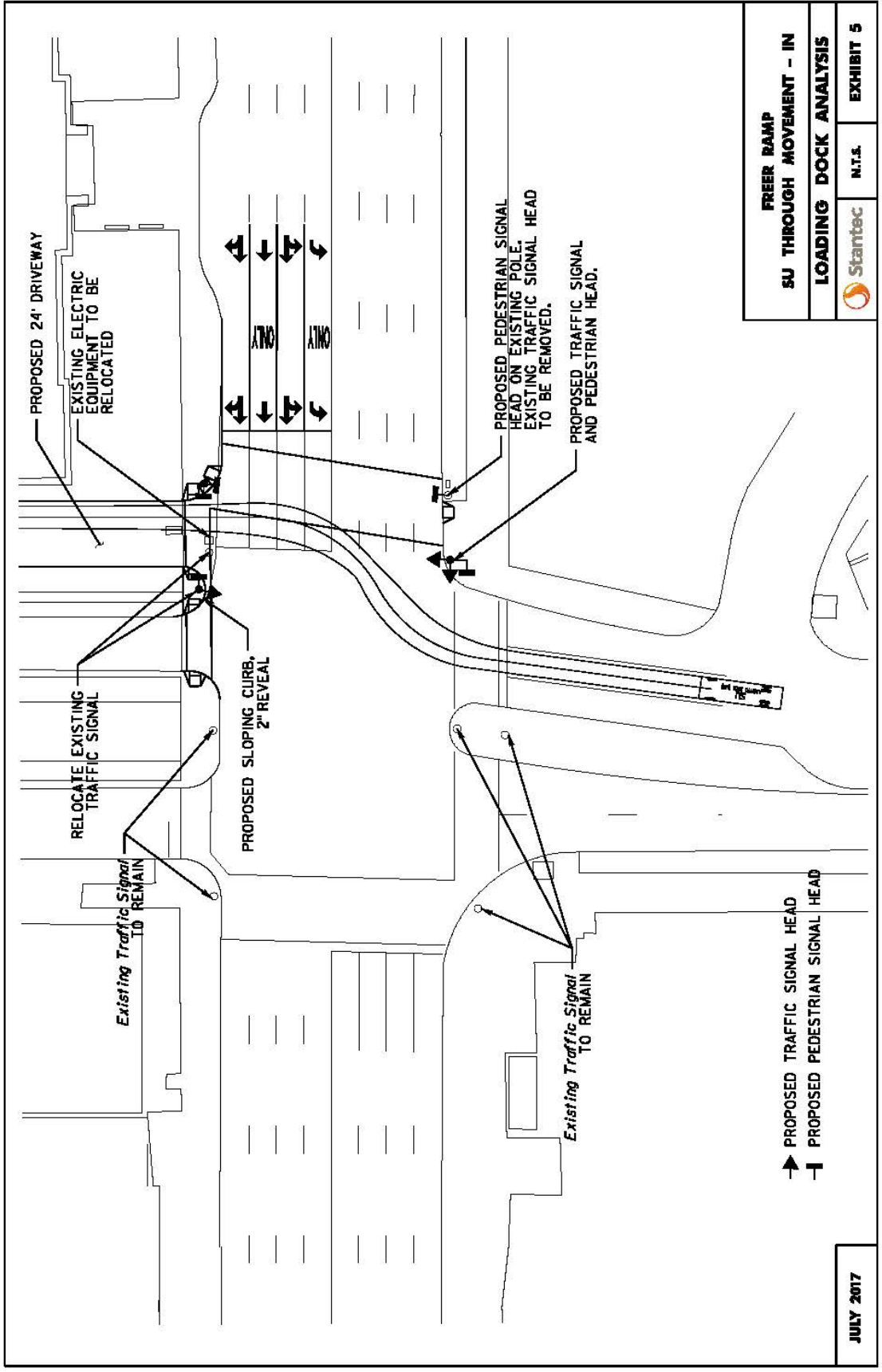
FREER RAMP	
SU LEFT-TURN - OUT	
LOADING DOCK ANALYSIS	
Stantec	N.T.S.
EXHIBIT 2	



FREER RAMP SU RIGHT-TURN - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 3

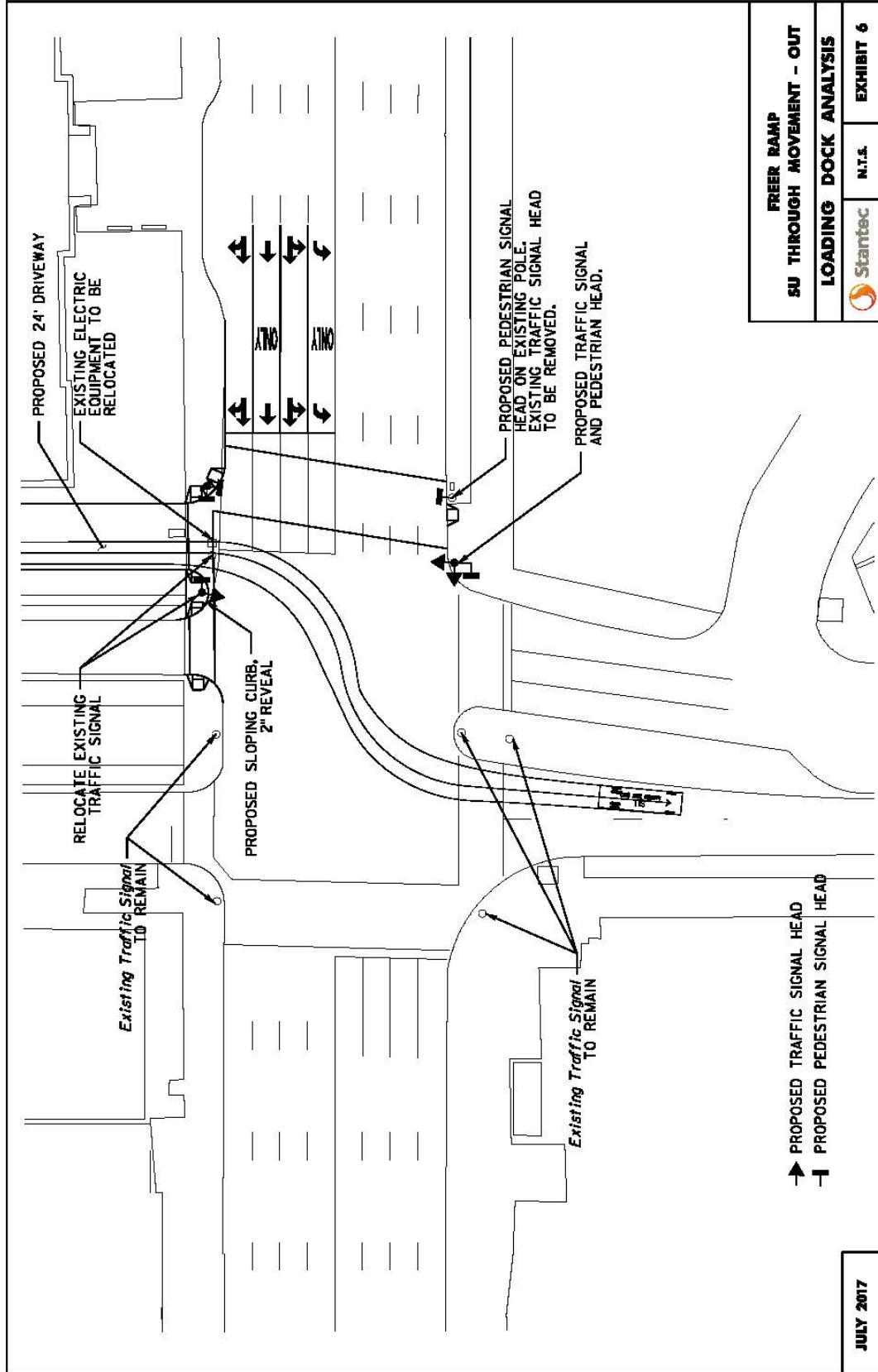


FREER RAMP		
SU RIGHT-TURN - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 4



FREER RAMP		
SU THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 5

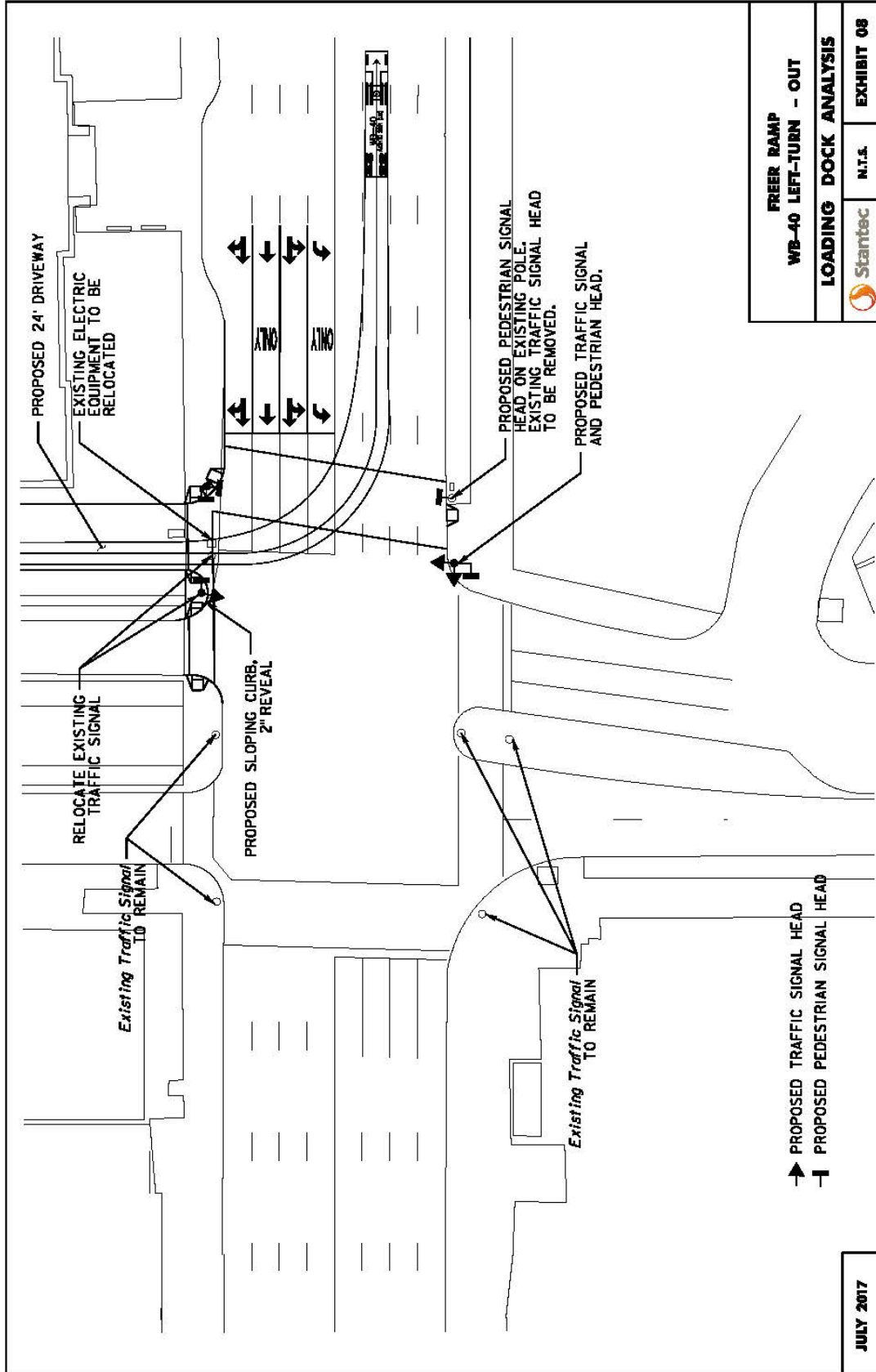
JULY 2017



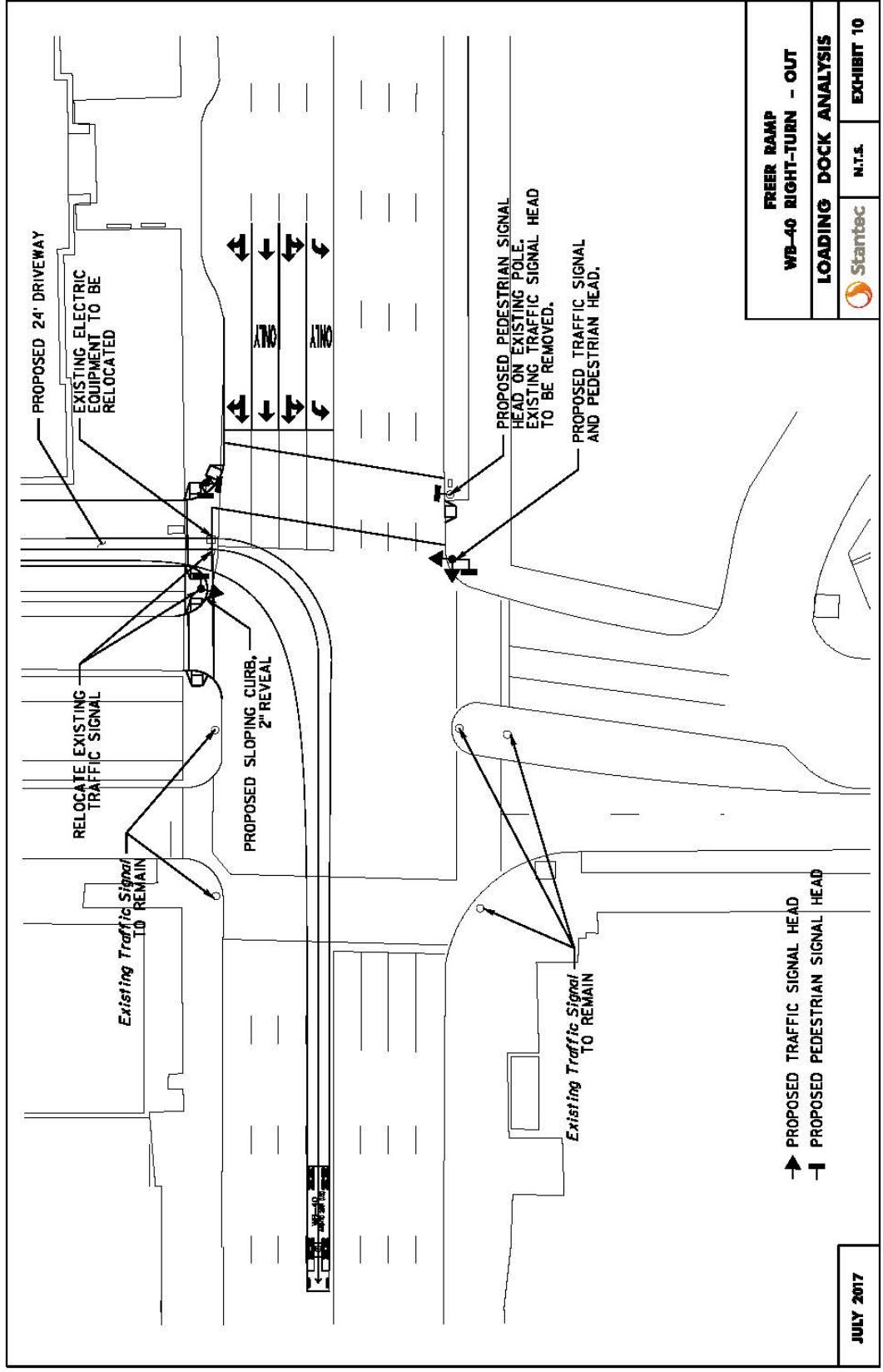
FREER RAMP		
SU THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 6

JULY 2017



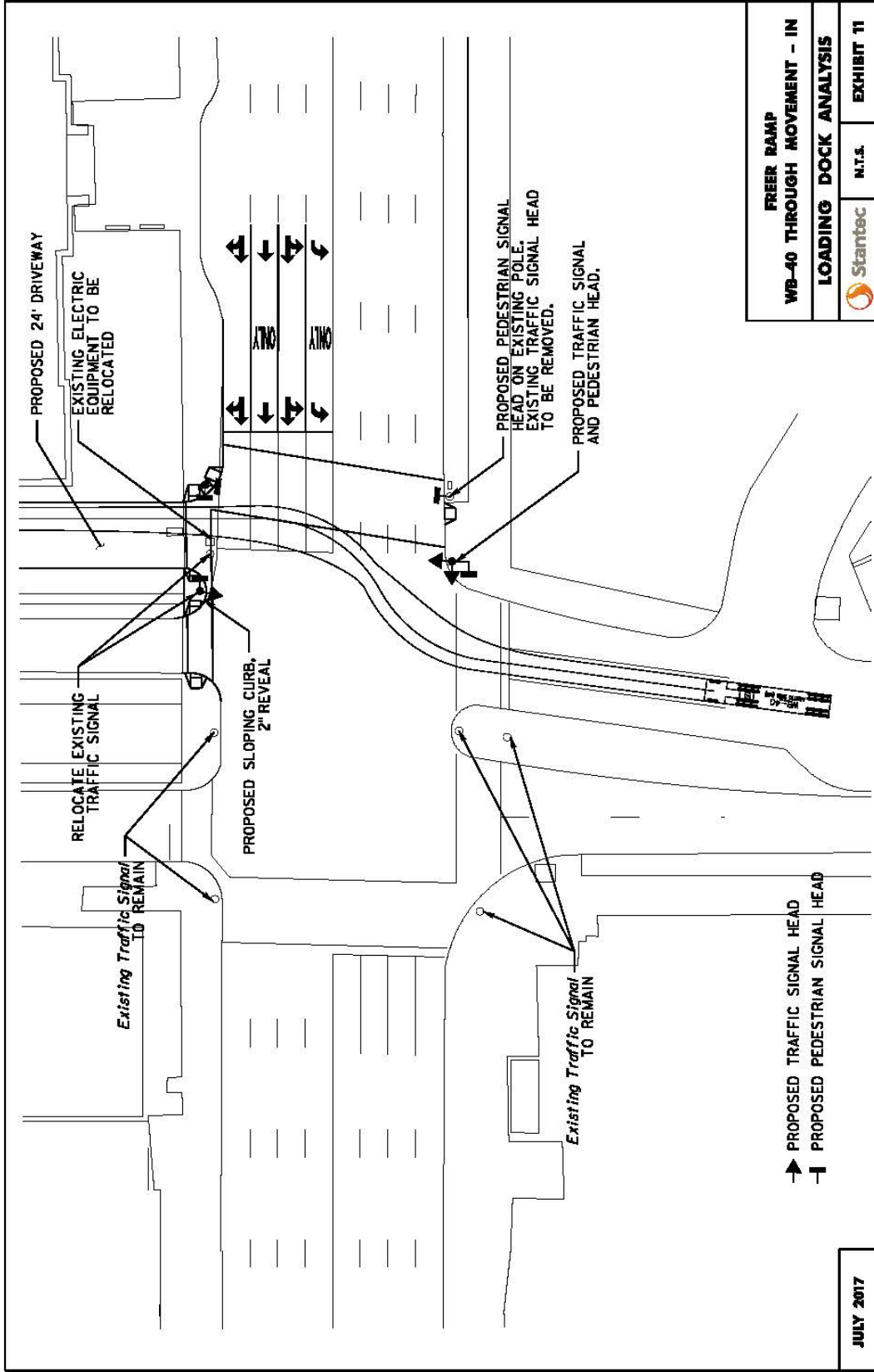






FREER RAMP	
WB-40 RIGHT-TURN - OUT	
LOADING DOCK ANALYSIS	
Startec	N.T.S.
EXHIBIT 10	

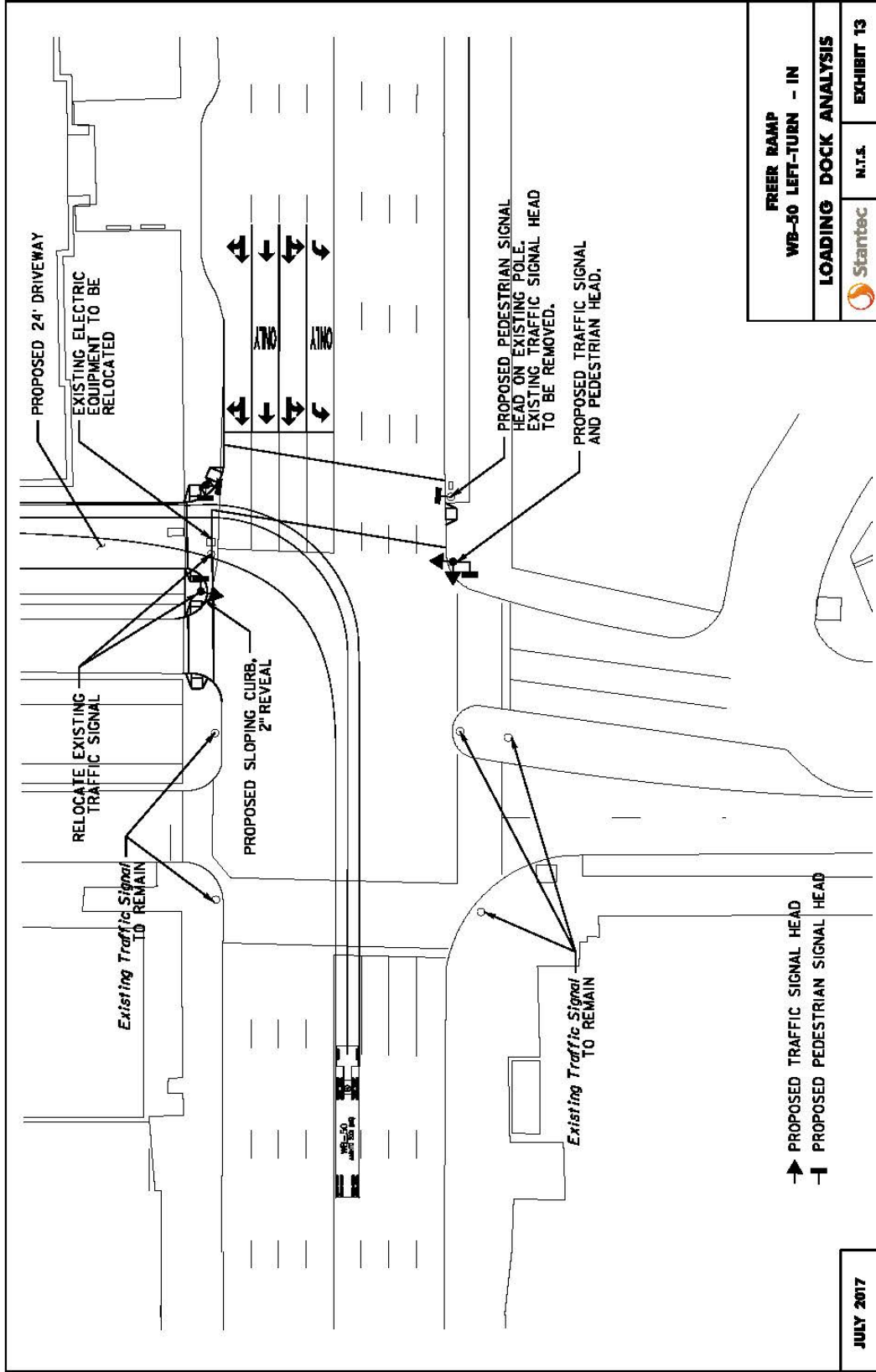
JULY 2017



FREER RAMP		
WB-40 THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Starttec	N.T.S.	EXHIBIT 11

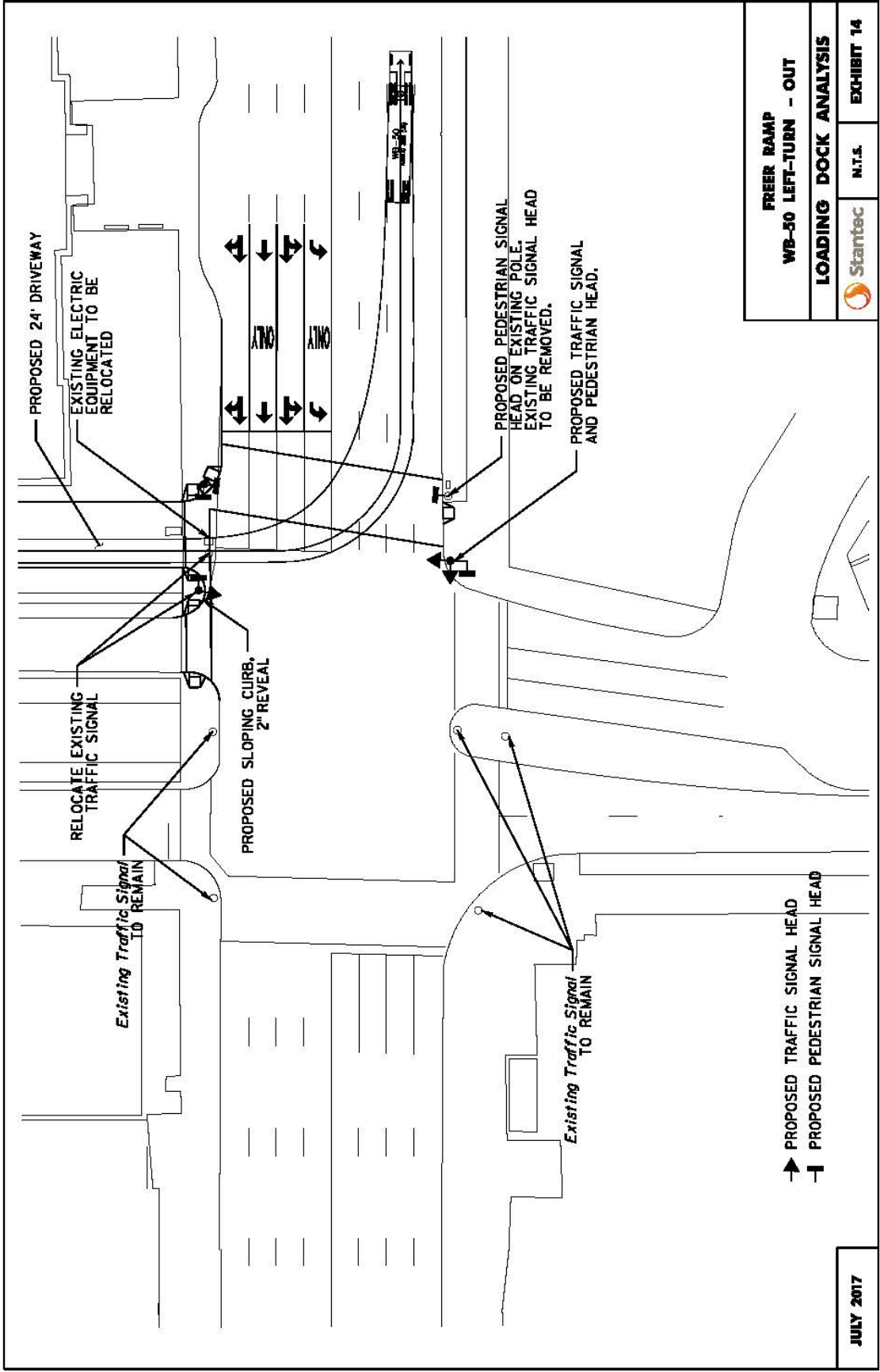
JULY 2017





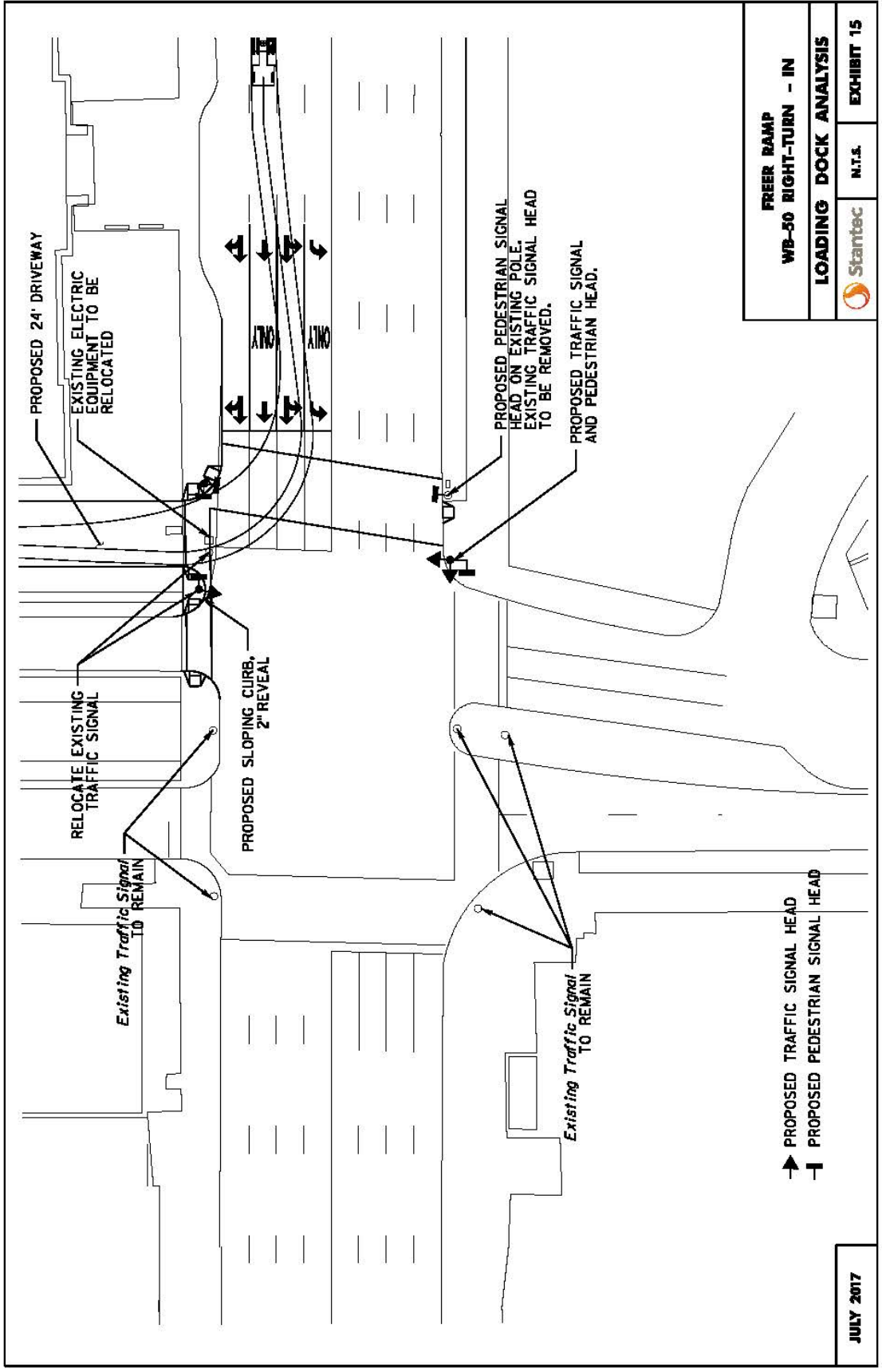
FREER RAMP		
WB-50 LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 13

JULY 2017



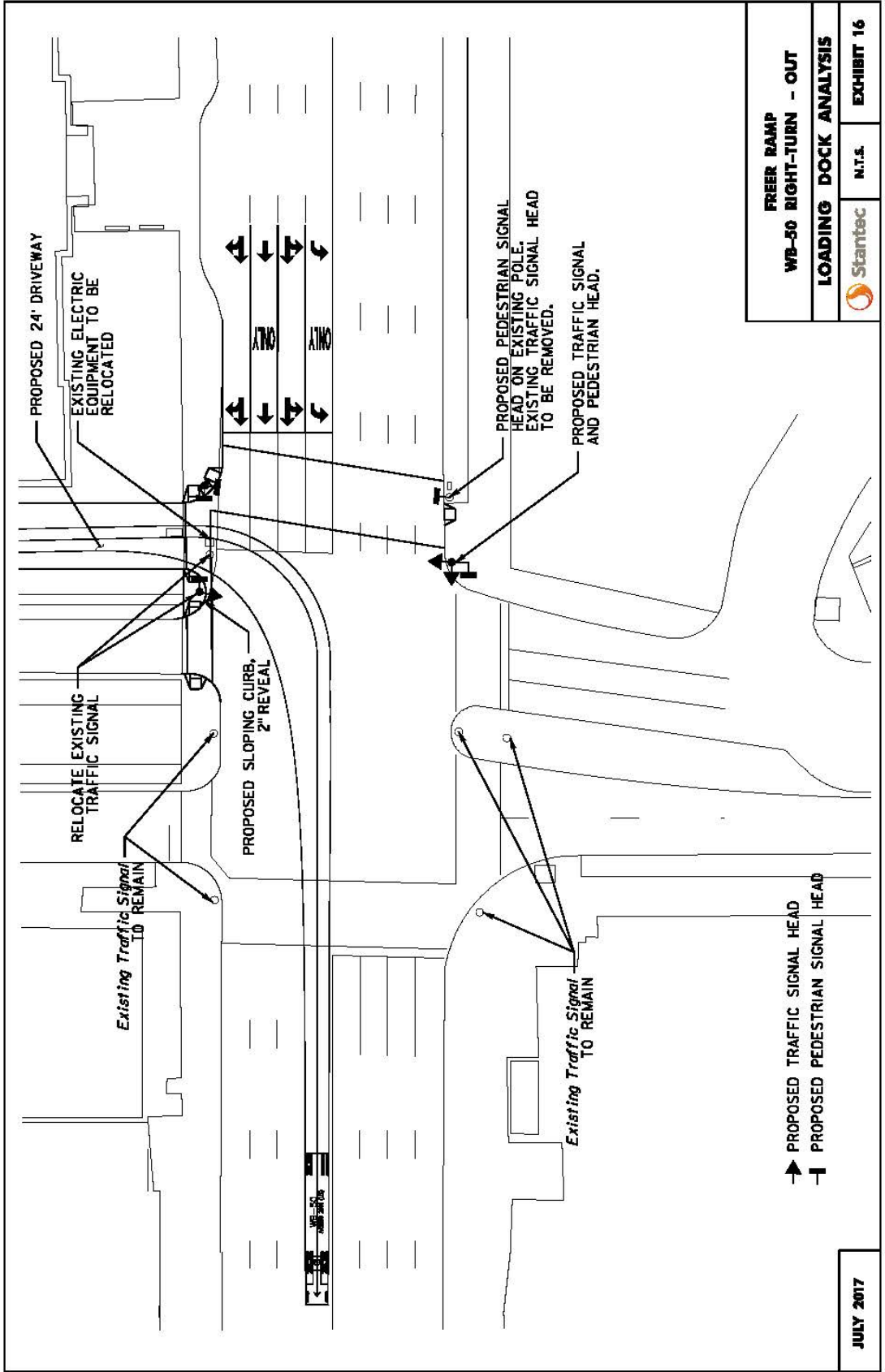
FREER RAMP		
WB-30 LEFT-TURN - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 14

JULY 2017



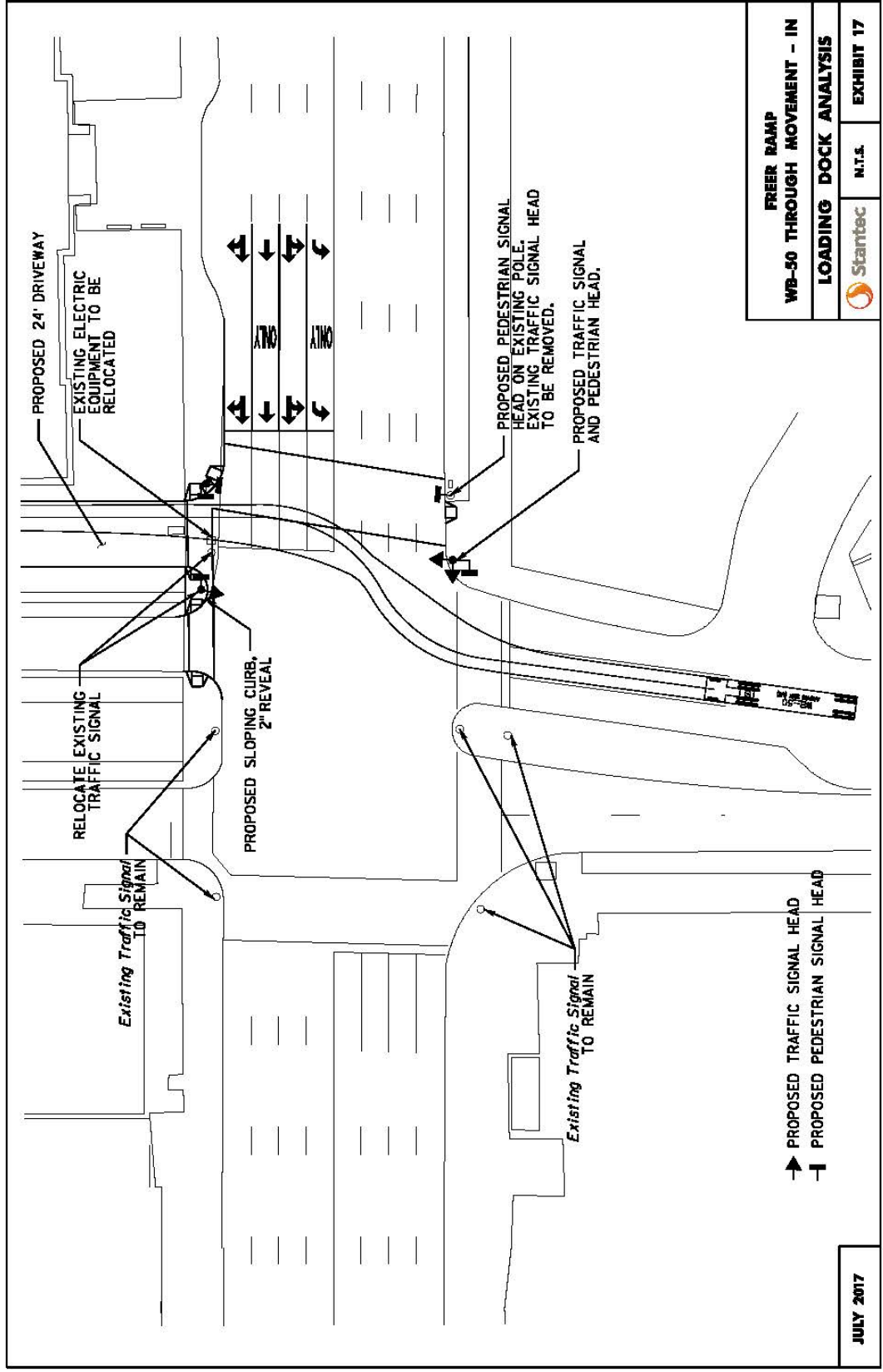
FREER RAMP		
WB-50 RIGHT-TURN - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 15

JULY 2017



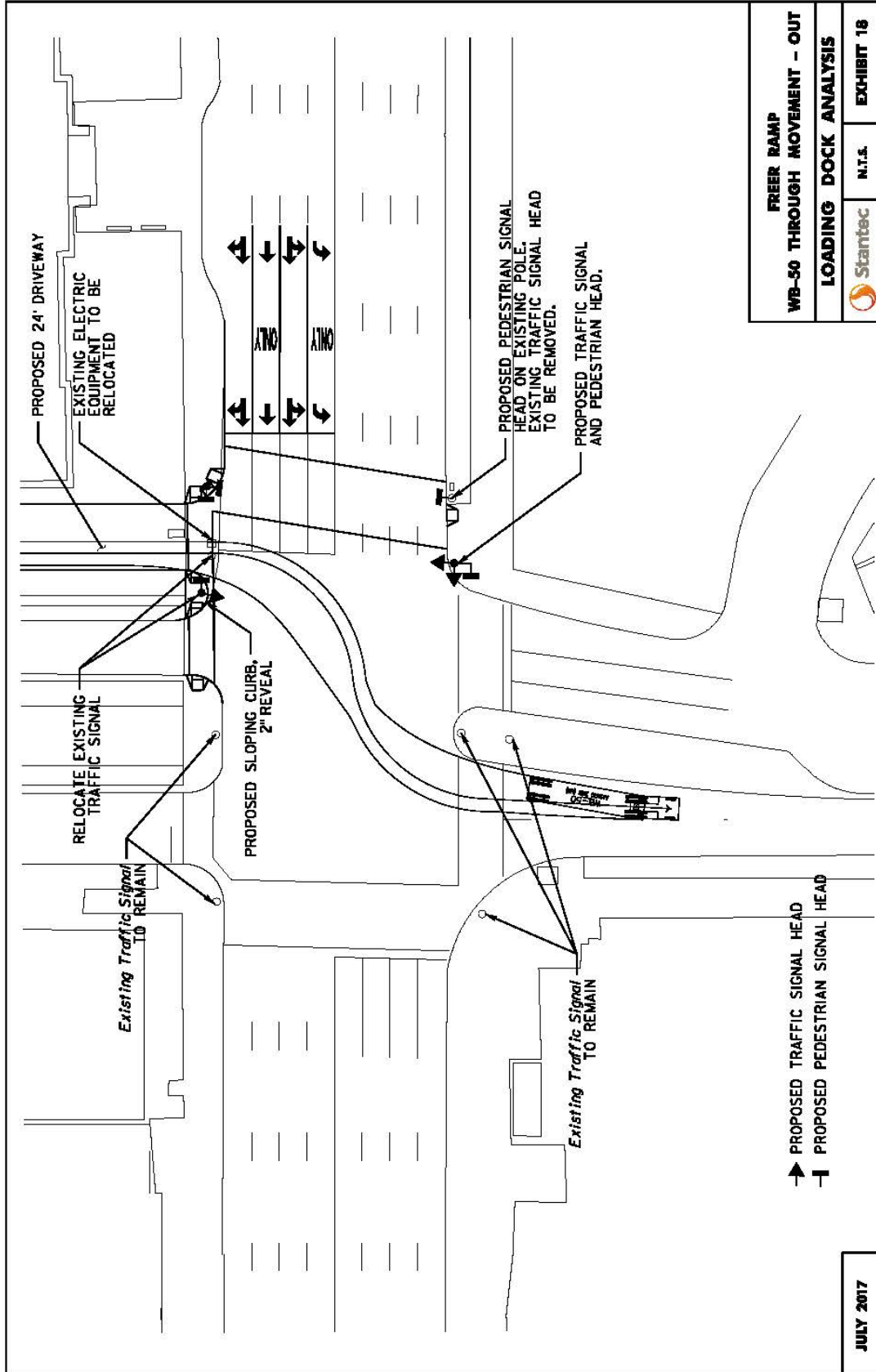
FREER RAMP	
WB-50 RIGHT-TURN - OUT	
LOADING DOCK ANALYSIS	
Startec	N.T.A.
EXHIBIT 16	

JULY 2017



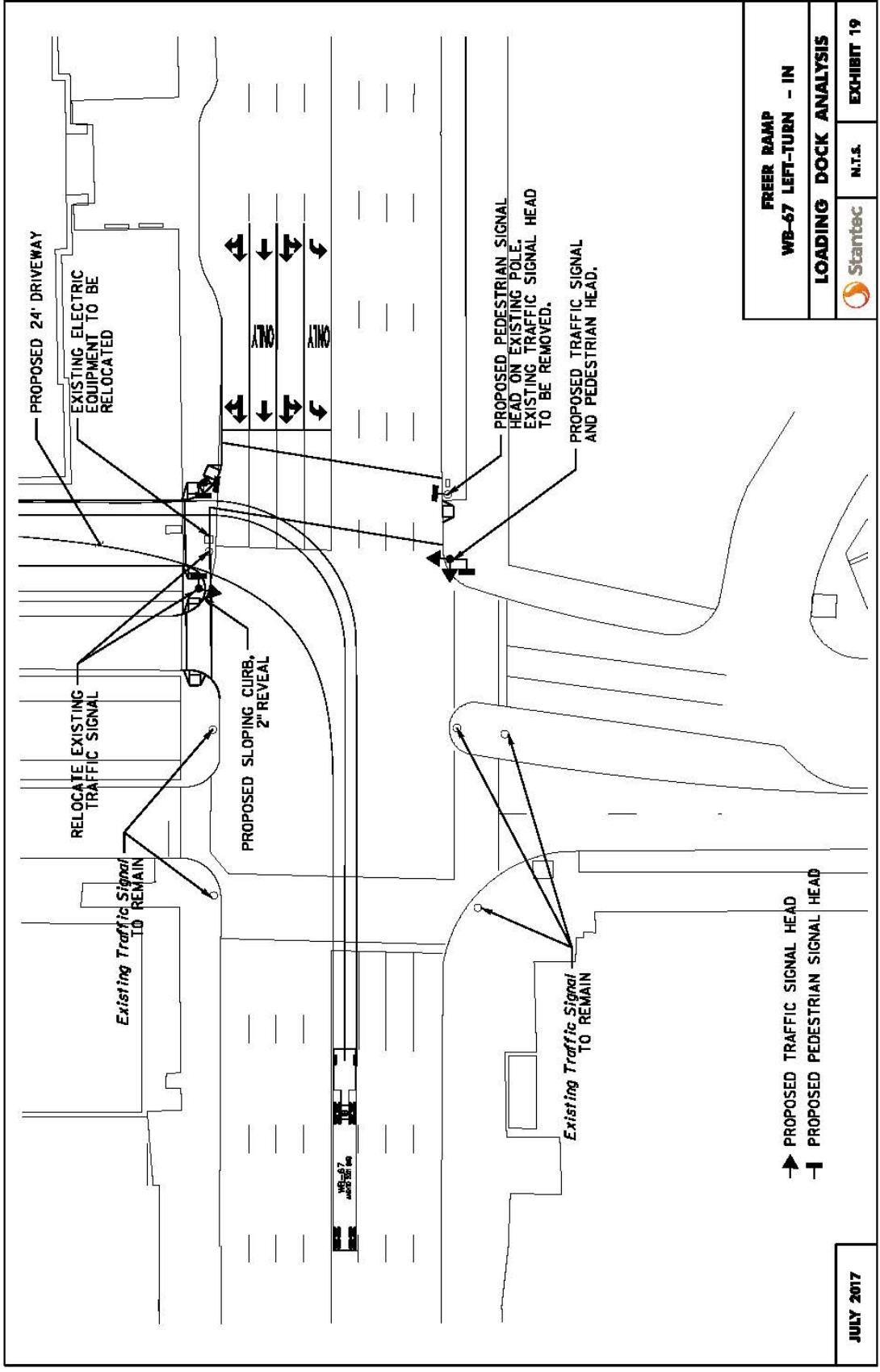
FREER RAMP		
WB-50 THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 17

JULY 2017



FREER RAMP		
WB-50 THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 16

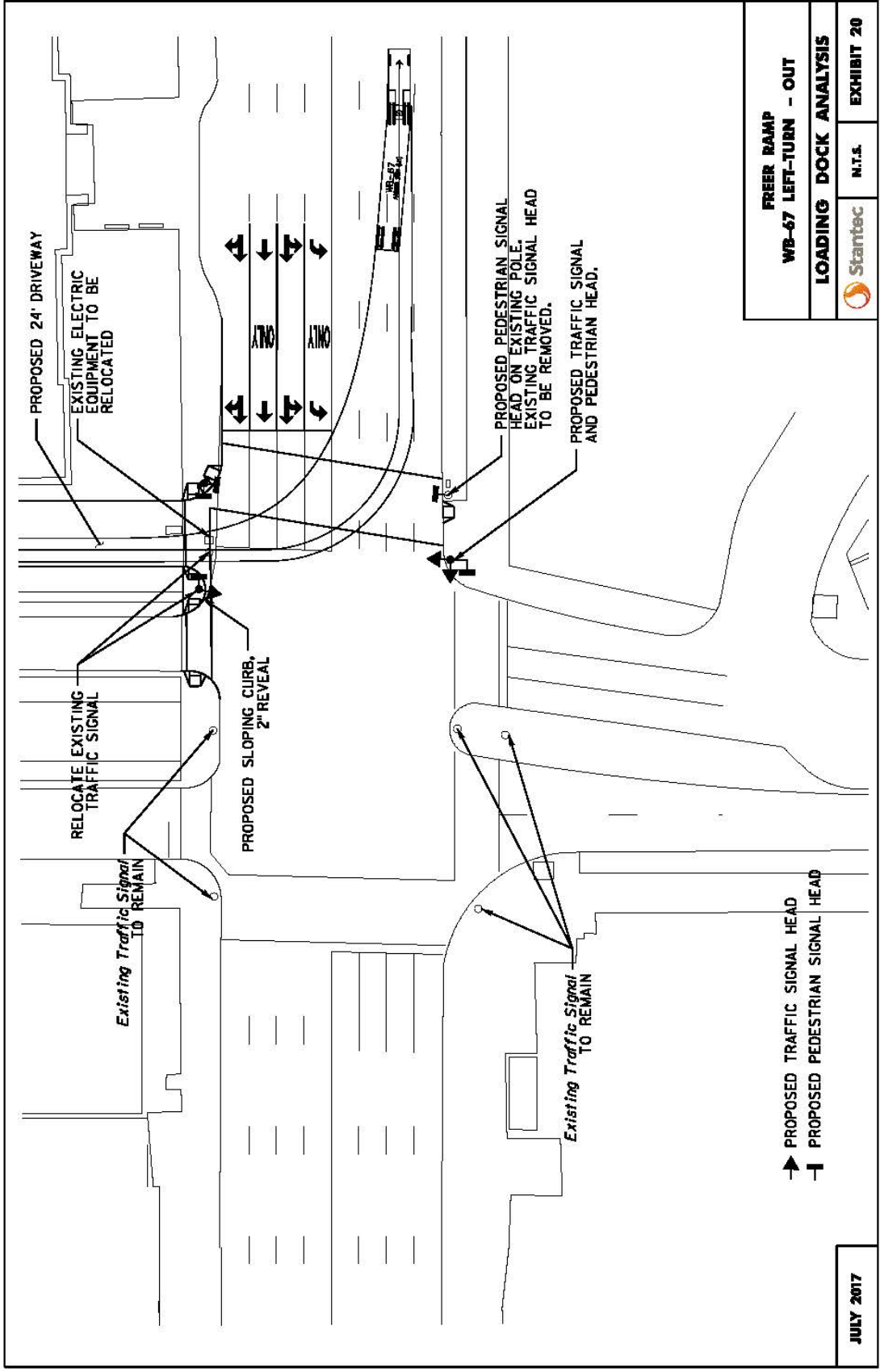
JULY 2017



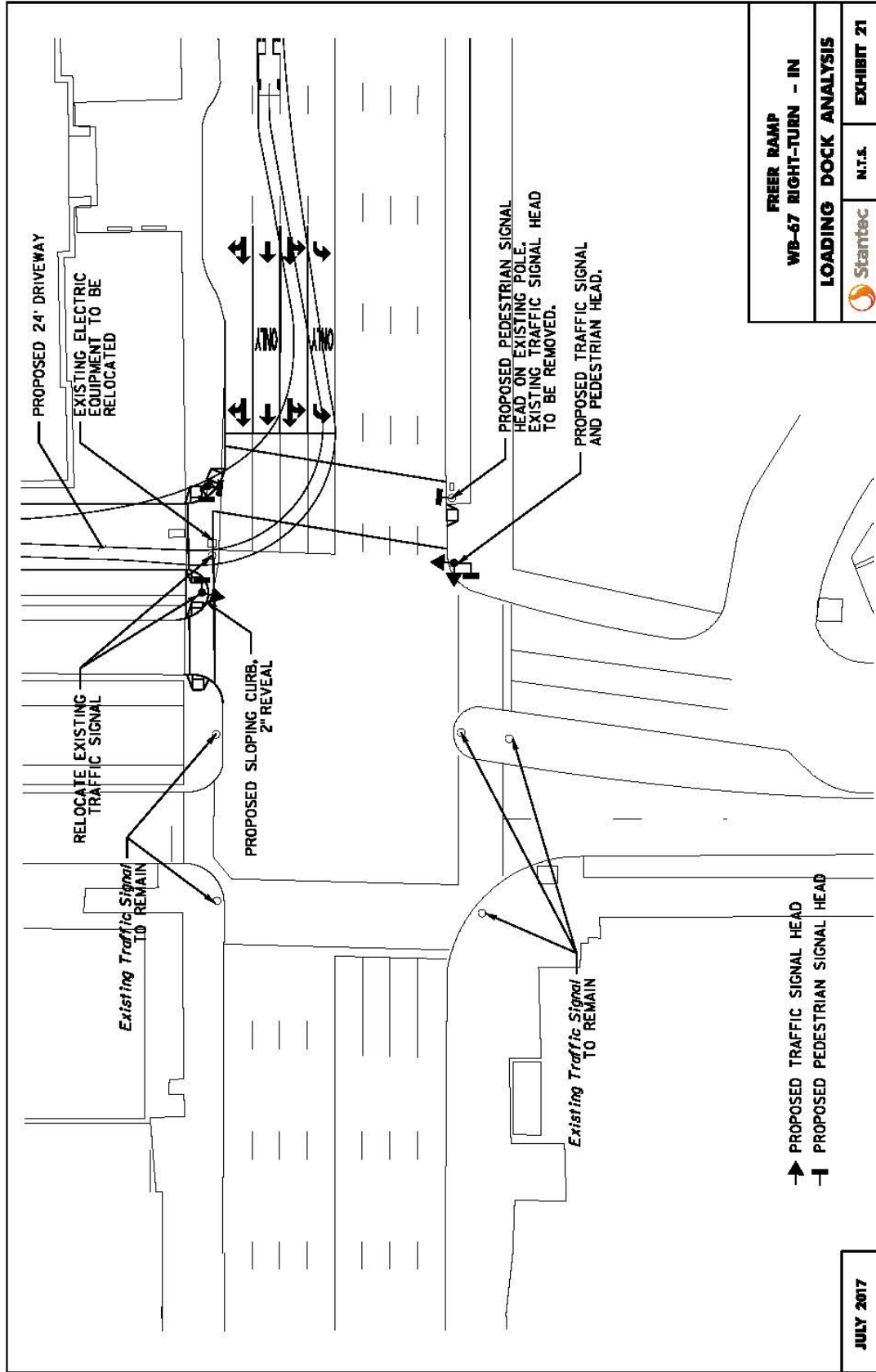
→ PROPOSED TRAFFIC SIGNAL HEAD  
 -| PROPOSED PEDESTRIAN SIGNAL HEAD

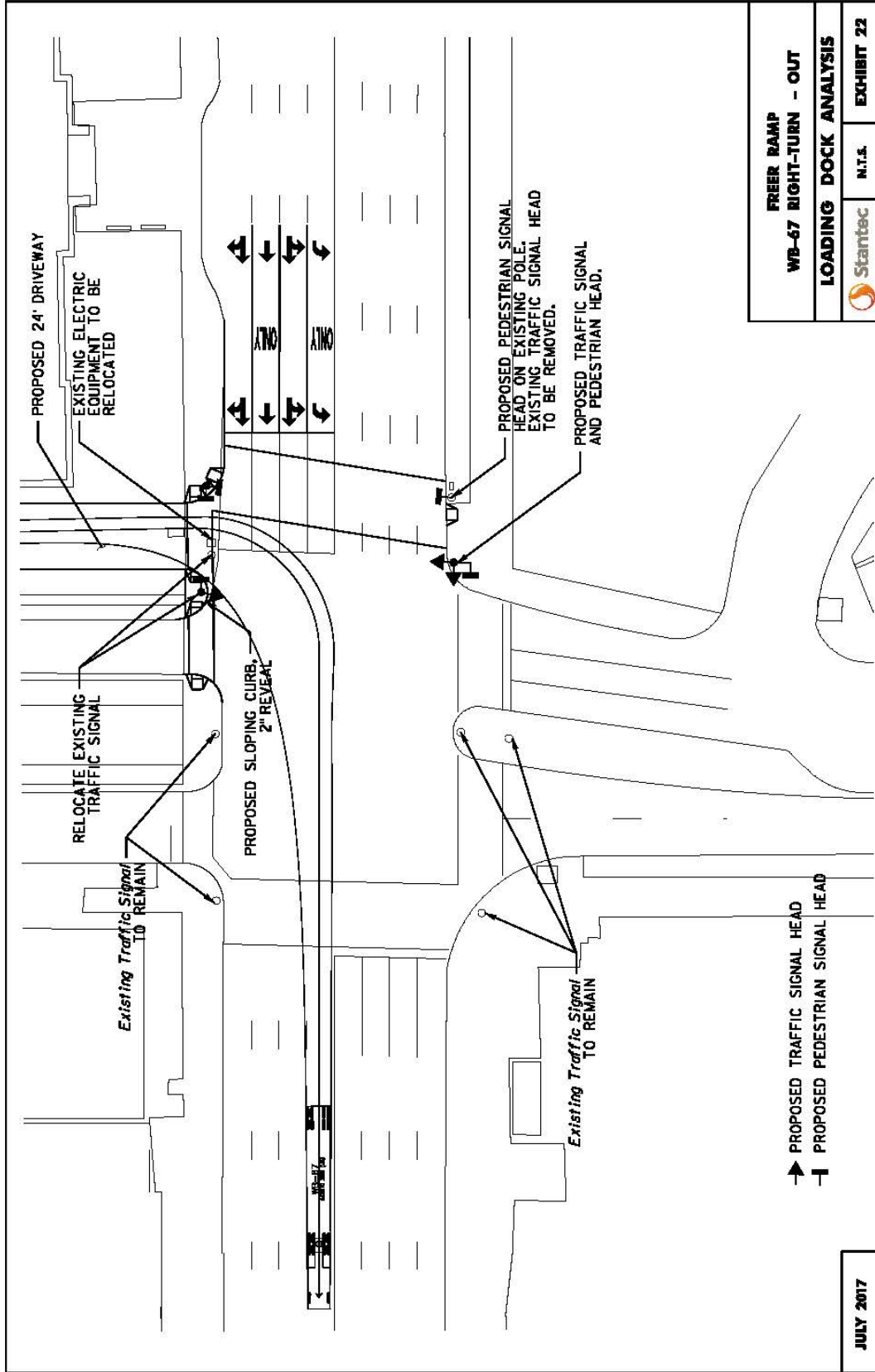
FREER RAMP		
WB-67 LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 19

JULY 2017



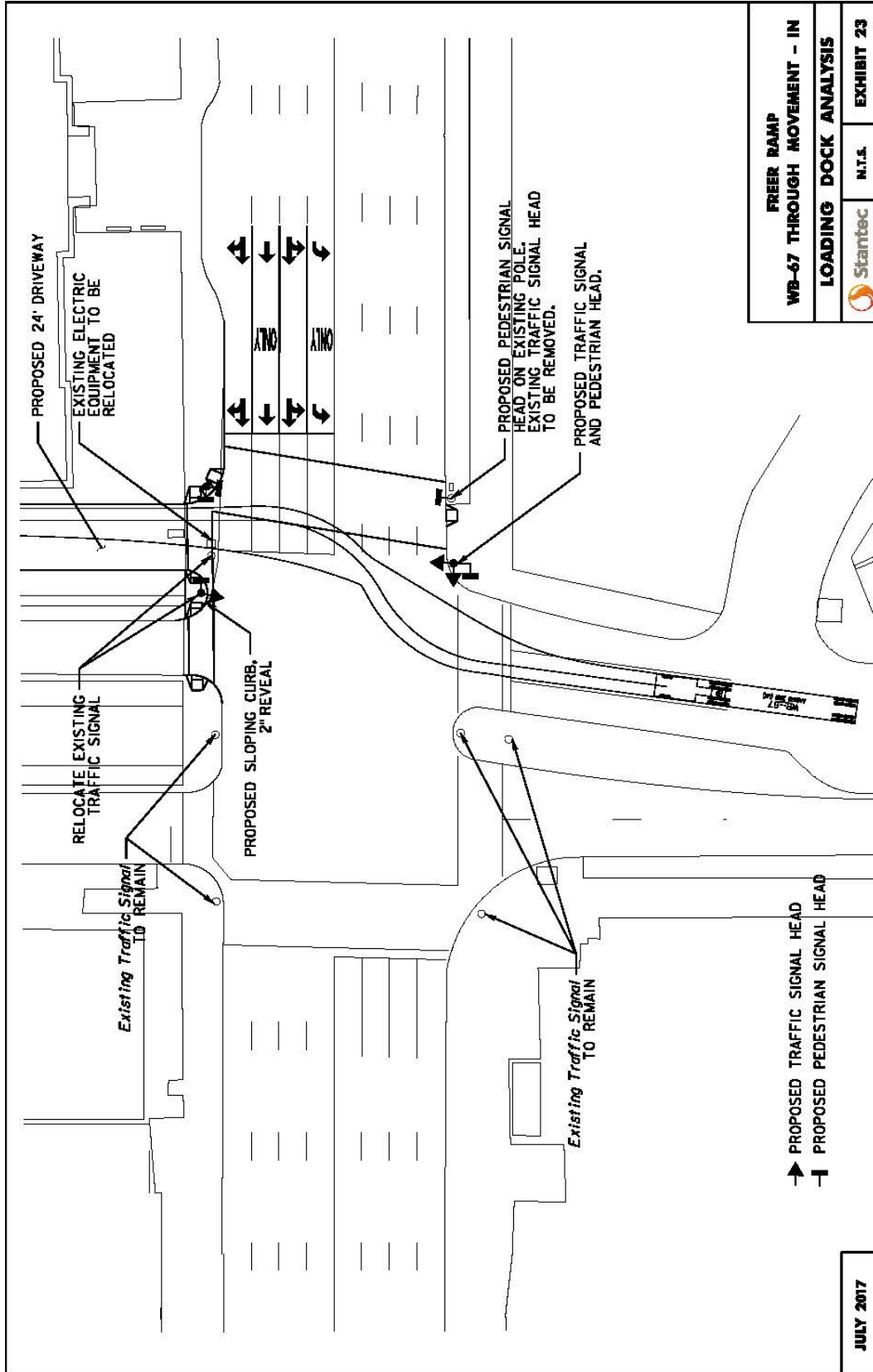
FREER RAMP	
WB-67 LEFT-TURN - OUT	
LOADING DOCK ANALYSIS	
Stantec	N.T.S.
EXHIBIT 20	





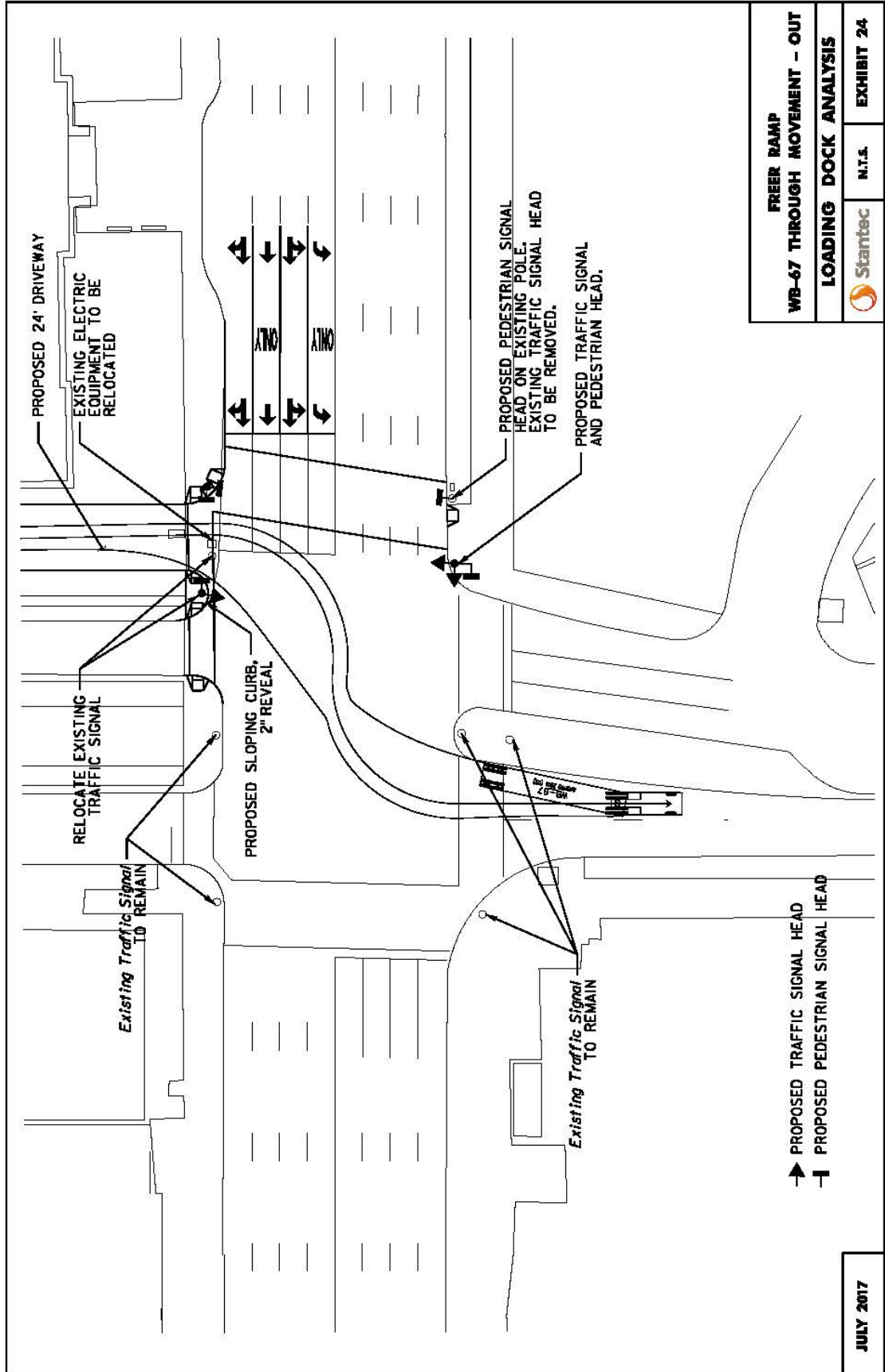
FREER RAMP		
WB-67 RIGHT-TURN - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 22

JULY 2017



FREER RAMP		
WB-67 THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 23

JULY 2017



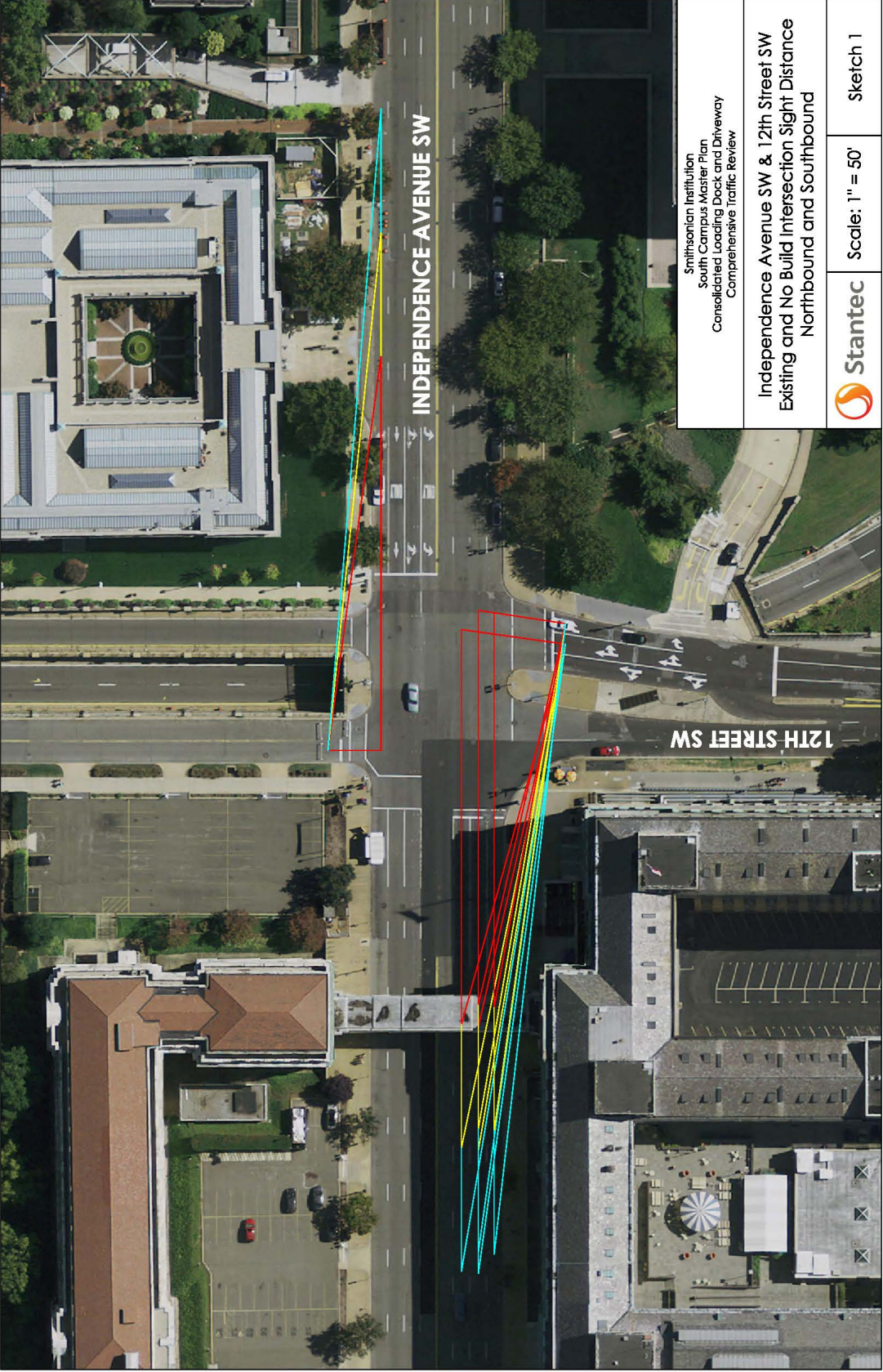
FREER RAMP		
WB-67 THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 24

## **APPENDIX F: PARKING**

Exhibit 17  
Smithsonian Institution, South Campus Master Plan  
Parking Inventory  
Tuesday, December 08, 2015

	Segment	Total # On-street Parking Spaces	# of Permit Spaces	# of Metered Spaces	# of ADA Spaces	Parking Regulations
1	Independence WB b/w 7th and 9th	15	3 Vendor	0	0	1. No Parking Monday - Street Cleaning 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. No Parking Bus Zone
2	Independence WB b/w 9th and L'Enfant	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. Snow Emergency Route - Tow Away
3	Independence WB b/w L'Enfant and 12th	21	0	18	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Metro Bus 4. Snow Emergency Route - Tow Away 5. Vendor Stand
4	Independence WB b/w 12th and 14th	15	0	15	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Metro Bus 4. Snow Emergency Route - Tow Away 5. Vendor Stand
5	Independence EB b/w 14th and 12th	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Tow Away - Metro Bus Zone
6	Independence EB b/w 12th and L'Enfant	20	0	20	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 3. Pay by Phone 4. No Parking 10PM - 5AM - Street Cleaning Tuesday
7	Independence EB b/w L'Enfant and 9th	12	0	12	0	Has 3 main Signs 1. ADA Parking 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 4. Snow Emergency Route - Tow Away
8	12th St NB b/w C St and Independence	14	0	14	2	1. ADA Parking 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 4. Snow Emergency Route - Tow Away
9	12th St SB b/w C St and Independence	9	0	9	0	1. Snow Emergency Route - Tow Away 2. 2-Hour Parking 9:30AM-4PM, M-Sat
10	14th St NB b/w C St and Independence	3	0	0	0	1. 15-min Tour Bus Stand 9:30AM-4PM, No Parking All Other Times 2. No Standing or Parking Metro Bus Zones 3. Snow Emergency Route - Tow Away 4. Special Permit Parking (all times)
11	14th St SB b/w C St and Independence	4	4	0	0	1. No Standing or Parking Metro Bus Zones 2. Snow Emergency Route - Tow Away 3. Special Permit Parking (all times)
12	14th St NB b/w Independence and Jefferson	0	0	0	0	1. Snow Emergency Route - Tow Away
13	14th St SB b/w Independence and Jefferson	8	0	0	0	1. Snow Emergency Route - Tow Away 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F

## **APPENDIX G: SAFETY**



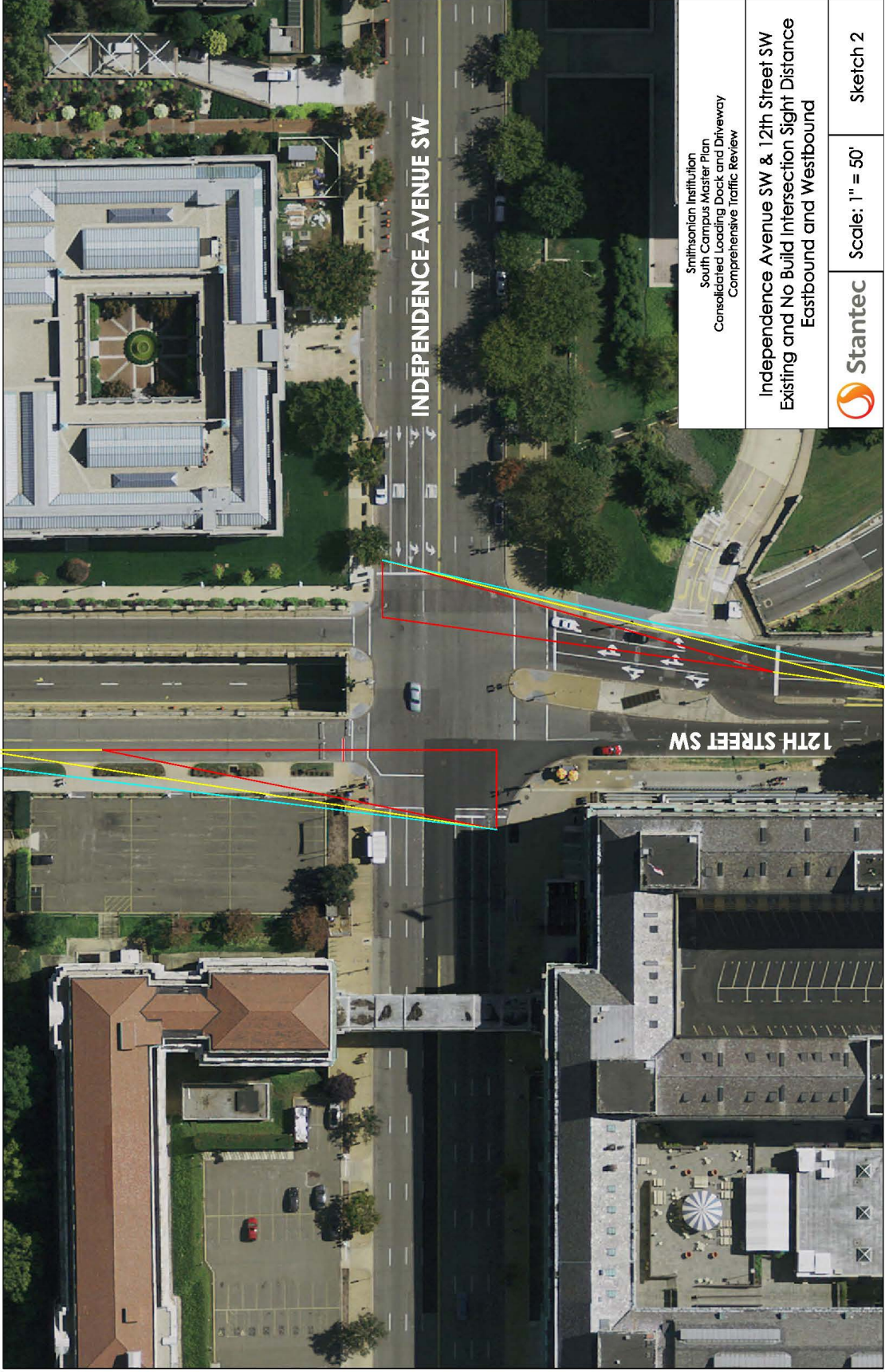
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Existing and No Build Intersection Sight Distance  
Northbound and Southbound

 Stantec

Scale: 1" = 50'

Sketch 1



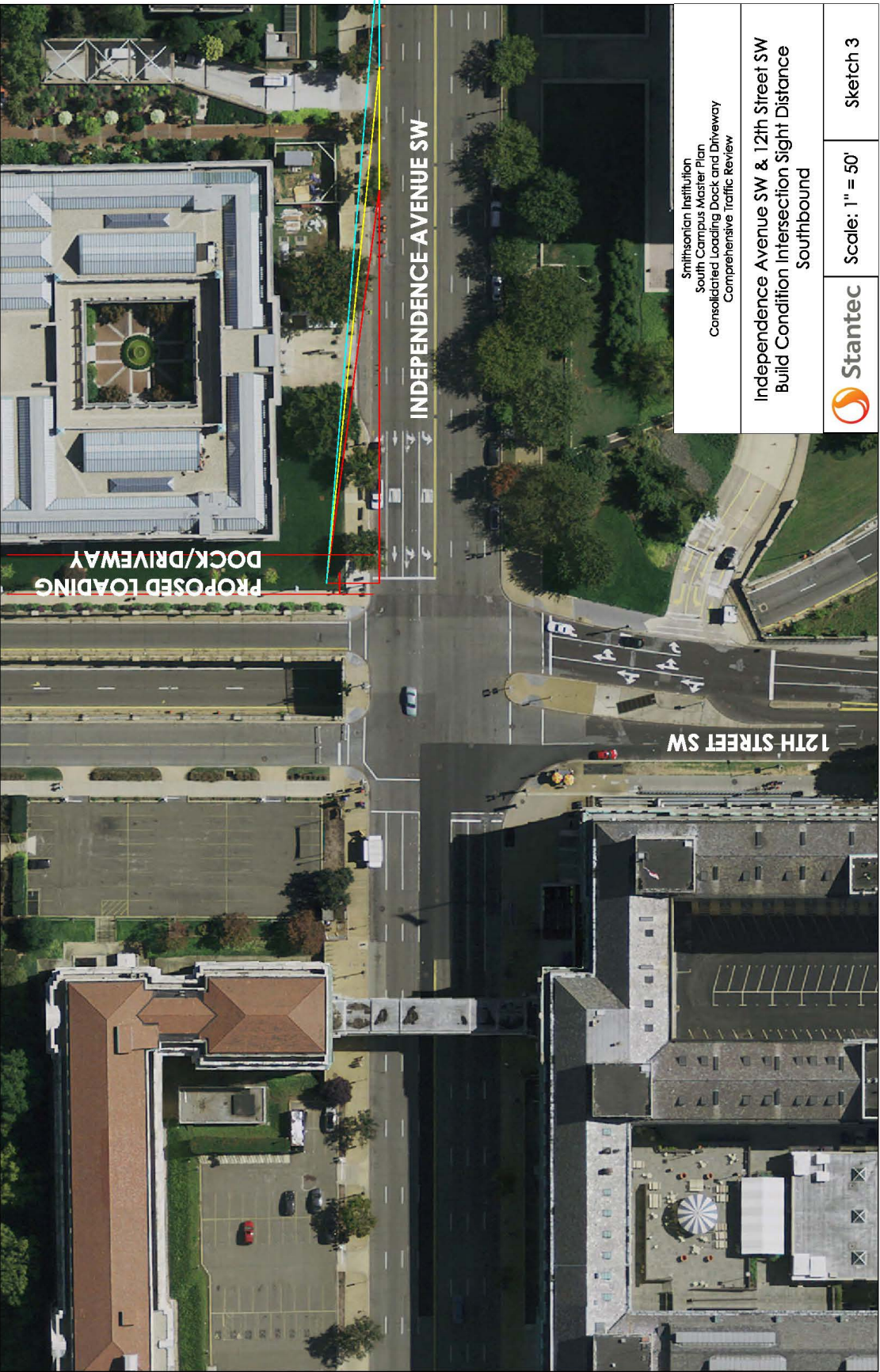
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Existing and No Build Intersection Sight Distance  
Eastbound and Westbound



Scale: 1" = 50'

Sketch 2



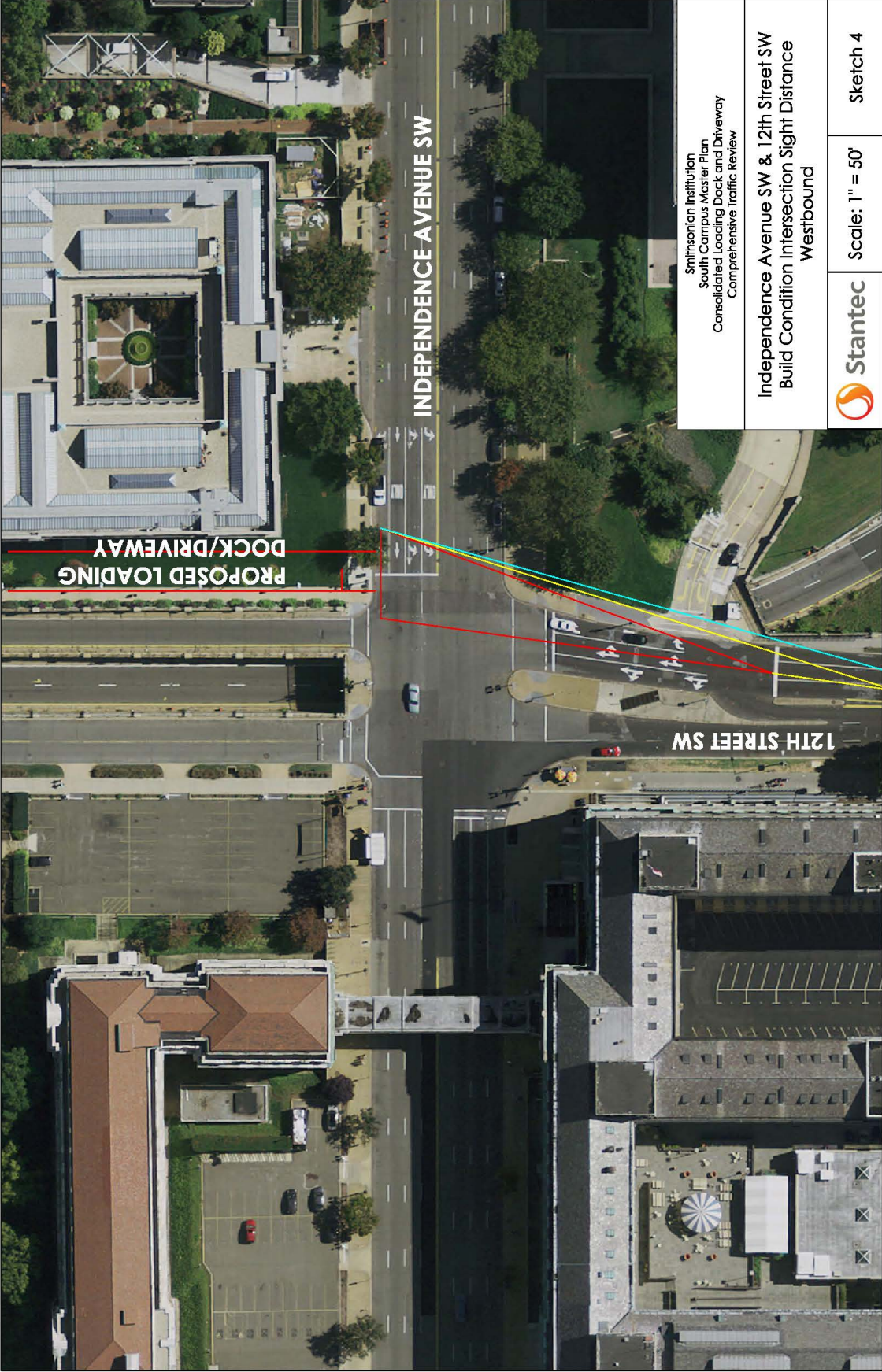
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Build Condition Intersection Sight Distance  
Southbound

**Stantec**

Scale: 1" = 50'

Sketch 3



Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Build Condition Intersection Sight Distance  
Westbound



Stantec

Scale: 1" = 50'

Sketch 4

**Accident Summary Report (R-7)****Intersection:** INDEPENDENCE AVE and FOURTEENTH ST, SW**Time Period Covered:** From 01/01/2012 To 12/31/2014**Prepared By:** admin TARAS**Prepared Date:** 12/8/2015

Total Number of Accident:	62	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>
Total Number of Fatalities:	0	Right Angle:	3	4.8%	Fixed Object:	1	1.6%
Total Number of Injuries:	12	Left Turn:	0	0.0%	Ran Off Road:	1	1.6%
Total Number of Disabling Injuries:	0	Right Turn:	4	6.5%	Ped. Involved:	1	1.6%
Total Number of NonDisabling Injuries:	4	Rear End:	17	27.4%	Backing:	0	0.0%
Total Number of Pedestrians Involved:	1	Side Swiped:	31	50.0%	Non Collision:	0	0.0%
Total Number of Bicycles Involved:	1	Head On:	0	0.0%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	1	Parked:	0	0.0%	Unspecified:	4	6.5%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	7	11.3%	Sunday:	6	9.7%
09:30 ~ 11:30:	12	19.4%	Monday:	8	12.9%
11:30 ~ 13:30:	7	11.3%	Tuesday:	8	12.9%
13:30 ~ 16:00:	12	19.4%	Wednesday:	13	21.0%
16:00 ~ 18:30:	8	12.9%	Thursday:	11	17.7%
18:30 ~ 07:30:	16	25.8%	Friday:	9	14.5%
Unspecified:	0	0.0%	Saturday:	7	11.3%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	54	87.1%	Dry:	54	87.1%
Rain:	5	8.1%	Wet:	5	8.1%
Snow:	1	1.6%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	1	1.6%	Repairing:	0	0.0%
Unspecified:	1	1.6%	Unspecified:	3	4.8%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	68	55.3%	Fatal Collision:	0	0.0%
Bus:	20	16.3%	Injury Collision:	11	17.7%
Truck:	8	6.5%	PDO Collision:	51	82.3%
Taxi:	12	9.8%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	46	74.2%
Police/Emergency Vehicle:	2	1.6%	Dawn/Dusk:	1	1.6%
Motorcycle/Moped:	1	0.8%	Dark(Lighted):	11	17.7%
Bicycle:	1	0.8%	Dark(Not Lighted):	1	1.6%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	11	8.9%	Unspecified:	3	4.8%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	0	0.0%	In Crosswalk with Signal:	1	100.0%
Driver: Alcohol/Drug:	2	1.6%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	22	17.9%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	0	0.0%
Roadway:	1	0.8%	From Between Parked Cars:	0	0.0%
Unspecified:	98	79.7%	Unspecified:	0	0.0%

<b>Year</b>	<b>Accidents</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Disabling Injuries</b>	<b>Pedestrians</b>	<b>Bicycles</b>	<b>Motorcycles</b>
2012	19	0	3	3	0	1	0
2013	19	0	2	1	0	0	1
2014	24	0	7	0	1	0	0

1 Records are not approved as of 12/8/2015 8:18:44 AM

DC Department of Transportation - Traffic Accident Reporting and Analysis System

## Accident Summary Report (R-7)

Intersection: INDEPENDENCE AVE and TWELFTH ST, SW

Time Period Covered: From 01/01/2012 To 12/31/2014

Prepared By: admin TARAS

Prepared Date: 12/8/2015

Total Number of Accident:	53	Collision Type	#ACC	%	Collision Type	#ACC	%
Total Number of Fatalities:	0	Right Angle:	7	13.2%	Fixed Object:	0	0.0%
Total Number of Injuries:	24	Left Turn:	6	11.3%	Ran Off Road:	0	0.0%
Total Number of Disabling Injuries:	3	Right Turn:	2	3.8%	Ped. Involved:	4	7.5%
Total Number of NonDisabling Injuries:	9	Rear End:	10	18.9%	Backing:	1	1.9%
Total Number of Pedestrians Involved:	5	Side Swiped:	19	35.8%	Non Collision:	1	1.9%
Total Number of Bicycles Involved:	2	Head On:	1	1.9%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	2	Parked:	1	1.9%	Unspecified:	1	1.9%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	5	9.4%	Sunday:	2	3.8%
09:30 ~ 11:30:	3	5.7%	Monday:	9	17.0%
11:30 ~ 13:30:	10	18.9%	Tuesday:	7	13.2%
13:30 ~ 16:00:	11	20.8%	Wednesday:	8	15.1%
16:00 ~ 18:30:	16	30.2%	Thursday:	14	26.4%
18:30 ~ 07:30:	8	15.1%	Friday:	6	11.3%
Unspecified:	0	0.0%	Saturday:	7	13.2%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	45	84.9%	Dry:	45	84.9%
Rain:	8	15.1%	Wet:	8	15.1%
Snow:	0	0.0%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	0	0.0%	Repairing:	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	58	57.4%	Fatal Collision:	0	0.0%
Bus:	15	14.9%	Injury Collision:	18	34.0%
Truck:	3	3.0%	PDO Collision:	35	66.0%
Taxi:	19	18.8%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	45	84.9%
Police/Emergency Vehicle:	1	1.0%	Dawn/Dusk:	0	0.0%
Motorcycle/Moped:	2	2.0%	Dark(Lighted):	7	13.2%
Bicycle:	2	2.0%	Dark(Not Lighted):	0	0.0%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	1	1.0%	Unspecified:	1	1.9%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	1	1.0%	In Crosswalk with Signal:	3	60.0%
Driver: Alcohol/Drug:	0	0.0%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	21	20.8%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	1	20.0%
Roadway:	0	0.0%	From Between Parked Cars:	0	0.0%
Unspecified:	79	78.2%	Unspecified:	1	20.0%

Year	Accidents	Fatalities	Injuries	Disabling Injuries	Pedestrians	Bicycles	Motorcycles
2012	20	0	7	3	2	0	1
2013	16	0	6	3	2	0	1
2014	17	0	11	3	1	2	0

0 Records are not approved as of 12/8/2015 8:17:02 AM

**Accident Summary Report (R-7)****Intersection:** INDEPENDENCE AVE and L'ENFANT PROMENADE, SW**Time Period Covered:** From 01/01/2012 To 12/31/2014**Prepared By:** admin TARAS**Prepared Date:** 12/8/2015

Total Number of Accident:	8	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>
Total Number of Fatalities:	0	Right Angle:	0	0.0%	Fixed Object:	0	0.0%
Total Number of Injuries:	3	Left Turn:	1	12.5%	Ran Off Road:	0	0.0%
Total Number of Disabling Injuries:	0	Right Turn:	0	0.0%	Ped. Involved:	0	0.0%
Total Number of NonDisabling Injuries:	0	Rear End:	1	12.5%	Backing:	0	0.0%
Total Number of Pedestrians Involved:	0	Side Swiped:	3	37.5%	Non Collision:	0	0.0%
Total Number of Bicycles Involved:	0	Head On:	1	12.5%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	0	Parked:	2	25.0%	Unspecified:	0	0.0%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	0	0.0%	Sunday:	0	0.0%
09:30 ~ 11:30:	1	12.5%	Monday:	0	0.0%
11:30 ~ 13:30:	3	37.5%	Tuesday:	2	25.0%
13:30 ~ 16:00:	2	25.0%	Wednesday:	1	12.5%
16:00 ~ 18:30:	0	0.0%	Thursday:	1	12.5%
18:30 ~ 07:30:	2	25.0%	Friday:	2	25.0%
Unspecified:	0	0.0%	Saturday:	2	25.0%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	8	100.0%	Dry:	8	100.0%
Rain:	0	0.0%	Wet:	0	0.0%
Snow:	0	0.0%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	0	0.0%	Repairing:	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	10	62.5%	Fatal Collision:	0	0.0%
Bus:	3	18.8%	Injury Collision:	2	25.0%
Truck:	1	6.3%	PDO Collision:	6	75.0%
Taxi:	1	6.3%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	6	75.0%
Police/Emergency Vehicle:	1	6.3%	Dawn/Dusk:	1	12.5%
Motorcycle/Moped:	0	0.0%	Dark(Lighted):	1	12.5%
Bicycle:	0	0.0%	Dark(Not Lighted):	0	0.0%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	2	12.5%	In Crosswalk with Signal:	0	0.0%
Driver: Alcohol/Drug:	0	0.0%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	3	18.8%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	0	0.0%
Roadway:	0	0.0%	From Between Parked Cars:	0	0.0%
Unspecified:	11	68.8%	Unspecified:	0	0.0%

<b>Year</b>	<b>Accidents</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Disabling Injuries</b>	<b>Pedestrians</b>	<b>Bicycles</b>	<b>Motorcycles</b>
2013	2	0	0	0	0	0	0
2014	6	0	3	0	0	0	0

0 Records are not approved as of 12/8/2015 8:22:05 AM

## **APPENDIX A: STUDY AREA DATA**



---

To:	Jonathan Rogers	From:	Adam Catherine
	DDOT		Stantec
File:	2028110978	Date:	October 20, 2015

---

**Reference: Loading Dock Trip Generation Analysis**

The Smithsonian Institution (SI) South Campus Master Plan includes several improvements that are intended to enhance the user experience by providing seamless connections between the various South Campus facilities, increasing the visibility of the facilities, and providing additional education and visitor service space. As part of the overall vision for the South Campus, SI is proposing to consolidate three existing loading areas along Independence Avenue into a single loading driveway that would be accessed via a ramp at the intersection of Independence Avenue and 12<sup>th</sup> Street, on the west side of the Freer Gallery (see **Attachment A**). The consolidation of the three existing loading driveways would eliminate breaks in the current campus site plan, allowing for a cohesive connection across the entire campus for visitors. In addition, the new loading driveway would be able to accept all truck types, as well as eliminate the need for trucks to back in to or out of the driveways, as occurs in the existing condition.

This memorandum summarizes the analysis that was performed to estimate the number of AM peak hour, PM peak hour, and weekday loading trips that would be consolidated at the new driveway location. It should be noted that the proposed loading driveway consolidation is not anticipated to generate additional personal auto (car), transit, pedestrian, or bicycle trips.

**Existing Conditions**

Observations of the existing loading areas were conducted from 7:00 AM – 7:00 PM for a period of seven days between Thursday, September 24 and Wednesday, September 30, 2015. Field data collection technicians noted the arrival and departure times of each vehicle, the vehicle type (van, box truck, or tractor trailer), the direction from which they entered and the direction to which they exited, as well as if the vehicle needed to back into or out of the loading area. The raw data is contained in **Attachment B**, and a summary of the data is shown in **Table 1**.

In addition to the loading area data, turning movement counts were conducted at the signalized intersections of Independence Avenue and 12<sup>th</sup> Street, and Independence Avenue and L'Enfant Plaza on Tuesday, September 29 from 7:00 AM – 10:00 AM and 3:00 PM – 7:00 PM. The turning movement counts were used to determine the AM and PM peak hours of Independence Avenue for the purposes of the truck trip generation analysis, and will also be used to conduct the capacity analysis for the existing and proposed conditions.

The data shown in **Table 1** reveals that the majority of truck activity occurs on weekday, off-peak periods. No deliveries were recorded on Saturday, and only two were recorded on Sunday. It should also be noted that almost 60% of all the delivery vehicles either back into or out of the existing loading driveways, thus impeding traffic flow on Independence Avenue.

**Design with community in mind**

ca u:\1925\2028110978\corresp\scoping\20151009\_truck\_trip\_gen\_memo.docx

**Reference: Loading Dock Trip Generation Analysis**

**Table 1: Summary of Existing Loading Area Activity**

<b>Total Number of Vehicles over 7-Day Count Period</b>	<b>142</b>	
Number of Vehicles Arriving/Departing on a Weekday	140	99%
Number of Vehicles Arriving/Departing on a Weekend	2	1%
<b>Average Duration of Loading Area Activity (per Vehicle)</b>	<b>38 min</b>	
Vehicles Backing Into Loading Dock	62	44%
Vehicles Backing out of Loading Dock	19	13%
Vehicles Entering From WB Independence Ave*	110	80%
Vehicles Entering From EB Independence Ave*	29	20%
Vehicles Departing to WB Independence Ave*	87	64%
Vehicles Departing to EB Independence Ave*	50	36%
<b>Highest Number of Trips During AM Peak Hour of Independence Avenue (8:00 AM - 9:00 AM)</b>	<b>6</b>	
<b>Entering</b>	<b>3</b>	<b>50%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Exiting</b>	<b>3</b>	<b>50%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Highest Number of Trips During PM Peak Hour of Independence Avenue (4:45 PM - 5:45 PM)</b>	<b>5</b>	
<b>Entering</b>	<b>2</b>	<b>40%</b>
Van	0	
Box Truck	2	
Tractor Trailer	0	
<b>Exiting</b>	<b>3</b>	<b>60%</b>
Van	0	
Box Truck	2	
Tractor Trailer	1	
<b>Highest Number of Weekday Trips</b>	<b>96</b>	
<b>Entering</b>	<b>48</b>	<b>50%</b>
Van	6	
Box Truck	34	
Tractor Trailer	8	
<b>Exiting</b>	<b>48</b>	<b>50%</b>
Van	6	
Box Truck	34	
Tractor Trailer	8	

\*The total number of entering and departing vehicles is slightly less than the total vehicles recorded because of vehicle arrivals/departures that occurred before or after the count period.

**Reference: Loading Dock Trip Generation Analysis**

The AM peak hour, PM peak hour, and weekday trips shown in **Table 1** represent the highest number of trips that were recorded on any given weekday during the duration of the counts. This will provide a conservative analysis of the proposed condition.

**Estimate of Future Loading Activity**

In addition to the consolidated loading driveway, the Master Plan includes an expansion of the South Campus facilities to provide additional user amenities, such as dining and shopping. While the exact square footages of the retail/dining areas are unclear at this time, an increase in loading driveway activity is anticipated. SI provided Stantec with an estimate of food-related delivery activity at the National Museum of the American Indian (NMAI), which has facilities similar to those anticipated for the South Campus.

**Table 2: Estimate of Future Loading Area Activity**

Weekday Trips			Existing	New	Future
	Entering	Total	48	13	61
		Van	6	0	6
		Box Truck	34	13	47
		Tractor Trailer	8	0	8
	Exiting	Total	48	12	60
		Van	6	0	6
		Box Truck	34	12	46
		Tractor Trailer	8	0	8
	<b>Total</b>		<b>96</b>	<b>25</b>	<b>121</b>
AM Peak Hour Trips	Entering	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	Exiting	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	<b>Total</b>		<b>6</b>	<b>2</b>	<b>8</b>
PM Peak Hour Trips	Entering	Total	2	1	3
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	0	0	0
	Exiting	Total	3	1	4
		Van	0	0	0
		Box Truck	2	1	3
		Tractor Trailer	1	0	1
	<b>Total</b>		<b>5</b>	<b>2</b>	<b>7</b>



October 20, 2015  
Jonathan Rogers  
Page 4 of 4

**Reference: Loading Dock Trip Generation Analysis**

The data provided by NMAI indicates that there are approximately 25 food-related deliveries on a typical weekday, which primarily utilize box trucks. However, SI did not have logs to identify the time or duration of the deliveries. Therefore, the NMAI data was applied to the ratio of peak hour to daily trips, obtained from the South Campus data, to estimate the number of additional deliveries that would occur at the consolidated driveway location. **Table 2** provides the total AM peak hour, PM peak hour, and weekday trips that would be experienced in the proposed condition.

**Trip Arrival and Distribution Patterns**

It is assumed that the distribution of both existing and new trips would follow the existing distribution pattern shown in **Table 1**. However, it should be noted the proposed consolidated loading area is being designed so that trucks of all types can enter the facility and use an L-shaped loading area within the site to back into the dock, thereby eliminating the backing activity that currently occurs on Independence Avenue (see **Attachment A**).

**Conclusions and Next Steps**

This memorandum summarizes the analysis that was performed to estimate the number of AM peak hour, PM peak hour, and weekday truck loading trips that would be consolidated at the new driveway location. The results of the analysis indicate that the majority of trips occur on weekdays and during off-peak periods. The data also reveals that almost 60% of the loading trips require a vehicle to back into or out of the loading dock, thus blocking traffic on Independence Avenue.

Based on the results of the trip estimate, the proposed consolidated driveway would experience approximately 121 daily trips, with a minimal amount occurring during the AM peak hour (8) and PM peak hour (7). The proposed loading driveway would also eliminate backing activity that currently occurs on Independence Avenue. However, due to its proximity to the intersection of Independence Avenue and 12<sup>th</sup> Street, a capacity analysis must be performed to determine if an actuated traffic signal phase for the new driveway could be provided without significantly impacting intersection operations.

**STANTEC CONSULTING SERVICES INC.**

Adam Catherine  
Associate  
Phone: (856) 234-0800 ext 8542  
Fax: (856) 234-5926  
Adam.Catherine@stantec.com

Attachment: Attachment A: Proposed Loading Dock Plan  
Attachment B: Existing Delivery Data

Design with community in mind

ca uz\1925\2028110978\corresp\scoping\20151009\_truck\_trip\_gen\_memorandum.docx

Attachment B  
 Smithsonian South Campus Loading Dock  
 Vehicle Counts  
 Thursday, September 24, 2015 - Wednesday, September 30, 2015

Vehicle	Day	Date	Time In	Time Out	Duration (min)	Vehicle Type	Pull In	Back In	Pull Out	Back Out	Entering From WB	Entering From EB	Departing to WB	Departing to EB
1	Thursday	9/24/2015	7:44 AM	9:15 AM	31	Box Truck	1		1		1		1	
2	Thursday	9/24/2015	8:45 AM	10:31 AM	46	Box Truck	1		1		1			
3	Thursday	9/24/2015	9:32 AM	10:46 AM	74	Van	1		1			1		1
4	Thursday	9/24/2015	9:36 AM	9:47 AM	11	Box Truck		1	1		1			1
5	Thursday	9/24/2015	9:45 AM	9:52 AM	7	Box Truck		1	1		1		1	
6	Thursday	9/24/2015	11:31 AM	11:49 AM	18	Box Truck		1	1		1			1
7	Thursday	9/24/2015	1:01 PM	1:12 PM	11	Van	1		1			1	1	
8	Thursday	9/24/2015	3:42 PM	3:52 PM	10	Tractor Trailer		1	1		1			1
9	Friday	9/25/2015	6:47 AM	7:08 AM	21	Tractor Trailer		1	1		1		1	
10	Friday	9/25/2015	7:42 AM	7:58 AM	16	Box Truck	1		1		1		1	
11	Friday	9/25/2015	8:04 AM	8:32 AM	28	Tractor Trailer		1	1		1		1	
12	Friday	9/25/2015	8:20 AM	8:41 AM	21	Box Truck	1		1		1		1	
13	Friday	9/25/2015	9:03 AM	9:10 AM	7	Box Truck	1		1		1		1	
14	Friday	9/25/2015	9:06 AM	9:23 AM	17	Box Truck	1		1		1		1	
15	Friday	9/25/2015	9:11 AM	9:23 AM	12	Box Truck	1		1		1			1
16	Friday	9/25/2015	9:43 AM	9:55 AM	12	Tractor Trailer		1	1		1			1
17	Friday	9/25/2015	9:49 AM	9:55 AM	6	Box Truck	1		1		1			1
18	Friday	9/25/2015	10:20 AM	10:46 AM	26	Box Truck	1		1		1		1	
19	Friday	9/25/2015	10:20 AM	10:39 AM	19	Box Truck		1	1			1		1
20	Friday	9/25/2015	10:23 AM	11:29 AM	6	Box Truck	1		1		1			1
21	Friday	9/25/2015	10:27 AM	10:46 AM	19	Tractor Trailer		1	1			1	1	
22	Friday	9/25/2015	10:49 AM	11:12 AM	23	Tractor Trailer		1	1		1			1
23	Friday	9/25/2015	11:10 AM	12:05 PM	55	Box Truck	1		1		1		1	
24	Friday	9/25/2015	11:13 AM	12:07 PM	54	Box Truck	1		1		1		1	
25	Friday	9/25/2015	11:17 AM	12:40 PM	83	Tractor Trailer		1	1		1		1	
26	Friday	9/25/2015	11:30 AM	12:13 PM	43	Box Truck	1		1		1		1	
27	Friday	9/25/2015	11:57 AM	12:52 PM	55	Box Truck	1		1		1			1
28	Friday	9/25/2015	12:20 PM	1:50 PM	90	Tractor Trailer		1	1		1		1	
29	Friday	9/25/2015	12:30 PM	1:11 PM	41	Box Truck	1		1		1			1
30	Friday	9/25/2015	12:46 PM	1:31 PM	45	Box Truck	1		1			1	1	
31	Friday	9/25/2015	1:04 PM	1:51 PM	47	Box Truck	1		1			1	1	
32	Friday	9/25/2015	1:33 PM	2:13 PM	40	Tractor Trailer		1	1		1			1
33	Friday	9/25/2015	1:43 PM	2:13 PM	30	Tractor Trailer		1	1		1			1
34	Friday	9/25/2015	1:44 PM	-	-	Box Truck	1		1		1			
35	Friday	9/25/2015	1:46 PM	-	-	Box Truck	1		1		1			
36	Friday	9/25/2015	2:05 PM	2:11 PM	6	Box Truck	1		1				1	
37	Friday	9/25/2015	2:43 PM	2:54 PM	11	Box Truck	1		1		1		1	
38	Friday	9/25/2015	2:44 PM	2:58 PM	14	Box Truck	1		1			1	1	
39	Friday	9/25/2015	2:55 PM	3:05 PM	10	Box Truck		1	1		1		1	
40	Friday	9/25/2015	3:30 PM	5:22 PM	112	Box Truck	1		1		1		1	
41	Friday	9/25/2015	5:21 PM	5:42 PM	21	Tractor Trailer		1	1		1			1
42	Sunday	9/27/2015	10:59 AM	11:50 AM	51	Van	1		1				1	
43	Sunday	9/27/2015	12:37 PM	3:32 PM	175	Van	1		1			1	1	
44	Monday	9/28/2015	7:12 AM	7:24 AM	12	Box Truck	1		1		1		1	
45	Monday	9/28/2015	7:45 AM	8:23 AM	38	Tractor Trailer		1	1		1			1
46	Monday	9/28/2015	8:04 AM	8:38 AM	34	Box Truck	1		1			1	1	
47	Monday	9/28/2015	8:50 AM	9:31 AM	41	Tractor Trailer	1		1		1			1
48	Monday	9/28/2015	8:52 AM	9:01 AM	9	Box Truck		1	1		1		1	
49	Monday	9/28/2015	9:02 AM	9:09 AM	7	Box Truck	1		1			1	1	
50	Monday	9/28/2015	9:11 AM	9:32 AM	21	Tractor Trailer		1	1		1		1	
51	Monday	9/28/2015	9:36 AM	9:54 AM	18	Box Truck	1		1		1			1
52	Monday	9/28/2015	10:08 AM	10:18 AM	10	Box Truck		1	1		1		1	
53	Monday	9/28/2015	10:12 AM	12:35 PM	143	Box Truck	1		1		1		1	
54	Monday	9/28/2015	11:50 AM	12:40 PM	50	Box Truck	1		1		1		1	
55	Monday	9/28/2015	12:27 PM	12:57 PM	30	Box Truck	1		1		1		1	
56	Monday	9/28/2015	12:49 PM	1:10 PM	21	Box Truck	1		1			1		1
57	Monday	9/28/2015	1:51 PM	1:37 PM	46	Box Truck	1		1		1			1
58	Monday	9/28/2015	1:25 PM	1:34 PM	9	Tractor Trailer		1	1		1		1	
59	Monday	9/28/2015	1:45 PM	1:51 PM	6	Box Truck	1		1		1			1
60	Monday	9/28/2015	1:47 PM	1:56 PM	9	Box Truck	1		1				1	
61	Monday	9/28/2015	2:07 PM	2:17 PM	10	Box Truck	1		1		1			1
62	Monday	9/28/2015	3:18 PM	3:24 PM	6	Box Truck	1		1		1		1	

	Tuesday	9/29/2015	-	7:16 AM	-	Box Truck		1				1	
64	Tuesday	9/29/2015	-	7:19 AM	-	Box Truck		1				1	
65	Tuesday	9/29/2015	-	7:20 AM	-	Box Truck		1					1
66	Tuesday	9/29/2015	6:15 AM	7:09 AM	54	Box Truck	1			1			
67	Tuesday	9/29/2015	6:15 AM	9:37 AM	142	Tractor Trailer		1		1	1	1	
68	Tuesday	9/29/2015	7:26 AM	7:47 AM	21	Box Truck	1	1		1			1
69	Tuesday	9/29/2015	7:27 AM	7:51 AM	24	Box Truck	1	1		1		1	
70	Tuesday	9/29/2015	7:29 AM	8:45 AM	76	Box Truck	1	1		1			
71	Tuesday	9/29/2015	7:45 AM	8:49 AM	64	Box Truck	1	1		1		1	
72	Tuesday	9/29/2015	8:38 AM	9:16 AM	38	Box Truck	1	1		1		1	
73	Tuesday	9/29/2015	8:45 AM	10:02 AM	77	Box Truck	1		1		1		1
74	Tuesday	9/29/2015	9:09 AM	10:03 AM	54	Box Truck	1		1		1		1
75	Tuesday	9/29/2015	9:16 AM	10:14 AM	58	Tractor Trailer		1		1		1	1
76	Tuesday	9/29/2015	9:40 AM	10:46 AM	66	Tractor Trailer		1		1	1	1	
77	Tuesday	9/29/2015	9:46 AM	10:07 AM	21	Box Truck	1		1	1		1	
78	Tuesday	9/29/2015	9:53 AM	10:09 AM	16	Box Truck	1			1	1		1
79	Tuesday	9/29/2015	9:58 AM	10:58 AM	60	Tractor Trailer		1	1		1		1
80	Tuesday	9/29/2015	10:00 AM	10:26 AM	26	Box Truck		1	1		1		1
81	Tuesday	9/29/2015	10:03 AM	10:28 AM	25	Box Truck		1	1		1		1
82	Tuesday	9/29/2015	10:14 AM	10:34 AM	20	Box Truck		1	1		1		1
83	Tuesday	9/29/2015	10:17 AM	10:41 AM	24	Box Truck	1			1		1	1
84	Tuesday	9/29/2015	10:23 AM	11:03 AM	40	Box Truck	1			1		1	1
85	Tuesday	9/29/2015	10:33 AM	12:07 PM	34	Tractor Trailer		1		1		1	
86	Tuesday	9/29/2015	10:35 AM	11:03 AM	28	Box Truck		1	1		1		1
87	Tuesday	9/29/2015	10:50 AM	11:48 AM	58	Box Truck	1		1		1		1
88	Tuesday	9/29/2015	10:56 AM	11:15 AM	19	Box Truck	1		1		1		1
89	Tuesday	9/29/2015	11:00 AM	11:34 AM	34	Box Truck	1			1		1	1
90	Tuesday	9/29/2015	11:25 AM	12:34 PM	69	Tractor Trailer		1		1	1		1
91	Tuesday	9/29/2015	11:44 AM	12:12 PM	28	Box Truck		1	1		1		1
92	Tuesday	9/29/2015	12:02 PM	12:23 PM	21	Box Truck		1	1			1	
93	Tuesday	9/29/2015	12:07 PM	12:35 PM	28	Box Truck	1			1	1		1
94	Tuesday	9/29/2015	12:12 PM	12:40 PM	28	Box Truck	1		1		1		1
95	Tuesday	9/29/2015	12:24 PM	1:53 PM	89	Tractor Trailer		1		1	1		1
96	Tuesday	9/29/2015	12:30 PM	1:22 PM	52	Box Truck			1		1		1
97	Tuesday	9/29/2015	12:35 PM	12:45 PM	10	Box Truck	1		1		1		1
98	Tuesday	9/29/2015	12:38 PM	1:03 PM	25	Box Truck		1		1		1	
99	Tuesday	9/29/2015	12:56 PM	1:34 PM	38	Box Truck	1		1		1		1
100	Tuesday	9/29/2015	1:15 PM	1:43 PM	28	Box Truck		1			1		1
101	Tuesday	9/29/2015	1:18 PM	3:31 PM	133	Box Truck	1		1		1		1
102	Tuesday	9/29/2015	1:20 PM	3:31 PM	131	Box Truck	1			1		1	
103	Tuesday	9/29/2015	1:20 PM	3:37 PM	137	Box Truck	1		1		1		1
104	Tuesday	9/29/2015	1:45 PM	3:22 PM	97	Tractor Trailer		1	1		1		1
105	Tuesday	9/29/2015	2:21 PM	3:37 PM	76	Box Truck	1			1	1		1
106	Tuesday	9/29/2015	3:03 PM	4:15 PM	72	Tractor Trailer		1		1	1		1
107	Tuesday	9/29/2015	3:20 PM	4:07 PM	47	Box Truck		1	1		1		1
108	Tuesday	9/29/2015	3:30 PM	4:10 PM	40	Box Truck	1		1			1	1
109	Tuesday	9/29/2015	4:05 PM	-	-	Box Truck	1				1		
110	Tuesday	9/29/2015	4:44 PM	-	-	Tractor Trailer		1			1		
111	Wednesday	9/30/2015	7:47 AM	7:50 AM	3	Box Truck		1	1			1	1
112	Wednesday	9/30/2015	8:42 AM	9:17 AM	35	Van		1		1		1	
113	Wednesday	9/30/2015	8:50 AM	9:05 AM	15	Van	1				1		1
114	Wednesday	9/30/2015	9:02 AM	10:02 AM	60	Van	1			1			1
115	Wednesday	9/30/2015	9:10 AM	9:17 AM	7	Box Truck	1		1			1	
116	Wednesday	9/30/2015	9:14 AM	9:22 AM	8	Box Truck		1		1	1		1
117	Wednesday	9/30/2015	9:32 AM	11:17 AM	105	Tractor Trailer		1	1		1		
118	Wednesday	9/30/2015	9:49 AM	9:56 AM	7	Box Truck		1	1			1	1
119	Wednesday	9/30/2015	10:22 AM	10:27 AM	65	Box Truck	1			1		1	1
120	Wednesday	9/30/2015	10:35 AM	11:02 AM	27	Box Truck	1		1		1		
121	Wednesday	9/30/2015	10:41 AM	11:41 AM	60	Box Truck		1	1			1	1
122	Wednesday	9/30/2015	11:17 AM	11:28 AM	11	Van	1		1		1		
123	Wednesday	9/30/2015	11:23 AM	11:29 AM	6	Van		1	1			1	1
124	Wednesday	9/30/2015	11:27 AM	11:31 AM	4	Van	1		1			1	1
125	Wednesday	9/30/2015	11:54 AM	12:26 PM	32	Box Truck		1	1		1		1
126	Wednesday	9/30/2015	11:59 AM	12:31 PM	32	Van	1		1		1		
127	Wednesday	9/30/2015	12:16 PM	12:32 PM	16	Box Truck		1	1			1	1
128	Wednesday	9/30/2015	12:34 PM	12:46 PM	12	Box Truck		1	1		1		1
129	Wednesday	9/30/2015	1:13 PM	1:18 PM	5	Box Truck	1	1					1
130	Wednesday	9/30/2015	1:14 PM	1:37 PM	23	Box Truck		1	1		1		1
131	Wednesday	9/30/2015	1:25 PM	1:38 PM	13	Van	1				1		
132	Wednesday	9/30/2015	1:56 PM	2:11 PM	15	Van	1		1		1		
133	Wednesday	9/30/2015	1:56 PM	2:38 PM	42	Van	1						1
134	Wednesday	9/30/2015	2:42 PM	3:22 PM	40	Box Truck		1	1		1		1
135	Wednesday	9/30/2015	3:03 PM	3:27 PM	24	Box Truck		1	1				1
136	Wednesday	9/30/2015	3:11 PM	3:24 PM	13	Van		1		1			
137	Wednesday	9/30/2015	3:17 PM	4:01 PM	44	Box Truck	1				1		1
138	Wednesday	9/30/2015	3:21 PM	3:22 PM	1	Van		1		1			1
139	Wednesday	9/30/2015	3:33 PM	4:25 PM	52	Box Truck	1			1		1	1
140	Wednesday	9/30/2015	3:56 PM	5:12 PM	76	Box Truck		1	1		1		1
141	Wednesday	9/30/2015	5:05 PM	-	-	Van		1				1	
142	Wednesday	9/30/2015	5:10 PM	-	-	Box Truck	1			1			

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	470	62	15	122	6	0	245	8	0	79	29
07:15	0	474	67	22	156	3	0	326	10	1	90	37
07:30	0	537	71	21	110	3	0	263	10	0	106	21
07:45	0	558	64	20	145	3	0	353	14	0	117	35
08:00	0	577	52	35	118	1	0	361	14	1	143	48
08:15	0	657	56	31	126	5	0	408	9	0	150	56
08:30	0	546	30	33	103	2	0	370	11	0	162	65
08:45	0	506	46	23	127	7	0	396	14	0	142	61
09:00	0	552	43	34	146	3	0	377	5	0	126	81
09:15	0	494	29	36	97	9	1	414	12	0	104	66
09:30	0	512	30	27	82	3	0	365	6	1	90	33
09:45	0	445	42	26	103	5	2	280	7	1	116	40
Peak Hour	0	2286	184	122	474	15	0	1535	48	1	597	230
15:00	0	257	26	29	261	8	0	80	10	1	112	23
15:15	0	306	49	35	286	10	1	117	7	1	89	22
15:30	0	184	30	27	307	5	1	66	2	0	118	20
15:45	0	189	22	43	331	10	0	72	5	3	154	32
16:00	0	281	57	52	362	8	1	68	7	3	245	27
16:15	0	370	92	51	457	6	0	101	4	2	281	30
16:30	0	366	65	26	344	6	0	117	3	0	189	25
16:45	0	356	87	39	314	3	0	81	4	2	204	27
17:00	0	358	92	34	331	11	0	117	12	1	210	23
17:15	0	373	87	38	360	6	0	127	5	0	229	22
17:30	0	368	77	26	332	0	1	130	6	0	207	19
17:45	0	370	96	38	421	4	0	99	13	2	226	22
18:00	0	389	85	29	422	8	0	65	2	3	123	51
18:15	0	326	54	23	366	11	0	96	3	2	213	43
18:30	0	309	50	32	400	11	0	106	8	3	172	29
18:45	0	230	43	17	395	9	1	98	4	2	148	23
Peak Hour	0	1469	352	136	1444	21	1	473	36	3	872	86

Passenger Cars

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	6	2	3	9	0	0	0	0	1	1	7
07:15	0	9	3	3	8	1	0	1	0	0	1	3
07:30	0	2	3	4	6	1	1	1	0	1	0	8
07:45	0	7	1	4	13	0	2	3	0	1	1	4
08:00	0	8	2	6	5	1	0	1	0	1	2	4
08:15	0	4	3	4	6	0	1	2	0	0	0	2
08:30	0	5	3	8	9	1	3	1	0	3	0	5
08:45	0	6	3	5	5	0	2	2	0	0	2	4
09:00	0	3	0	4	9	0	1	4	0	1	1	1
09:15	0	0	3	4	6	1	0	2	0	0	1	6
09:30	0	3	1	5	8	0	1	3	0	2	0	1
09:45	0	6	2	3	3	1	0	1	0	1	3	4
Peak Hour	0	23	11	23	25	2	6	6	0	4	4	15
15:00	0	3	2	2	6	0	0	0	0	0	7	2
15:15	0	5	1	2	3	0	2	0	0	0	5	2
15:30	0	3	2	5	4	0	0	1	0	1	7	2
15:45	0	7	0	0	3	0	1	1	1	3	7	5
16:00	0	4	1	5	4	0	0	2	0	2	3	2
16:15	0	5	2	5	3	0	1	3	0	4	7	9
16:30	0	8	2	3	8	0	3	2	0	2	3	5
16:45	0	3	2	4	3	0	2	3	0	1	8	4
17:00	0	2	3	0	1	0	1	2	0	2	15	5
17:15	0	7	1	1	8	0	2	1	1	2	6	1
17:30	0	4	2	3	10	0	0	3	0	2	5	3
17:45	0	1	2	4	7	0	1	1	0	5	4	6
18:00	0	2	2	2	6	0	2	2	0	4	0	1
18:15	0	3	1	0	3	0	1	1	0	0	2	2
18:30	0	4	1	3	2	0	2	1	0	3	0	5
18:45	0	1	3	2	6	0	0	0	0	2	2	1
Peak Hour	0	14	8	8	26	0	4	7	1	11	30	15

Heavy Vehicles

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	0	476	64	18	131	6	0	245	8	1	80	36	1065
07:15	0	483	70	25	164	4	0	327	10	1	91	40	1215
07:30	0	539	74	25	116	4	1	264	10	1	106	29	1169
07:45	0	565	65	24	158	3	2	356	14	1	118	39	1345
08:00	0	585	54	41	123	2	0	362	14	2	145	52	1380
08:15	0	661	59	35	132	5	1	410	9	0	150	58	1520
08:30	0	551	33	41	112	3	3	371	11	3	162	70	1360
08:45	0	512	49	28	132	7	2	398	14	0	144	65	1351
09:00	0	555	43	38	155	3	1	381	5	1	127	82	1391
09:15	0	494	32	40	103	10	1	416	12	0	105	72	1285
09:30	0	515	31	32	90	3	1	368	6	3	90	34	1173
09:45	0	451	44	29	106	6	2	281	7	2	119	44	1091
Peak Total	0	2309	195	145	499	17	6	1541	48	5	601	245	5611
PHF	#DIV/0!	0.873	0.826	0.884	0.945	0.607	0.500	0.940	0.857	0.417	0.927	0.875	0.923
%HV	#DIV/0!	1.0%	5.6%	15.9%	5.0%	11.8%	100.0%	0.4%	0.0%	80.0%	0.7%	6.1%	0.0%
15:00	0	260	28	31	267	8	0	80	10	1	119	25	829
15:15	0	311	50	37	289	10	3	117	7	1	94	24	943
15:30	0	187	32	32	311	5	1	67	2	1	125	22	785
15:45	0	196	22	43	334	10	1	73	6	6	161	37	889
16:00	0	285	58	57	366	8	1	70	7	5	248	29	1134
16:15	0	375	94	56	460	6	1	104	4	6	288	39	1433
16:30	0	374	67	29	352	6	3	119	3	2	192	30	1177
16:45	0	359	89	43	317	3	2	84	4	3	212	31	1147
17:00	0	360	95	34	332	11	1	119	12	3	225	28	1220
17:15	0	380	88	39	368	6	2	128	6	2	235	23	1277
17:30	0	372	79	29	342	0	1	133	6	2	212	22	1198
17:45	0	371	98	42	428	4	1	100	13	7	230	28	1322
18:00	0	391	87	31	428	8	2	67	2	7	123	52	1198
18:15	0	329	55	23	359	11	1	97	3	2	215	45	1140
18:30	0	313	51	35	402	11	2	107	8	6	172	34	1141
18:45	0	231	46	19	401	9	1	98	4	4	150	24	987
Peak Total	0	1483	360	144	1470	21	5	480	37	14	902	101	5017
PHF	#DIV/0!	0.976	0.918	0.857	0.859	0.477	0.625	0.902	0.712	0.500	0.960	0.902	0.949
%HV	#DIV/0!	0.9%	2.2%	5.6%	1.8%	0.0%	80.0%	1.5%	2.7%	78.6%	3.3%	14.9%	0.0%

Total Vehicles

Start Date: 12/8/2015  
Start Time: 7:00:00 AM  
Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound				14th St, SW Southbound				Independence Ave, SW Eastbound				Independence Ave, SW Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	7	0	0	0	11	0	2	0	7	0	0	0	25
07:15	1	0	0	18	2	3	1	6	0	2	2	4	0	2	0	40
07:30	0	0	0	15	0	0	0	12	0	2	0	3	0	1	0	54
07:45	0	0	0	21	1	0	0	20	0	6	0	5	0	1	0	50
08:00	0	0	0	15	0	1	0	8	0	1	0	3	0	2	0	60
08:15	0	1	0	8	0	3	0	5	0	3	0	3	0	0	0	54
08:30	0	0	0	12	1	0	0	5	0	5	0	10	0	1	0	47
08:45	0	0	0	7	0	0	0	5	1	2	0	8	0	1	0	54
09:00	0	0	0	6	2	1	0	8	0	0	0	10	0	1	0	42
09:15	0	0	0	3	0	1	0	5	0	4	1	7	0	1	0	28
09:30	0	0	0	0	0	0	0	13	0	1	0	7	0	0	0	26
09:45	0	1	0	4	0	0	0	2	1	2	0	11	0	0	0	9
Peak Total	0	1	0	42	1	4	0	23	1	11	0	24	0	4	0	215
15:00	1	0	0	34	0	0	0	17	0	0	0	6	0	0	0	24
15:15	0	0	0	27	0	1	0	2	0	0	0	4	0	2	0	22
15:30	0	0	0	12	0	0	0	7	0	0	0	10	0	0	0	9
15:45	0	1	0	28	0	0	0	3	0	0	0	16	0	1	0	9
16:00	0	0	0	25	0	0	0	1	0	1	0	15	0	3	0	27
16:15	0	0	0	75	0	2	0	1	0	1	0	10	0	3	0	30
16:30	0	2	0	47	0	1	0	10	0	0	0	37	0	2	0	8
16:45	0	1	0	49	0	1	0	14	0	0	0	7	0	7	0	11
17:00	0	0	0	26	0	0	0	12	0	0	0	4	0	8	1	14
17:15	0	1	0	99	0	1	1	18	0	1	0	11	0	3	1	8
17:30	0	1	1	44	0	1	1	9	0	0	0	9	0	6	0	14
17:45	1	0	0	25	0	0	0	7	0	0	0	3	0	6	0	4
18:00	0	0	0	38	0	0	0	11	0	1	0	2	0	4	1	7
18:15	2	0	0	32	0	1	0	4	0	0	0	6	0	1	1	4
18:30	0	1	0	14	0	0	0	13	1	1	0	6	0	1	0	1
18:45	0	0	0	10	0	0	0	6	0	2	0	4	0	2	0	1
Peak Total	1	2	1	194	0	2	2	46	0	1	0	27	0	23	2	40

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave at 12th St, SW

Start Time	12th St, NW Northbound			12th St, NW Southbound			Independence Eastbound			Independence Ave SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	19	27	13	0	0	0	13	324	49	40	153	21	659
07:15	13	30	8	0	3	1	6	361	45	30	198	24	719
07:30	22	60	20	0	4	2	15	356	38	35	142	20	714
07:45	11	32	25	0	2	0	5	285	49	36	160	35	640
08:00	32	80	31	3	2	1	13	359	37	33	180	31	802
08:15	46	44	21	2	2	2	7	324	32	32	160	35	707
08:30	44	44	23	2	5	2	11	308	40	37	168	30	714
08:45	44	32	34	3	4	3	17	351	25	37	142	32	724
09:00	49	66	39	1	4	1	4	357	22	35	155	38	771
09:15	31	21	49	0	4	4	10	281	28	47	174	38	687
09:30	67	31	45	0	3	4	13	284	15	30	157	23	672
09:45	36	54	48	5	4	1	5	276	19	30	102	23	603
Peak Total	166	200	109	10	13	8	48	1342	134	139	650	128	2947
PHF	0.902	0.625	0.801	0.833	0.650	0.667	0.706	0.935	0.838	0.939	0.903	0.914	0.919
15:00	25	39	61	1	6	2	8	209	14	34	160	31	590
15:15	17	24	55	4	5	2	10	192	12	30	169	31	551
15:30	29	40	63	3	7	2	8	184	24	44	183	21	608
15:45	26	36	52	1	3	5	3	213	15	35	179	26	594
16:00	25	31	34	3	5	3	3	221	6	51	184	26	592
16:15	30	47	55	1	0	0	3	229	8	56	226	14	669
16:30	44	43	71	0	1	2	2	243	14	69	249	24	762
16:45	51	59	88	3	6	8	2	242	10	78	262	34	843
17:00	30	35	78	4	5	4	0	217	6	73	348	39	839
17:15	25	47	56	3	5	2	0	196	8	84	307	43	776
17:30	18	84	54	2	4	3	0	238	3	93	278	34	811
17:45	20	42	56	3	6	0	0	215	5	84	294	49	774
18:00	21	61	72	1	2	2	2	156	0	94	322	48	781
18:15	26	29	44	1	4	2	4	205	2	101	270	36	724
18:30	19	29	63	1	1	2	24	179	0	96	257	29	700
18:45	21	30	53	0	0	1	10	156	0	55	216	17	559
Peak Total	93	208	244	12	20	9	0	866	22	334	1227	165	3200
PHF	0.775	0.619	0.782	0.750	0.833	0.563	#DIV/0!	0.910	0.688	0.898	0.881	0.842	0.954

Vehicles

Start Date: 9/29/2015  
Start Time: 7:00:00 AM  
Site Code: Independence Ave at 12th St, SW

Start Time	12th St, NW Northbound				12th St, NW Southbound				Independence Eastbound				Independence Ave SW Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	0	0	1	0	33	0	1	0	50	0	2	0	41
07:15	0	0	3	0	0	4	0	6	0	4	0	68	0	6	0	22
07:30	0	1	0	0	0	3	0	31	0	5	0	76	0	3	0	38
07:45	0	0	0	0	0	9	0	21	0	6	2	102	0	8	0	46
08:00	0	0	1	0	1	3	0	35	0	0	0	90	0	2	0	34
08:15	0	0	0	0	0	5	0	25	0	5	0	121	0	1	0	21
08:30	0	1	0	0	0	13	0	32	0	7	0	102	0	5	0	39
08:45	0	2	0	2	0	9	0	24	0	4	1	104	0	2	0	46
09:00	0	0	2	3	1	6	0	26	0	4	0	80	0	2	0	43
09:15	0	0	0	0	0	8	0	11	0	1	0	33	0	5	0	14
09:30	0	0	0	0	0	6	0	8	0	2	0	72	0	5	0	28
09:45	0	0	0	0	0	1	0	16	0	0	0	58	0	5	0	20
Peak Total	0	3	1	2	1	30	0	116	0	16	1	417	0	10	0	140
15:00	0	1	0	0	0	2	1	22	0	4	0	37	0	1	0	62
15:15	1	0	0	0	1	1	0	27	0	21	0	21	0	2	0	50
15:30	0	0	0	2	0	0	0	32	0	8	0	49	0	3	0	59
15:45	1	0	0	0	0	1	0	24	0	10	0	39	0	3	0	45
16:00	0	0	0	0	0	1	0	8	0	0	0	26	0	1	0	39
16:15	0	0	0	0	0	0	0	0	0	1	0	5	0	1	0	0
16:30	1	0	4	3	0	0	0	5	0	0	0	20	0	1	0	48
16:45	0	0	6	0	0	0	0	23	0	1	0	12	0	8	0	95
17:00	0	1	3	0	0	0	0	6	0	1	0	32	0	5	0	86
17:15	0	1	1	0	0	4	0	12	0	14	0	11	0	3	0	83
17:30	0	1	2	0	0	0	0	20	0	0	0	12	0	4	0	76
17:45	0	1	2	0	0	3	0	13	0	1	0	4	0	3	0	40
18:00	0	1	5	0	0	0	0	1	0	1	0	10	0	3	0	37
18:15	0	1	0	0	0	0	0	2	0	0	0	22	0	2	0	33
18:30	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	30
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Peak Total	0	4	8	0	0	7	0	51	0	16	0	59	0	15	0	285

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: PEAK-HOUR COUNT AT L'ENFANT

Start Time	L'Enfant Plaza Northbound		Independence Ave Eastbound		Independence Ave Westbound		Total
	Left	Right	Thru	Right	Left	Thru	
07:00	8	8	293	42	12	218	581
07:15	10	21	349	14	19	245	658
07:30	10	19	332	37	20	180	598
07:45	13	23	305	14	17	223	595
08:00	11	33	361	23	18	216	662
08:15	12	45	348	15	19	235	674
08:30	17	24	300	27	7	229	604
08:45	16	50	376	20	22	200	684
09:00	19	29	377	25	15	204	669
09:15	18	26	317	13	18	224	616
09:30	3	21	310	17	4	186	541
09:45	7	17	294	16	5	145	484
Peak Total	56	152	1385	85	66	880	2624
PHF	0.824	0.760	0.921	0.787	0.750	0.936	0.959
15:00	10	16	252	19	10	218	525
15:15	16	15	238	16	14	204	503
15:30	21	20	231	25	15	248	560
15:45	15	16	236	23	12	231	533
16:00	15	19	242	22	7	252	557
16:15	27	9	271	17	15	323	662
16:30	32	18	303	15	17	316	701
16:45	23	15	299	22	8	353	720
17:00	46	34	286	20	18	412	816
17:15	66	4	261	10	12	381	734
17:30	54	13	259	14	9	365	714
17:45	60	4	251	10	11	346	682
18:00	59	14	226	10	8	419	736
18:15	25	11	255	5	4	369	669
18:30	14	6	245	3	6	362	636
18:45	9	5	203	3	2	293	515
Peak Total	226	55	1057	54	50	1504	2946
PHF	0.856	0.404	0.924	0.675	0.694	0.913	0.903

Vehicles

Start Date: 9/29/2015  
Start Time: 7:00:00 AM  
Site Code: PEAK-HOUR COUNT AT L'ENFANT AND INDEPENDENCE

Start Time	L'Enfant Plaza Northbound				L'Enfant Plaza Southbound				Independence Ave Eastbound				Independence Ave Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	7	0	0	0	2	0	0	1	0	0	3	0	4
07:30	0	0	0	10	0	0	0	13	0	7	0	11	1	6	0	28
07:45	1	0	2	20	0	0	0	16	0	2	0	7	2	8	0	21
08:00	0	2	0	0	0	0	0	1	0	1	1	8	1	5	0	14
08:15	0	0	1	11	0	0	0	7	0	2	1	9	0	3	0	17
08:30	0	1	0	9	0	0	0	19	0	3	2	24	0	4	0	25
08:45	1	2	0	7	0	0	0	13	0	3	0	12	0	8	0	13
09:00	0	0	0	8	0	0	0	1	0	2	3	5	0	4	0	10
09:15	0	0	0	35	0	0	0	0	0	2	0	12	0	2	0	5
09:30	0	0	0	7	0	0	0	7	0	0	0	30	0	0	0	0
09:45	0	0	0	10	0	0	0	0	0	0	0	34	0	0	0	0
Peak Total	1	5	1	27	0	0	0	40	0	9	4	53	1	20	0	69
15:00	0	0	0	4	0	0	0	8	0	5	0	42	0	2	0	16
15:15	0	0	0	4	0	0	0	35	0	2	1	28	0	5	0	2
15:30	0	1	0	27	0	0	0	36	0	3	0	58	0	2	0	31
15:45	0	1	0	12	0	0	0	26	0	10	0	39	0	3	0	1
16:00	0	0	0	20	0	0	0	17	0	1	0	65	4	9	0	3
16:15	0	0	0	14	0	0	0	1	0	3	0	63	0	1	0	0
16:30	0	1	0	26	0	0	0	16	0	0	0	83	3	2	0	2
16:45	2	1	0	23	0	0	0	2	0	2	0	35	3	5	0	0
17:00	0	1	1	3	0	0	0	20	0	2	0	68	0	4	0	0
17:15	0	0	0	5	0	0	0	22	0	5	0	23	5	2	0	5
17:30	0	1	0	1	0	0	0	8	0	2	0	38	2	1	0	2
17:45	0	3	0	1	0	0	0	2	0	4	0	25	4	0	0	0
18:00	0	0	0	1	0	0	0	0	0	1	0	14	1	0	0	0
18:15	0	0	0	3	0	0	0	0	0	0	0	31	0	0	0	0
18:30	9	0	0	10	0	0	0	0	0	0	0	17	0	0	0	0
18:45	4	0	1	6	0	0	0	0	0	0	0	11	0	3	0	0
Peak Total	0	5	1	10	0	0	0	52	0	13	0	154	11	7	0	7

Bicycles and Peds

Ronald Catterton

Ronald Catterton

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	62	3	Right turns left
	SB	26	0	
	EB	28	0	
	WB	12	0	
7:30 AM	NB	60	14	U-TURN MESSED UP TRAFFIC
	SB	21	4	Left turns left
	EB	32	0	
	WB	12	0	
7:45 AM	NB	58	2	Right turns left
	SB	13	0	
	EB	20	0	
	WB	13	0	
8:00 AM	NB	50	0	
	SB	15	4	Left turns left

7:00 AM 10 seconds  
8:00 AM 12 seconds

Signal - SB Lead left time

	EB	16	0	
	WB	15	0	
8:15 AM	NB	45	0	
	SB	16	4	left Turns left
	EB	10	0	
	WB	20	0	
8:30 AM	NB	43	0	
	SB	19	9	left Turns left.
	EB	10	0	
	WB	31	0	
8:45 AM	NB	45	0	
	SB	15	3	left Turns left
	EB	12	0	
	WB	30	0	
9:00 AM	NB	45	0	
	SB	11	1	11 15 11
	EB	15	0	
	WB	29	0	

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: \_\_\_\_\_

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	15	0	
	SB	13	0	
	EB	0	0	
	WB	33	0	
4:30 PM	NB	16	0	
	SB	16	0	
	EB	2	0	
	WB	25	0	
4:45 PM	NB	23	0	
	SB	18	0	
	EB	4	0	
	WB	38	0	
5:00 PM	NB	30	0	
	SB	24	0	

4:00 pm  
5:00 pm

18 sec  
18 sec.

Signal - SB Lead  
Left time

	EB	6	0	
	WB	33	0	
5:15 PM	NB	15	0	
	SB	21	0	
	EB	2	0	
	WB	32	0	
5:30 PM	NB	18	0	
	SB	27	0	
	EB	6	0	
	WB	32	0	
5:45 PM	NB	8	0	
	SB	11	0	
	EB	6	0	
	WB	38	0	
6:00 PM	NB	16	0	
	SB	30	0	
	EB	4	0	
	WB	31	0	

Babinda Connor

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	3	0	
	SB	0	0	
	EB	24	0	
	WB	2	0	
7:30 AM	NB	5	0	
	SB	0	0	
	EB	7	0	
	WB	4	0	
7:45 AM	NB	0	0	
	SB	0	0	
	EB	1	0	
	WB	10	0	
8:00 AM	NB	10	0	
	SB	1	0	

# 12<sup>th</sup> @ Independence

	EB	17	0	
	WB	4	0	
8:15 AM	NB	3	0	
	SB	0	0	
	EB	12	6	All remaining were left turns in queue
	WB	9	0	
8:30 AM	NB	7	0	
	SB	0	0	
	EB	28	1	One left turn vehicle remaining
	WB	6	0	All lefts were in queue. All went through.
8:45 AM	NB	17	0	
	SB	0	0	
	EB	36	1	One through did not get through
	WB	2	0	both were lefts and got through
9:00 AM	NB	2	0	
	SB	4	0	
	EB	8	0	
	WB	4	0	

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	5	0	
	SB	0	0	
	EB	25	0	
	WB	14	0	
4:30 PM	NB	10	0	
	SB	1	0	
	EB	32	2	The remaining were rights behind a stopped bus.
	WB	19	0	
4:45 PM	NB	6	0	
	SB	0	0	
	EB	40	0	
	WB	22	0	
5:00 PM	NB	10	0	
	SB	0	0	

# 12<sup>th</sup> St @ Independence

	EB	13	1	Bus stopped in right lane
	WB	20	0	
5:15 PM	NB	6	0	
	SB	1	0	
	EB	17	1	Bus stopped Right Lane
	WB	16	0	
5:30 PM	NB	4	0	
	SB	0	0	
	EB	28	1	Uber in right lane
	WB	19	0	
5:45 PM	NB	5	0	
	SB	0	0	
	EB	15	0	
	WB	19	0	
6:00 PM	NB	3	0	
	SB	0	0	
	EB	14	0	
	WB	16	0	

Brenda Connor

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Pic 1 EB  
2 NB  
3 WB



Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	0	0	
	<del>SB</del>	<del>0</del>	<del>0</del>	<del>2 made rights on red</del>
	EB	4	0	
	WB	18	0	
7:30 AM	NB	0	0	2 made rights on red
	<del>SB</del>	<del>0</del>	<del>0</del>	X
	EB	5	0	
	WB	21	0	
7:45 AM	NB	8	0	
	<del>SB</del>	<del>0</del> 1	<del>0</del>	>
	EB	11	0	
	WB	12	2	All left turns - thru's All get thru & rights
8:00 AM	NB	6	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	X

L Enfort @ Ind.

	EB	3	0	
	WB	22	0	
8:15 AM	NB	1 <del>scribble</del>	0	<del>scribble</del>
	<del>SB</del>	X	X	X
	EB	6	0	
	WB	33	1	Left-turn vehicle
8:30 AM	NB	4	0	
	<del>SB</del>	X	X	X
	EB	4	0	
	WB	28	0	
8:45 AM	NB	6	0	
	<del>SB</del>	X	X	X
	EB	2	0	
	WB	24	0	
9:00 AM	NB	<del>scribble</del> 2	0	
	<del>SB</del>	X	X	X
	EB	7	0	
	WB	18	0	

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	0	0	
	<del>SB</del>	>	X	>
	EB	21	0	
	WB	2	0	
4:30 PM	NB	2	0	
	<del>SB</del>	>	>	>
	EB	11	0	
	WB	15	0	
4:45 PM	NB	5	0	
	<del>SB</del>	>	>	>
	EB	5	0	
	WB	17	0	
5:00 PM	NB	4	0	
	<del>SB</del>	>	>	>

# La'Entant Independence

	EB	4	0	
	WB	18	0	
5:15 PM	NB	7	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	4	0	
	WB	28	0	
5:30 PM	NB	1	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	5	0	
	WB	11	0	
5:45 PM	NB	0	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	6	0	
	WB	8	0	
6:00 PM	NB	3	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	7	0	
	WB	5	0	

## **APPENDIX B: CAPACITY ANALYSIS**

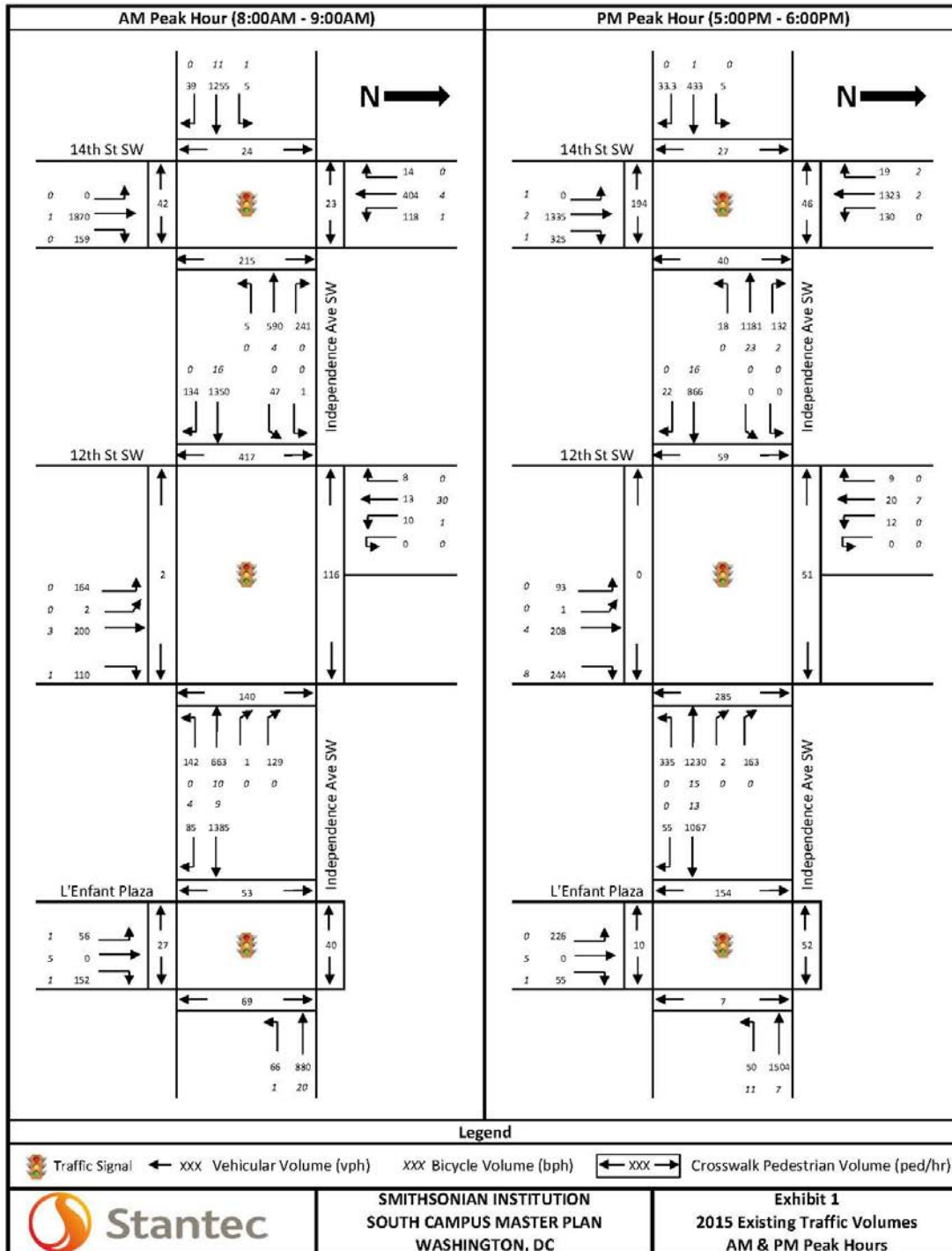
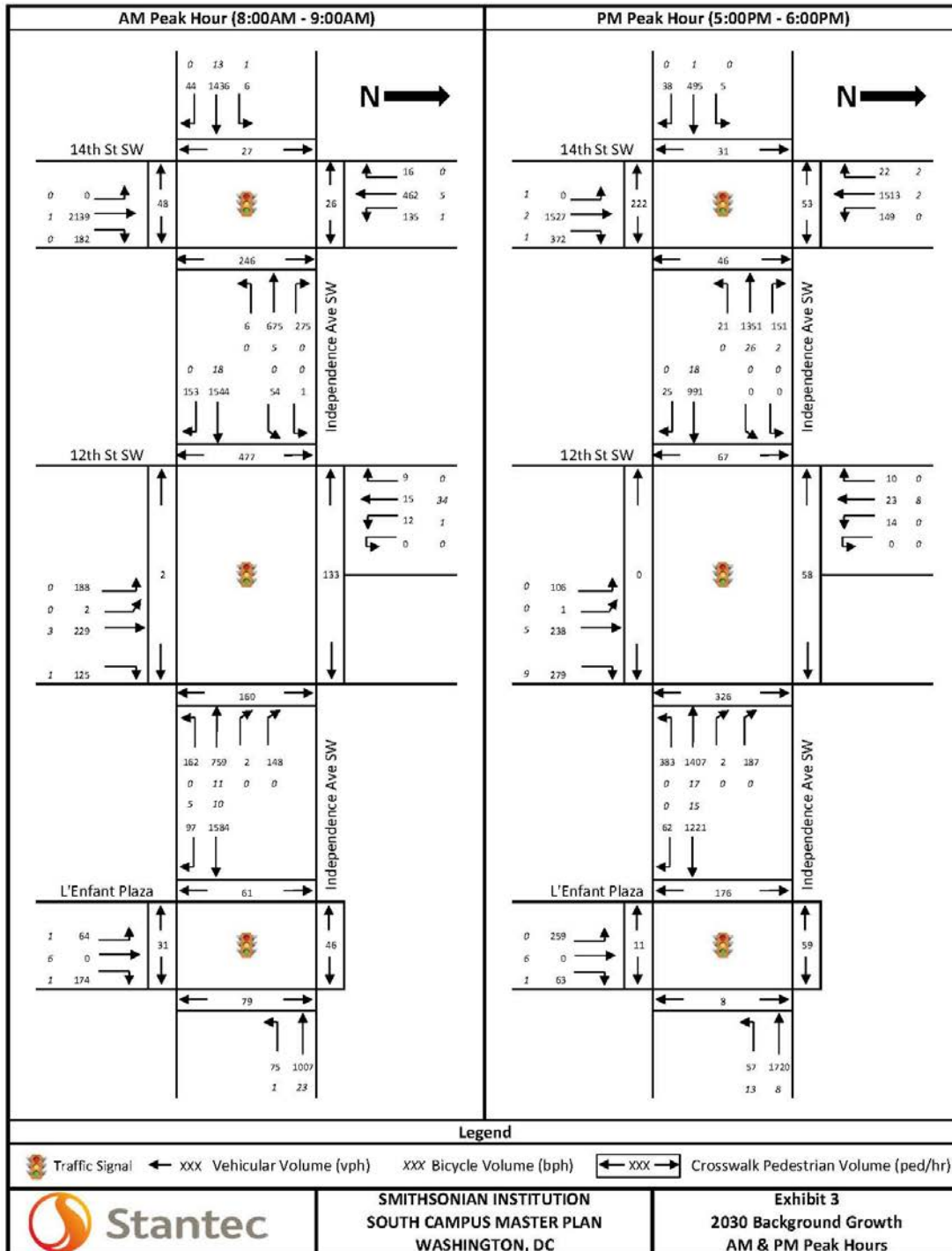
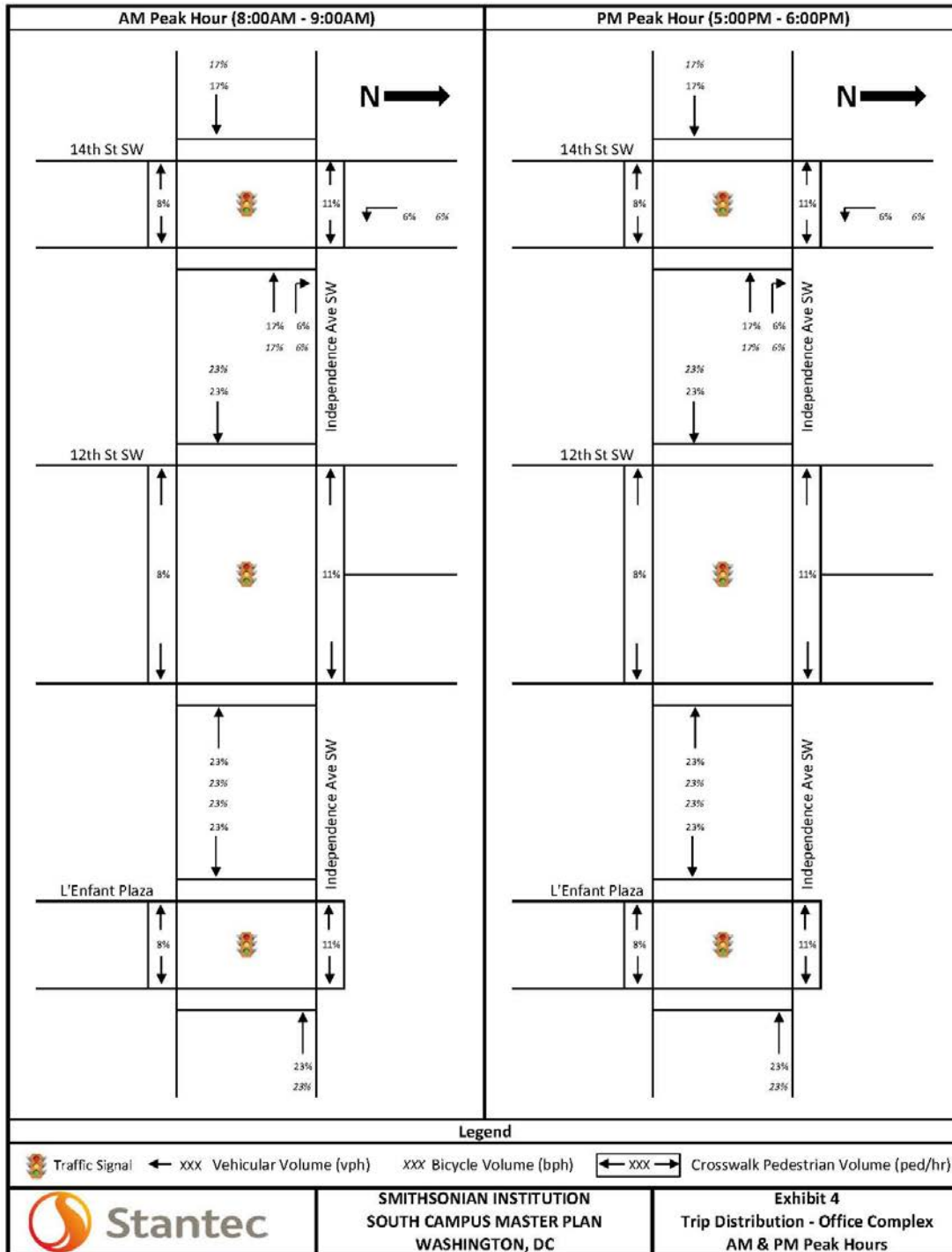


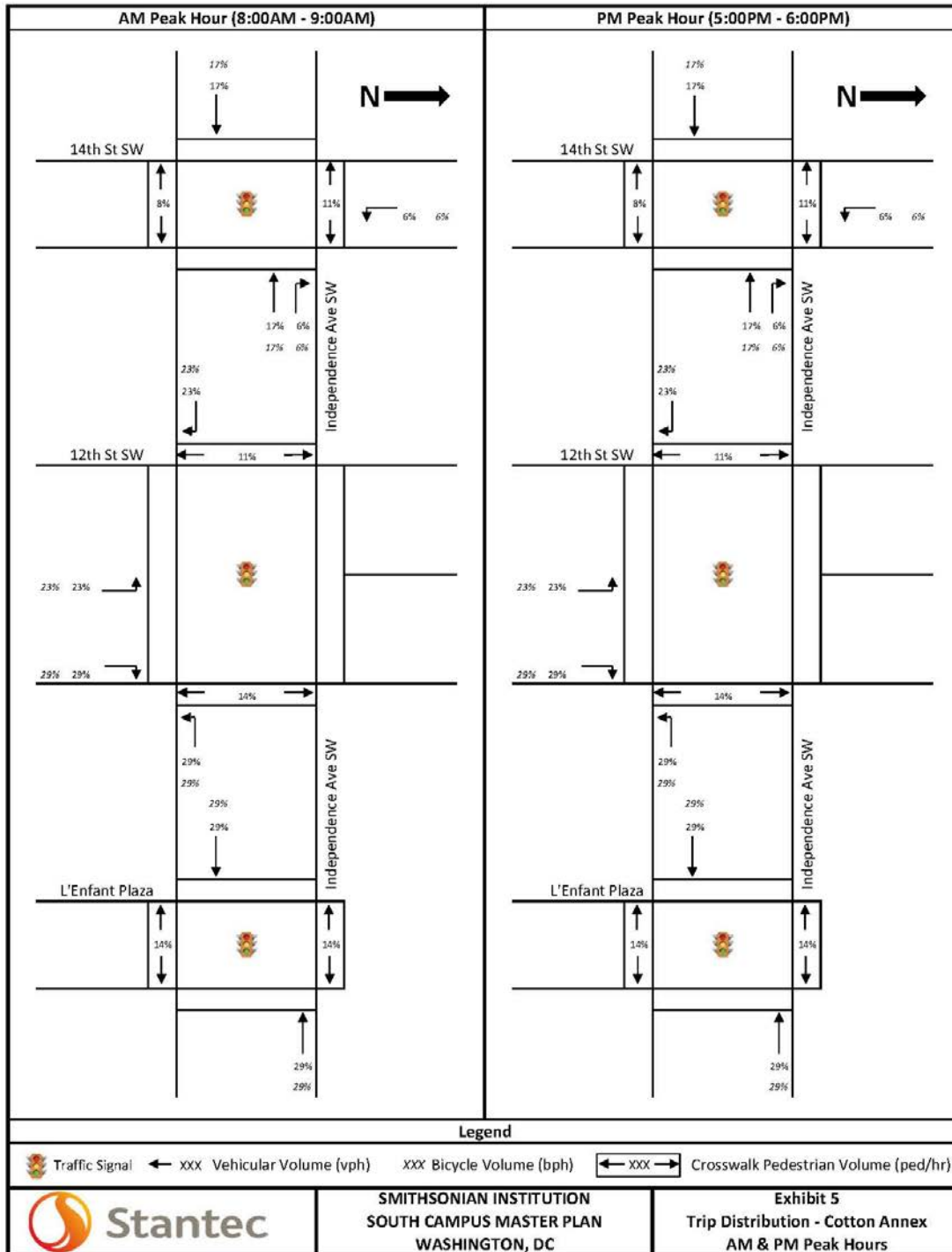
Exhibit 2  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2015 Existing Condition

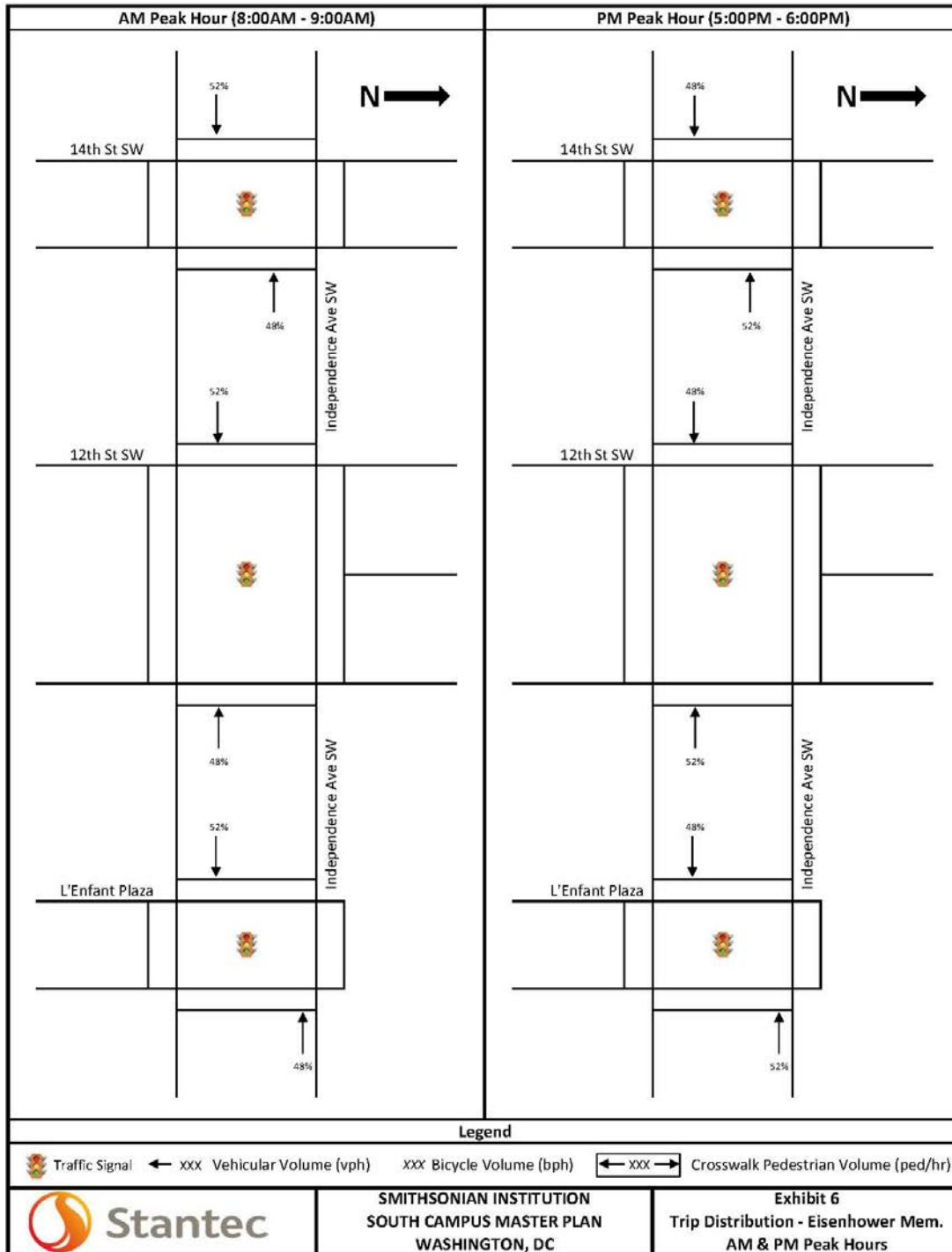
Intersection	Lane Group	AM Peak Hour (8:00AM - 9:00AM)				Lane Group	PM Peak Hour (5:00PM - 6:00PM)			
		v/c Ratio	Delay (sec)	Level of Service	50th %ile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %ile Queue Length (ft)
14th Street SW & Independence Avenue SW <i>Signalized</i>	EB-TR	0.95	51.4	D	354	EB-TR	0.40	31.7	C	100
	WB-T	0.48	41.1	D	147	WB-T	1.01	54.4	F	~343
	WB-R	0.51	30.9	C	102	WB-R	0.31	8.1	A	19
	NB-T	0.85	29.4	C	447	NB-T	0.65	26.1	C	279
	NB-R	0.31	9.9	A	32	NB-R	0.47	14.1	B	88
	SB-L	0.83	61.6	E	47	SB-L	0.46	18.2	B	37
	SB-TR	0.17	10.0	A	48	SB-TR	0.48	11.8	B	181
	Intersection	-	35.4	D	-	Intersection	-	28.2	C	-
12th Street SW & Independence Avenue SW <i>Signalized</i>	EB-LTR	0.72	6.8	A	38	EB-LTR	0.47	30.3	C	171
	WB-L	0.57	35.0	D	53	WB-L	0.66	23.7	C	70
	WB-LTR	0.39	5.1	A	34	WB-LTR	0.68	11.6	B	121
	NB-L	0.38	16.0	B	103	NB-L	0.20	21.9	C	52
	NB-TR	0.49	18.3	B	142	NB-TR	0.54	30.5	C	153
	NB-R	0.16	1.3	A	0	NB-R	0.27	2.6	A	1
	SB-LTR	0.08	0.4	A	0	SB-LTR	0.10	0.4	A	0
	Intersection	-	8.6	A	-	Intersection	-	18.8	B	-
L'Enfant Plaza & Independence Avenue SW <i>Signalized</i>	EB-TR	0.50	3.4	A	25	EB-TR	0.42	20.9	C	225
	WB-LT	0.35	8.9	A	79	WB-LT	0.57	12.0	B	163
	NB-L	0.14	34.7	C	33	NB-L	0.60	44.6	D	159
	NB-R	0.30	16.9	B	47	NB-R	0.10	6.1	A	0
	Intersection	-	6.8	A	-	Intersection	-	17.8	B	-

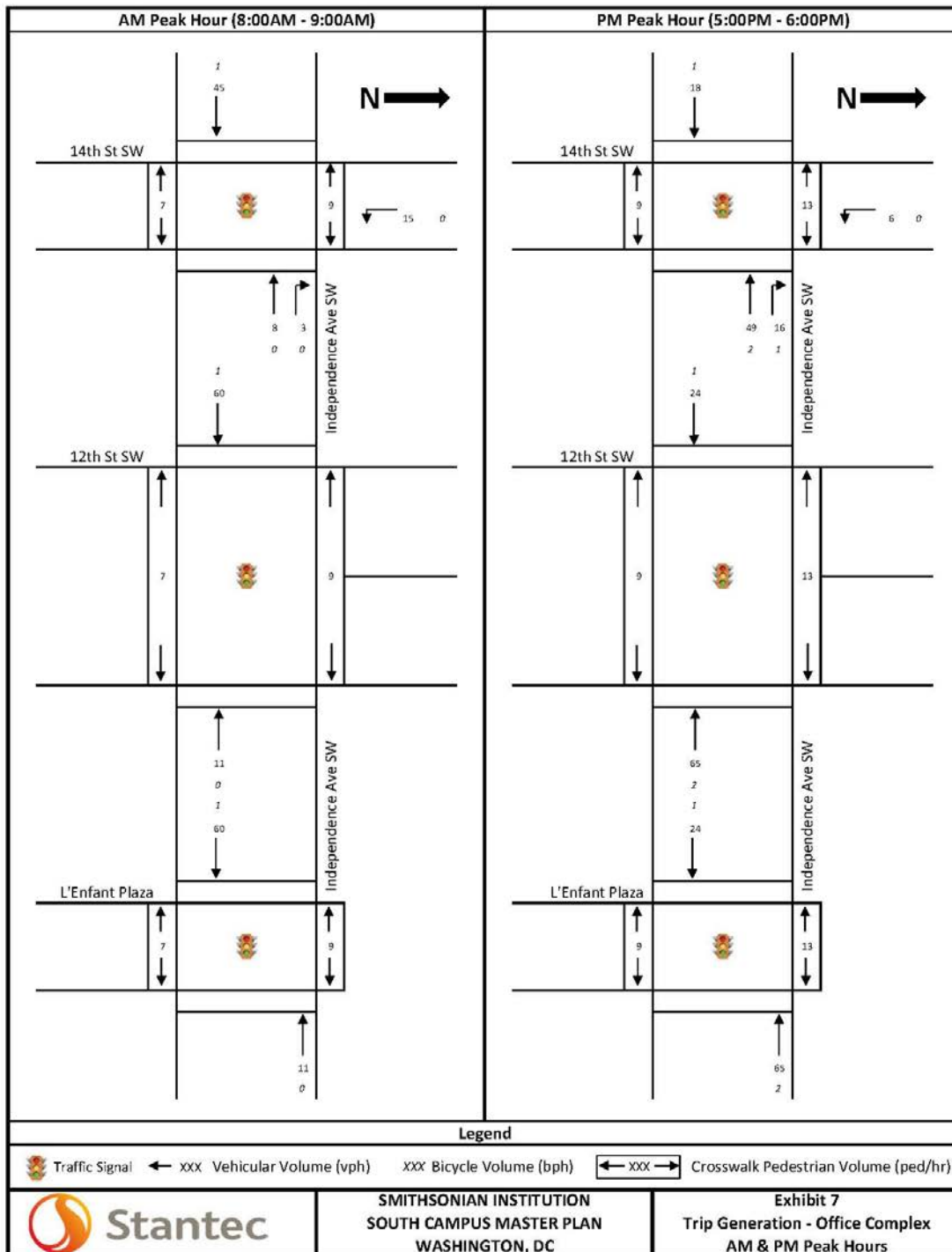
v/c ratio = volume/capacity ratio  
Source: Synchro 9

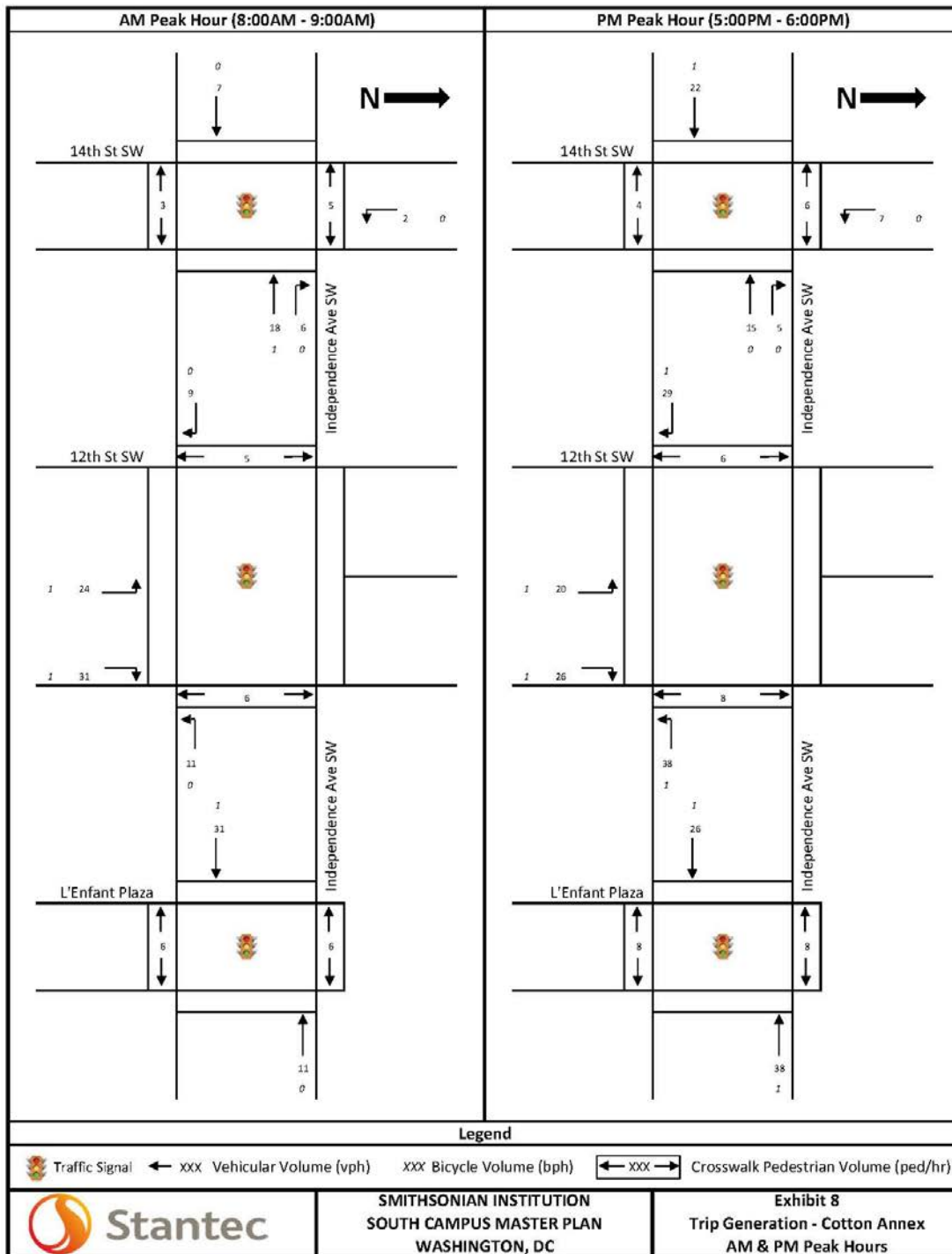


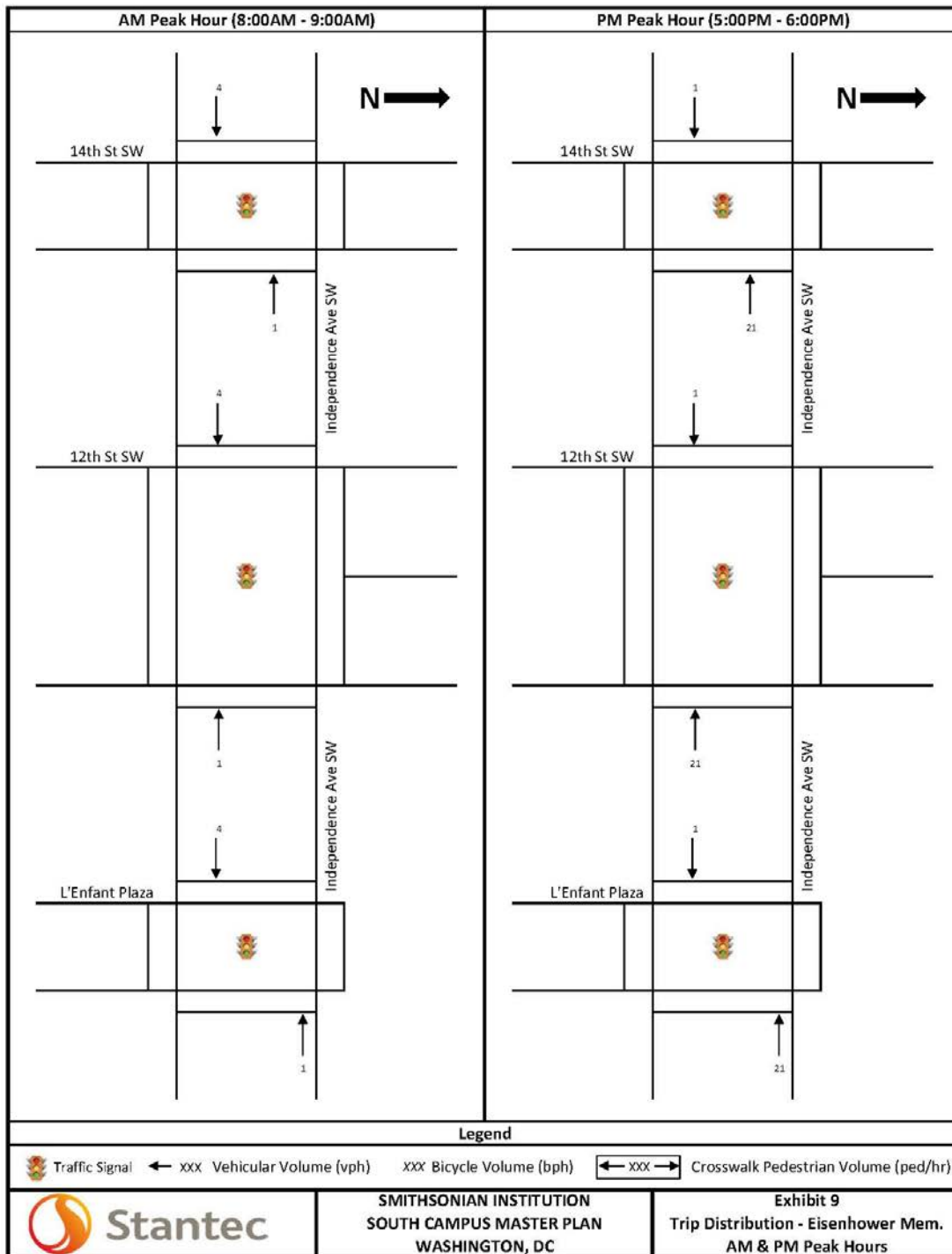












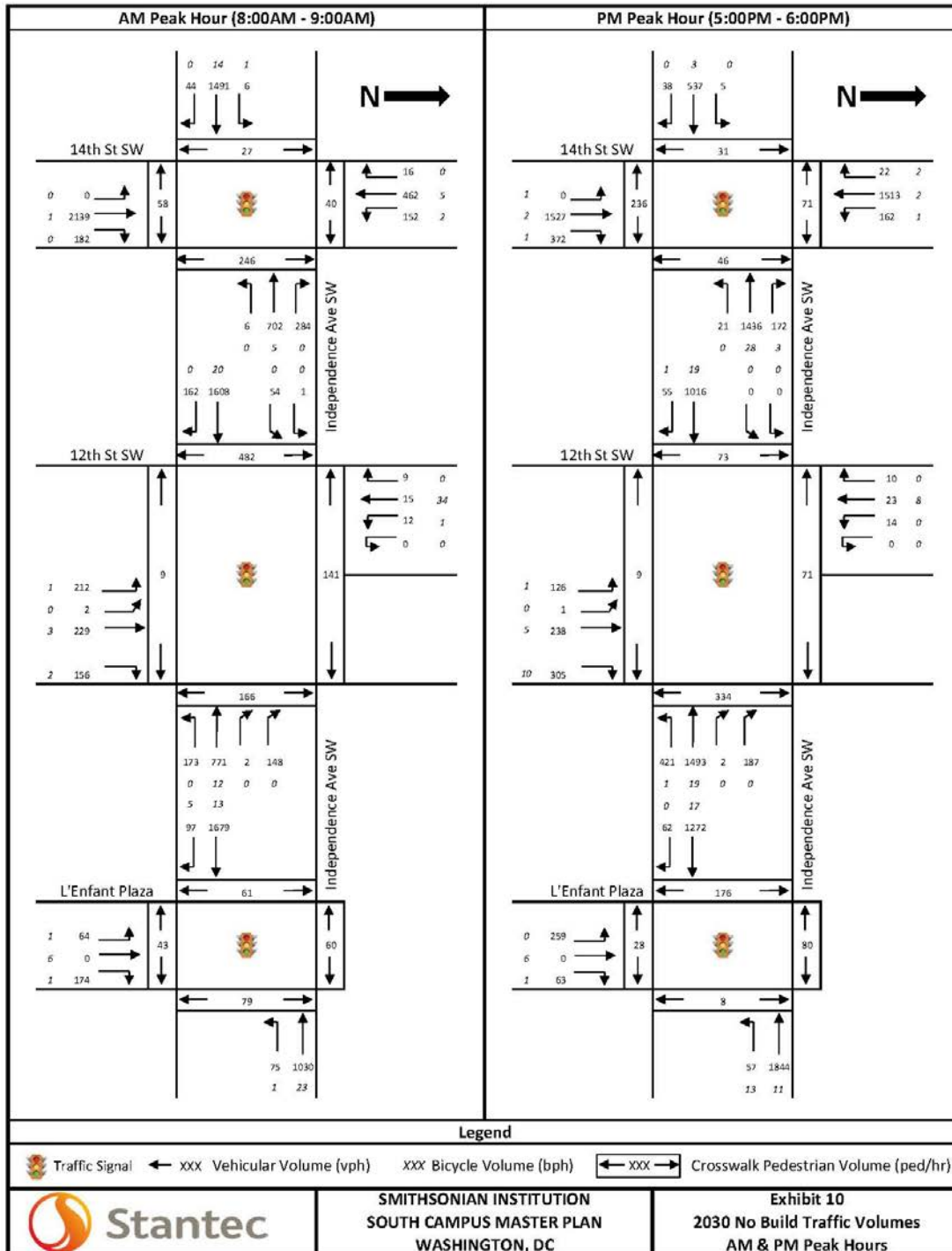
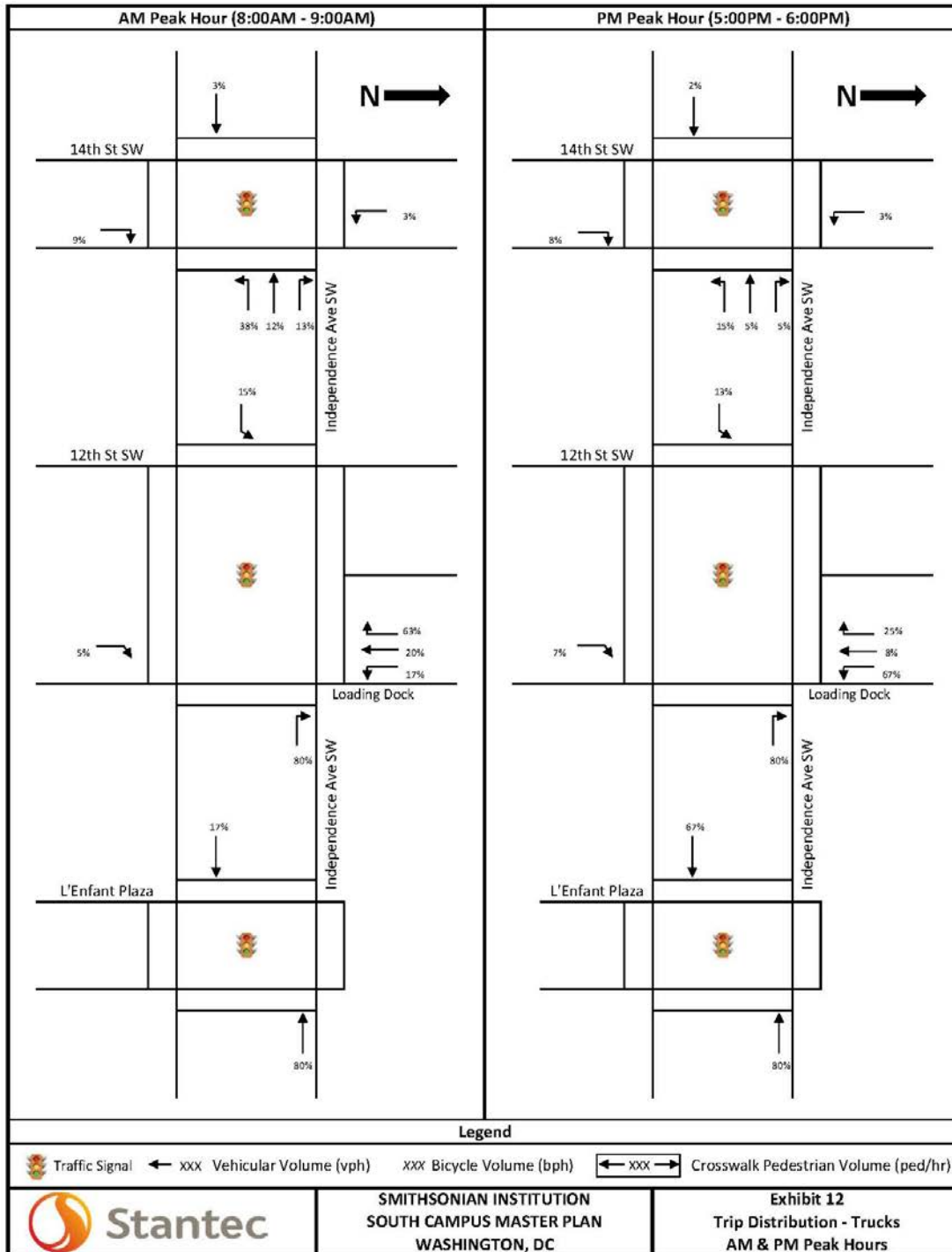
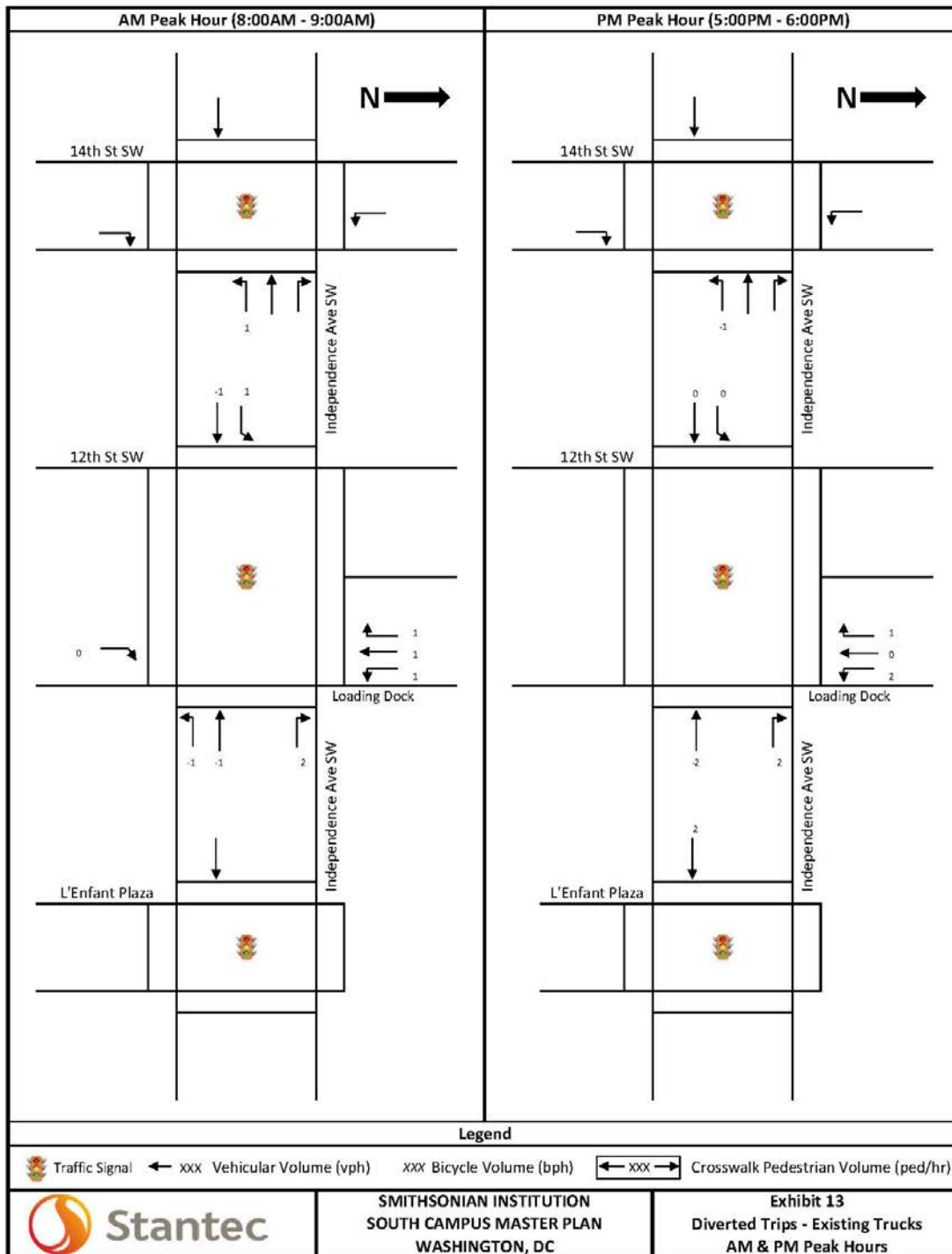


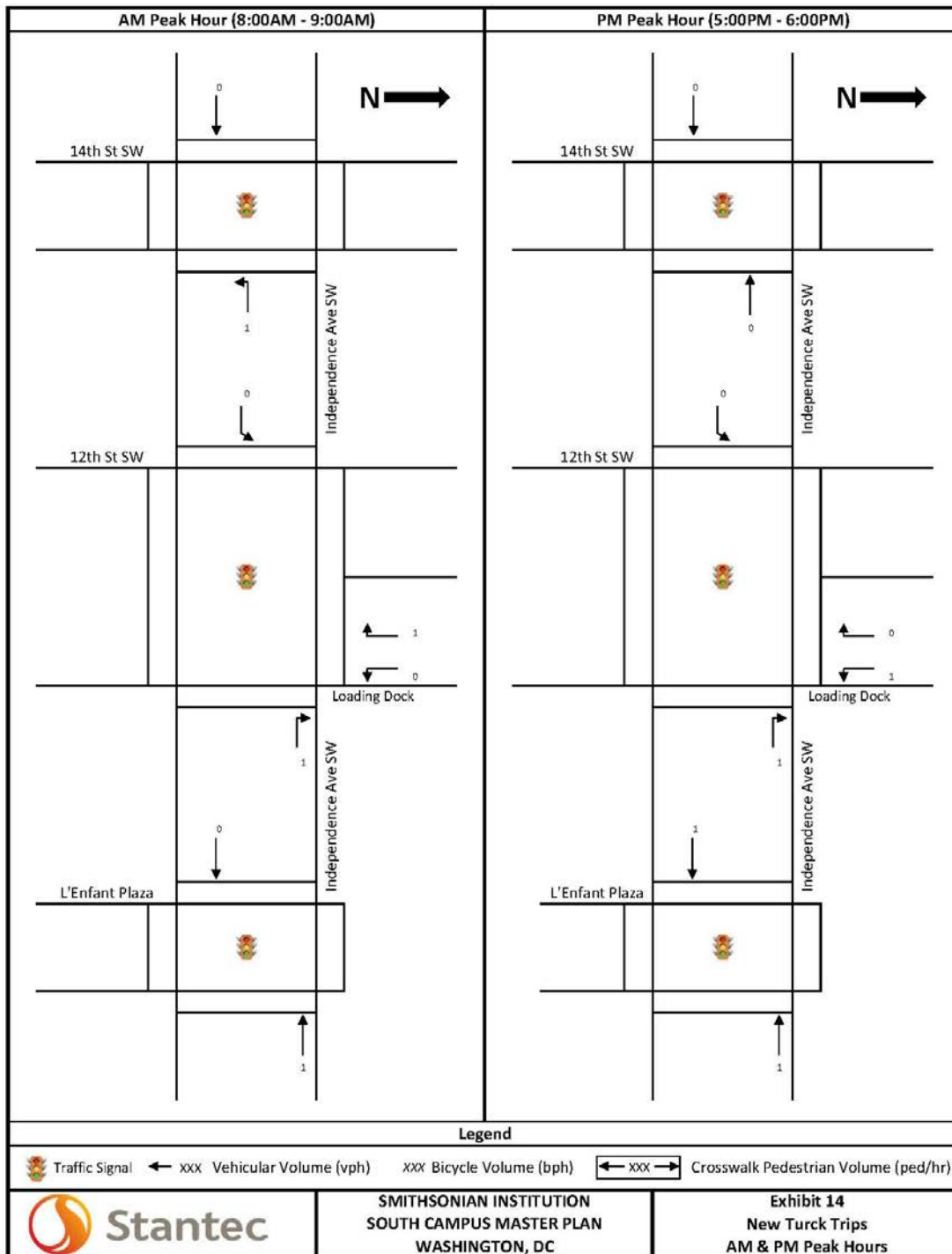
Exhibit 11  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2030 No Build Condition

Intersection	Lane Group	AM Peak Hour (8:00AM - 9:00AM)					Lane Group	PM Peak Hour (5:00PM - 6:00PM)				
		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)
14th Street SW & Independence Avenue SW <i>Signalized</i>	EB-TR	1.13	104.0	F	~506	#604	EB-TR	0.53	34.2	C	130	169
	WB-T	0.63	43.5	D	191	232	WB-T	1.23	135.0	F	~497	#601
	WB-R	0.61	34.4	C	13	240	WB-R	0.40	7.4	A	22	m37
	NB-T	0.97	41.2	D	568	#704	NB-T	0.74	28.4	C	338	397
	NB-R	0.36	11.5	B	43	98	NB-R	0.56	19.9	B	145	242
	SB-L	1.07	119.9	F	~86	#225	SB-L	0.60	30.4	C	65	139
	SB-TR	0.19	10.2	B	56	74	SB-TR	0.55	12.8	B	221	261
Intersection	-	57.3	E	-	-	Intersection	-	50.5	D	-	-	
12th Street SW & Independence Avenue SW <i>Signalized</i>	EB-LTR	0.88	9.3	A	45	m44	EB-LTR	0.57	32.3	C	208	242
	WB-L	0.73	47.3	D	86	#203	WB-L	0.88	43.5	D	118	#325
	WB-LTR	0.47	5.7	A	41	49	WB-LTR	0.87	18.6	B	219	290
	NB-L	0.49	17.5	B	137	216	NB-L	0.27	17.5	B	72	125
	NB-TR	0.58	19.5	B	169	261	NB-TR	0.67	27.9	C	196	303
	NB-R	0.23	1.4	A	0	0	NB-R	0.32	2.0	A	11	46
	SB-LTR	0.09	0.4	A	0	0	SB-LTR	0.11	0.8	A	0	3
Intersection	-	10.8	B	-	-	Intersection	-	24.3	C	-	-	
L'Enfant Plaza & Independence Avenue SW <i>Signalized</i>	EB-TR	0.61	3.9	A	36	39	EB-TR	0.49	21.4	C	270	305
	WB-LT	0.42	9.5	A	95	113	WB-LT	0.74	16.4	B	227	258
	NB-L	0.16	35.0	D	38	76	NB-L	0.66	46.2	D	184	279
	NB-R	0.35	20.6	C	65	121	NB-R	0.12	8.0	A	4	34
Intersection	-	7.5	A	-	-	Intersection	-	20.3	C	-	-	

v/c ratio = volume/capacity ratio  
Source: Synchro 9







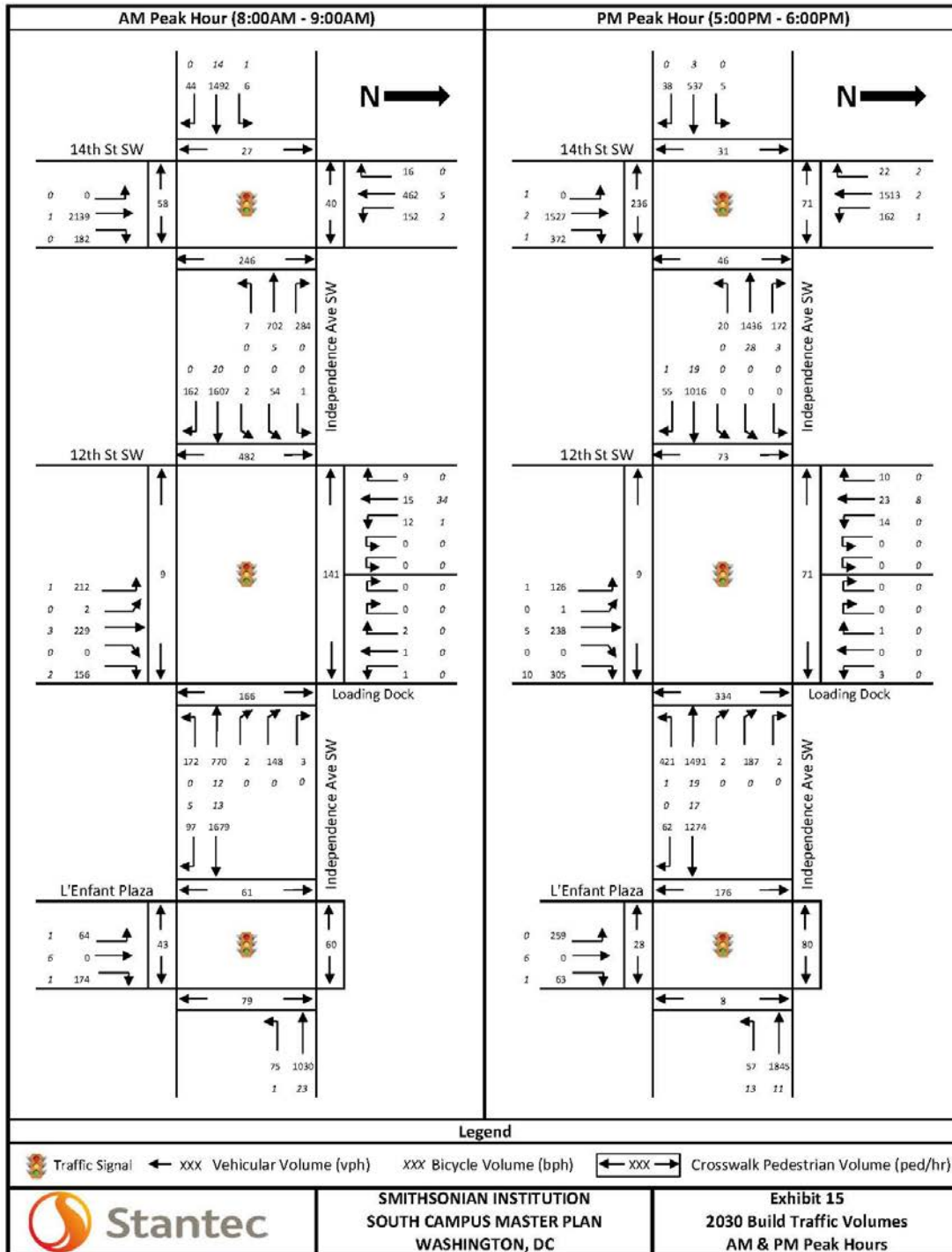


Exhibit 16  
Smithsonian Institution, South Campus Master Plan  
Capacity Analysis Results  
2030 Build Condition

Intersection	AM Peak Hour (8:00AM - 9:00AM)						Lane Group	PM Peak Hour (5:00PM - 6:00PM)					
	Lane Group	v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)		v/c Ratio	Delay (sec)	Level of Service	50th %tile Queue Length (ft)	95th %tile Queue Length (ft)	
14th Street SW & Independence Avenue SW Signalized	EB-TR	1.13	104.3	F		~506	#605	EB-TR	0.53	34.2	C	130	169
	WB-T	0.64	42.5	D		205	242	WB-T	1.23	135.0	F		#577
	WB-R	0.61	34.8	C		151	255	WB-R	0.40	5.1	A	13	m26
	NB-T	0.97	41.2	D		568	#704	NB-T	0.74	28.4	C	338	397
	NB-R	0.36	11.5	B		43	98	NB-R	0.56	19.9	B	145	242
	SB-L	1.07	119.9	F		~86	#225	SB-L	0.60	30.4	C	65	139
	SB-TR	0.19	10.2	B		56	74	SB-TR	0.55	12.8	B	221	261
	Intersection	-	57.3	E		-	-	Intersection	-	50.4	D	-	-
12th Street SW & Independence Avenue SW Signalized	EB-LTR	1.04	34.0	F		~440	m375	EB-LTR	0.48	25.7	C	165	236
	WB-L	0.77	53.3	D		87	#212	WB-L	0.93	48.5	D	190	#444
	WB-LTR	0.53	10.5	B		71	84	WB-LTR	0.85	12.6	B	124	#308
	NB-L	0.57	19.2	B		145	227	NB-L	0.33	21.3	C	78	135
	NB-TR	0.59	19.5	B		156	242	NB-TR	0.60	29.2	C	158	245
	NB-R	0.25	1.4	A		0	1	NB-R	0.40	3.7	A	41	94
	SB-LTR	0.09	0.4	A		0	0	SB-LTR	0.12	0.5	A	0	0
	Loading-LTR	0.11	57.2	E		3	15	Loading-LTR	0.11	56.8	E	3	15
L'Enfant Plaza & Independence Avenue SW Signalized	Intersection	-	25.0	C		-	-	Intersection	-	19.9	B	-	-
	EB-TR	0.61	3.2	A		22	m25	EB-TR	0.49	11.7	B	237	68
	WB-LT	0.42	9.5	A		95	113	WB-LT	0.74	16.4	B	227	258
	NB-L	0.16	35.0	D		38	76	NB-L	0.66	46.2	D	184	279
	NB-R	0.35	20.6	C		65	121	NB-R	0.12	8.0	A	4	34
	Intersection	-	7.0	A		-	-	Intersection	-	16.6	B	-	-

v/c ratio = volume/capacity ratio  
Source: Synchro 9

## **APPENDIX C: SYNCHRO OUTPUT**

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	↖	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	1255	39	5	590	241	0	1870	159	118	404	14
Future Volume (vph)	5	1255	39	5	590	241	0	1870	159	118	404	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4967	0	0	4764	1422	0	4964	1524	1452	4571	0
Flt Permitted		0.937			0.894					0.075		
Satd. Flow (perm)	0	4654	0	0	4259	1366	0	4964	1081	115	4571	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				123			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	23		42	42		23	24		215	215		24
Confl. Bikes (#/hr)			11			4			1			4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1411	0	0	646	262	0	2033	173	128	454	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		0.95			0.48	0.51		0.85	0.31	0.83	0.17	
Control Delay		51.4			41.1	30.9		29.4	9.9	61.6	10.0	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		51.4			41.1	30.9		29.4	9.9	61.6	10.0	
LOS		D			D	C		C	A	E	A	
Approach Delay		51.4			38.2			27.9			21.3	
Approach LOS		D			D			C			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.95											
Intersection Signal Delay:	35.4					Intersection LOS: D						

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Intersection Capacity Utilization 99.0%  
Analysis Period (min) 15

ICU Level of Service F

Splits and Phases: 1: 14th St SW & Independence Ave SW

<p>↑ ø2 (R)</p> <p>58 s</p>	<p>→ ø4</p> <p>40 s</p>	<p>↘ ø9</p> <p>12 s</p>
<p>↓ ø6 (R)</p> <p>58 s</p>	<p>← ø8</p> <p>40 s</p>	

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Group												
Lane Configurations			4111		1	4111				2	1	1
Traffic Volume (vph)	1	47	1350	134	142	663	1	129	164	2	200	110
Future Volume (vph)	1	47	1350	134	142	663	1	129	164	2	200	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	11
Satd. Flow (prot)	0	0	5937	0	1407	3883	0	0	0	1695	1663	1440
Flt Permitted			0.854		0.085	0.901				0.950		
Satd. Flow (perm)	0	0	5056	0	126	3502	0	0	0	1101	1663	1440
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			26			21					3	35
Link Speed (mph)			35			35					30	
Link Distance (ft)			1110			590					162	
Travel Time (s)			21.6			11.5					3.7	
Confl. Peds. (#/hr)	116	116		2			116	116	417			140
Confl. Bikes (#/hr)				16			10	10				3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%	3%	3%	3%	0%	3%	3%
Shared Lane Traffic (%)					10%							10%
Lane Group Flow (vph)	0	0	1665	0	139	877	0	0	0	180	229	108
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA	pt+ov
Protected Phases			6		5	2			4	4!	4!	4 5!
Permitted Phases	6	6			2							
Minimum Split (s)	42.0	42.0	42.0		19.0	61.0			36.0	36.0	36.0	
Total Split (s)	55.0	55.0	55.0		19.0	74.0			36.0	36.0	36.0	
Total Split (%)	50.0%	50.0%	50.0%		17.3%	67.3%			32.7%	32.7%	32.7%	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0	
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5	
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5	
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Act Effct Green (s)			50.0		69.0	69.0				30.5	30.5	49.5
Actuated g/C Ratio			0.45		0.63	0.63				0.28	0.28	0.45
v/c Ratio			0.72		0.57	0.39				0.38	0.49	0.16
Control Delay			6.8		35.0	5.1				14.0	16.4	0.5
Queue Delay			0.0		0.0	0.0				2.0	1.8	0.7
Total Delay			6.8		35.0	5.1				16.0	18.3	1.3
LOS			A		D	A				B	B	A
Approach Delay			6.8			9.2					13.9	
Approach LOS			A			A					B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 57 (52%), Referenced to phase 2:WBT and 6:EBTL, Start of Green												
Natural Cycle: 100												
Control Type: Pre-timed												
Maximum v/c Ratio: 0.72												
Intersection Signal Delay: 8.6	Intersection LOS: A											

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

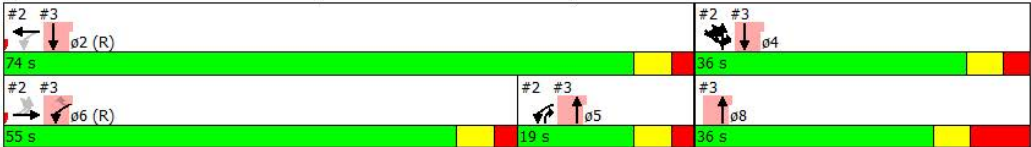
	SEL	SER	SER2	ø8
Lane Group				
Lane Configurations	RT			
Traffic Volume (vph)	10	13	8	
Future Volume (vph)	10	13	8	
Ideal Flow (vphpl)	1900	1900	1900	
Lane Width (ft)	14	14	14	
Satd. Flow (prot)	1299	0	0	
Flt Permitted	0.984			
Satd. Flow (perm)	1222	0	0	
Right Turn on Red			Yes	
Satd. Flow (RTOR)	99			
Link Speed (mph)	30			
Link Distance (ft)	395			
Travel Time (s)	9.0			
Confl. Peds. (#/hr)	140		417	
Confl. Bikes (#/hr)		30	30	
Peak Hour Factor	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	10%	0%	
Shared Lane Traffic (%)				
Lane Group Flow (vph)	34	0	0	
Turn Type	Prot			
Protected Phases	4!			8
Permitted Phases				
Minimum Split (s)	36.0			36.0
Total Split (s)	36.0			36.0
Total Split (%)	32.7%			33%
Yellow Time (s)	4.0			4.0
All-Red Time (s)	3.0			6.5
Lost Time Adjust (s)	-1.5			
Total Lost Time (s)	5.5			
Lead/Lag				
Lead-Lag Optimize?				
Act Effect Green (s)	30.5			
Actuated g/C Ratio	0.28			
v/c Ratio	0.08			
Control Delay	0.4			
Queue Delay	0.0			
Total Delay	0.4			
LOS	A			
Approach Delay	0.4			
Approach LOS	A			
Intersection Summary				

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour











Intersection Capacity Utilization 96.6%	ICU Level of Service F
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

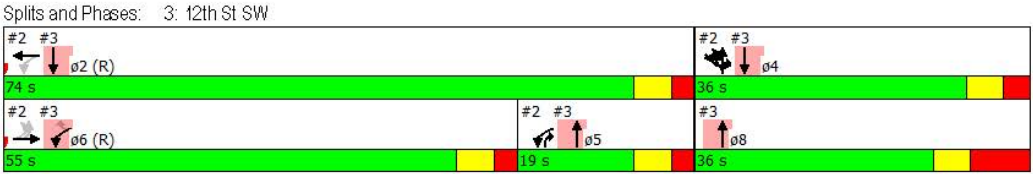
2015 Existing  
AM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	476	0	0	289				
Future Volume (vph)	0	0	476	0	0	289				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1773	1837	4868	0	0	3271				
Flt Permitted										
Satd. Flow (perm)	1773	1837	4868	0	0	3271				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	517	0	0	314				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					61.0	36.0	19.0	36.0
Total Split (s)	55.0	55.0					74.0	36.0	19.0	36.0
Total Split (%)	50.0%	50.0%					67%	33%	17%	33%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effct Green (s)			46.0			110.0				
Actuated g/C Ratio			0.42			1.00				
v/c Ratio			0.25			0.10				
Control Delay			21.3			0.0				
Queue Delay			0.0			0.0				
Total Delay			21.3			0.0				
LOS			C			A				
Approach Delay			21.3			0.0				
Approach LOS			C			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 57 (52%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 100										
Control Type: Pretimed										
Maximum v/c Ratio: 0.72										
Intersection Signal Delay: 13.3						Intersection LOS: B				
Intersection Capacity Utilization 16.7%						ICU Level of Service A				
Analysis Period (min) 15										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

! Phase conflict between lane groups.



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1385	85	66	880	56	152	
Future Volume (vph)	1385	85	66	880	56	152	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5940	0	0	5905	1805	1615	
Flt Permitted				0.758	0.950		
Satd. Flow (perm)	5940	0	0	4487	1673	1441	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	17					58	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		27	27		53	69	
Confl. Bikes (#/hr)		9				5	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1532	0	0	986	58	158	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.50			0.35	0.14	0.30	
Control Delay	3.4			8.9	34.7	16.9	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.4			8.9	34.7	16.9	
LOS	A			A	C	B	
Approach Delay	3.4			8.9	21.7		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 67 (61%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 67.5%	ICU Level of Service C
Analysis Period (min): 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

<div> </div> <div> <div>02 (R)</div> <div>61.5 s</div> </div>	<div> </div> <div> <div>04</div> <div>30 s</div> </div>	<div> </div> <div> <div>09</div> <div>14.5 s</div> </div>
<div> </div> <div> <div>06 (R)</div> <div>61.5 s</div> </div>		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	↖	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	433	33	18	1181	132	0	1335	325	130	1323	19
Future Volume (vph)	5	433	33	18	1181	132	0	1335	325	130	1323	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4741	0	0	4644	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.898			0.925					0.105		
Satd. Flow (perm)	0	4262	0	0	4293	1209	0	4964	1481	175	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				139			151		2	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	46		194	194		46	27		40	40		27
Confl. Bikes (#/hr)			1			23			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	496	0	0	1262	139	0	1405	342	137	1413	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.40			1.01	0.31		0.65	0.47	0.46	0.48	
Control Delay		31.7			54.4	8.1		26.1	14.1	18.2	11.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		31.7			54.4	8.1		26.1	14.1	18.2	11.8	
LOS		C			D	A		C	B	B	B	
Approach Delay		31.7			49.8			23.8			12.4	
Approach LOS		C			D			C			B	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 110												
Control Type: Pretimed												
Maximum v/c Ratio: 1.01												
Intersection Signal Delay: 28.2	Intersection LOS: C											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	






1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour

Intersection Capacity Utilization 88.3%  
Analysis Period (min) 15

ICU Level of Service E

Splits and Phases: 1: 14th St SW & Independence Ave SW

 02 (R) 53 s	 04 37 s	 09 20 s
 06 (R) 53 s	 08 37 s	

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	↑↑↑↑		↙	↑↑↑↑				↘	↑	↘	↘	
Traffic Volume (vph)	866	22	335	1230	2	163	93	1	208	244	12	20
Future Volume (vph)	866	22	335	1230	2	163	93	1	208	244	12	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	14	14
Satd. Flow (prot)	5896	0	1393	4060	0	0	0	1678	1568	1426	1281	0
Flt Permitted			0.225	0.855				0.950			0.985	
Satd. Flow (perm)	5896	0	330	3478	0	0	0	1548	1568	1426	1159	0
Right Turn on Red		Yes			Yes					Yes		
Satd. Flow (RTOR)	5			1				8		35	99	
Link Speed (mph)	35			35				30			30	
Link Distance (ft)	1110			590				162			395	
Travel Time (s)	21.6			11.5				3.7			9.0	
Confl. Peds. (#/hr)					51	51	59			285	285	
Confl. Bikes (#/hr)		16			15	15				4		7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Shared Lane Traffic (%)			17%							14%		
Lane Group Flow (vph)	935	0	293	1529	0	0	0	99	255	221	43	0
Turn Type	NA		pm+pt	NA			Split	Split	NA	pt+ov	Prot	
Protected Phases	6		5	2			4	4!	4!	4 5!	4!	
Permitted Phases			2									
Minimum Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (%)	38.2%		27.3%	65.5%			34.5%	34.5%	34.5%		34.5%	
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0		4.0	
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0		3.0	
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5		-1.5	
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5		5.5	
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Act Effct Green (s)	37.0		67.0	67.0				32.5	32.5	62.5	32.5	
Actuated g/C Ratio	0.34		0.61	0.61				0.30	0.30	0.57	0.30	
v/c Ratio	0.47		0.66	0.68				0.20	0.54	0.27	0.10	
Control Delay	30.3		23.7	11.6				19.0	25.1	2.0	0.4	
Queue Delay	0.0		0.0	0.0				2.9	5.4	0.6	0.0	
Total Delay	30.3		23.7	11.6				21.9	30.5	2.6	0.4	
LOS	C		C	B				C	C	A	A	
Approach Delay	30.3			13.6					18.3		0.4	
Approach LOS	C			B					B		A	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green											
Natural Cycle:	110											
Control Type:	Pre-timed											
Maximum v/c Ratio:	0.68											
Intersection Signal Delay:	18.8						Intersection LOS: B					

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour



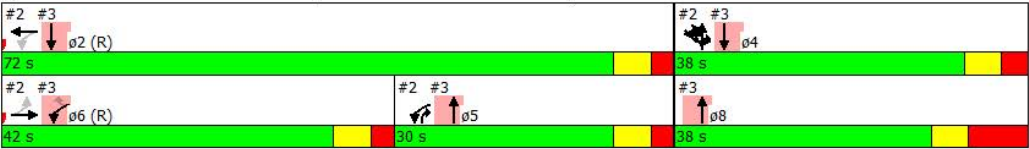
Lane Group	SER2	ø8
Lane Configurations		
Traffic Volume (vph)	9	
Future Volume (vph)	9	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	14	
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	59	
Confl. Bikes (#/hr)	7	
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Yellow Time (s)	4.0	
All-Red Time (s)	6.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour











Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



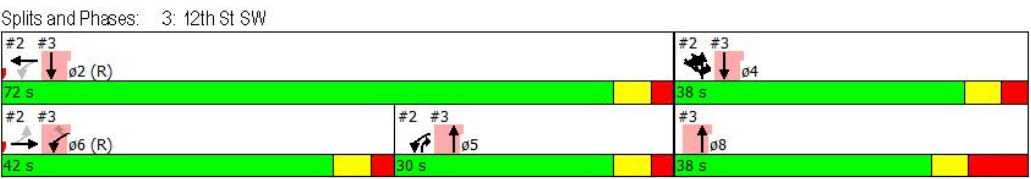
3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

											
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8	
Lane Configurations											
Traffic Volume (vph)	0	0	546	0	0	377					
Future Volume (vph)	0	0	546	0	0	377					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900					
Lane Width (ft)	10	11	11	11	10	10					
Satd. Flow (prot)	1739	1801	4916	0	0	3303					
Flt Permitted											
Satd. Flow (perm)	1739	1801	4916	0	0	3303					
Right Turn on Red		Yes		Yes							
Satd. Flow (RTOR)											
Link Speed (mph)	20		30			30					
Link Distance (ft)	188		380			162					
Travel Time (s)	6.4		8.6			3.7					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95					
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	575	0	0	397					
Turn Type	Prot	Perm	NA			NA					
Protected Phases	6l		5 8			2 4l	2	4	5	8	
Permitted Phases		6									
Minimum Split (s)	42.0	42.0					72.0	38.0	30.0	38.0	
Total Split (s)	42.0	42.0					72.0	38.0	30.0	38.0	
Total Split (%)	38.2%	38.2%					65%	35%	27%	35%	
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5	
Lost Time Adjust (s)	-1.5	-1.5									
Total Lost Time (s)	5.0	5.0									
Lead/Lag	Lead	Lead							Lag		
Lead-Lag Optimize?	Yes	Yes							Yes		
Act Effect Green (s)			63.0			110.0					
Actuated g/C Ratio			0.57			1.00					
v/c Ratio			0.20			0.12					
Control Delay			11.6			0.1					
Queue Delay			0.0			0.0					
Total Delay			11.6			0.1					
LOS			B			A					
Approach Delay			11.6			0.1					
Approach LOS			B			A					
Intersection Summary											
Area Type:	Other										
Cycle Length:	110										
Actuated Cycle Length:	110										
Offset:	4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle:	110										
Control Type:	Pretimed										
Maximum v/c Ratio:	0.68										
Intersection Signal Delay:	6.9				Intersection LOS: A						
Intersection Capacity Utilization	14.7%				ICU Level of Service A						
Analysis Period (min)	15										
! Phase conflict between lane groups.											

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1067	55	50	1504	226	55	
Future Volume (vph)	1067	55	50	1504	226	55	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5862	0	0	5854	1805	1615	
Flt Permitted				0.827	0.950		
Satd. Flow (perm)	5862	0	0	4850	1415	1580	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					61	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		10	10		157	7	
Confl. Bikes (#/hr)		13					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1247	0	0	1727	251	61	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	60.5		15.5	60.5	30.0	15.5	4.0
Total Split (%)	55.0%		14.1%	55.0%	27.3%	14.1%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	55.5			66.0	25.5	37.5	
Actuated g/C Ratio	0.50			0.60	0.23	0.34	
v/c Ratio	0.42			0.57	0.60	0.10	
Control Delay	20.9			12.0	44.6	6.1	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	20.9			12.0	44.6	6.1	
LOS	C			B	D	A	
Approach Delay	20.9			12.0	37.1		
Approach LOS	C			B	D		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2015 Existing  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 71.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 ø2 (R)	 ø4	 ø9
60.5 s	4 s 30 s	15.5 s
 ø6 (R)		
60.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	6	1491	44	6	702	284	0	2139	182	152	462	16
Future Volume (vph)	6	1491	44	6	702	284	0	2139	182	152	462	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4961	0	0	4759	1422	0	4964	1524	1452	4570	0
Flt Permitted		0.936			0.806					0.075		
Satd. Flow (perm)	0	4644	0	0	3836	1339	0	4964	1050	115	4570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				122			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	40		58	58		40	27		246	246		27
Confl. Bikes (#/hr)			14			5			1			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1676	0	0	770	309	0	2325	198	165	519	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		1.13			0.63	0.61		0.97	0.36	1.07	0.19	
Control Delay		104.0			43.5	34.4		41.2	11.5	119.9	10.2	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		104.0			43.5	34.4		41.2	11.5	119.9	10.2	
LOS		F			D	C		D	B	F	B	
Approach Delay		104.0			40.9			38.9			36.7	
Approach LOS		F			D			D			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	120											
Control Type:	Pre-timed											
Maximum v/c Ratio:	1.13											
Intersection Signal Delay:	57.3											
Intersection LOS:	E											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Intersection Capacity Utilization 108.9%  
Analysis Period (min) 15

ICU Level of Service G

Splits and Phases: 1: 14th St SW & Independence Ave SW



2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	↖	↗	→	↘	↙	←	↖	↗	↘	↙	↑	↗
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations			4111		1	4111				1	1	1
Traffic Volume (vph)	1	54	1608	162	173	771	2	148	212	2	229	156
Future Volume (vph)	1	54	1608	162	173	771	2	148	212	2	229	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	11
Satd. Flow (prot)	0	0	5931	0	1407	3851	0	0	0	1694	1653	1440
Flt Permitted			0.835		0.073	0.876				0.950		
Satd. Flow (perm)	0	0	4945	0	108	3377	0	0	0	1072	1653	1440
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			26			10					3	35
Link Speed (mph)			35			35					30	
Link Distance (ft)			1110			590					162	
Travel Time (s)			21.6			11.5					3.7	
Confl. Peds. (#/hr)	141	141		9	9		141	141	482			166
Confl. Bikes (#/hr)							12	12				3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	3%	3%	3%	3%	3%	0%	3%	3%
Shared Lane Traffic (%)					10%							10%
Lane Group Flow (vph)	0	0	1984	0	169	1020	0	0	0	232	266	153
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA	pt+ov
Protected Phases			6		5	2			4	4!	4!	4 5!
Permitted Phases	6	6			2							
Minimum Split (s)	42.0	42.0	42.0		19.0	61.0			36.0	36.0	36.0	
Total Split (s)	55.0	55.0	55.0		19.0	74.0			36.0	36.0	36.0	
Total Split (%)	50.0%	50.0%	50.0%		17.3%	67.3%			32.7%	32.7%	32.7%	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0	
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5	
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5	
Lead/Lag	Lead	Lead	Lead		Lag							
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							
Act Effct Green (s)			50.0		69.0	69.0				30.5	30.5	49.5
Actuated g/C Ratio			0.45		0.63	0.63				0.28	0.28	0.45
v/c Ratio			0.88		0.73	0.47				0.49	0.58	0.23
Control Delay			9.3		47.3	5.7				15.8	18.1	0.8
Queue Delay			0.0		0.0	0.0				1.7	1.4	0.6
Total Delay			9.3		47.3	5.7				17.5	19.5	1.4
LOS			A		D	A				B	B	A
Approach Delay			9.3			11.7					14.5	
Approach LOS			A			B					B	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 57 (52%), Referenced to phase 2:WBT and 6:EBTL, Start of Green												
Natural Cycle: 100												
Control Type: Pretimed												
Maximum v/c Ratio: 0.88												
Intersection Signal Delay: 10.8	Intersection LOS: B											

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

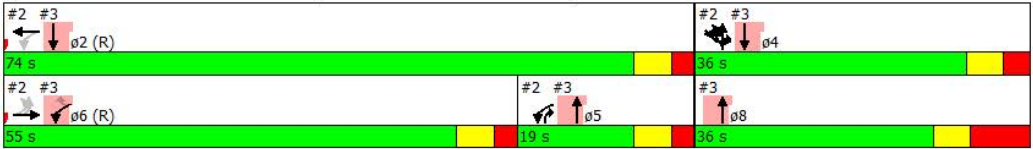
	SEL	SER	SER2	ø8
Lane Group	SEL	SER	SER2	ø8
Lane Configurations	RT			
Traffic Volume (vph)	12	15	9	
Future Volume (vph)	12	15	9	
Ideal Flow (vphpl)	1900	1900	1900	
Lane Width (ft)	14	14	14	
Satd. Flow (prot)	1311	0	0	
Flt Permitted	0.984			
Satd. Flow (perm)	1215	0	0	
Right Turn on Red			Yes	
Satd. Flow (RTOR)	99			
Link Speed (mph)	30			
Link Distance (ft)	395			
Travel Time (s)	9.0			
Confl. Peds. (#/hr)	166		482	
Confl. Bikes (#/hr)				
Peak Hour Factor	0.92	0.92	0.92	
Heavy Vehicles (%)	0%	10%	0%	
Shared Lane Traffic (%)				
Lane Group Flow (vph)	39	0	0	
Turn Type	Prot			
Protected Phases	4!			8
Permitted Phases				
Minimum Split (s)	36.0			36.0
Total Split (s)	36.0			36.0
Total Split (%)	32.7%			33%
Yellow Time (s)	4.0			4.0
All-Red Time (s)	3.0			6.5
Lost Time Adjust (s)	-1.5			
Total Lost Time (s)	5.5			
Lead/Lag				
Lead-Lag Optimize?				
Act Effect Green (s)	30.5			
Actuated g/C Ratio	0.28			
v/c Ratio	0.09			
Control Delay	0.4			
Queue Delay	0.0			
Total Delay	0.4			
LOS	A			
Approach Delay	0.4			
Approach LOS	A			
Intersection Summary				

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour











Intersection Capacity Utilization 103.4%	ICU Level of Service G
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

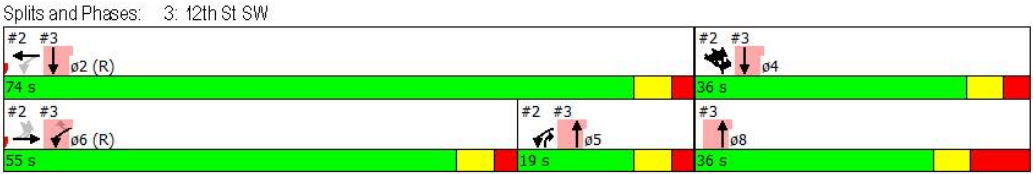
2030 No Build  
AM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	599	0	0	350				
Future Volume (vph)	0	0	599	0	0	350				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1773	1837	4868	0	0	3271				
Flt Permitted										
Satd. Flow (perm)	1773	1837	4868	0	0	3271				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	651	0	0	380				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					61.0	36.0	19.0	36.0
Total Split (s)	55.0	55.0					74.0	36.0	19.0	36.0
Total Split (%)	50.0%	50.0%					67%	33%	17%	33%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effct Green (s)			46.0			110.0				
Actuated g/C Ratio			0.42			1.00				
v/c Ratio			0.32			0.12				
Control Delay			22.0			0.0				
Queue Delay			0.0			0.0				
Total Delay			22.1			0.0				
LOS			C			A				
Approach Delay			22.1			0.0				
Approach LOS			C			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 57 (52%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 100										
Control Type: Prelimed										
Maximum v/c Ratio: 0.88										
Intersection Signal Delay: 14.0						Intersection LOS: B				
Intersection Capacity Utilization 19.1%						ICU Level of Service A				
Analysis Period (min) 15										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

! Phase conflict between lane groups.



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1679	97	75	1030	64	174	
Future Volume (vph)	1679	97	75	1030	64	174	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5928	0	0	5905	1805	1615	
Flt Permitted				0.734	0.950		
Satd. Flow (perm)	5928	0	0	4347	1654	1418	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	16					46	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		43	43		61	79	
Confl. Bikes (#/hr)		13				6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1850	0	0	1151	67	181	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.61			0.42	0.16	0.35	
Control Delay	3.9			9.5	35.0	20.6	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.9			9.5	35.0	20.6	
LOS	A			A	D	C	
Approach Delay	3.9			9.5	24.5		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 67 (61%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 ø2 (R)	 ø4	 ø9
61.5 s	4 s 30 s	14.5 s
 ø6 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	↖	→	↘	↙	←	↖	↙	↑	↗	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Future Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4748	0	0	4646	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.821			0.921					0.083		
Satd. Flow (perm)	0	3898	0	0	4280	1170	0	4964	1469	139	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				164			107			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	71		236	136		71	31		46	46		31
Confl. Bikes (#/hr)			3			28			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	610	0	0	1534	181	0	1607	392	171	1616	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.53			1.23	0.40		0.74	0.56	0.60	0.55	
Control Delay		34.2			135.0	7.4		28.4	19.9	30.4	12.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		34.2			135.0	7.4		28.4	19.9	30.4	12.8	
LOS		C			F	A		C	B	C	B	
Approach Delay		34.2			121.5			26.8			14.4	
Approach LOS		C			F			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 120												
Control Type: Pretimed												
Maximum v/c Ratio: 1.23												
Intersection Signal Delay: 50.5	Intersection LOS: D											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	





1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour

Intersection Capacity Utilization 93.0%  
Analysis Period (min) 15

ICU Level of Service F

Splits and Phases: 1: 14th St SW & Independence Ave SW

 02 (R) 53 s	 04 37 s	 09 20 s
 06 (R) 53 s	 08 37 s	

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	↑↑↑↑		↙	↑↑↑↑				↘	↑	↘	↘	
Traffic Volume (vph)	1016	55	421	1493	2	187	126	1	238	305	14	23
Future Volume (vph)	1016	55	421	1493	2	187	126	1	238	305	14	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	14	14
Satd. Flow (prot)	5861	0	1393	4060	0	0	0	1678	1534	1426	1265	0
Flt Permitted			0.164	0.776				0.950			0.985	
Satd. Flow (perm)	5861	0	240	3156	0	0	0	1516	1534	1426	1140	0
Right Turn on Red		Yes				Yes				Yes		
Satd. Flow (RTOR)	11							10		35		99
Link Speed (mph)	35			35				30				30
Link Distance (ft)	1110			590				162				395
Travel Time (s)	21.6			11.5				3.7				9.0
Confl. Peds. (#/hr)		9	9		71	71	73			334	334	
Confl. Bikes (#/hr)		19			19	19				5		8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Shared Lane Traffic (%)			19%							17%		
Lane Group Flow (vph)	1127	0	359	1855	0	0	0	134	306	266	50	0
Turn Type	NA		pm+pt	NA			Split	Split	NA	pt+ov	Prot	
Protected Phases	6		5	2			4	4!	4!	4 5!	4!	
Permitted Phases			2									
Minimum Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (s)	42.0		30.0	72.0			38.0	38.0	38.0		38.0	
Total Split (%)	38.2%		27.3%	65.5%			34.5%	34.5%	34.5%		34.5%	
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0		4.0	
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0		3.0	
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5		-1.5	
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5		5.5	
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Act Effct Green (s)	37.0		67.0	67.0				32.5	32.5	62.5	32.5	
Actuated g/C Ratio	0.34		0.61	0.61				0.30	0.30	0.57	0.30	
v/c Ratio	0.57		0.88	0.87				0.27	0.67	0.32	0.11	
Control Delay	32.3		43.5	18.6				17.5	27.9	2.0	0.8	
Queue Delay	0.0		0.0	0.0				3.0	3.8	0.4	0.0	
Total Delay	32.3		43.5	18.6				20.6	31.6	2.3	0.8	
LOS	C		D	B				C	C	A	A	
Approach Delay	32.3			22.6					18.5		0.8	
Approach LOS	C			C					B		A	
<b>Intersection Summary</b>												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green												
Natural Cycle: 110												
Control Type: Pretimed												
Maximum v/c Ratio: 0.88												
Intersection Signal Delay: 24.3	Intersection LOS: C											

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour



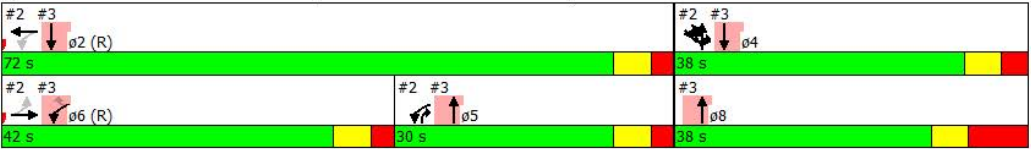
Lane Group	SER2	ø8
Lane Configurations		
Traffic Volume (vph)	10	
Future Volume (vph)	10	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	14	
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	73	
Confl. Bikes (#/hr)	8	
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Yellow Time (s)	4.0	
All-Red Time (s)	6.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

2: 12th St SW & Independence Ave SW & 12th St Ramp  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour











Intersection Capacity Utilization 107.1%	ICU Level of Service G
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp



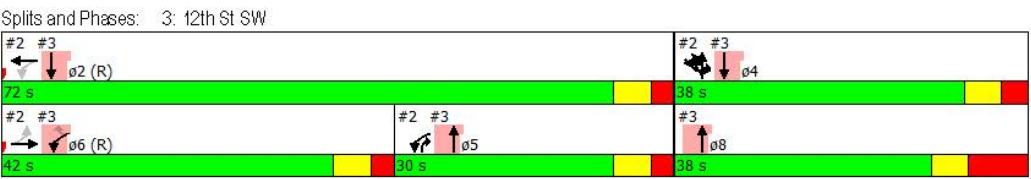
3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

										
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8
Lane Configurations										
Traffic Volume (vph)	0	0	670	0	0	499				
Future Volume (vph)	0	0	670	0	0	499				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	10	11	11	11	10	10				
Satd. Flow (prot)	1739	1801	4916	0	0	3303				
Flt Permitted										
Satd. Flow (perm)	1739	1801	4916	0	0	3303				
Right Turn on Red		Yes		Yes						
Satd. Flow (RTOR)										
Link Speed (mph)	20		30			30				
Link Distance (ft)	188		380			162				
Travel Time (s)	6.4		8.6			3.7				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	705	0	0	525				
Turn Type	Prot	Perm	NA			NA				
Protected Phases	6!		8 5			2 4!	2	4	5	8
Permitted Phases		6								
Minimum Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (s)	42.0	42.0					72.0	38.0	30.0	38.0
Total Split (%)	38.2%	38.2%					65%	35%	27%	35%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5
Lost Time Adjust (s)	-1.5	-1.5								
Total Lost Time (s)	5.0	5.0								
Lead/Lag	Lead	Lead							Lag	
Lead-Lag Optimize?	Yes	Yes							Yes	
Act Effect Green (s)			59.0			110.0				
Actuated g/C Ratio			0.54			1.00				
v/c Ratio			0.27			0.16				
Control Delay			14.1			0.1				
Queue Delay			0.0			0.0				
Total Delay			14.2			0.1				
LOS			B			A				
Approach Delay			14.2			0.1				
Approach LOS			B			A				
Intersection Summary										
Area Type:	Other									
Cycle Length: 110										
Actuated Cycle Length: 110										
Offset: 4 (4%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green										
Natural Cycle: 110										
Control Type: Pretimed										
Maximum v/c Ratio: 0.88										
Intersection Signal Delay: 8.2						Intersection LOS: A				
Intersection Capacity Utilization 20.4%						ICU Level of Service A				
Analysis Period (min) 15										
! Phase conflict between lane groups.										

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↖	↗	
Traffic Volume (vph)	1272	62	57	1844	259	63	
Future Volume (vph)	1272	62	57	1844	259	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5843	0	0	5860	1805	1615	
Flt Permitted				0.801	0.950		
Satd. Flow (perm)	5843	0	0	4697	1368	1572	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					60	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		28	28		176	8	
Confl. Bikes (#/hr)		17				6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1482	0	0	2112	288	70	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	61.5		13.5	61.5	31.0	13.5	4.0
Total Split (%)	55.9%		12.3%	55.9%	28.2%	12.3%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Act Effct Green (s)	56.5			65.0	26.5	36.5	
Actuated g/C Ratio	0.51			0.59	0.24	0.33	
v/c Ratio	0.49			0.74	0.66	0.12	
Control Delay	21.4			16.4	46.2	8.0	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	21.4			16.4	46.2	8.0	
LOS	C			B	D	A	
Approach Delay	21.4			16.4	38.7		
Approach LOS	C			B	D		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 No Build  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 20.3	Intersection LOS: C
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 ø2 (R)	 ø4	 ø9
61.5 s	4 s 31 s	13.5 s
 ø6 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	6	1492	44	7	702	284	0	2139	182	152	462	16
Future Volume (vph)	6	1492	44	7	702	284	0	2139	182	152	462	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4961	0	0	4750	1422	0	4964	1524	1452	4570	0
Flt Permitted		0.936			0.799					0.075		
Satd. Flow (perm)	0	4644	0	0	3799	1339	0	4964	1050	115	4570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				122			89		8	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	40		58	58		40	27		246	246		27
Confl. Bikes (#/hr)			14			5			1			5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	0%	80%	1%	6%	0%	1%	6%	16%	5%	12%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1677	0	0	771	309	0	2325	198	165	519	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (s)	40.0	40.0		40.0	40.0	40.0		58.0	58.0	12.0		
Total Split (%)	36.4%	36.4%		36.4%	36.4%	36.4%		52.7%	52.7%	10.9%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effect Green (s)		35.0			35.0	35.0		53.0	53.0	61.0	65.5	
Actuated g/C Ratio		0.32			0.32	0.32		0.48	0.48	0.55	0.60	
v/c Ratio		1.13			0.64	0.61		0.97	0.36	1.07	0.19	
Control Delay		104.3			42.5	34.8		41.2	11.5	119.9	10.2	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		104.3			42.5	34.8		41.2	11.5	119.9	10.2	
LOS		F			D	C		D	B	F	B	
Approach Delay		104.3			40.3			38.9			36.7	
Approach LOS		F			D			D			D	
Intersection Summary												
Area Type:	Other											
Cycle Length:	110											
Actuated Cycle Length:	110											
Offset:	88 (80%), Referenced to phase 2:NBT and 6:SBTL, Start of Green											
Natural Cycle:	120											
Control Type:	Pre-timed											
Maximum v/c Ratio:	1.13											
Intersection Signal Delay:	57.3						Intersection LOS: E					

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour





Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	58.0
Total Split (s)	58.0
Total Split (%)	53%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour




















Intersection Capacity Utilization 108.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: 14th St SW & Independence Ave SW

 ø2 (R) 58 s	 ø4 40 s	 ø9 12 s
 ø6 (R) 58 s	 ø8 40 s	











2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

														
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR		
Lane Configurations														
Traffic Volume (vph)	54	2	1607	162	172	770	2	151	212	2	229	1		
Future Volume (vph)	54	2	1607	162	172	770	2	151	212	2	229	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	10	12	10	10	10	10	10	10	11	11	11	12		
Satd. Flow (prot)	0	0	5929	0	1407	3843	0	0	0	1694	1775	0		
Flt Permitted			0.819		0.083	0.875				0.950				
Satd. Flow (perm)	0	0	4854	0	123	3366	0	0	0	1072	1775	0		
Right Turn on Red			Yes											
Satd. Flow (RTOR)			24											
Link Speed (mph)			35			35					30			
Link Distance (ft)			1110			590					162			
Travel Time (s)			21.6			11.5					3.7			
Confl. Peds. (#/hr)	141			9	9		141	141	482					
Confl. Bikes (#/hr)							12	12						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	1%	100%	1%	1%	3%	3%	3%	3%	3%	0%	3%	100%		
Shared Lane Traffic (%)			10%											
Lane Group Flow (vph)	0	0	1984	0	168	1022	0	0	0	232	250	0		
Turn Type	Perm	Perm	NA		pm+pt	NA			Split	Split	NA			
Protected Phases			6		5	2			4	4!	4!			
Permitted Phases	6	6			2									
Detector Phase	6	6	6		5	2			4	4	4			
Switch Phase														
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0			7.0	7.0	7.0			
Minimum Split (s)	42.0	42.0	42.0		17.0	61.0			32.0	32.0	32.0			
Total Split (s)	48.0	48.0	48.0		18.0	66.0			32.0	32.0	32.0			
Total Split (%)	43.6%	43.6%	43.6%		16.4%	60.0%			29.1%	29.1%	29.1%			
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0			
All-Red Time (s)	2.5	2.5	2.5		2.5	2.5			3.0	3.0	3.0			
Lost Time Adjust (s)			-1.5		-1.5	-1.5				-1.5	-1.5			
Total Lost Time (s)			5.0		5.0	5.0				5.5	5.5			
Lead/Lag	Lead	Lead	Lead		Lag									
Lead-Lag Optimize?	Yes	Yes	Yes		Yes									
Recall Mode	C-Max	C-Max	C-Max		Max	C-Max			Max	Max	Max			
Act Effect Green (s)			43.0		61.0	61.0				26.5	26.5			
Actuated g/C Ratio			0.39		0.55	0.55				0.24	0.24			
v/c Ratio			1.04		0.77	0.53				0.57	0.59			
Control Delay			34.0		53.3	10.5				17.6	17.8			
Queue Delay			0.0		0.0	0.0				1.7	1.6			
Total Delay			34.0		53.3	10.5				19.2	19.5			
LOS			C		D	B				B	B			
Approach Delay			34.0			16.5					14.7			
Approach LOS			C			B					B			
Intersection Summary														
Area Type:	Other													
Cycle Length: 110														
Actuated Cycle Length: 110														
Offset: 62 (56%), Referenced to phase 2:WBT and 6:EBTL, Start of Green														

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

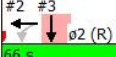

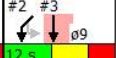


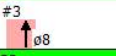
								
Lane Group	NBR2	SEL	SER	SER2	SWL2	SWL	SWR	ø8
Lane Configurations								
Traffic Volume (vph)	156	12	15	9	1	1	2	
Future Volume (vph)	156	12	15	9	1	1	2	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	14	14	10	10	10	
Satd. Flow (prot)	1516	1311	0	0	0	807	0	
Flt Permitted		0.984				0.976		
Satd. Flow (perm)	1516	1215	0	0	0	807	0	
Right Turn on Red	Yes			Yes				
Satd. Flow (RTOR)	116	169						
Link Speed (mph)		30				15		
Link Distance (ft)		395				273		
Travel Time (s)		9.0				12.4		
Confl. Peds. (#/hr)	166	166		482				
Confl. Bikes (#/hr)	3							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	0%	10%	0%	100%	100%	100%	
Shared Lane Traffic (%)								
Lane Group Flow (vph)	170	39	0	0	0	4	0	
Turn Type	pt+ov	Prot			Perm	Prot		
Protected Phases	4 5!	4!				9		8
Permitted Phases					9			
Detector Phase	4 5	4			9	9		
Switch Phase								
Minimum Initial (s)		7.0			5.0	5.0		5.0
Minimum Split (s)		32.0			12.0	12.0		32.0
Total Split (s)		32.0			12.0	12.0		32.0
Total Split (%)		29.1%			10.9%	10.9%		29%
Yellow Time (s)		4.0			4.0	4.0		4.0
All-Red Time (s)		3.0			3.0	3.0		6.5
Lost Time Adjust (s)		-1.5				0.0		
Total Lost Time (s)		5.5				7.0		
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode		Max			None	None		Max
Act Effect Green (s)	44.5	26.5				5.0		
Actuated g/C Ratio	0.40	0.24				0.05		
w/c Ratio	0.25	0.09				0.11		
Control Delay	0.9	0.4				57.2		
Queue Delay	0.6	0.0				0.0		
Total Delay	1.4	0.4				57.2		
LOS	A	A				E		
Approach Delay		0.4				57.3		
Approach LOS		A				E		
Intersection Summary								

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 25.0	Intersection LOS: C
Intersection Capacity Utilization 113.4%	ICU Level of Service H
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock

					
66 s		32 s		12 s	
					
48 s		18 s		32 s	

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

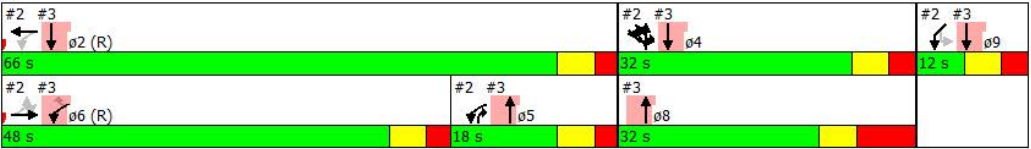
							ø2	ø4	ø5	ø8	ø9
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	↵	↶	↶↶↶			↶↶					
Traffic Volume (vph)	0	0	600	0	0	350					
Future Volume (vph)	0	0	600	0	0	350					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900					
Lane Width (ft)	10	11	11	11	10	10					
Satd. Flow (prot)	1773	1837	4868	0	0	3271					
Flt Permitted											
Satd. Flow (perm)	1773	1837	4868	0	0	3271					
Right Turn on Red		Yes		Yes							
Satd. Flow (RTOR)											
Link Speed (mph)	20		30			30					
Link Distance (ft)	188		380			162					
Travel Time (s)	6.4		8.6			3.7					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92					
Heavy Vehicles (%)	0%	0%	3%	0%	0%	3%					
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	652	0	0	380					
Turn Type	Prot	Perm	NA			NA					
Protected Phases	6!		8 5			2 4 9!	2	4	5	8	9
Permitted Phases		6									
Detector Phase	6	6	8 5			2 4 9					
Switch Phase											
Minimum Initial (s)	10.0	10.0					10.0	7.0	5.0	5.0	5.0
Minimum Split (s)	42.0	42.0					61.0	32.0	17.0	32.0	12.0
Total Split (s)	48.0	48.0					66.0	32.0	18.0	32.0	12.0
Total Split (%)	43.6%	43.6%					60%	29%	16%	29%	11%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5	3.0
Lost Time Adjust (s)	-1.5	-1.5									
Total Lost Time (s)	5.0	5.0									
Lead/Lag	Lead	Lead							Lag		
Lead-Lag Optimize?	Yes	Yes							Yes		
Recall Mode	C-Max	C-Max					C-Max	Max	Max	Max	None
Act Effect Green (s)			41.0			110.0					
Actuated g/C Ratio			0.37			1.00					
v/c Ratio			0.36			0.12					
Control Delay			25.7			0.0					
Queue Delay			0.1			0.0					
Total Delay			25.8			0.0					
LOS			C			A					
Approach Delay			25.8			0.0					
Approach LOS			C			A					
Intersection Summary											
Area Type:	Other										
Cycle Length: 110											
Actuated Cycle Length: 110											
Offset: 62 (56%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green											
Natural Cycle: 105											
Control Type: Actuated-Coordinated											

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 19.1%	ICU Level of Service A
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 3: 12th St SW



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1679	97	75	1030	64	174	
Future Volume (vph)	1679	97	75	1030	64	174	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5928	0	0	5905	1805	1615	
Flt Permitted				0.734	0.950		
Satd. Flow (perm)	5928	0	0	4347	1654	1418	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	16					46	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		43	43		61	79	
Confl. Bikes (#/hr)		13				6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	
Heavy Vehicles (%)	1%	1%	3%	3%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1850	0	0	1151	67	181	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (s)	61.5		14.5	61.5	30.0	14.5	4.0
Total Split (%)	55.9%		13.2%	55.9%	27.3%	13.2%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			66.0	25.5	36.5	
Actuated g/C Ratio	0.51			0.60	0.23	0.33	
v/c Ratio	0.61			0.42	0.16	0.35	
Control Delay	3.2			9.5	35.0	20.6	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	3.2			9.5	35.0	20.6	
LOS	A			A	D	C	
Approach Delay	3.2			9.5	24.5		
Approach LOS	A			A	C		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 75 (68%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
AM Peak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 02 (R)	 04	 09
61.5 s	4 s 30 s	14.5 s
 06 (R)		
61.5 s		

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	↖	→	↘	↙	←	↖	↘	↑	↖	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↖		↑↑↑	↖	↖	↑↑↑	
Traffic Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Future Volume (vph)	5	537	38	21	1436	172	0	1527	372	162	1513	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	10	10	11	11	12	10	10	10
Satd. Flow (prot)	0	4748	0	0	4646	1311	0	4964	1583	1589	4735	0
Flt Permitted		0.821			0.921					0.083		
Satd. Flow (perm)	0	3898	0	0	4280	1170	0	4964	1469	139	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				164			107			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		487			1110			612			436	
Travel Time (s)		9.5			21.6			13.9			9.9	
Confl. Peds. (#/hr)	71		236	136		71	31		46	46		31
Confl. Bikes (#/hr)			3			28			2			2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	610	0	0	1534	181	0	1607	392	171	1616	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	custom	NA	
Protected Phases		4			8			2		9	6 9	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0		
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	1.5		
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0		
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	4.5		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	64.0	68.5	
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.58	0.62	
v/c Ratio		0.53			1.23	0.40		0.74	0.56	0.60	0.55	
Control Delay		34.2			135.0	5.1		28.4	19.9	30.4	12.8	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		34.2			135.0	5.1		28.4	19.9	30.4	12.8	
LOS		C			F	A		C	B	C	B	
Approach Delay		34.2			121.3			26.8			14.4	
Approach LOS		C			F			C			B	
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 16 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green												
Natural Cycle: 120												
Control Type: Pretimed												
Maximum v/c Ratio: 1.23												
Intersection Signal Delay: 50.4	Intersection LOS: D											

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour






Lane Group	06
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	53.0
Total Split (s)	53.0
Total Split (%)	48%
Yellow Time (s)	3.5
All-Red Time (s)	2.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effect Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

1: 14th St SW & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 1: 14th St SW & Independence Ave SW

 02 (R)	 04	 09
53 s	37 s	20 s
 06 (R)	 08	
53 s	37 s	

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	→	↘	↙	←	↖	↗	↘	↙	↑	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	NBR2	SEL
Lane Configurations	THH		THH	THH				THH	THH		THH	THH
Traffic Volume (vph)	1016	55	421	1493	2	189	126	1	238	1	305	14
Future Volume (vph)	1016	55	421	1493	2	189	126	1	238	1	305	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	12	11	14
Satd. Flow (prot)	5861	0	1393	4057	0	0	0	1678	1758	0	1501	1262
Flt Permitted			0.167	0.772				0.950				0.985
Satd. Flow (perm)	5861	0	244	3138	0	0	0	1516	1758	0	1501	1138
Right Turn on Red		Yes									Yes	
Satd. Flow (RTOR)	10										141	169
Link Speed (mph)	35			35					30			30
Link Distance (ft)	1110			590					162			395
Travel Time (s)	21.6			11.5					3.7			9.0
Confl. Peds. (#/hr)		9	9		71	71	73				334	334
Confl. Bikes (#/hr)		19			19	19					5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	100%	4%	40%
Shared Lane Traffic (%)			19%									
Lane Group Flow (vph)	1127	0	359	1857	0	0	0	134	252	0	321	50
Turn Type	NA		pm+pt	NA			Split	Split	NA		pt+ov	Prot
Protected Phases	6		5	2			4	4!	4!		4 5!	4!
Permitted Phases			2									
Detector Phase	6		5	2			4	4	4		4 5	4
Switch Phase												
Minimum Initial (s)	10.0		5.0	10.0			7.0	7.0	7.0			7.0
Minimum Split (s)	39.0		21.0	60.0			32.0	32.0	32.0			32.0
Total Split (s)	39.0		27.0	66.0			32.0	32.0	32.0			32.0
Total Split (%)	35.5%		24.5%	60.0%			29.1%	29.1%	29.1%			29.1%
Yellow Time (s)	4.0		4.0	4.0			4.0	4.0	4.0			4.0
All-Red Time (s)	2.5		2.5	2.5			3.0	3.0	3.0			3.0
Lost Time Adjust (s)	-1.5		-1.5	-1.5				-1.5	-1.5			-1.5
Total Lost Time (s)	5.0		5.0	5.0				5.5	5.5			5.5
Lead/Lag	Lead		Lag									
Lead-Lag Optimize?	Yes		Yes									
Recall Mode	C-Max		Max	C-Max			Max	Max	Max			Max
Act Effect Green (s)	43.6		70.6	70.6				26.5	26.5		53.5	26.5
Actuated g/C Ratio	0.40		0.64	0.64				0.24	0.24		0.49	0.24
v/c Ratio	0.48		0.93	0.85				0.33	0.60		0.40	0.12
Control Delay	25.7		48.5	12.6				17.9	24.3		3.5	0.5
Queue Delay	0.0		0.0	0.0				3.4	4.9		0.2	0.0
Total Delay	25.7		48.5	12.6				21.3	29.2		3.7	0.5
LOS	C		D	B				C	C		A	A
Approach Delay	25.7			18.4					16.1			0.5
Approach LOS	C			B					B			A
Intersection Summary												
Area Type:	Other											
Cycle Length: 110												
Actuated Cycle Length: 110												
Offset: 22 (20%), Referenced to phase 2:WBTL and 6:EBT, Start of Green												

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

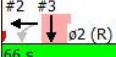

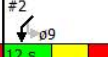


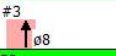
Lane Group	SER	SER2	SWL2	SWL	SWR	ø8
Lane Configurations						
Traffic Volume (vph)	23	10	3	0	1	
Future Volume (vph)	23	10	3	0	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	14	14	10	10	10	
Satd. Flow (prot)	0	0	0	826	0	
Flt Permitted				0.964		
Satd. Flow (perm)	0	0	0	826	0	
Right Turn on Red	Yes					
Satd. Flow (RTOR)						
Link Speed (mph)	15					
Link Distance (ft)	362					
Travel Time (s)	16.5					
Confl. Peds. (#/hr)	73					
Confl. Bikes (#/hr)	8	8				
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	
Heavy Vehicles (%)	40%	0%	100%	100%	100%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	
Turn Type	Perm			Prot		
Protected Phases				9	8	
Permitted Phases	9					
Detector Phase	9			9		
Switch Phase						
Minimum Initial (s)	5.0			5.0	5.0	
Minimum Split (s)	12.0			12.0	32.0	
Total Split (s)	12.0			12.0	32.0	
Total Split (%)	10.9%			10.9%	29%	
Yellow Time (s)	4.0			4.0	4.0	
All-Red Time (s)	3.0			3.0	6.5	
Lost Time Adjust (s)				0.0		
Total Lost Time (s)				7.0		
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None			None	None	
Act Effect Green (s)				5.0		
Actuated g/C Ratio				0.05		
v/c Ratio				0.11		
Control Delay				56.8		
Queue Delay				0.0		
Total Delay				56.8		
LOS				E		
Approach Delay				56.8		
Approach LOS				E		
Intersection Summary						

2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 116.5%	ICU Level of Service H
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 2: 12th St SW & Independence Ave SW & 12th St Ramp & Loading Dock

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

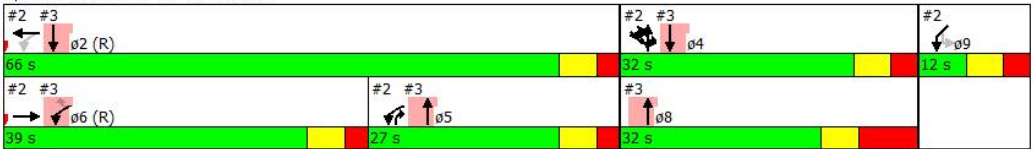
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø2	ø4	ø5	ø8	ø9
Lane Configurations	↰	↱	↕	↕	↰	↱					
Traffic Volume (vph)	0	0	671	0	0	499					
Future Volume (vph)	0	0	671	0	0	499					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900					
Lane Width (ft)	10	11	11	11	10	10					
Satd. Flow (prot)	1739	1801	4916	0	0	3303					
Flt Permitted											
Satd. Flow (perm)	1739	1801	4916	0	0	3303					
Right Turn on Red		Yes		Yes							
Satd. Flow (RTOR)											
Link Speed (mph)	20		30			30					
Link Distance (ft)	188		380			162					
Travel Time (s)	6.4		8.6			3.7					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95					
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	0	706	0	0	525					
Turn Type	Prot	Perm	NA			NA					
Protected Phases	6!		8 5			2 4!	2	4	5	8	9
Permitted Phases		6									
Detector Phase	6	6	8 5			2 4					
Switch Phase											
Minimum Initial (s)	10.0	10.0					10.0	7.0	5.0	5.0	5.0
Minimum Split (s)	39.0	39.0					60.0	32.0	21.0	32.0	12.0
Total Split (s)	39.0	39.0					66.0	32.0	27.0	32.0	12.0
Total Split (%)	35.5%	35.5%					60%	29%	25%	29%	11%
Yellow Time (s)	4.0	4.0					4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.5	2.5					2.5	3.0	2.5	6.5	3.0
Lost Time Adjust (s)	-1.5	-1.5									
Total Lost Time (s)	5.0	5.0									
Lead/Lag	Lead	Lead								Lag	
Lead-Lag Optimize?	Yes	Yes								Yes	
Recall Mode	C-Max	C-Max					C-Max	Max	Max	None	None
Act Effct Green (s)			50.0			106.6					
Actuated g/C Ratio			0.45			0.97					
v/c Ratio			0.32			0.16					
Control Delay			19.6			0.1					
Queue Delay			0.1			0.0					
Total Delay			19.7			0.1					
LOS			B			A					
Approach Delay			19.7			0.1					
Approach LOS			B			A					
<b>Intersection Summary</b>											
Area Type:	Other										
Cycle Length: 110											
Actuated Cycle Length: 110											
Offset: 22 (20%), Referenced to phase 2:WBL and 6:EBT, Start of Green											
Natural Cycle: 105											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.93											

3: 12th St SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 20.5%	ICU Level of Service A
Analysis Period (min) 15	
! Phase conflict between lane groups.	

Splits and Phases: 3: 12th St SW



4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PM Peak Hour

	→	↘	↙	←	↗	↖	ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3
Lane Configurations	↑↑↑↑			↓↓↓↓	↗	↖	
Traffic Volume (vph)	1274	62	57	1845	259	63	
Future Volume (vph)	1274	62	57	1845	259	63	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	12	12	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	5843	0	0	5860	1805	1615	
Flt Permitted				0.801	0.950		
Satd. Flow (perm)	5843	0	0	4697	1368	1572	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	13					60	
Link Speed (mph)	35			35	20		
Link Distance (ft)	590			1087	758		
Travel Time (s)	11.5			21.2	25.8		
Confl. Peds. (#/hr)		28	28		176	8	
Confl. Bikes (#/hr)		17				6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1485	0	0	2113	288	70	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	61.5		13.5	61.5	31.0	13.5	4.0
Total Split (%)	55.9%		12.3%	55.9%	28.2%	12.3%	4%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag		Lead
Lead-Lag Optimize?					Yes		Yes
Act Effct Green (s)	56.5			65.0	26.5	36.5	
Actuated g/C Ratio	0.51			0.59	0.24	0.33	
v/c Ratio	0.49			0.74	0.66	0.12	
Control Delay	11.7			16.4	46.2	8.0	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	11.7			16.4	46.2	8.0	
LOS	B			B	D	A	
Approach Delay	11.7			16.4	38.7		
Approach LOS	B			B	D		
<b>Intersection Summary</b>							
Area Type:	Other						
Cycle Length: 110							
Actuated Cycle Length: 110							
Offset: 29 (26%), Referenced to phase 2:EBT and 6:WBTL, Start of Green							
Natural Cycle: 110							

4: L'Enfant Plaza & Independence Ave SW  
SI South Campus Master Plan - Loading Dock Analysis

2030 Build  
PMPeak Hour

Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: L'Enfant Plaza & Independence Ave SW

 02 (R)	 04	 09
61.5 s	4 s 31 s	13.5 s
 06 (R)		
61.5 s		

## **APPENDIX D: LOADING ALTERNATIVES**

**DATE:** January 18, 2017  
**TO:** Bjarke Ingels Group, Smithsonian  
**FROM:** Jonathan Parker, Kleinfelder  
**SUBJECT:** South Mall Master Plan – Loading Dock Design Vehicle

For Kleinfelder's report in February 2014, the geometric proof-of-concept for the proposed materials management design for the South Mall Master Plan was based on the movement of the largest truck and the movement of the largest object expected to come and go from any of the museums. The largest vehicle is expected to be a long-haul semi-truck like those used by specialty art shipping companies. The conceptual ramp, truck apron, and loading dock layout was based on a WB-67. The question has recently been raised as to whether it is possible to plan around a vehicle other than a WB-67. The reduction

### Operational Reductions

Operationally, moving to a smaller design vehicle would exclude receiving large art delivery trucks for Collections in the loading dock. These deliveries would need to continue to be made on the street. Though infrequent, they are valuable deliveries. Delivery on the street exposes collections to greater risk for security, screening, handling, and environmental conditions. It is difficult to quantify the potential cost of not making improvements to materials handling for Collections.



Fig 1. Collections Delivery on Independence Ave Fig 2. Collections Delivery down Quad ramp  
from <http://artists-in-dialogue2.blogspot.com/2011/01/welcome-arrivals.html>

It is possible that food service would take advantage of the accommodation of large vehicles in the below-grade dock as well and employee WB-67s or WB-50s for occasional delivery.

If the design-vehicle were reduced, it would be to a WB-40, which is referred to as a city sized semi, and typically used by food service operators and vendors such as Sysco, Sodexho, Coca-Cola, Frito-Lay, and Poland Springs. The tractor and trailer typically measure 45' long.

The operational implications of the smaller design vehicle should be weighed against the dimensional implications of planning for a smaller design vehicle.

### Dimensional Reductions – the Ramp

The ramp requirements for smaller delivery vehicles is equivalent to those for a WB-67. The slope of the ramp would not be reduced by reducing the size of the design vehicle. The overall length of the ramp to achieve desired dock elevation would not be reduced. With the traffic on Independence Avenue

and the likely length of the ramp, we would strongly recommend maintaining two-way traffic for all but the WB-67 on the ramp, therefore the width of the truck ramp would not be reduced either. The radius of the turn in the ramp to accommodate two-way traffic of WB-40s and large box trucks is adequate to accommodate the one-way at-a-time turning of a WB-67 on the ramp. (See Figures 3 and 4)

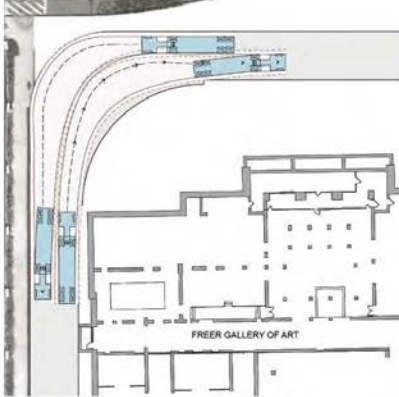


Fig 3. WB-40 two-way traffic at turn in ramp.

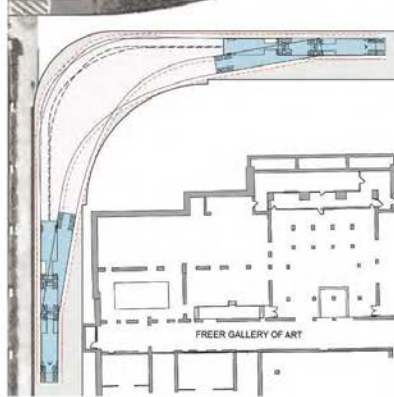


Fig 4. WB-67 one-way traffic at turn in ramp.

#### Dimensional Reductions – the Truck Apron and Loading Dock

The additional dimensional requirements for accommodating a large semi over a small semi are partially achieved by overlapping with space that is already being provided for smaller vehicles.

The width of the truck apron that is provided in order to accommodate roll-off vehicle pickup of compactors is adequate to accommodate the wide swings in the 3-point turning of a WB-67. (See dimension A in Figure 5)

A program for sizing the required number of delivery and recycling bays for materials management has not been developed, so it is unknown whether the truck apron length to accommodate the total number of recommended bays would be shorter or longer than the truck apron length needed for a WB-67. (See dimension B1 and B2 in Figure 5)

The square footage at the dock for unloading large semis would be removed, but square footage, equipment, and distribution paths would need to be added to accommodate receiving art deliveries at-grade and transporting them horizontally and vertically to collections receiving. (See C in Figure 5)

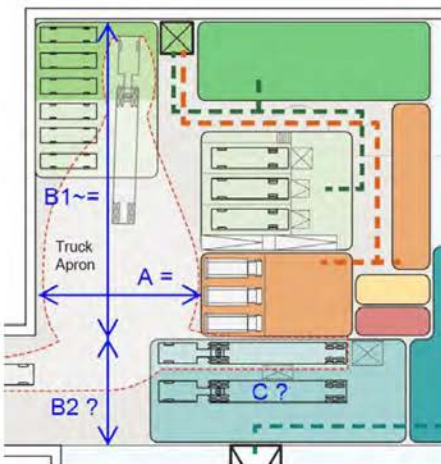


Fig 5. Truck Apron and Loading Dock

**Conclusions**

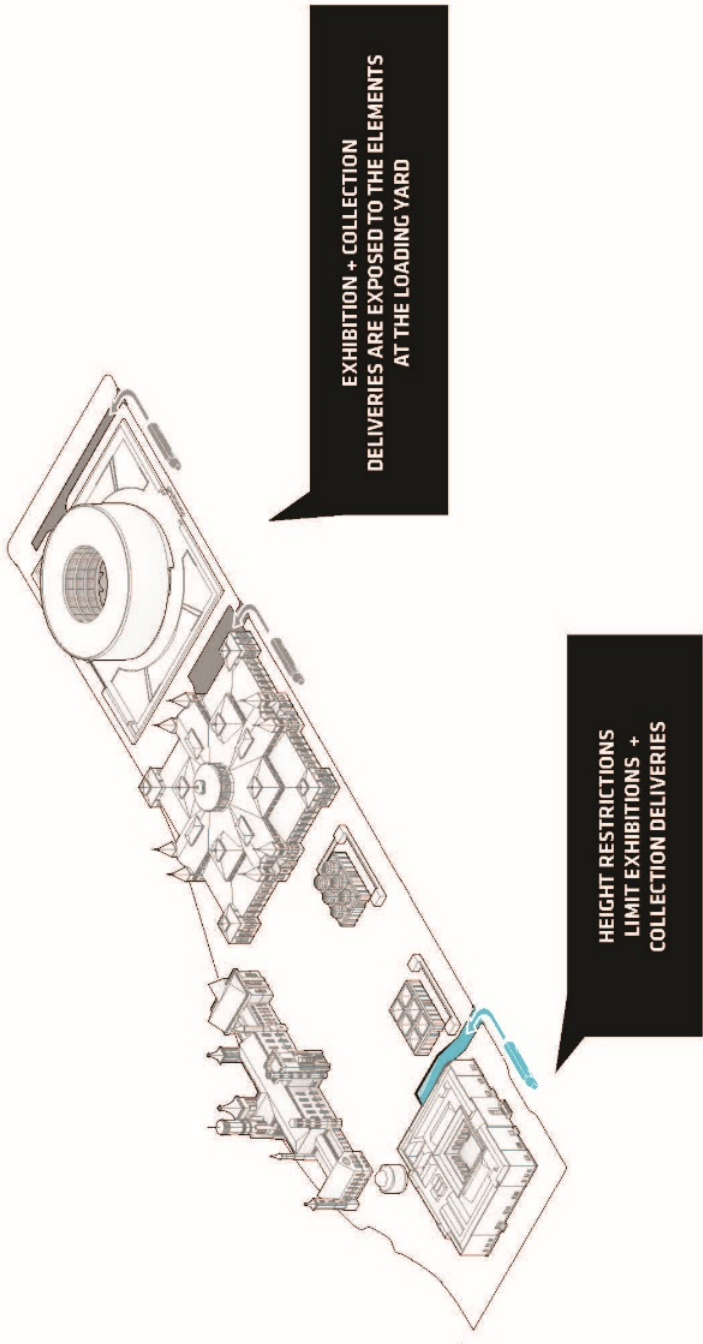
The footprint and dimensions of the ramp would see little if any reduction from switching from a WB-67 for the design vehicle to a WB-40. The size of the truck apron below-grade may see some moderate reduction, but that would depend on a more detailed programming effort also showing a need for fewer delivery, service, and recycling bays. The square footage for the large bays themselves would result in a reduction, however square footage, equipment, and distribution paths would need to be added to accommodate receiving art deliveries at-grade and transporting them horizontally and vertically to collections receiving.

The value of substantially improving the handling and receiving of collections by accommodating large semi-trucks in the below-grade dock should be weighed against the minimal to moderate potential reductions in footprint and dimensions of not designing for a WB-67.

**SMITHSONIAN SOUTH CAMPUS  
LOADING FACILITIES**  
DATE: SEP. 29 2016

BIG

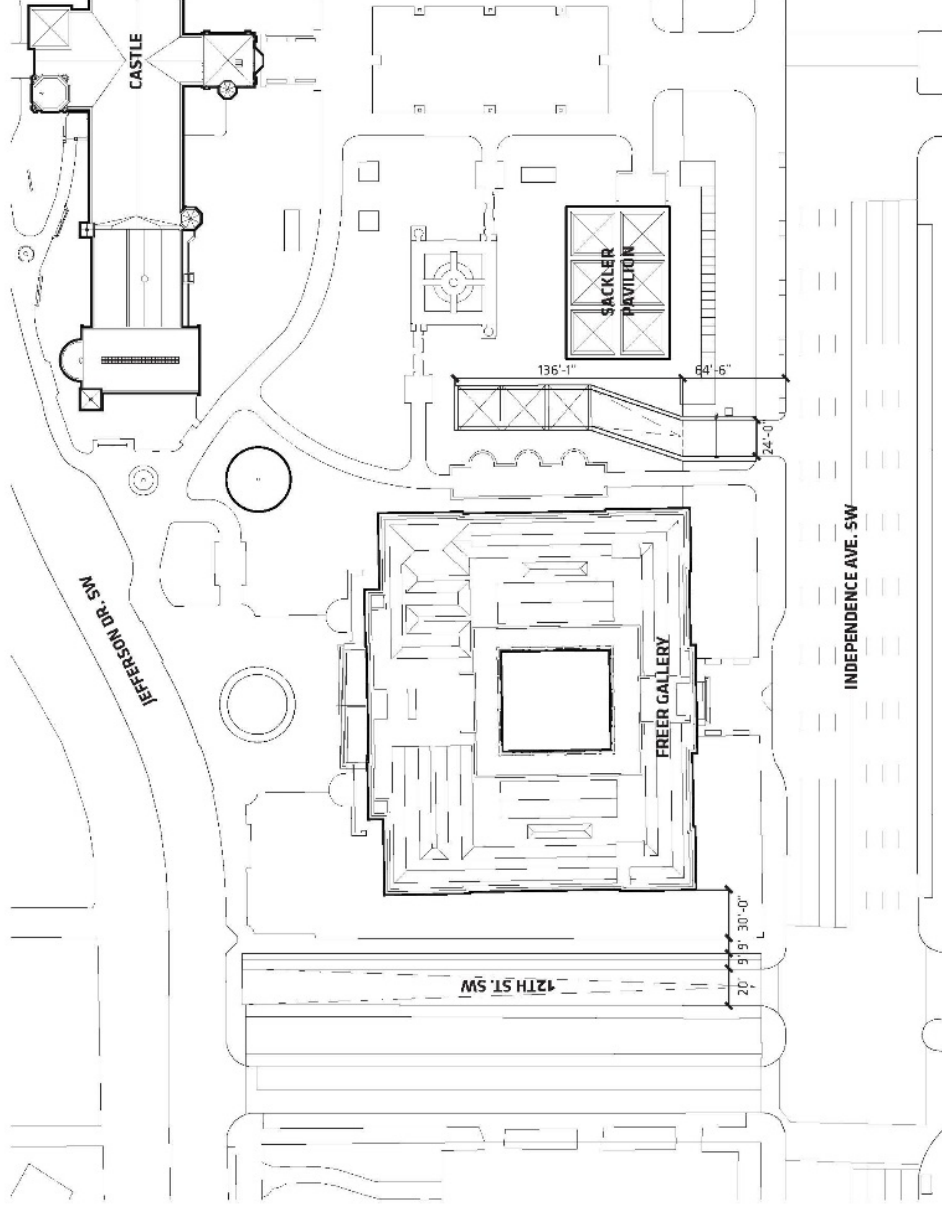
## EXISTING CURB CUTS & LOADING FACILITIES



EXISTING CURB CUTS AND LOADING FACILITIES

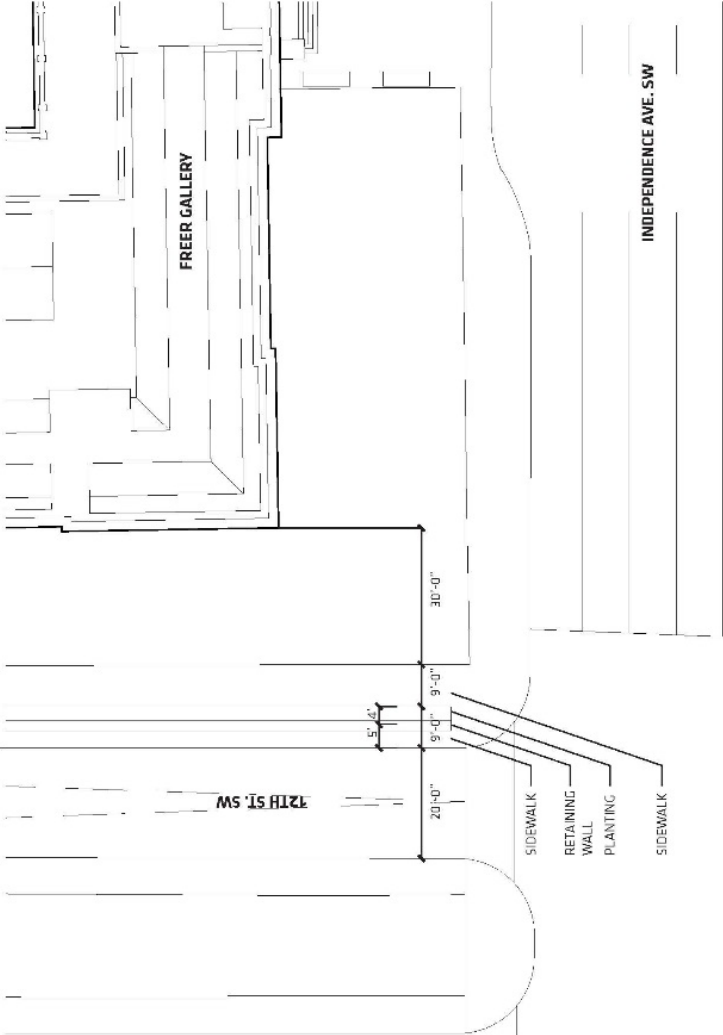
- The 3 existing loading facilities require large vehicles to back in from the street because of limited turn around area. The largest vehicles and deliveries must unload on the street because they do not fit into the dock.

EXISTING CURB CUT | LOADING FACILITIES: QUAD COMPLEX



EXISTING CURB CUT & RAMP AT GRADE

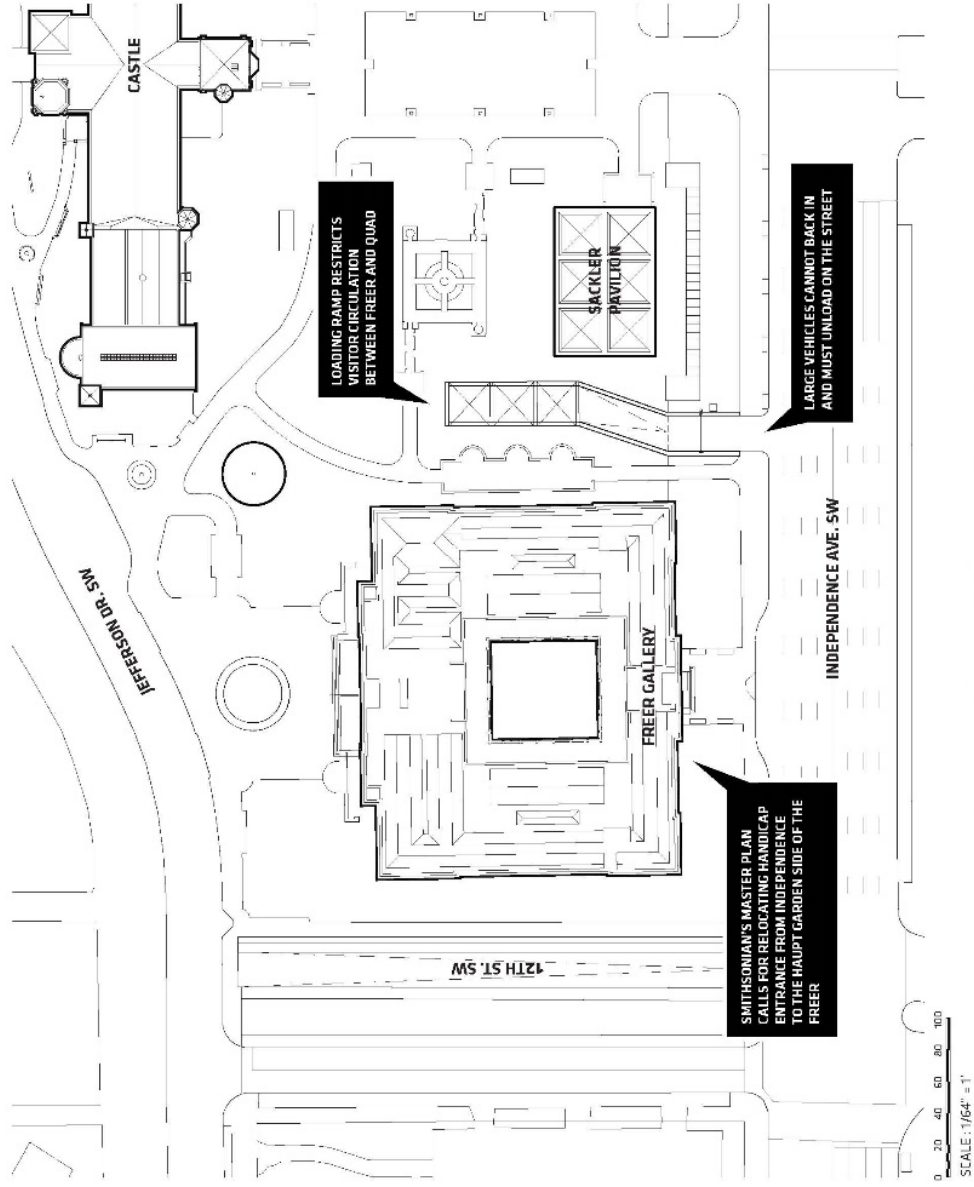
EXISTING CURB CUT | LOADING FACILITIES: QUAD COMPLEX



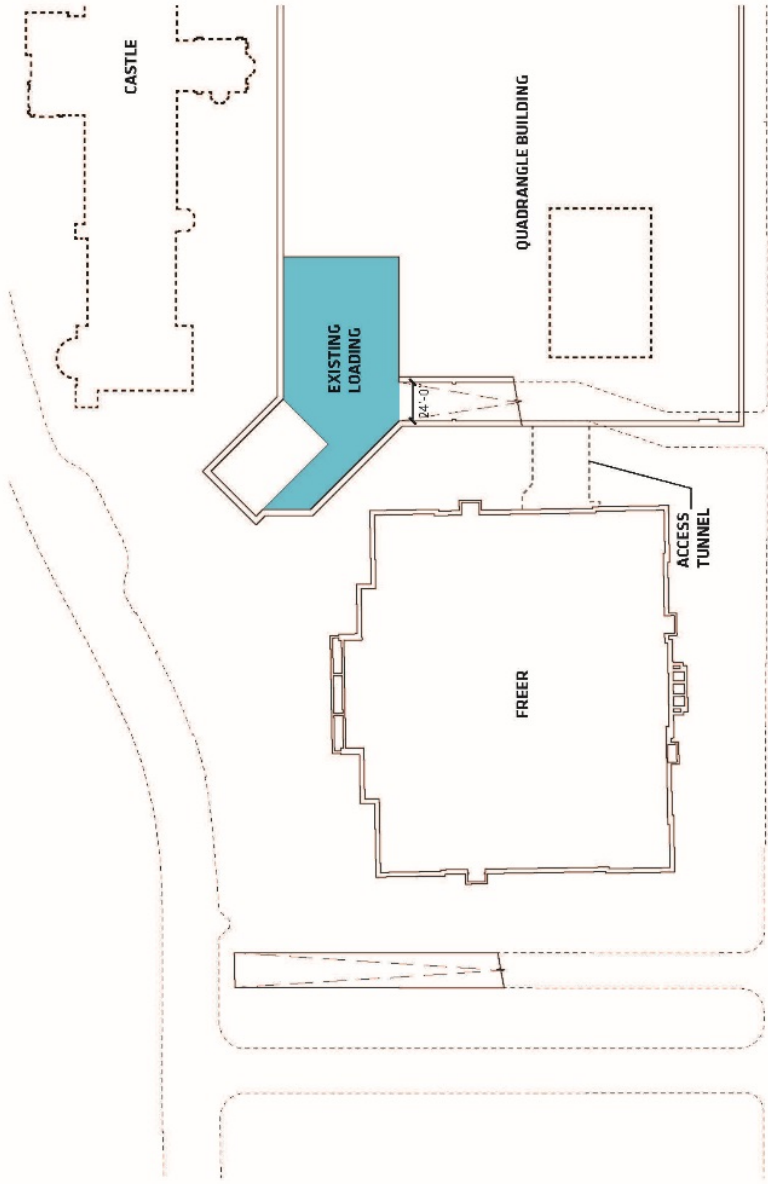
EXISTING DIMENSIONS



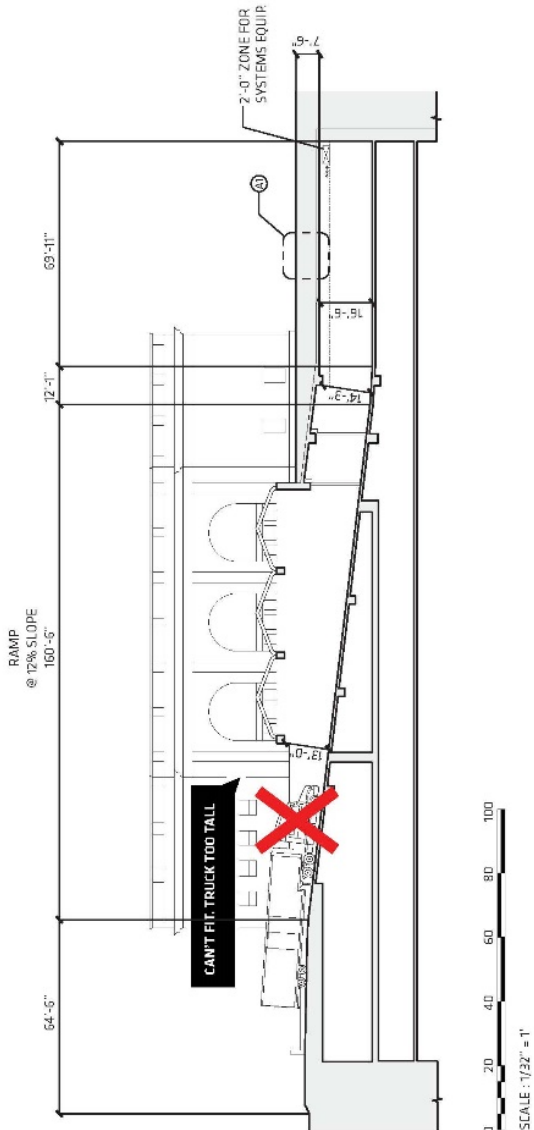
PERSPECTIVE @ 12TH ST. SW & INDEPENDENCE AVE. SW



EXISTING CURB CUT & RAMP AT GRADE

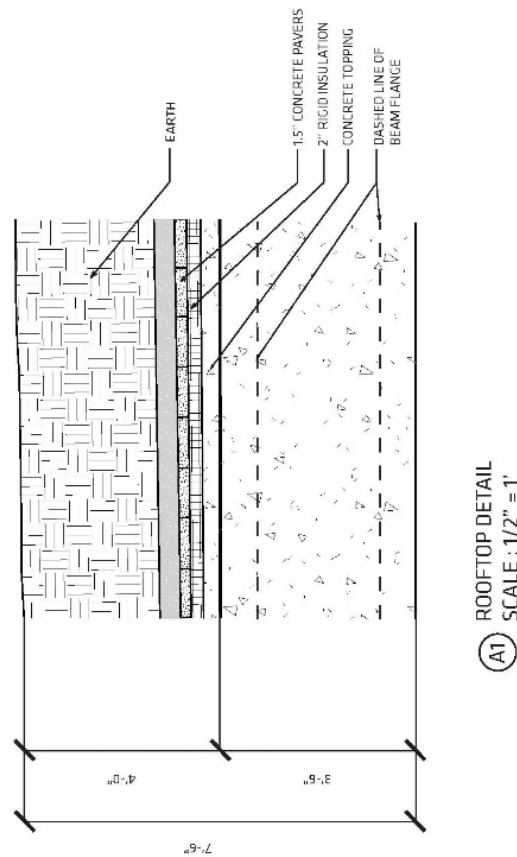


**EXISTING RAMP & LOADING FACILITY BELOW GRADE**

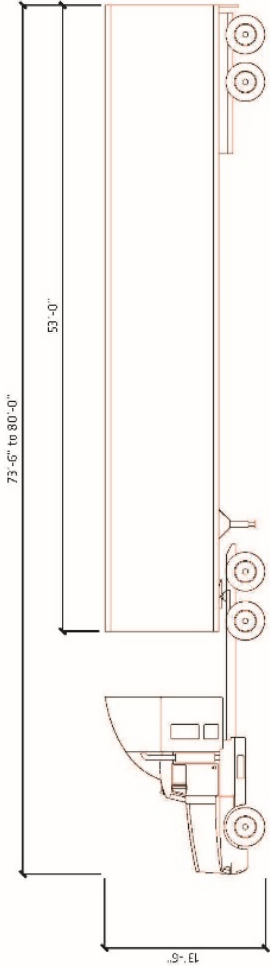


- Clearance requirements not met with current scheme. WB 67 truck type will be the basis of future loading dock design with a height 15' minimum required for passage.

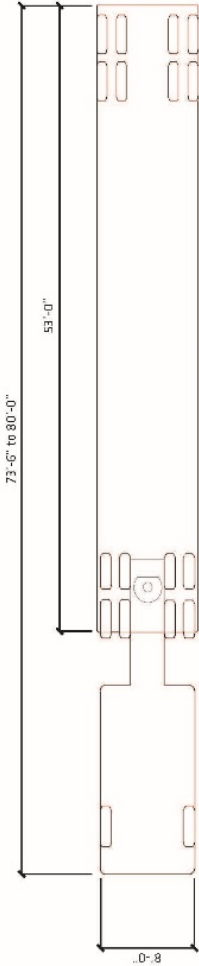
EXISTING LOADING FACILITIES SECTION



SECTION DETAIL @ A1



ART HAULER WITH LOW-BAY TRAILER

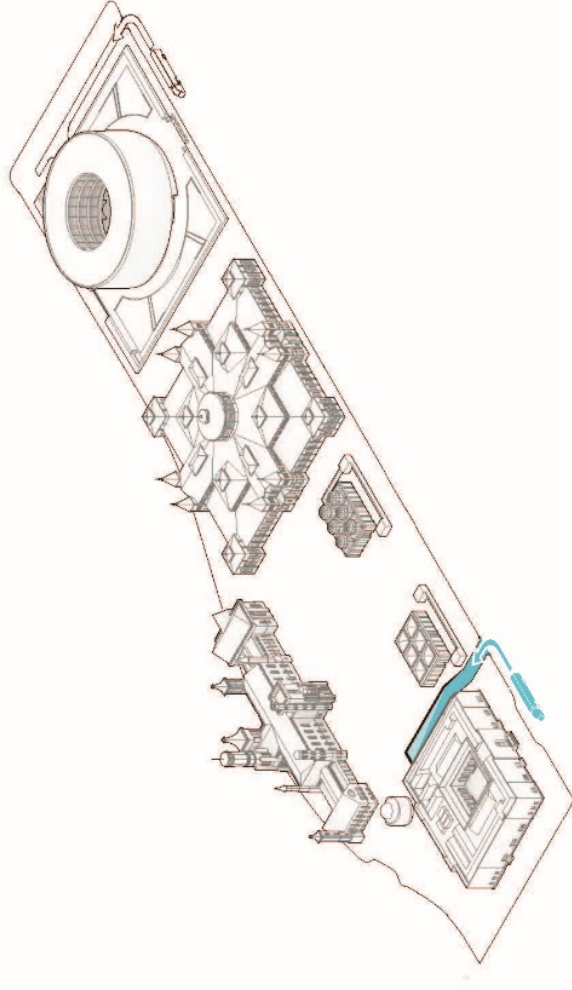


ART HAULER WITH LOW-BAY TRAILER

STANDARD DIMENSION WB-67

## SCHEME A

SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



SCHEME A CURB CUT AND LOADING FACILITY

- Reuse of the existing curb cut and ramp requires an expansion of the ramp and expansion of the below grade loading complex. Scheme A would limit vehicle traffic to one-way, and interfere with the Master Plan's East/West circulation.

CASTLE

SACKLER PAVILION

183'-7"

64'-6"

24'-0"

JEFFERSON DR. SW

12TH ST. SW

20'-5" 30'-0"

20'-5" 30'-0"

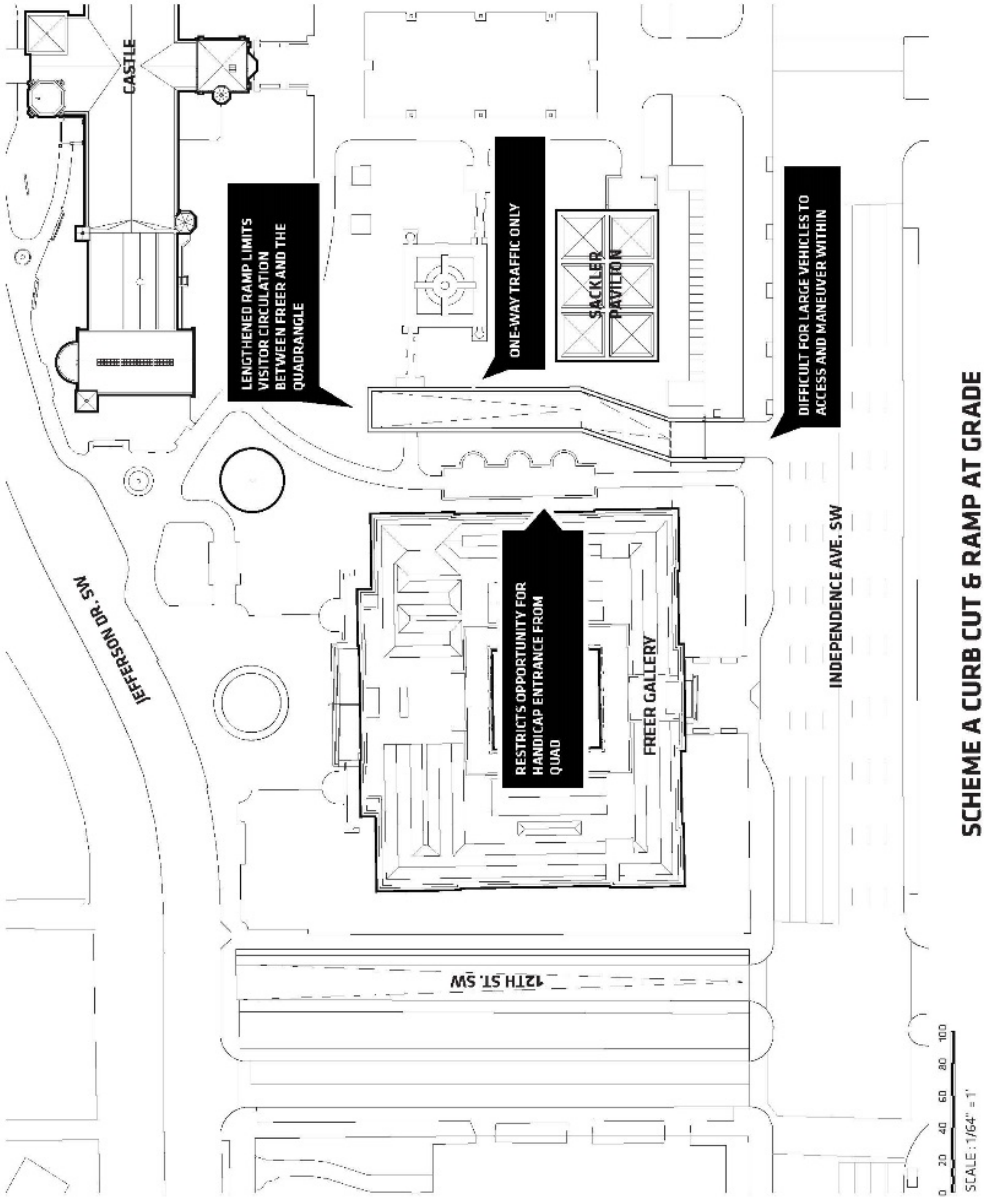
INDEPENDENCE AVE. SW

FREER GALLERY

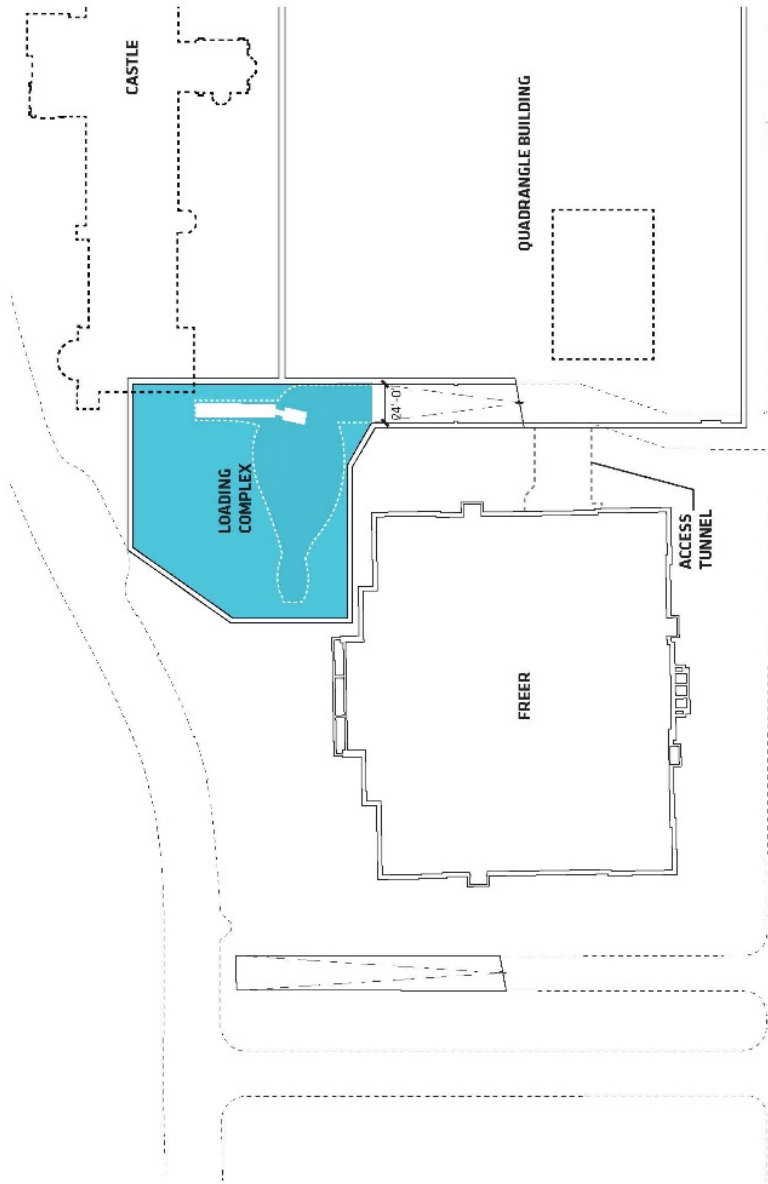
### SCHEME A CURB CUT & RAMP AT GRADE



SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX

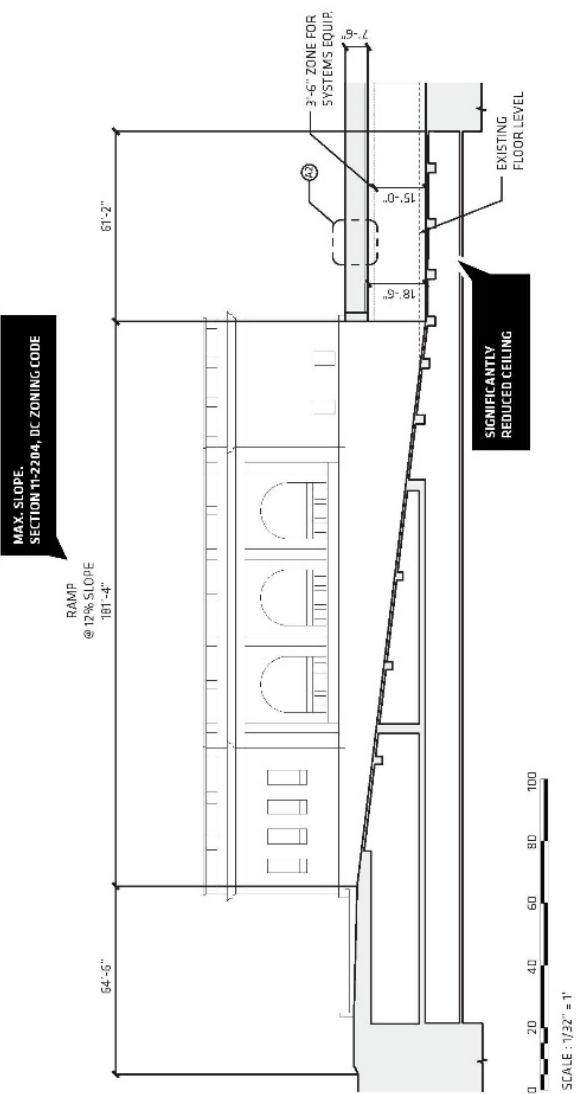


SCHEME A CURB CUT & RAMP AT GRADE



SCHEME A RAMP & LOADING FACILITY BELOW GRADE

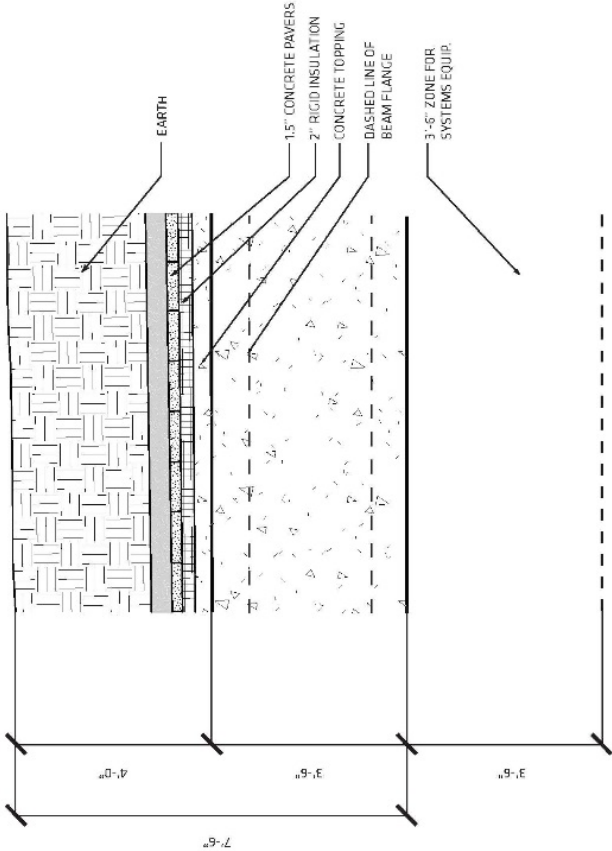
SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



- Scheme A requires the expansion of below grade loading support areas to provide increased maneuvering clearance. The floor of the loading dock will need to be lowered. The alteration will greatly reduce the ceiling height in floor level below loading dock

SCHEME A LOADING FACILITY SECTION

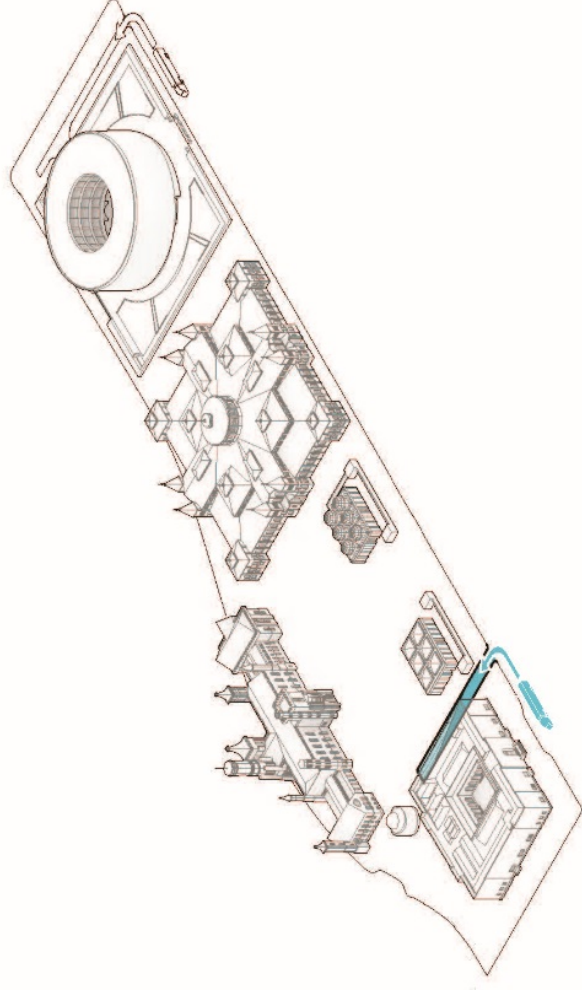
SCHEME A CURB CUT | LOADING FACILITIES: QUAD COMPLEX



ROOFTOP DETAIL  
A2  
SCALE : 1/2" = 1'

SECTION DETAIL @ A2

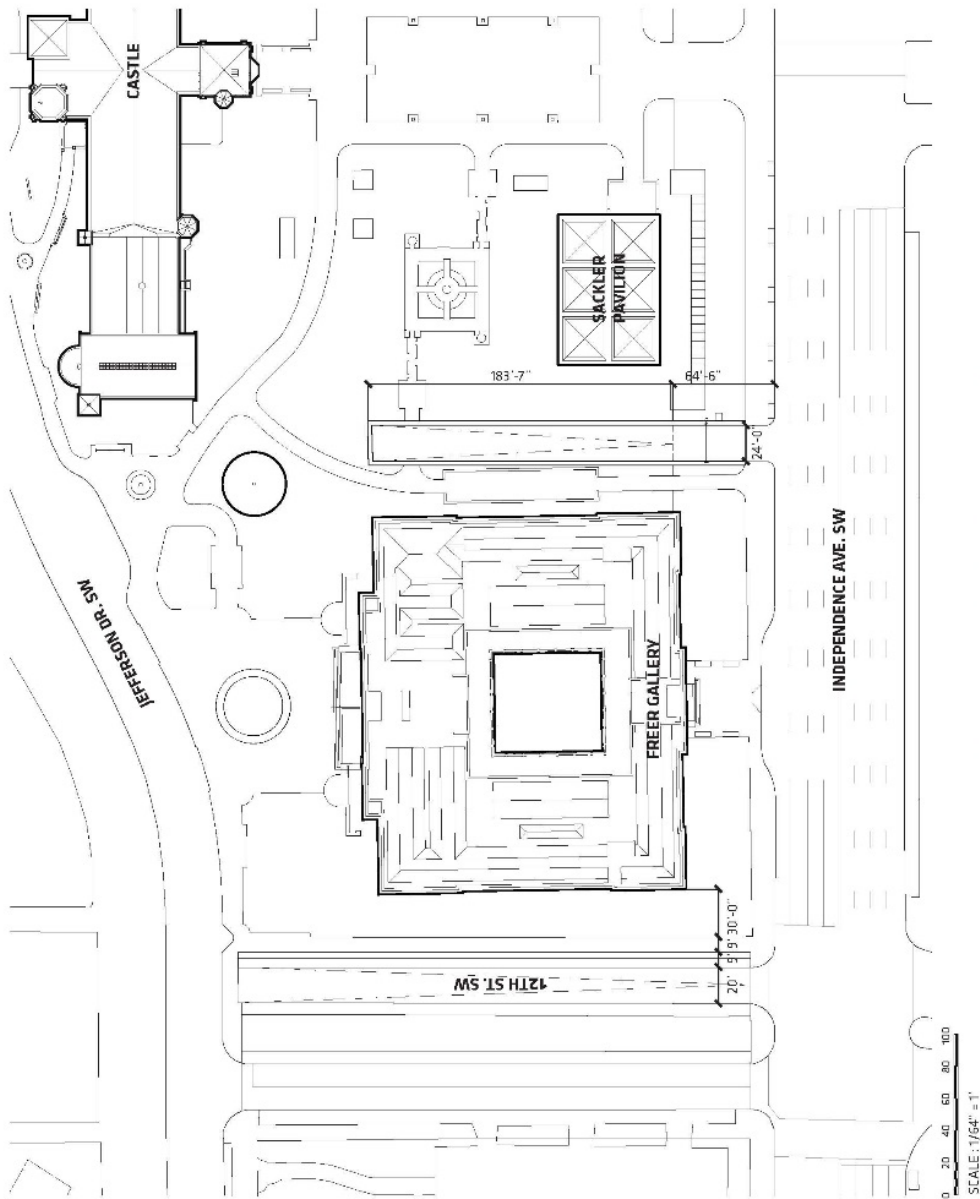
## SCHEME B



#### SCHEME B CURB CUT AND LOADING FACILITY

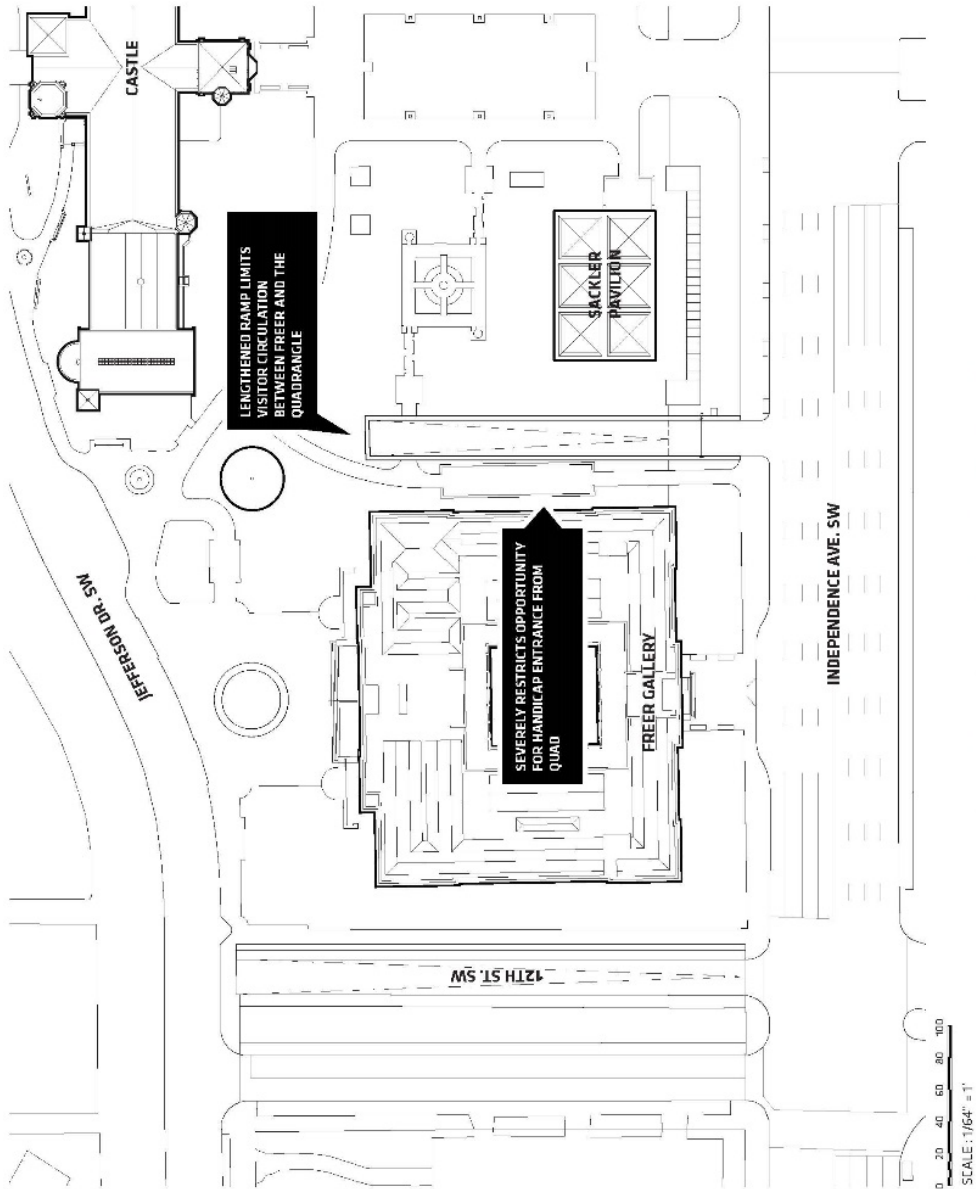
- Widening of the existing curb cut and new ramp would maintain approximate location of existing curb cut. The new ramp would allow for two-way traffic, but require an expansion of below grade complex.

SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX

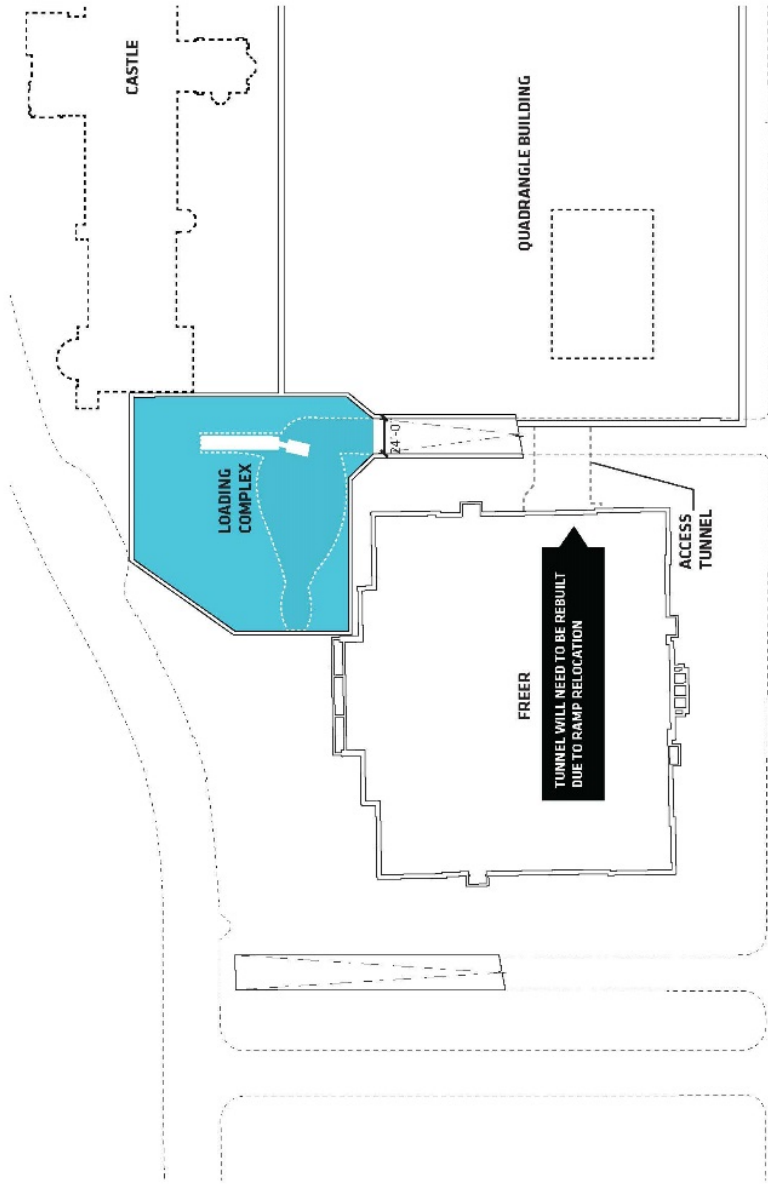


SCHEME B CURB CUT & RAMP AT GRADE

SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX

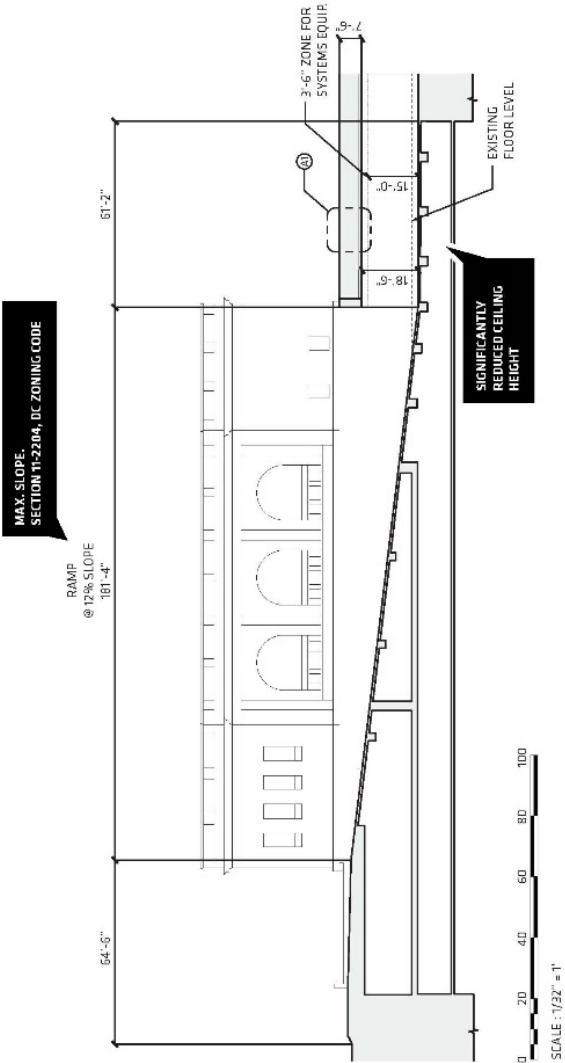


SCHEME B CURB CUT & RAMP AT GRADE



SCHEME B RAMP & LOADING FACILITY BELOW GRADE

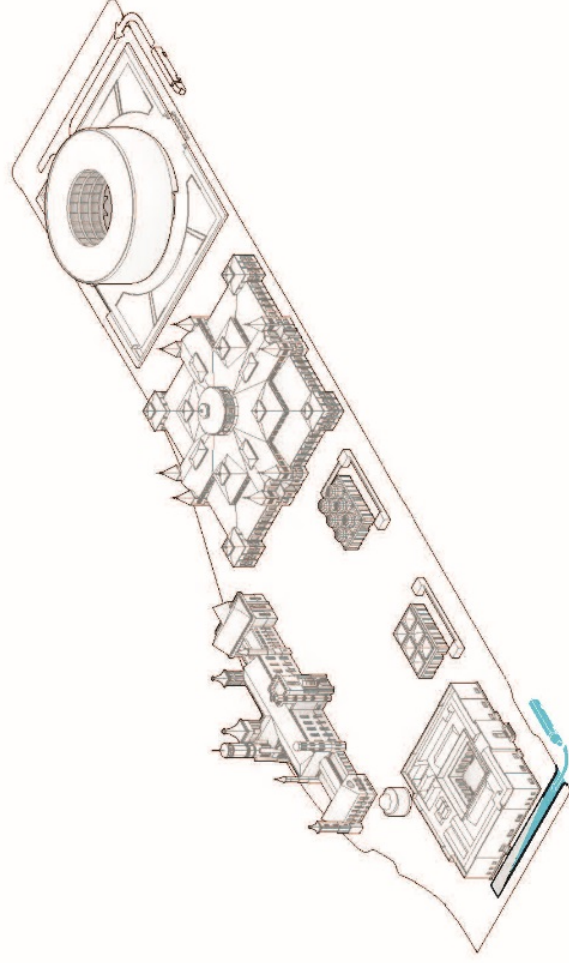
SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX



- Scheme B requires the expansion of below grade loading support areas to provide increased maneuvering clearance. The floor of the loading dock will need to be lowered. The alteration will greatly reduce the ceiling height in floor level below loading dock

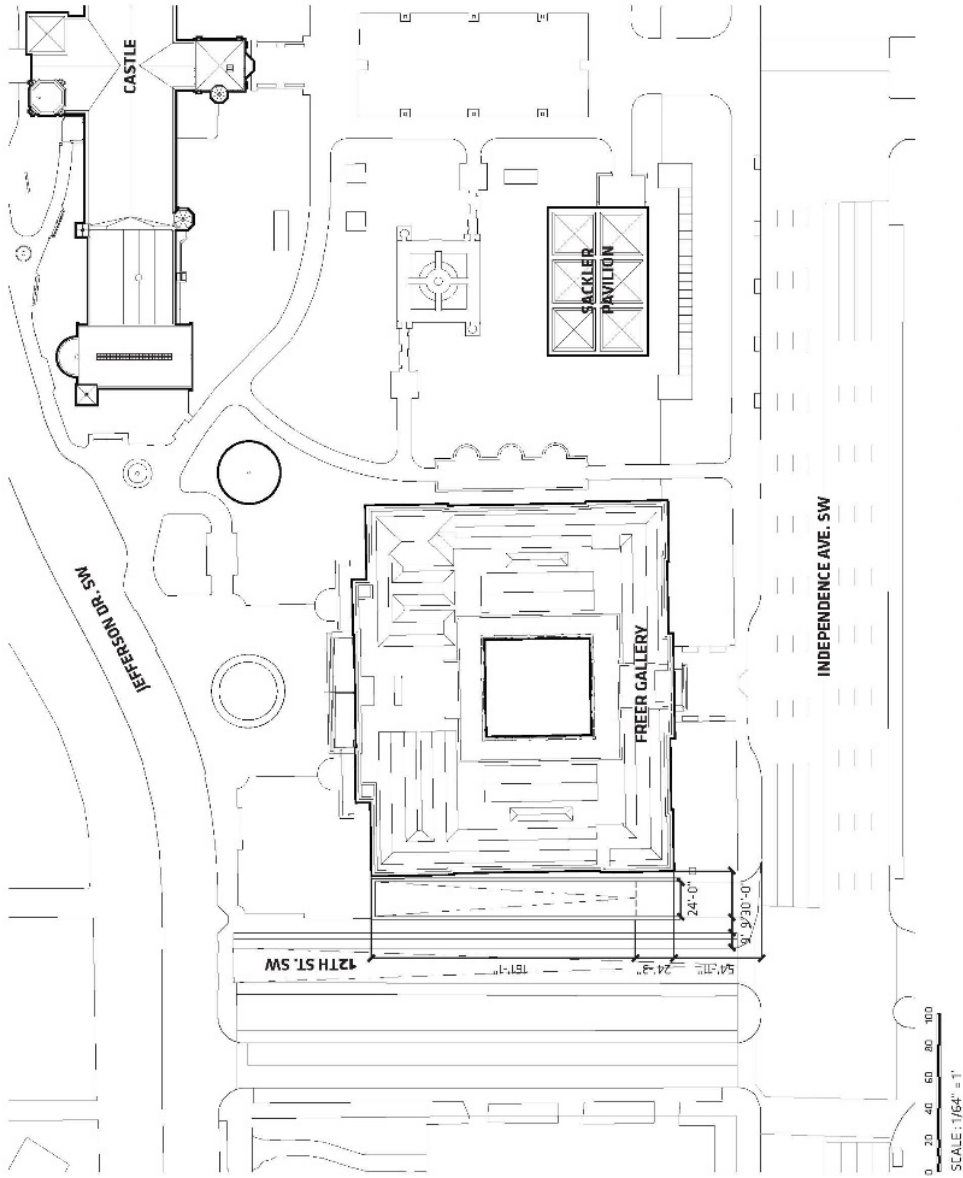
SCHEME B LOADING FACILITY SECTION

## **FREER RAMP**

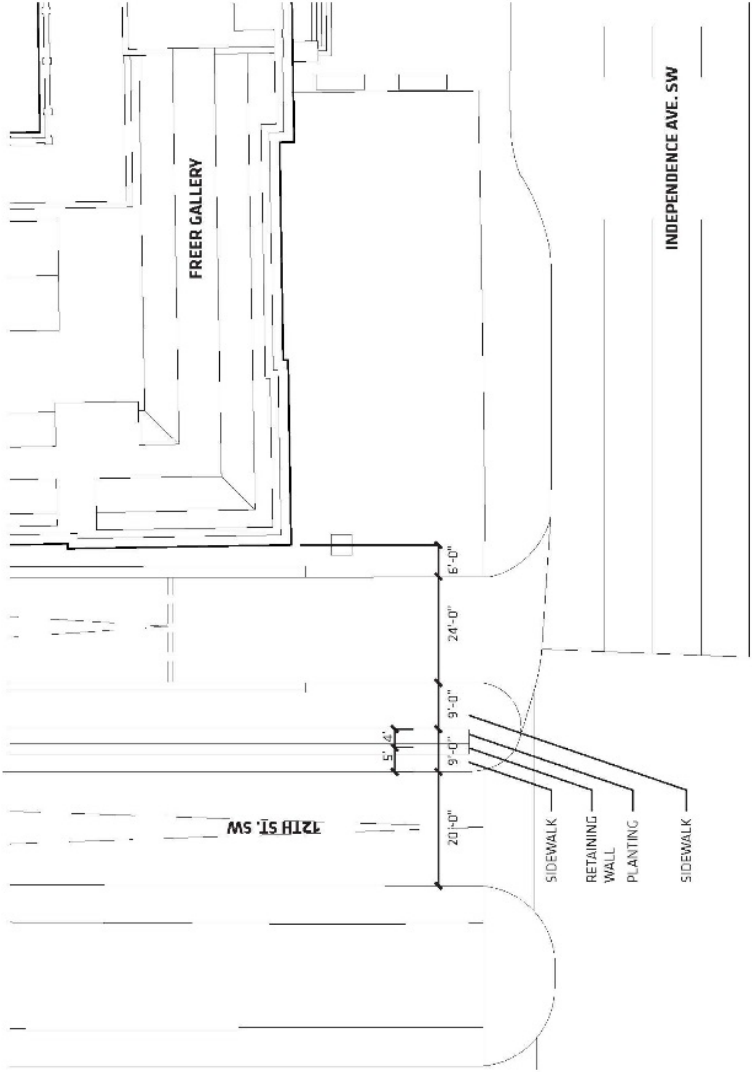


#### FREEER CURB CUT AND LOADING FACILITY

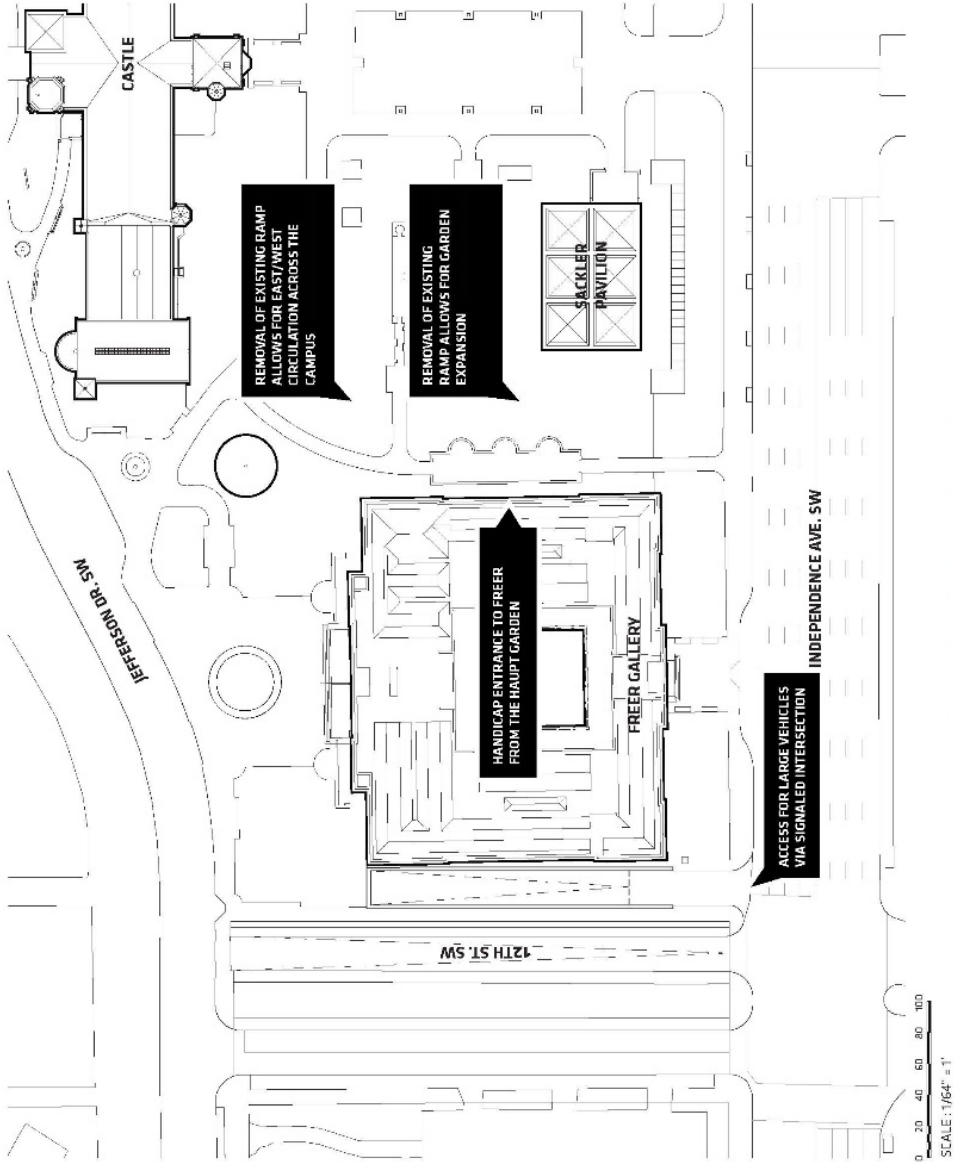
- A new curb cut and ramp would allow for the consolidation of existing curb cuts and loading facilities and allow two-way traffic. Scheme allows for East/West circulation across the Campus



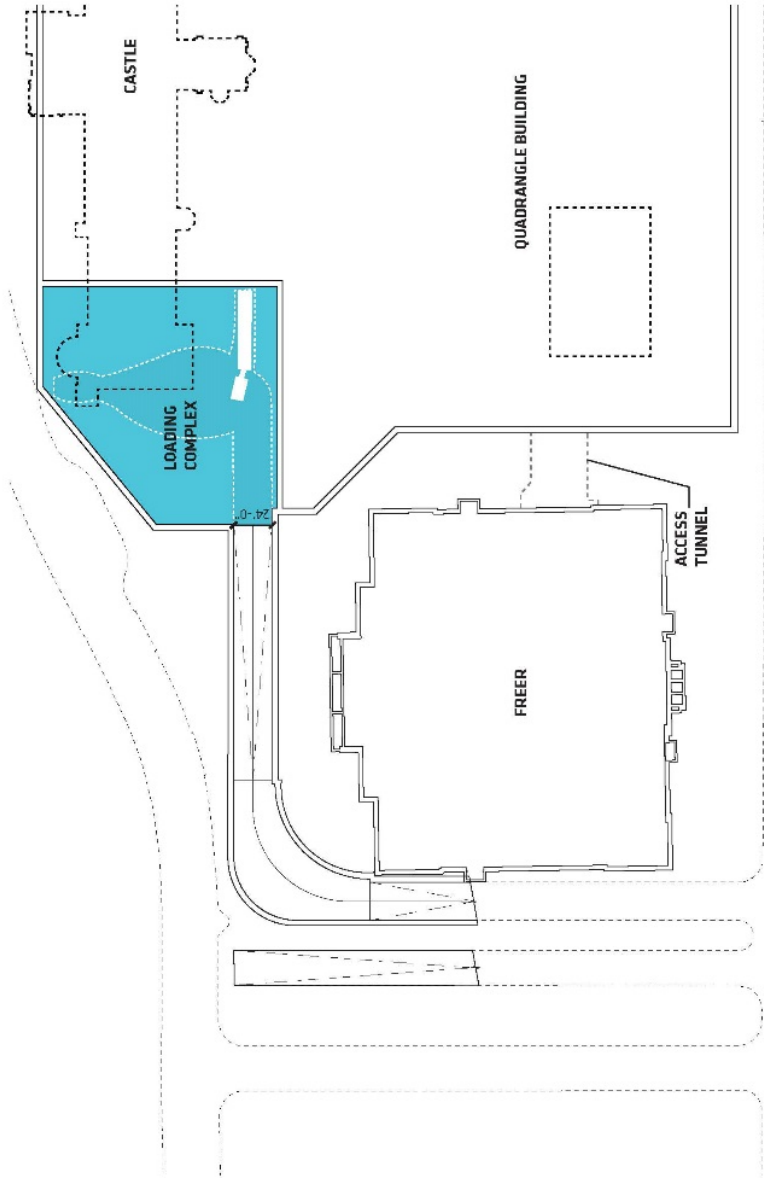
SCHEME B CURB CUT | LOADING FACILITIES: QUAD COMPLEX



PROPOSED DIMENSIONS

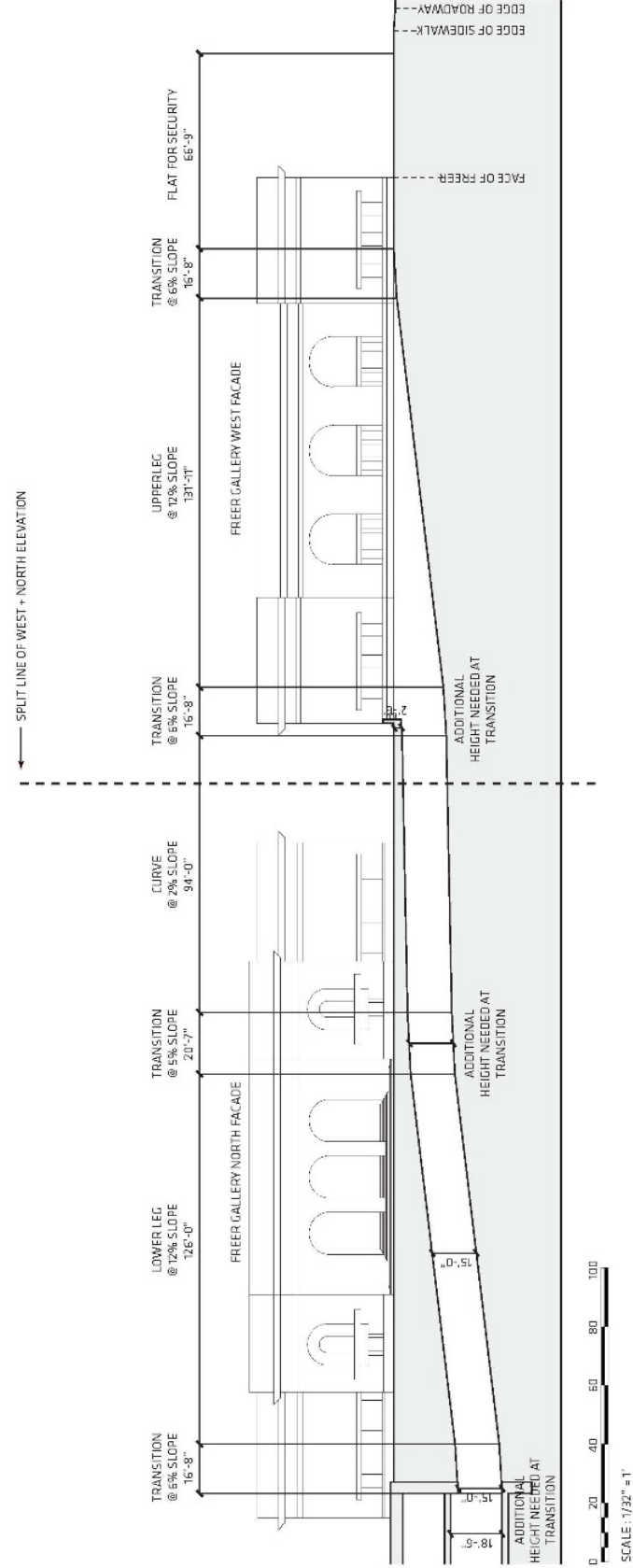


FREER CURB CUT & RAMP AT GRADE

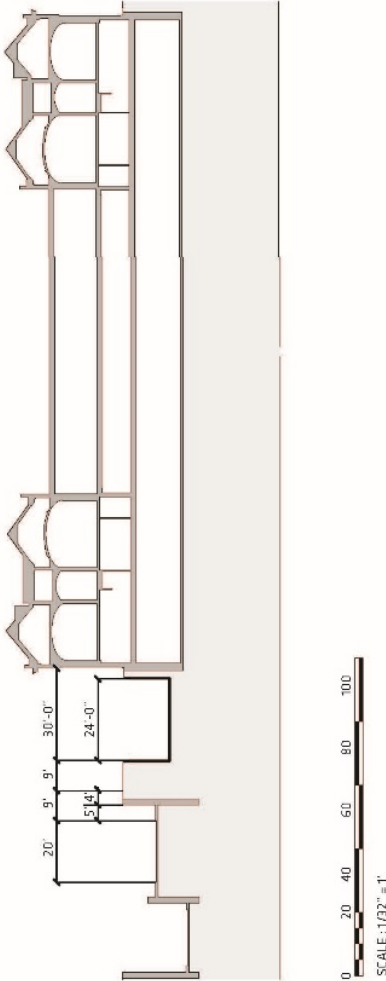


FREER RAMP & LOADING FACILITY BELOW GRADE

FREER CURB CUT | LOADING FACILITIES: QUAD COMPLEX

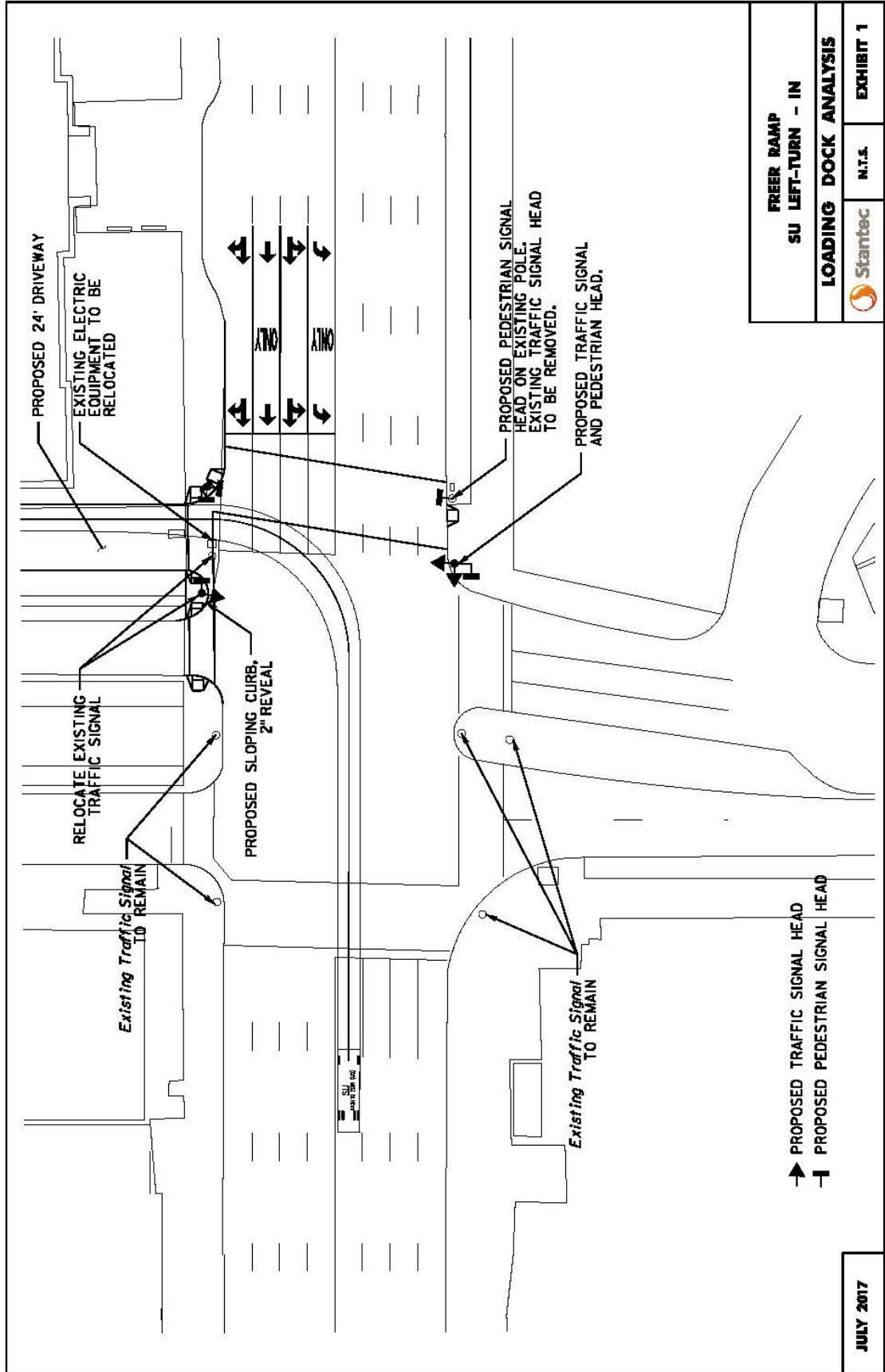


FREER LOADING FACILITY SECTION

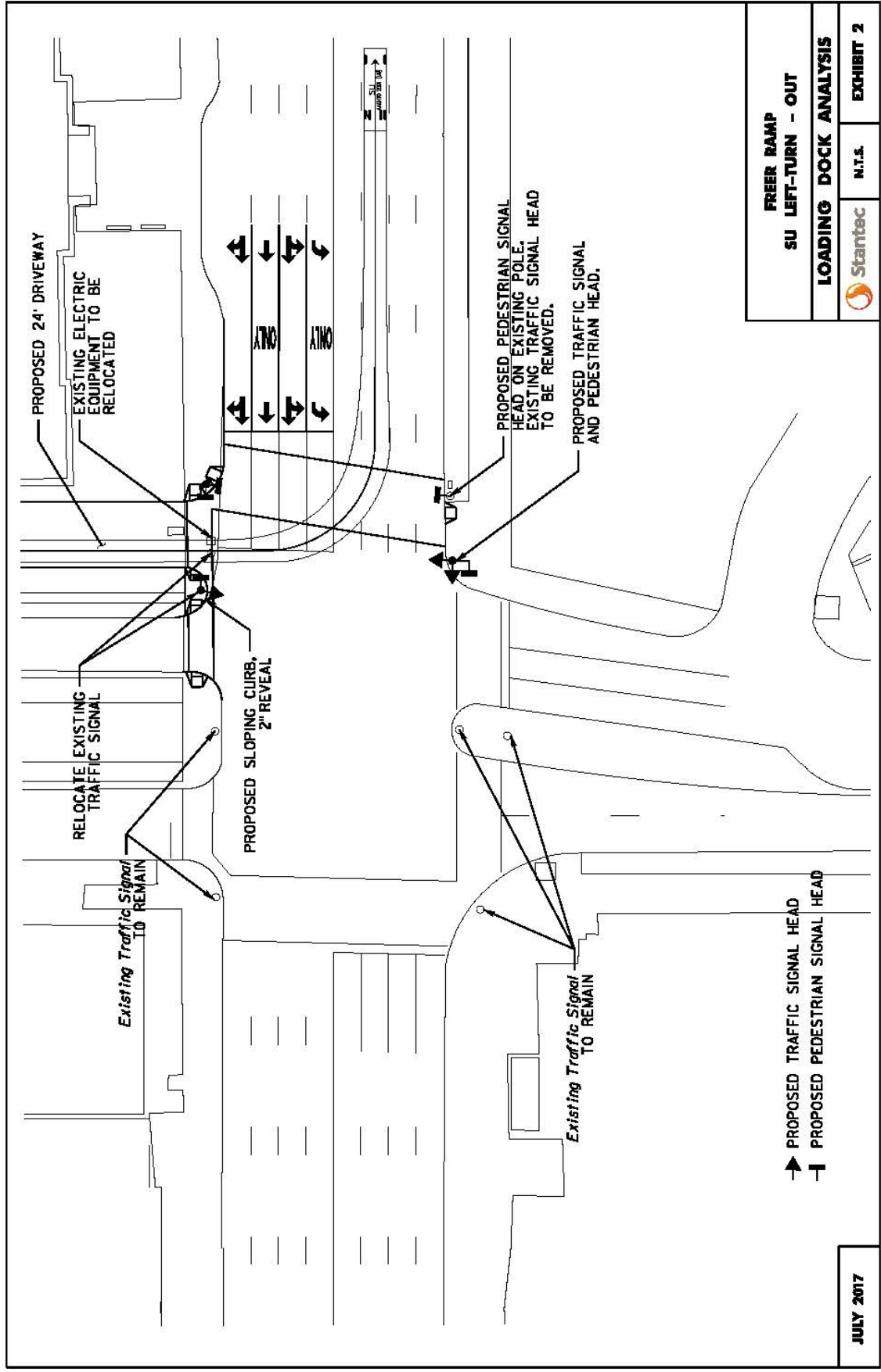


FREER LOADING RAMP SECTION

**APPENDIX E:  
INTERSECTION CONCEPT  
WITH TRUCK TURNING  
DIAGRAMS**

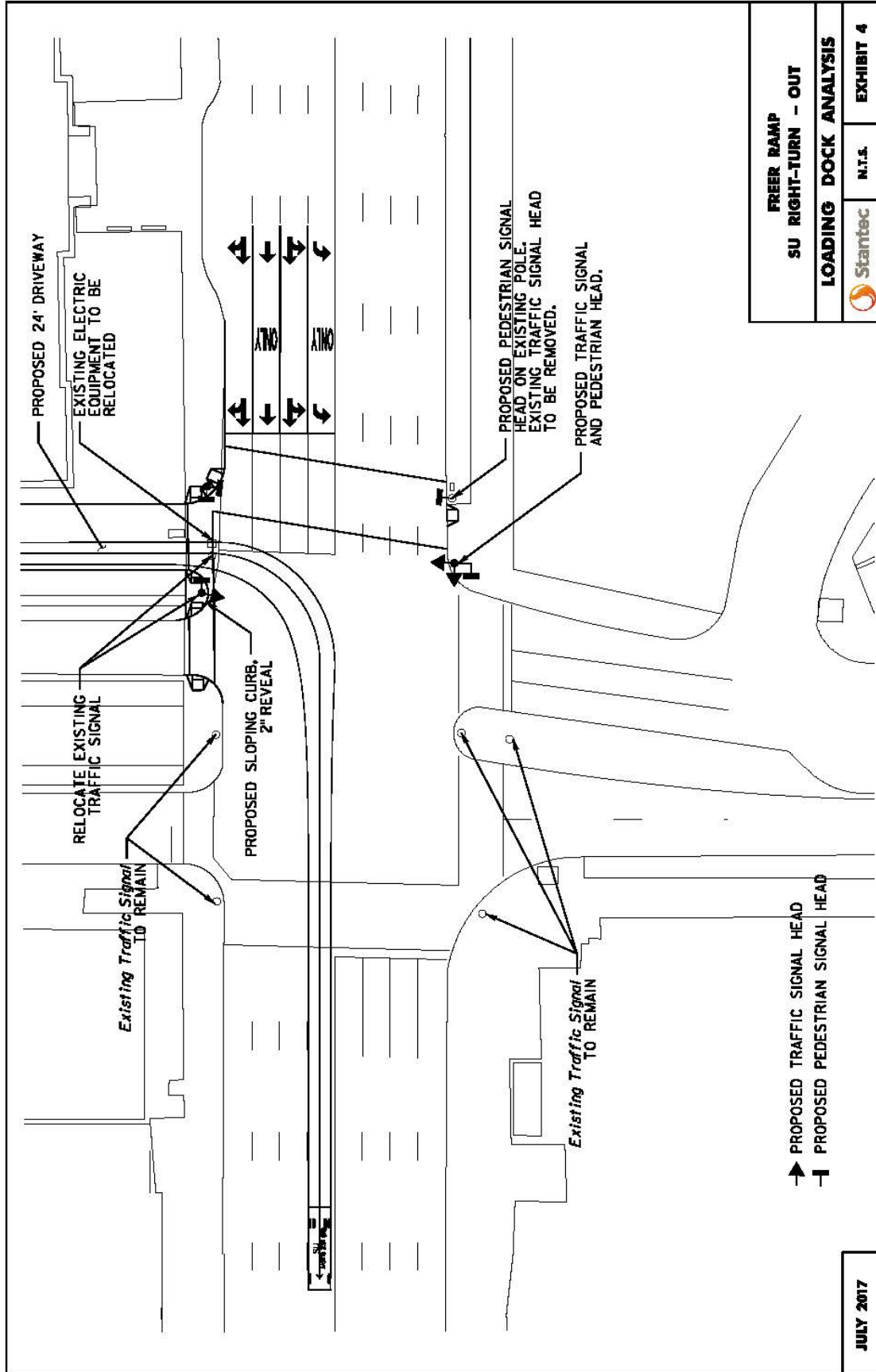


FREER RAMP		
SU LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 1

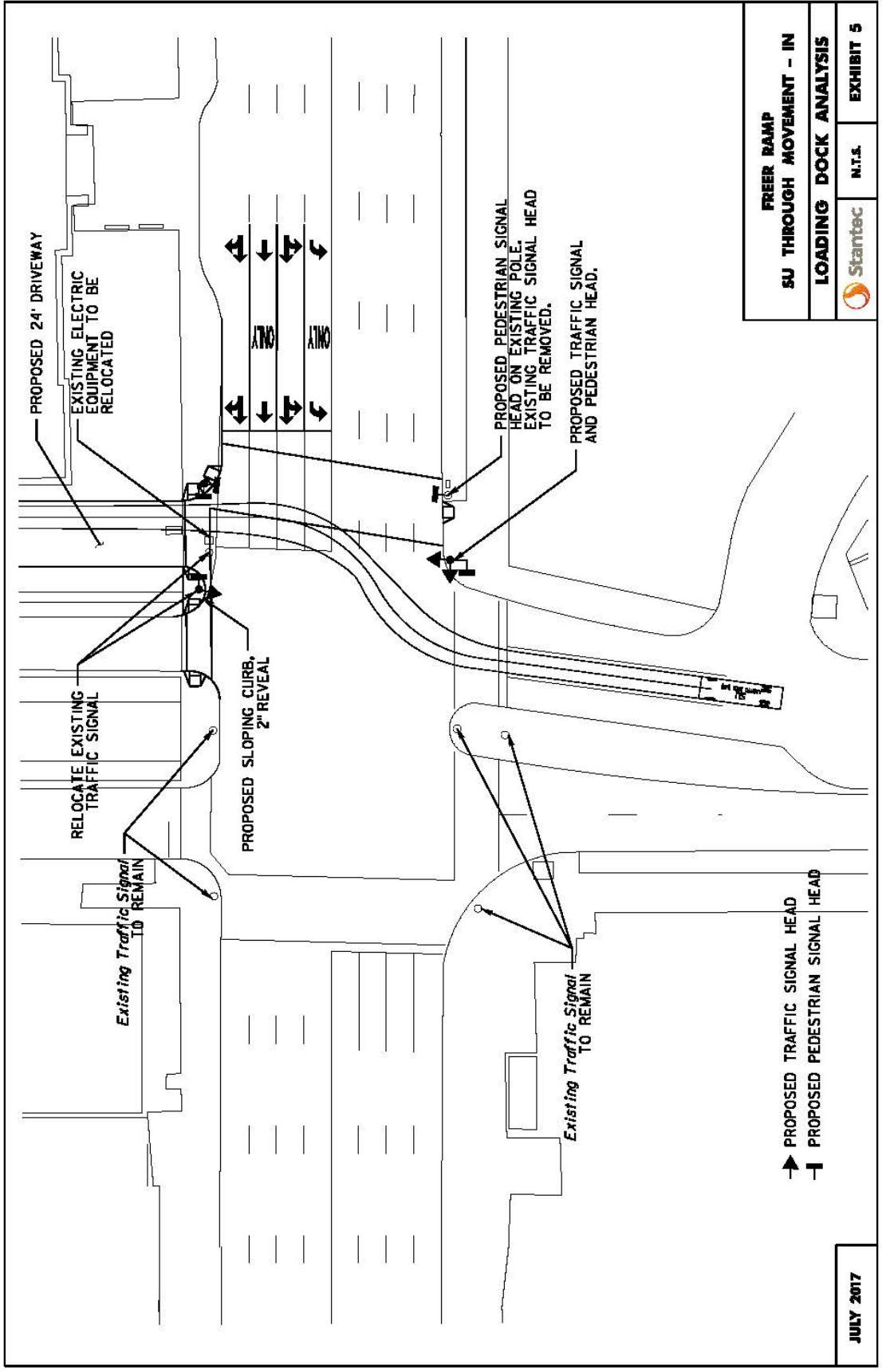


FREER RAMP	
SU LEFT-TURN - OUT	
LOADING DOCK ANALYSIS	
Stantec	N.T.S.
EXHIBIT 2	



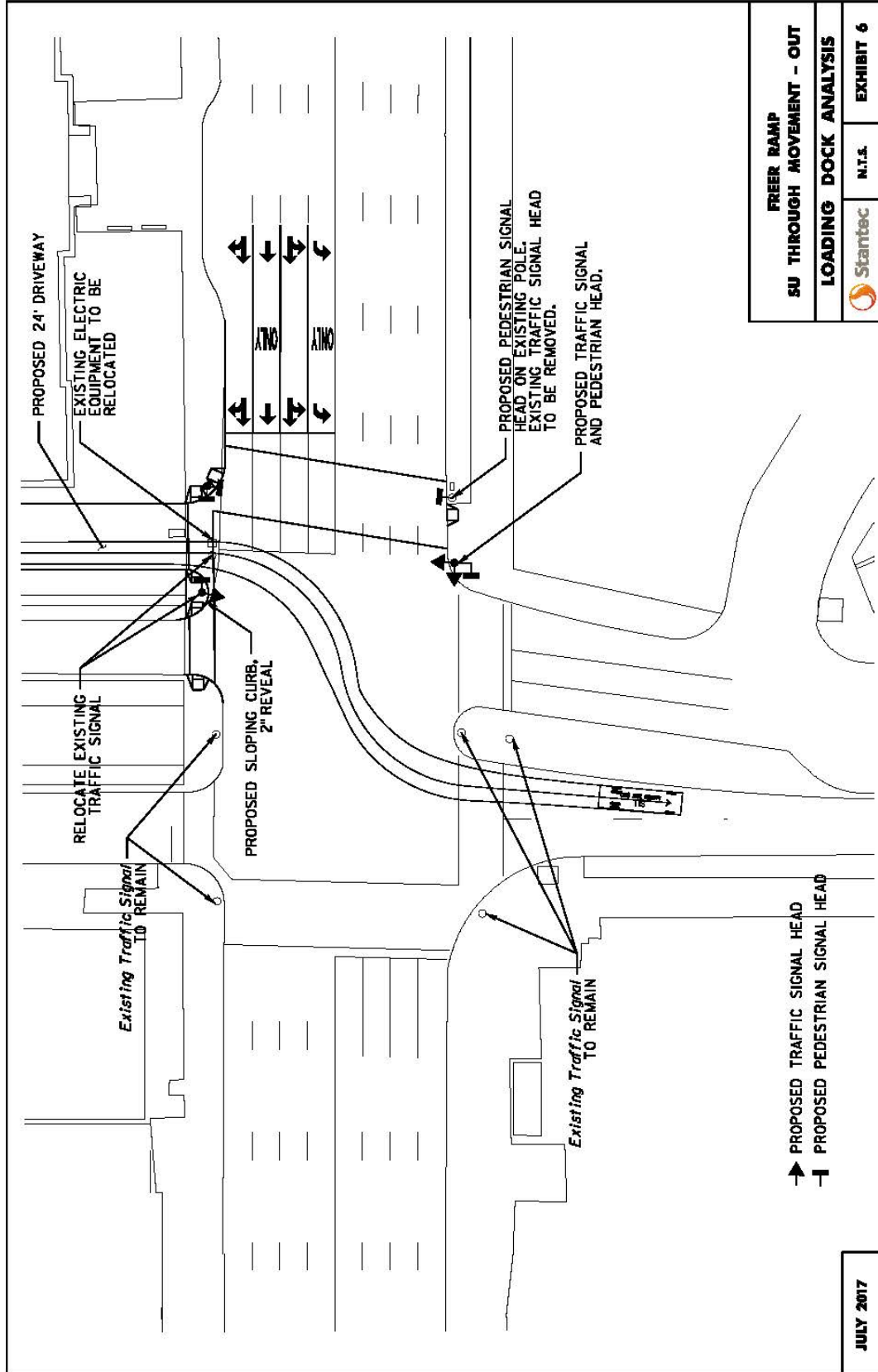


FREER RAMP		
SU RIGHT-TURN - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 4



FREER RAMP		
SU THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 5

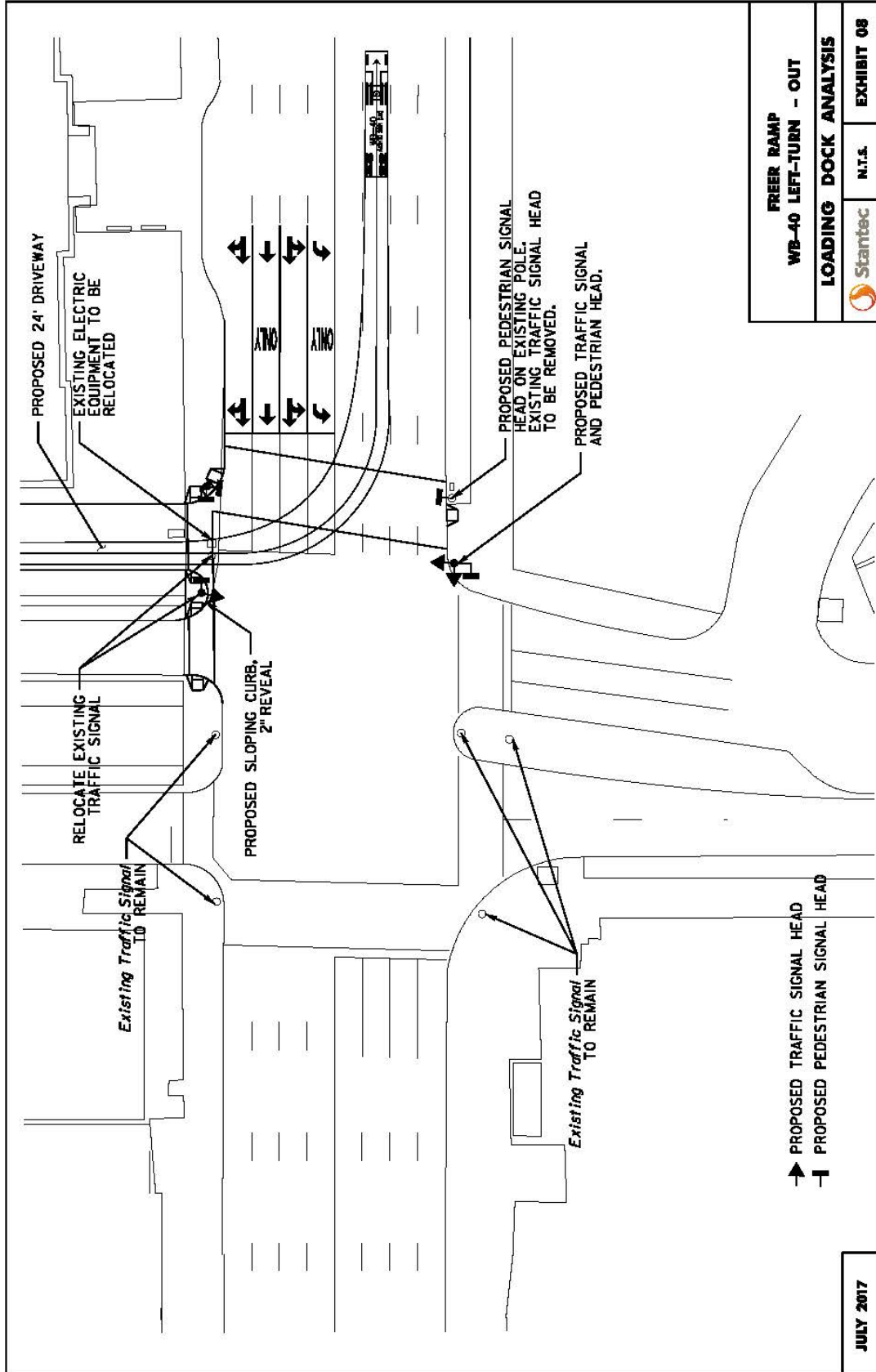
JULY 2017



FREER RAMP		
SU THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 6

JULY 2017

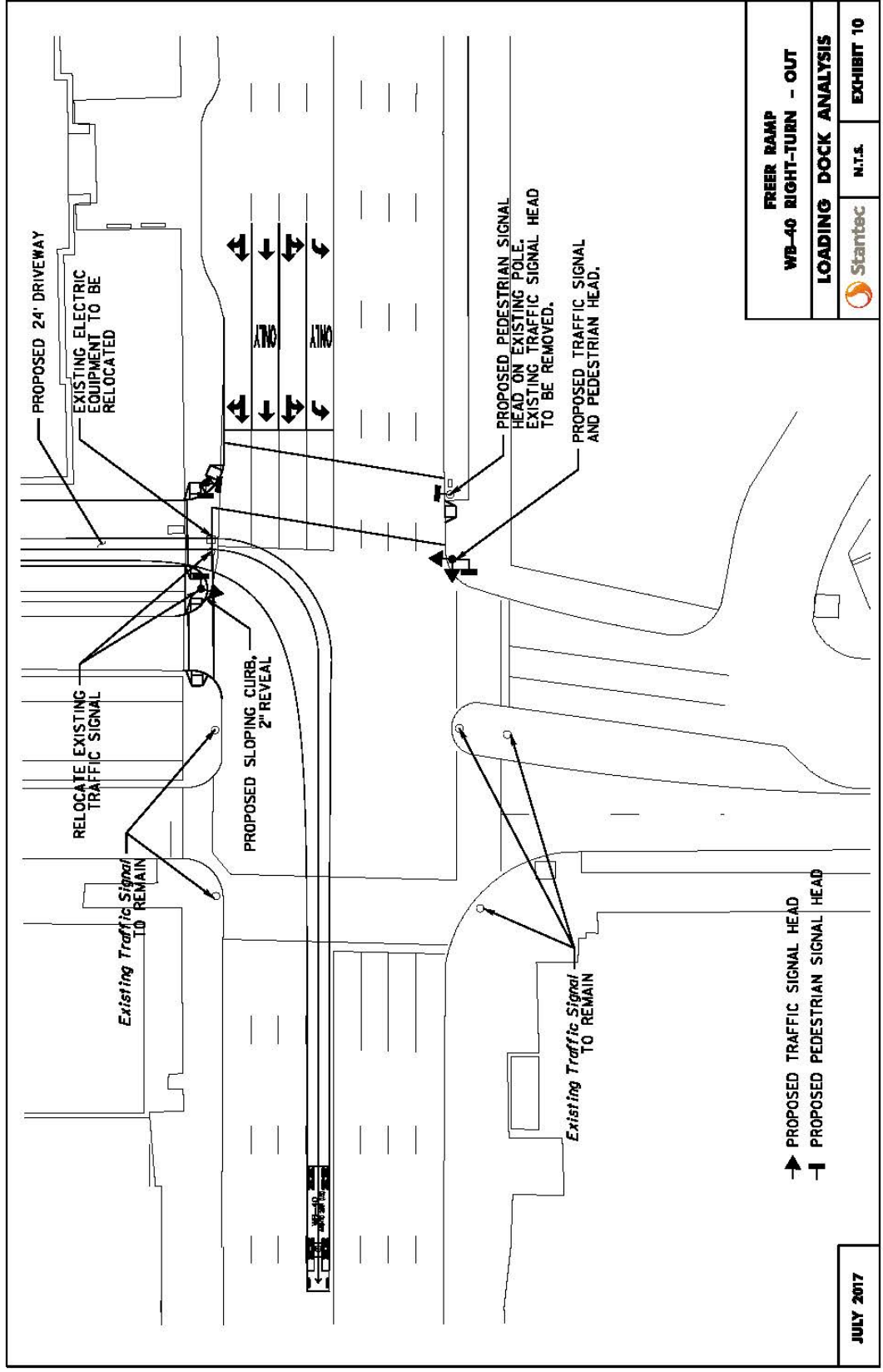




FREER RAMP		
WB-40 LEFT-TURN - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 08

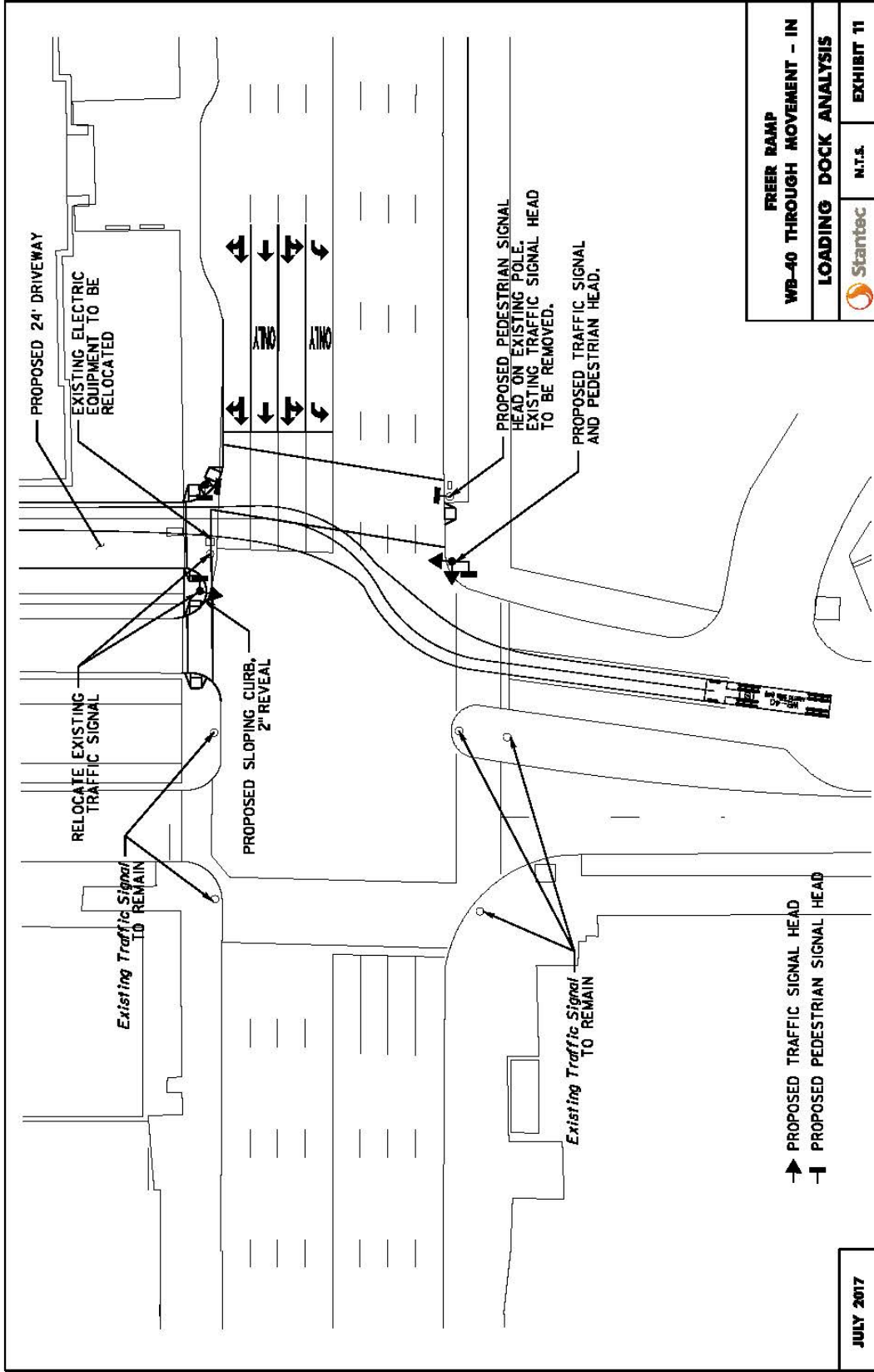
JULY 2017





FREER RAMP	
WB-40 RIGHT-TURN - OUT	
LOADING DOCK ANALYSIS	
Startec	N.T.S.
EXHIBIT 10	

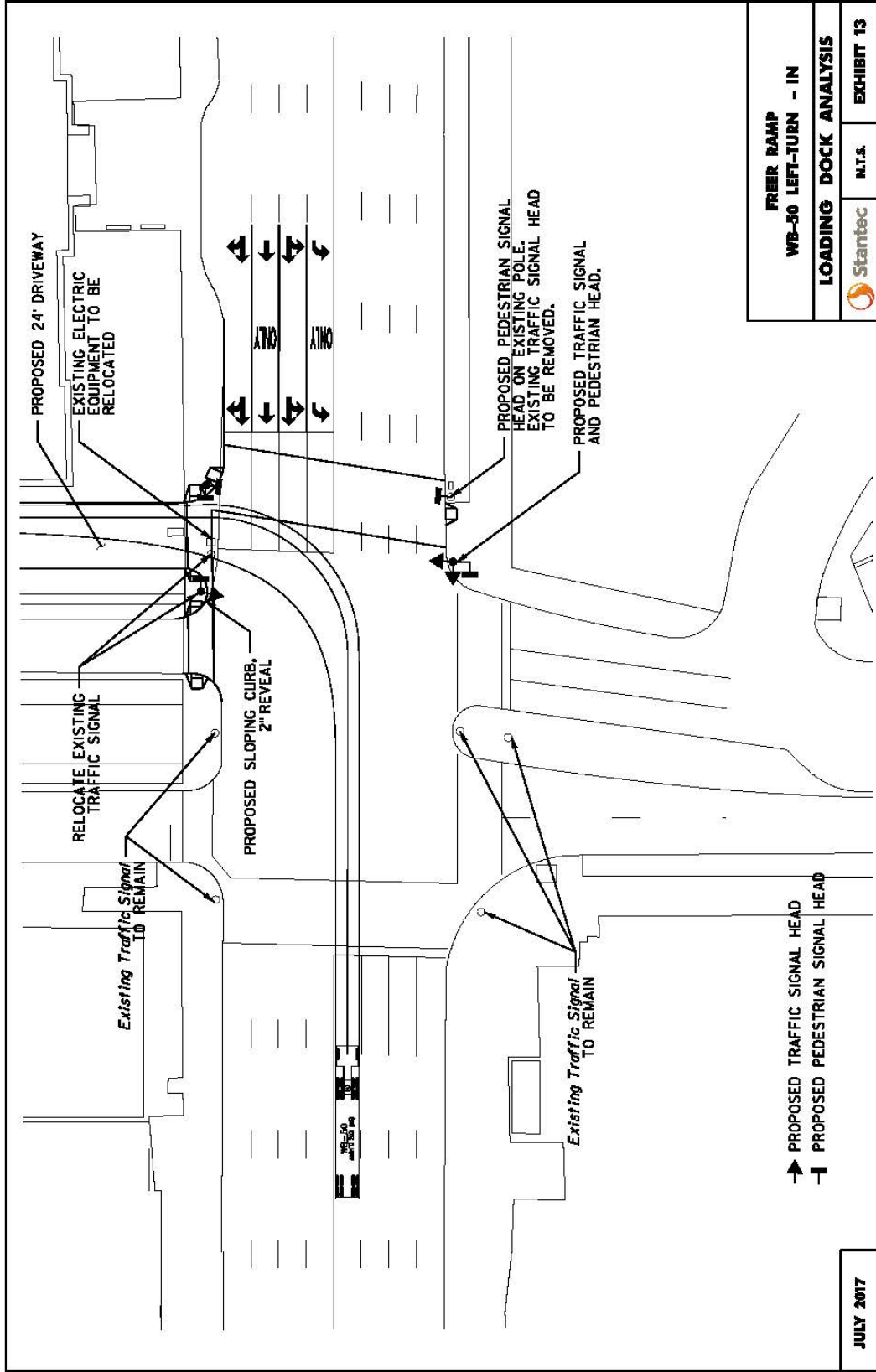
JULY 2017



FREER RAMP		
WB-40 THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 11

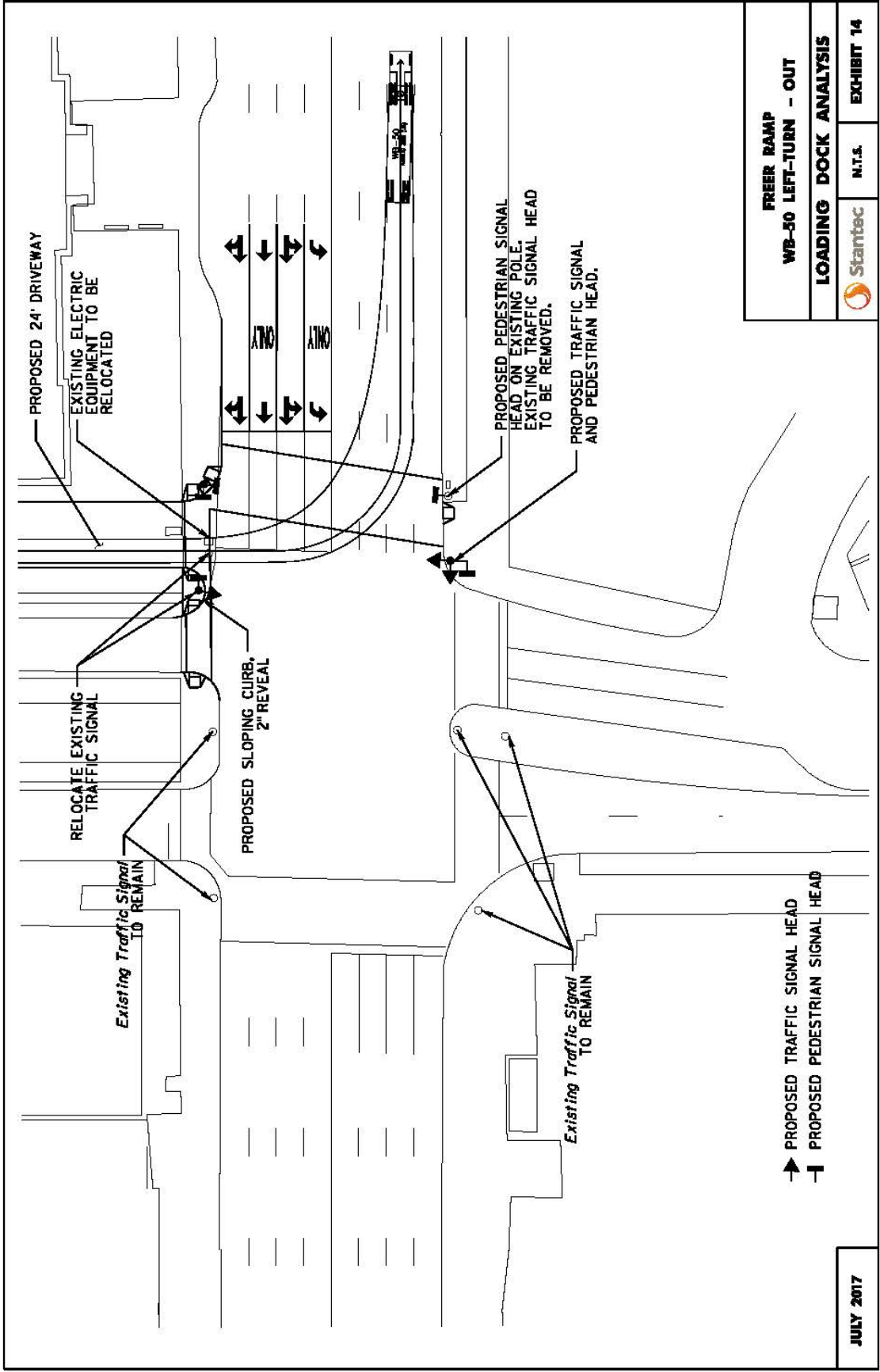
JULY 2017





FREER RAMP		
WB-50 LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 13

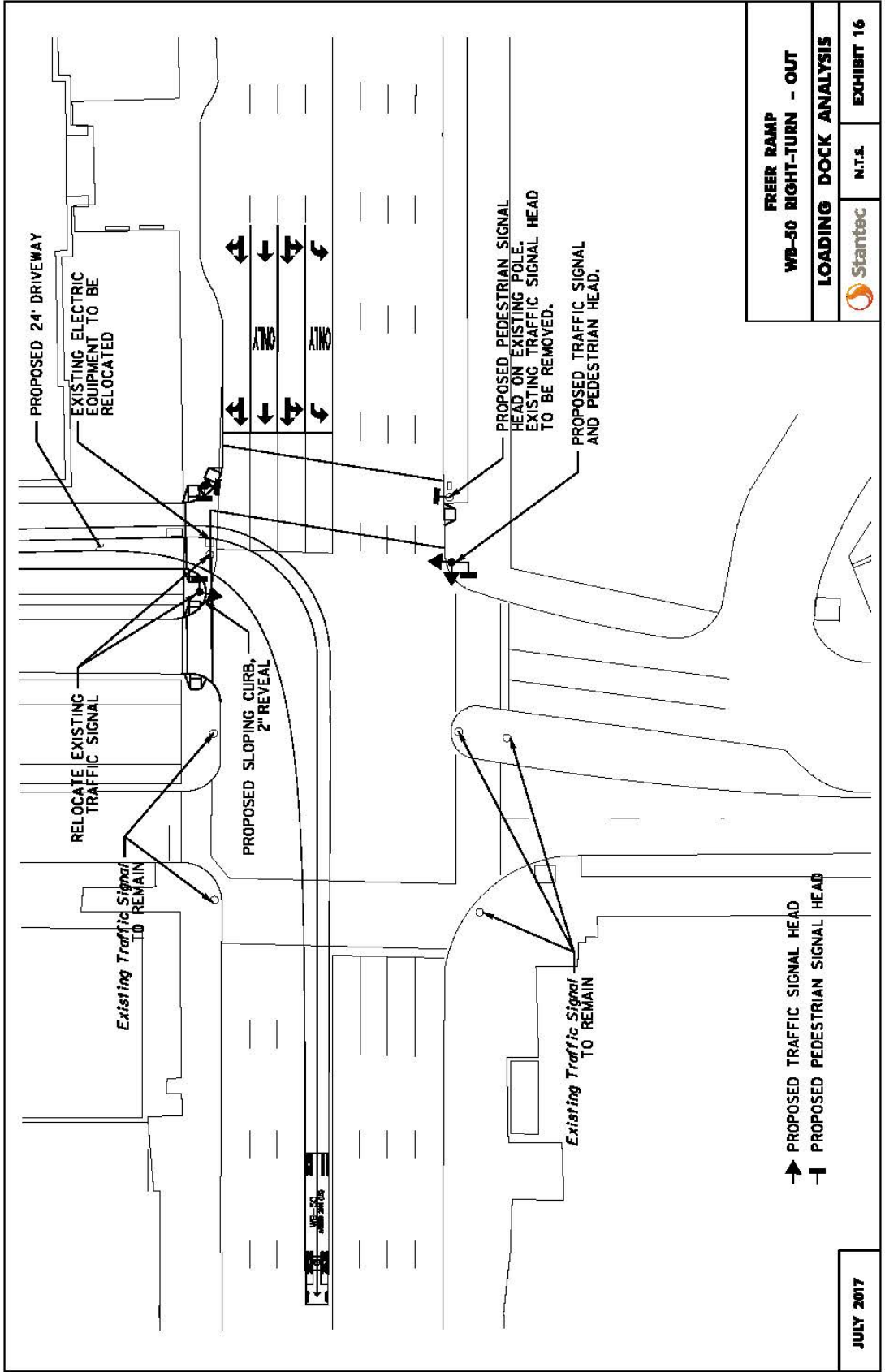
JULY 2017



FREER RAMP		
WB-30 LEFT-TURN - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 14

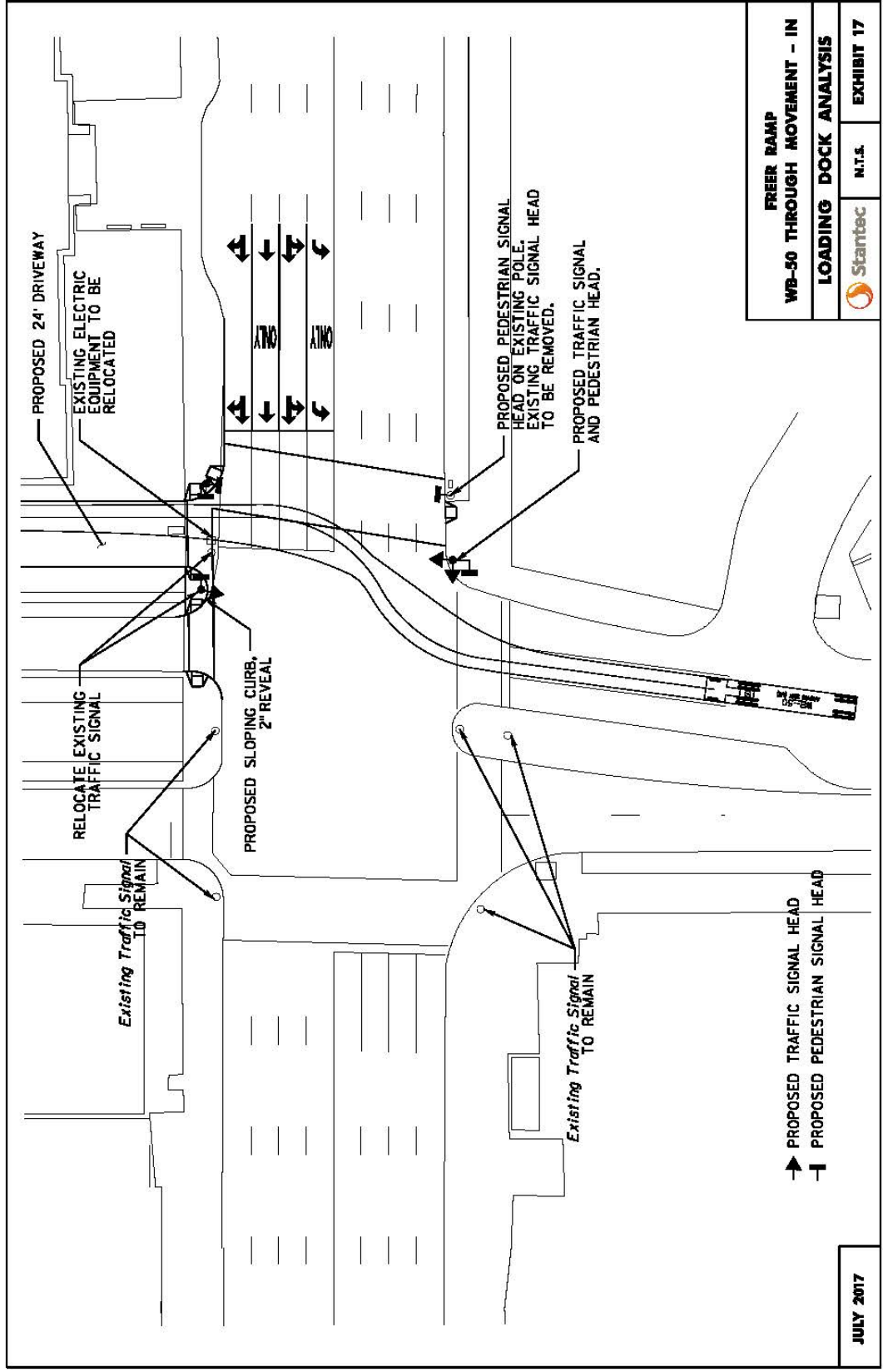
JULY 2017

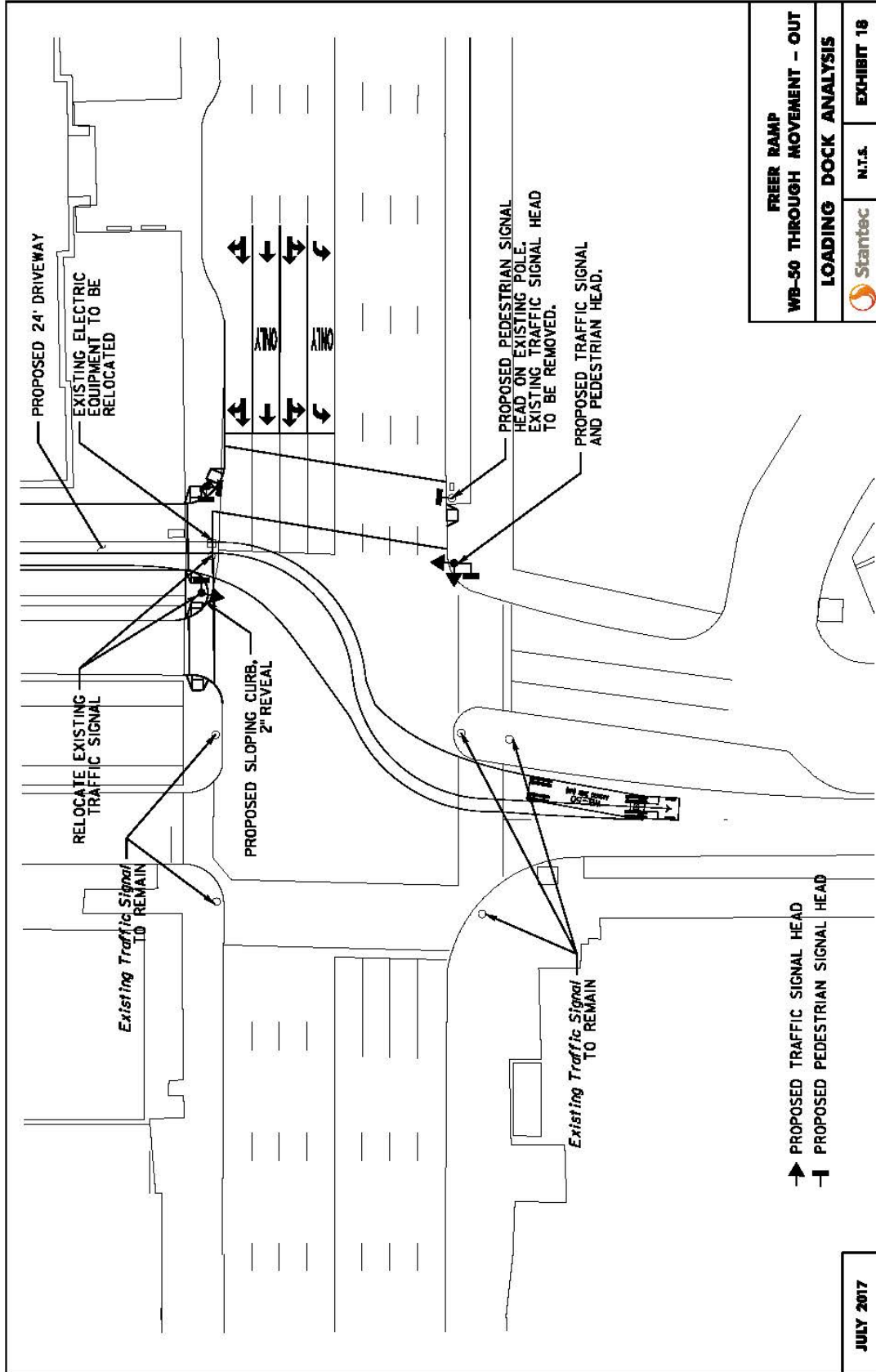




FREER RAMP	
WB-50 RIGHT-TURN - OUT	
LOADING DOCK ANALYSIS	
Startec	N.T.A.
EXHIBIT 16	

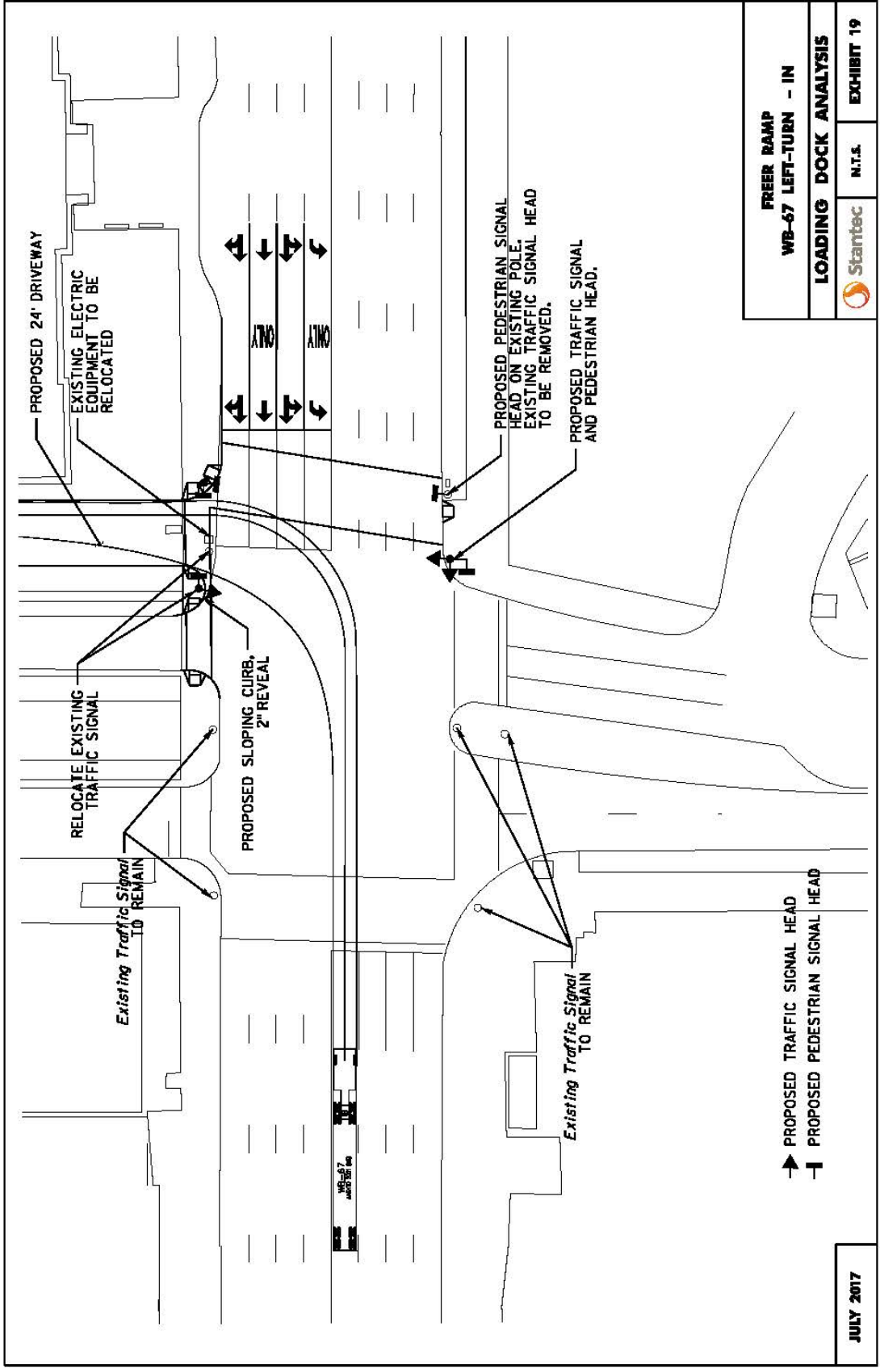
JULY 2017





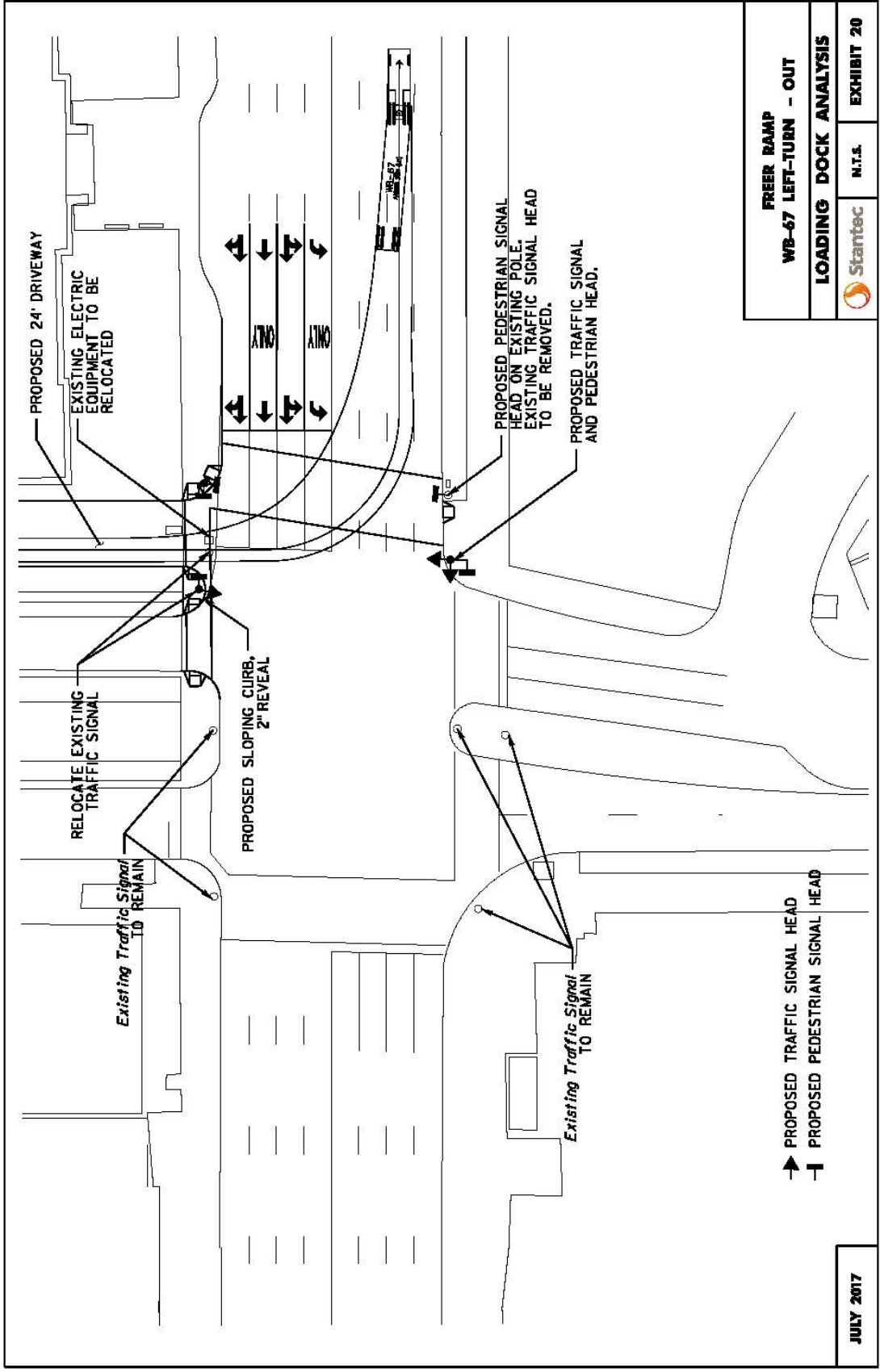
FREER RAMP		
WB-50 THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 16

JULY 2017



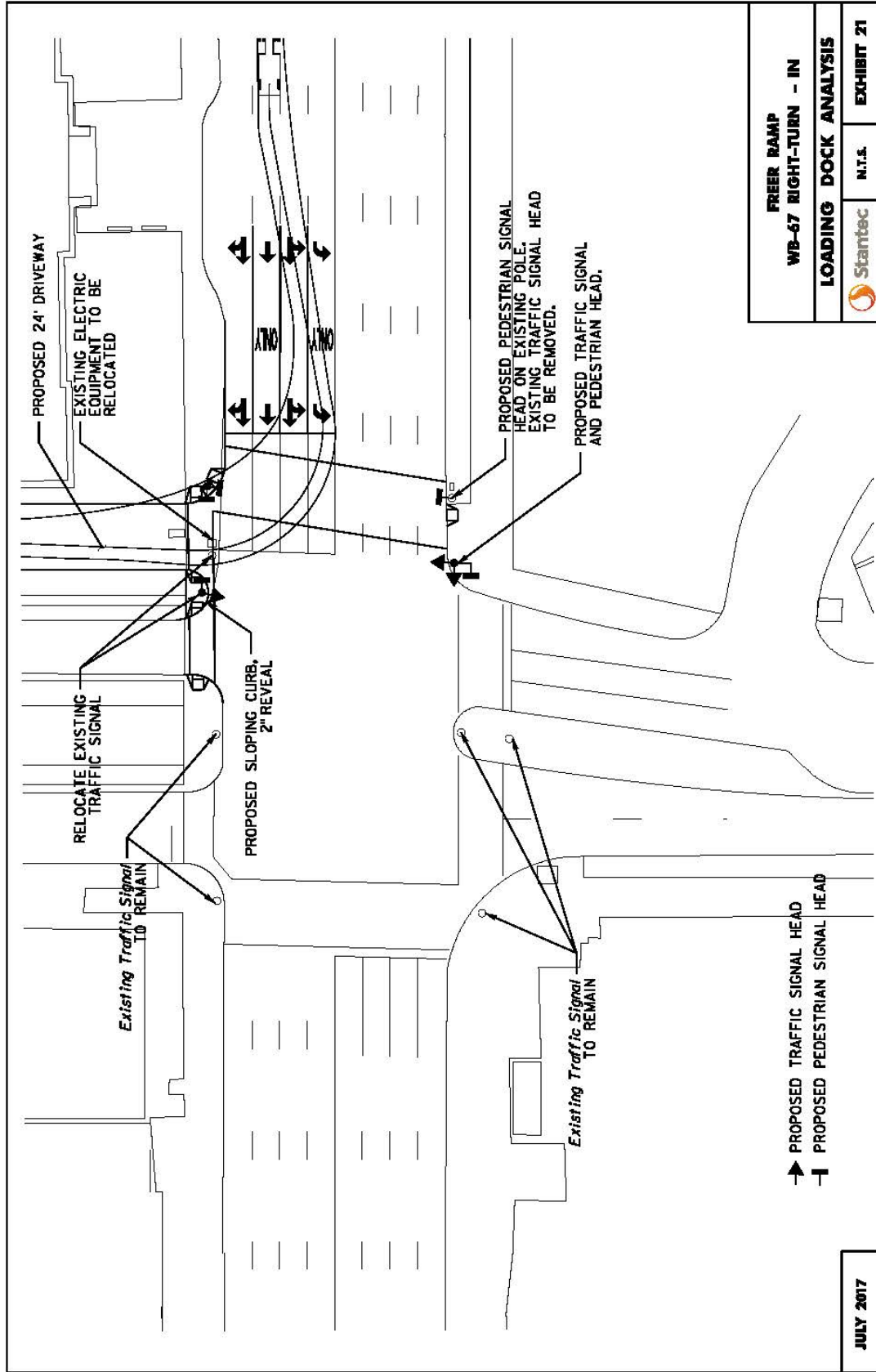
FREER RAMP		
WB-67 LEFT-TURN - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 19

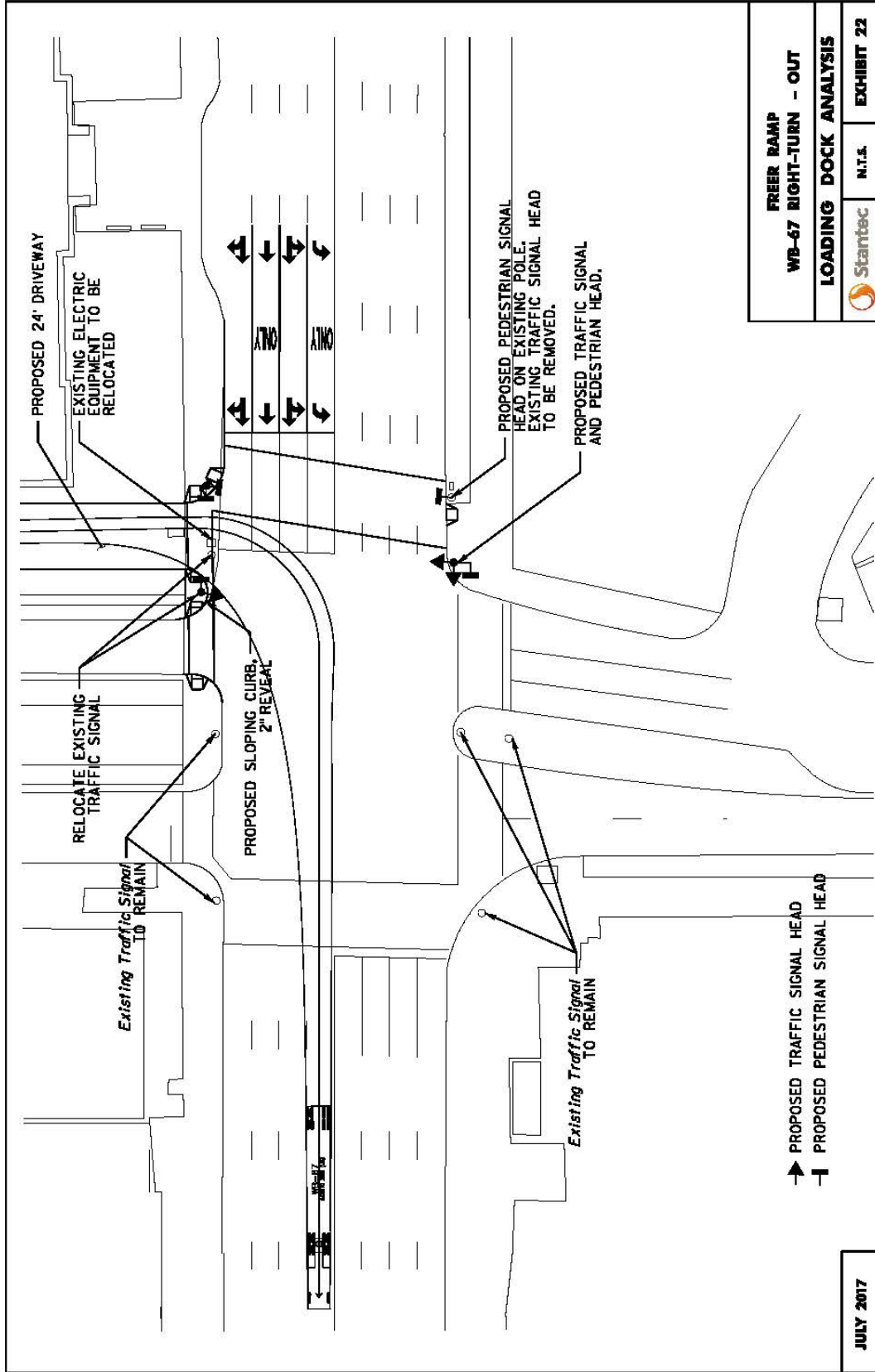
JULY 2017



FREER RAMP	
WB-67 LEFT-TURN - OUT	
LOADING DOCK ANALYSIS	
Stantec	N.T.S.
EXHIBIT 20	

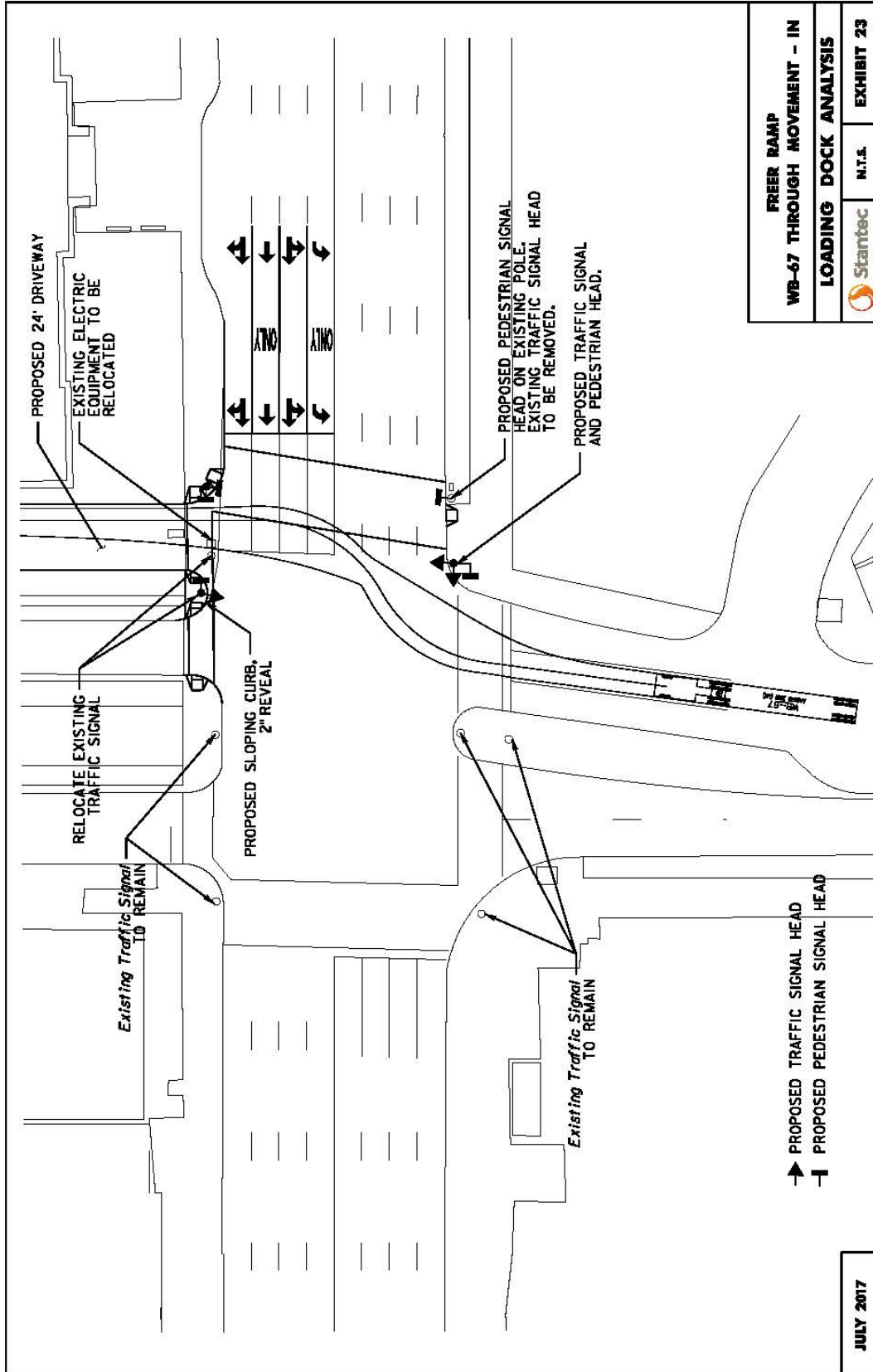
JULY 2017





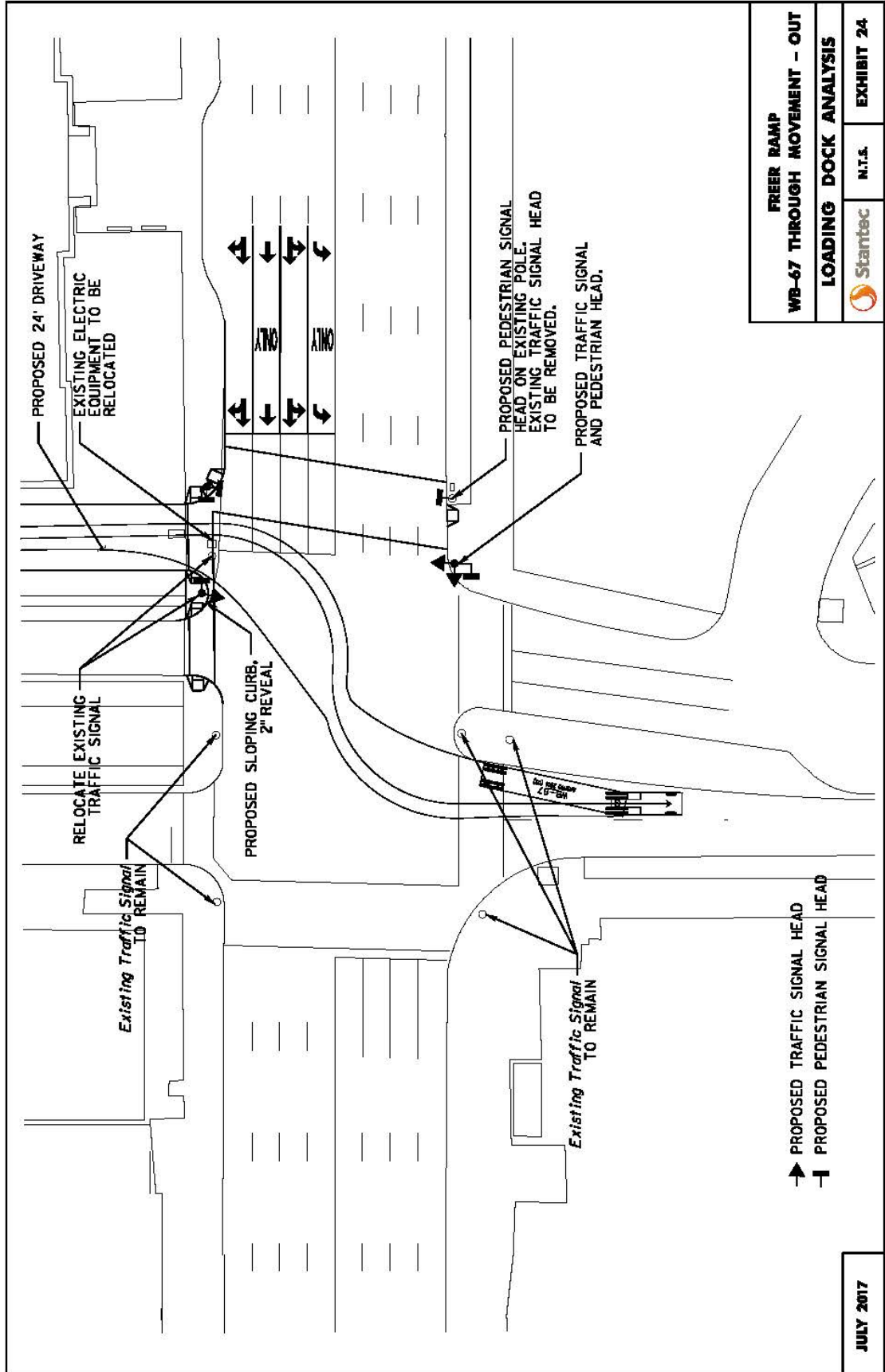
FREER RAMP		
WB-67 RIGHT-TURN - OUT		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 22

JULY 2017



FREER RAMP		
WB-67 THROUGH MOVEMENT - IN		
LOADING DOCK ANALYSIS		
Stantec	N.T.S.	EXHIBIT 23

JULY 2017



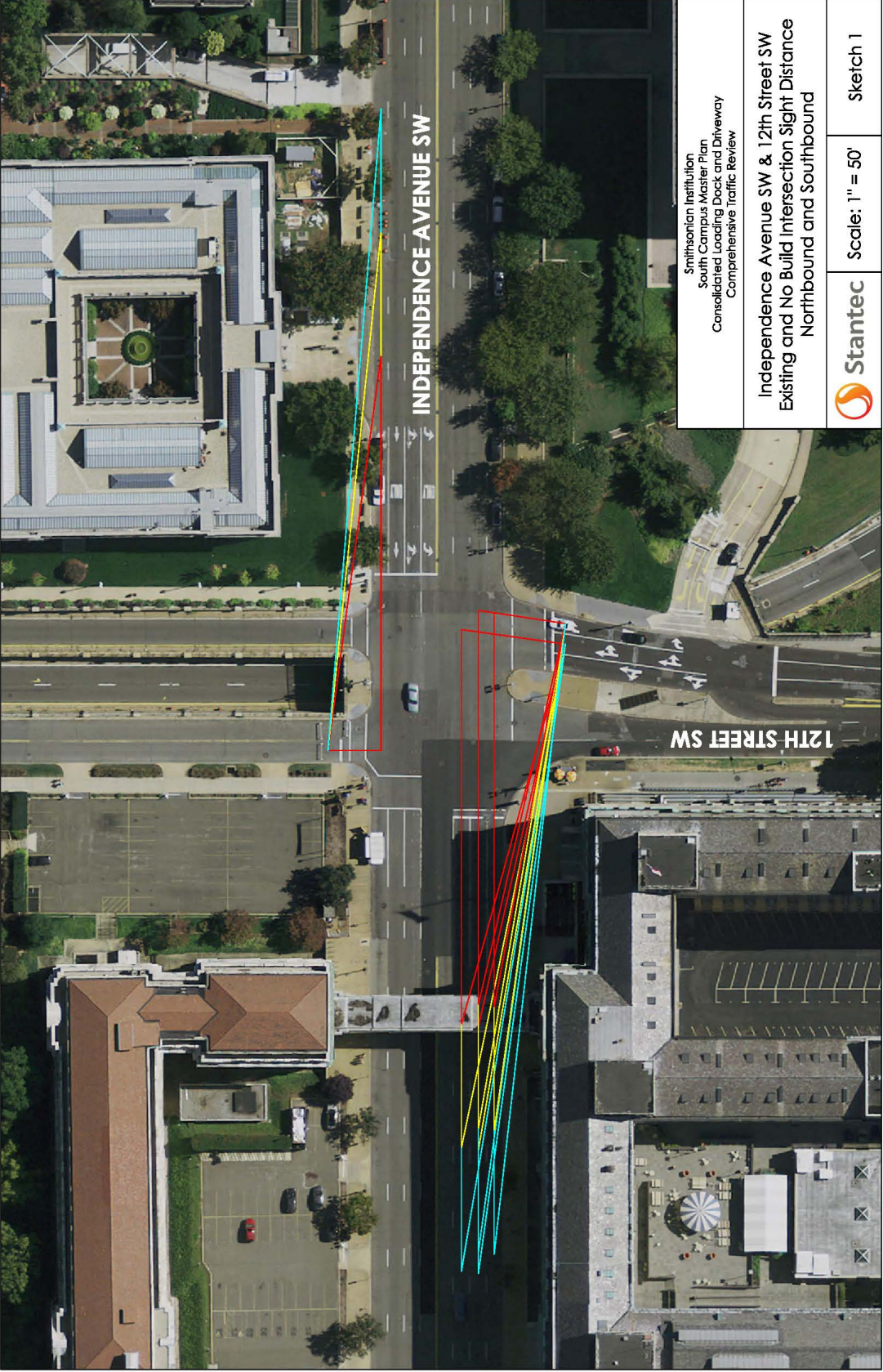
FREER RAMP		
WB-67 THROUGH MOVEMENT - OUT		
LOADING DOCK ANALYSIS		
Startec	N.T.S.	EXHIBIT 24

## **APPENDIX F: PARKING**

Exhibit 17  
Smithsonian Institution, South Campus Master Plan  
Parking Inventory  
Tuesday, December 08, 2015

	Segment	Total # On-street Parking Spaces	# of Permit Spaces	# of Metered Spaces	# of ADA Spaces	Parking Regulations
1	Independence WB b/w 7th and 9th	15	3 Vendor	0	0	1. No Parking Monday - Street Cleaning 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. No Parking Bus Zone
2	Independence WB b/w 9th and L'Enfant	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. Snow Emergency Route - Tow Away
3	Independence WB b/w L'Enfant and 12th	21	0	18	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Metro Bus 4. Snow Emergency Route - Tow Away 5. Vendor Stand
4	Independence WB b/w 12th and 14th	15	0	15	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Metro Bus 4. Snow Emergency Route - Tow Away 5. Vendor Stand
5	Independence EB b/w 14th and 12th	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Tow Away - Metro Bus Zone
6	Independence EB b/w 12th and L'Enfant	20	0	20	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 3. Pay by Phone 4. No Parking 10PM - 5AM - Street Cleaning Tuesday
7	Independence EB b/w L'Enfant and 9th	12	0	12	0	Has 3 main Signs 1. ADA Parking 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 4. Snow Emergency Route - Tow Away
8	12th St NB b/w C St and Independence	14	0	14	2	1. ADA Parking 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 4. Snow Emergency Route - Tow Away
9	12th St SB b/w C St and Independence	9	0	9	0	1. Snow Emergency Route - Tow Away 2. 2-Hour Parking 9:30AM-4PM, M-Sat
10	14th St NB b/w C St and Independence	3	0	0	0	1. 15-min Tour Bus Stand 9:30AM-4PM, No Parking All Other Times 2. No Standing or Parking Metro Bus Zones 3. Snow Emergency Route - Tow Away 4. Special Permit Parking (all times)
11	14th St SB b/w C St and Independence	4	4	0	0	1. No Standing or Parking Metro Bus Zones 2. Snow Emergency Route - Tow Away 3. Special Permit Parking (all times)
12	14th St NB b/w Independence and Jefferson	0	0	0	0	1. Snow Emergency Route - Tow Away
13	14th St SB b/w Independence and Jefferson	8	0	0	0	1. Snow Emergency Route - Tow Away 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F

## **APPENDIX G: SAFETY**



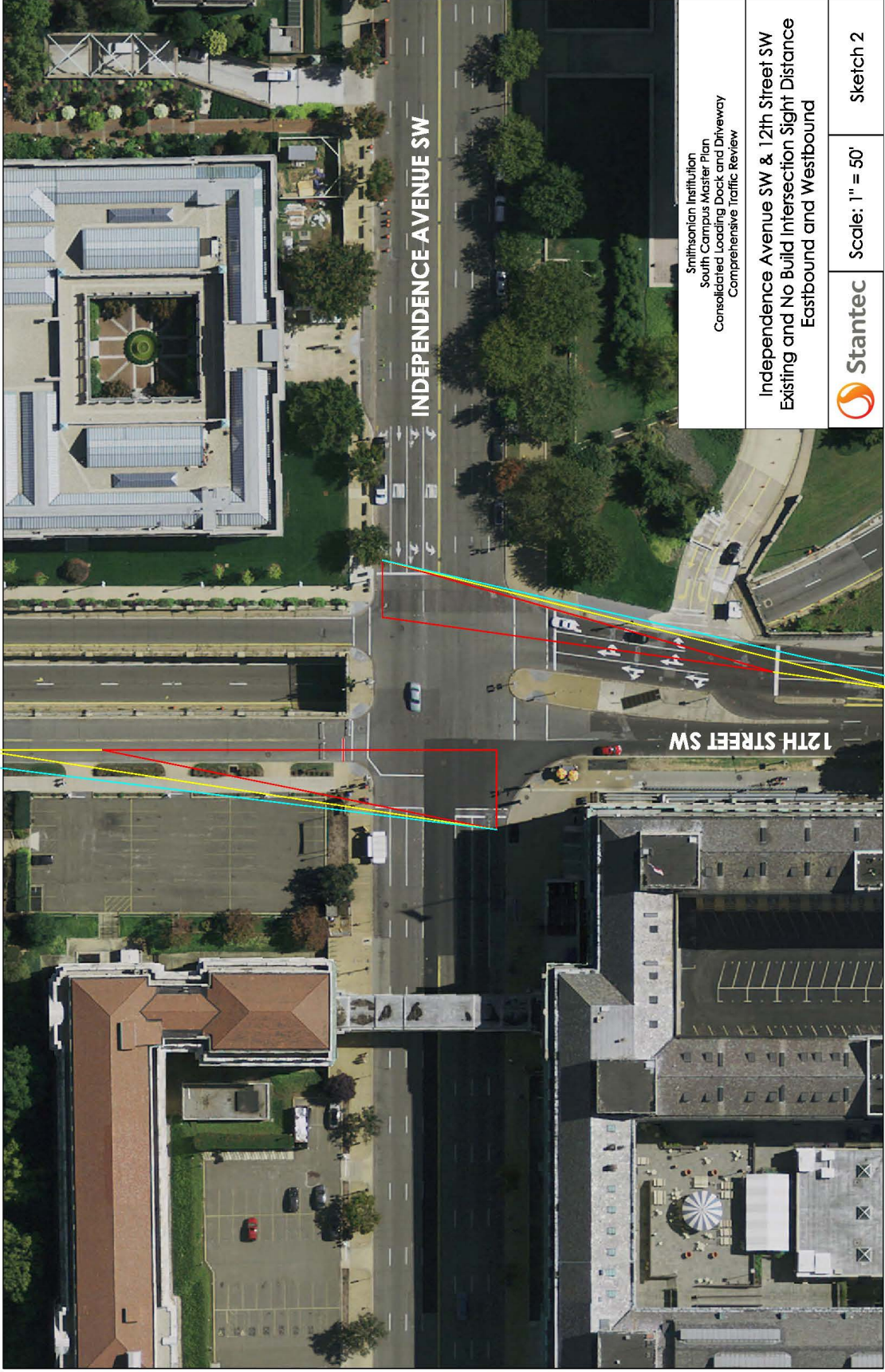
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Existing and No Build Intersection Sight Distance  
Northbound and Southbound

 Stantec

Scale: 1" = 50'

Sketch 1



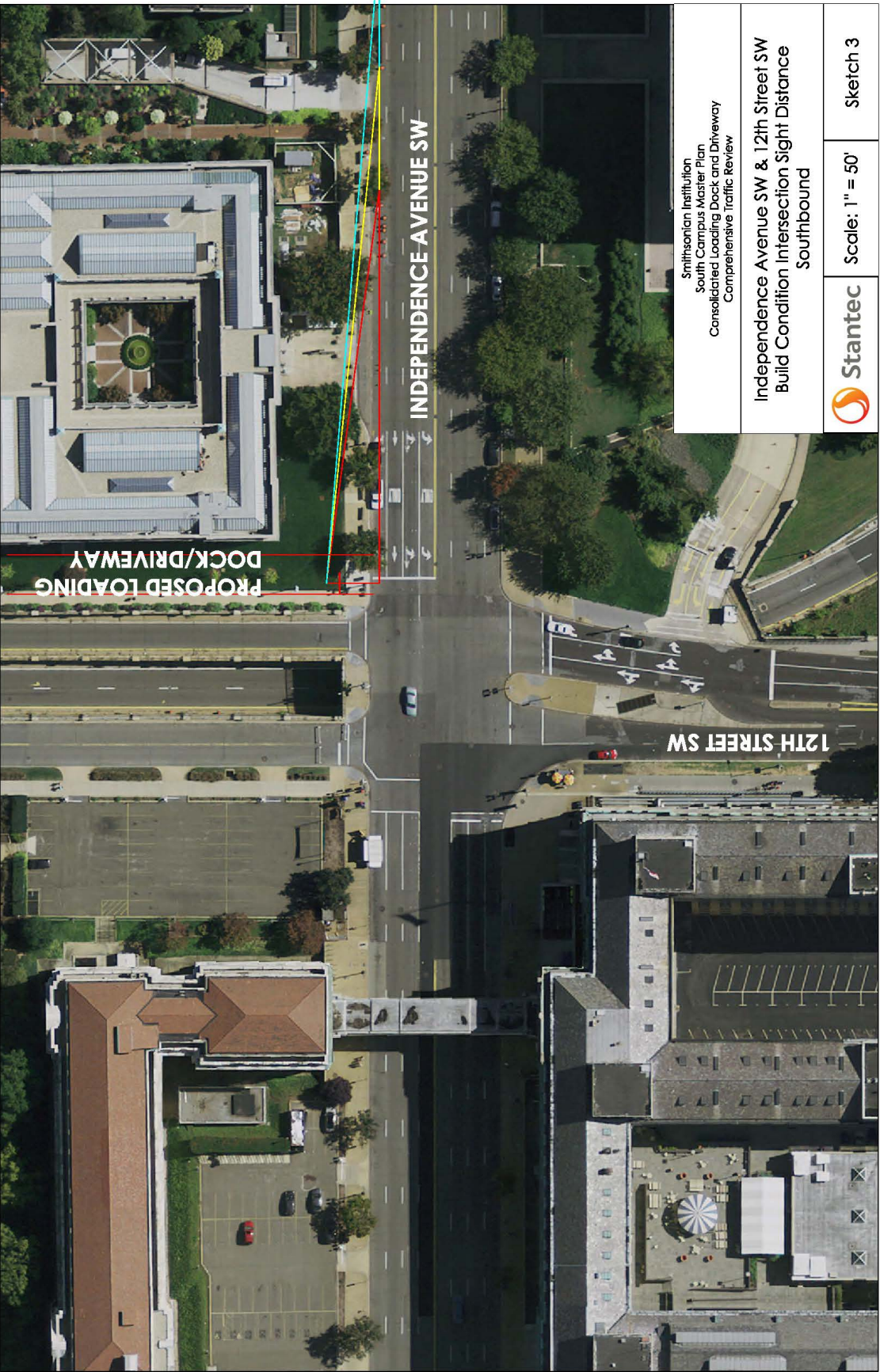
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Existing and No Build Intersection Sight Distance  
Eastbound and Westbound




Scale: 1" = 50'

Sketch 2



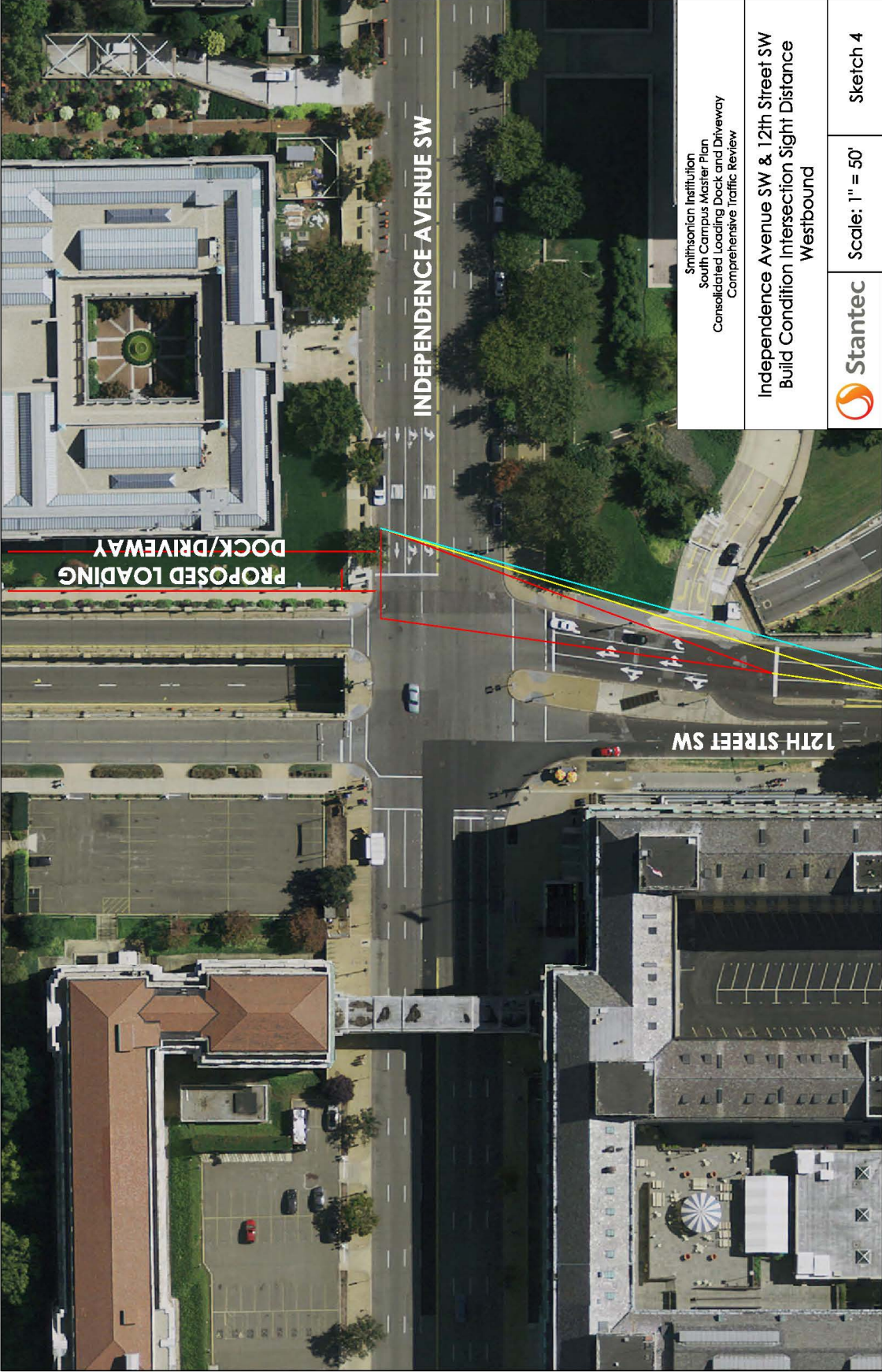
Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Build Condition Intersection Sight Distance  
Southbound

 **Stantec**

Scale: 1" = 50'

Sketch 3



Smithsonian Institution  
South Campus Master Plan  
Consolidated Loading Dock and Driveway  
Comprehensive Traffic Review

Independence Avenue SW & 12th Street SW  
Build Condition Intersection Sight Distance  
Westbound



Scale: 1" = 50'

Sketch 4

**Accident Summary Report (R-7)****Intersection:** INDEPENDENCE AVE and FOURTEENTH ST, SW**Time Period Covered:** From 01/01/2012 To 12/31/2014**Prepared By:** admin TARAS**Prepared Date:** 12/8/2015

Total Number of Accident:	62	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>
Total Number of Fatalities:	0	Right Angle:	3	4.8%	Fixed Object:	1	1.6%
Total Number of Injuries:	12	Left Turn:	0	0.0%	Ran Off Road:	1	1.6%
Total Number of Disabling Injuries:	0	Right Turn:	4	6.5%	Ped. Involved:	1	1.6%
Total Number of NonDisabling Injuries:	4	Rear End:	17	27.4%	Backing:	0	0.0%
Total Number of Pedestrians Involved:	1	Side Swiped:	31	50.0%	Non Collision:	0	0.0%
Total Number of Bicycles Involved:	1	Head On:	0	0.0%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	1	Parked:	0	0.0%	Unspecified:	4	6.5%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	7	11.3%	Sunday:	6	9.7%
09:30 ~ 11:30:	12	19.4%	Monday:	8	12.9%
11:30 ~ 13:30:	7	11.3%	Tuesday:	8	12.9%
13:30 ~ 16:00:	12	19.4%	Wednesday:	13	21.0%
16:00 ~ 18:30:	8	12.9%	Thursday:	11	17.7%
18:30 ~ 07:30:	16	25.8%	Friday:	9	14.5%
Unspecified:	0	0.0%	Saturday:	7	11.3%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	54	87.1%	Dry:	54	87.1%
Rain:	5	8.1%	Wet:	5	8.1%
Snow:	1	1.6%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	1	1.6%	Repairing:	0	0.0%
Unspecified:	1	1.6%	Unspecified:	3	4.8%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	68	55.3%	Fatal Collision:	0	0.0%
Bus:	20	16.3%	Injury Collision:	11	17.7%
Truck:	8	6.5%	PDO Collision:	51	82.3%
Taxi:	12	9.8%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	46	74.2%
Police/Emergency Vehicle:	2	1.6%	Dawn/Dusk:	1	1.6%
Motorcycle/Moped:	1	0.8%	Dark(Lighted):	11	17.7%
Bicycle:	1	0.8%	Dark(Not Lighted):	1	1.6%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	11	8.9%	Unspecified:	3	4.8%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	0	0.0%	In Crosswalk with Signal:	1	100.0%
Driver: Alcohol/Drug:	2	1.6%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	22	17.9%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	0	0.0%
Roadway:	1	0.8%	From Between Parked Cars:	0	0.0%
Unspecified:	98	79.7%	Unspecified:	0	0.0%

<b>Year</b>	<b>Accidents</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Disabling Injuries</b>	<b>Pedestrians</b>	<b>Bicycles</b>	<b>Motorcycles</b>
2012	19	0	3	3	0	1	0
2013	19	0	2	1	0	0	1
2014	24	0	7	0	1	0	0

1 Records are not approved as of 12/8/2015 8:18:44 AM

DC Department of Transportation - Traffic Accident Reporting and Analysis System

## Accident Summary Report (R-7)

Intersection: INDEPENDENCE AVE and TWELFTH ST, SW

Time Period Covered: From 01/01/2012 To 12/31/2014

Prepared By: admin TARAS

Prepared Date: 12/8/2015

Total Number of Accident:	53	Collision Type	#ACC	%	Collision Type	#ACC	%
Total Number of Fatalities:	0	Right Angle:	7	13.2%	Fixed Object:	0	0.0%
Total Number of Injuries:	24	Left Turn:	6	11.3%	Ran Off Road:	0	0.0%
Total Number of Disabling Injuries:	3	Right Turn:	2	3.8%	Ped. Involved:	4	7.5%
Total Number of NonDisabling Injuries:	9	Rear End:	10	18.9%	Backing:	1	1.9%
Total Number of Pedestrians Involved:	5	Side Swiped:	19	35.8%	Non Collision:	1	1.9%
Total Number of Bicycles Involved:	2	Head On:	1	1.9%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	2	Parked:	1	1.9%	Unspecified:	1	1.9%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	5	9.4%	Sunday:	2	3.8%
09:30 ~ 11:30:	3	5.7%	Monday:	9	17.0%
11:30 ~ 13:30:	10	18.9%	Tuesday:	7	13.2%
13:30 ~ 16:00:	11	20.8%	Wednesday:	8	15.1%
16:00 ~ 18:30:	16	30.2%	Thursday:	14	26.4%
18:30 ~ 07:30:	8	15.1%	Friday:	6	11.3%
Unspecified:	0	0.0%	Saturday:	7	13.2%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	45	84.9%	Dry:	45	84.9%
Rain:	8	15.1%	Wet:	8	15.1%
Snow:	0	0.0%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	0	0.0%	Repairing:	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	58	57.4%	Fatal Collision:	0	0.0%
Bus:	15	14.9%	Injury Collision:	18	34.0%
Truck:	3	3.0%	PDO Collision:	35	66.0%
Taxi:	19	18.8%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	45	84.9%
Police/Emergency Vehicle:	1	1.0%	Dawn/Dusk:	0	0.0%
Motorcycle/Moped:	2	2.0%	Dark(Lighted):	7	13.2%
Bicycle:	2	2.0%	Dark(Not Lighted):	0	0.0%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	1	1.0%	Unspecified:	1	1.9%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	1	1.0%	In Crosswalk with Signal:	3	60.0%
Driver: Alcohol/Drug:	0	0.0%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	21	20.8%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	1	20.0%
Roadway:	0	0.0%	From Between Parked Cars:	0	0.0%
Unspecified:	79	78.2%	Unspecified:	1	20.0%

Year	Accidents	Fatalities	Injuries	Disabling Injuries	Pedestrians	Bicycles	Motorcycles
2012	20	0	7	3	2	0	1
2013	16	0	6	3	2	0	1
2014	17	0	11	3	1	2	0

0 Records are not approved as of 12/8/2015 8:17:02 AM

**Accident Summary Report (R-7)****Intersection:** INDEPENDENCE AVE and L'ENFANT PROMENADE, SW**Time Period Covered:** From 01/01/2012 To 12/31/2014**Prepared By:** admin TARAS**Prepared Date:** 12/8/2015

Total Number of Accident:	8	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>	<b>Collision Type</b>	<b>#ACC</b>	<b>%</b>
Total Number of Fatalities:	0	Right Angle:	0	0.0%	Fixed Object:	0	0.0%
Total Number of Injuries:	3	Left Turn:	1	12.5%	Ran Off Road:	0	0.0%
Total Number of Disabling Injuries:	0	Right Turn:	0	0.0%	Ped. Involved:	0	0.0%
Total Number of NonDisabling Injuries:	0	Rear End:	1	12.5%	Backing:	0	0.0%
Total Number of Pedestrians Involved:	0	Side Swiped:	3	37.5%	Non Collision:	0	0.0%
Total Number of Bicycles Involved:	0	Head On:	1	12.5%	Under/Over Ride:	0	0.0%
Total Number of Motorcycles Involved:	0	Parked:	2	25.0%	Unspecified:	0	0.0%

<b>Time of Day</b>	<b>#ACC</b>	<b>%</b>	<b>Day of week</b>	<b>#ACC</b>	<b>%</b>
07:30 ~ 09:30:	0	0.0%	Sunday:	0	0.0%
09:30 ~ 11:30:	1	12.5%	Monday:	0	0.0%
11:30 ~ 13:30:	3	37.5%	Tuesday:	2	25.0%
13:30 ~ 16:00:	2	25.0%	Wednesday:	1	12.5%
16:00 ~ 18:30:	0	0.0%	Thursday:	1	12.5%
18:30 ~ 07:30:	2	25.0%	Friday:	2	25.0%
Unspecified:	0	0.0%	Saturday:	2	25.0%

<b>Weather Condition</b>	<b>#ACC</b>	<b>%</b>	<b>Surface Condition</b>	<b>#ACC</b>	<b>%</b>
Clear:	8	100.0%	Dry:	8	100.0%
Rain:	0	0.0%	Wet:	0	0.0%
Snow:	0	0.0%	Snow/Ice:	0	0.0%
Sleet/Hail:	0	0.0%	Slush:	0	0.0%
Fog/Mist:	0	0.0%	Water/Sand:	0	0.0%
Crosswind/Blowing Sand:	0	0.0%	Repairing:	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Type of Vehicle</b>	<b>#VEH</b>	<b>%</b>	<b>Accident Severity Type</b>	<b>#ACC</b>	<b>%</b>
Passenger Car:	10	62.5%	Fatal Collision:	0	0.0%
Bus:	3	18.8%	Injury Collision:	2	25.0%
Truck:	1	6.3%	PDO Collision:	6	75.0%
Taxi:	1	6.3%	<b>Light Condition</b>	<b>#ACC</b>	<b>%</b>
Minivan:	0	0.0%	Daylight:	6	75.0%
Police/Emergency Vehicle:	1	6.3%	Dawn/Dusk:	1	12.5%
Motorcycle/Moped:	0	0.0%	Dark(Lighted):	1	12.5%
Bicycle:	0	0.0%	Dark(Not Lighted):	0	0.0%
Fixed Object:	0	0.0%	Dark(Unknown Lighting):	0	0.0%
Unspecified:	0	0.0%	Unspecified:	0	0.0%

<b>Contributing Factor</b>	<b>#VEH</b>	<b>%</b>	<b>Pedestrian Actions</b>	<b>#ACC</b>	<b>%</b>
Driver: Speed:	2	12.5%	In Crosswalk with Signal:	0	0.0%
Driver: Alcohol/Drug:	0	0.0%	In Crosswalk against Signal:	0	0.0%
Driver: Electronic Device:	0	0.0%	In Crosswalk no Signal:	0	0.0%
Driver: Others:	3	18.8%	In Unmarked Crosswalk:	0	0.0%
Vehicle:	0	0.0%	Not in Crosswalk:	0	0.0%
Roadway:	0	0.0%	From Between Parked Cars:	0	0.0%
Unspecified:	11	68.8%	Unspecified:	0	0.0%

<b>Year</b>	<b>Accidents</b>	<b>Fatalities</b>	<b>Injuries</b>	<b>Disabling Injuries</b>	<b>Pedestrians</b>	<b>Bicycles</b>	<b>Motorcycles</b>
2013	2	0	0	0	0	0	0
2014	6	0	3	0	0	0	0

0 Records are not approved as of 12/8/2015 8:22:05 AM

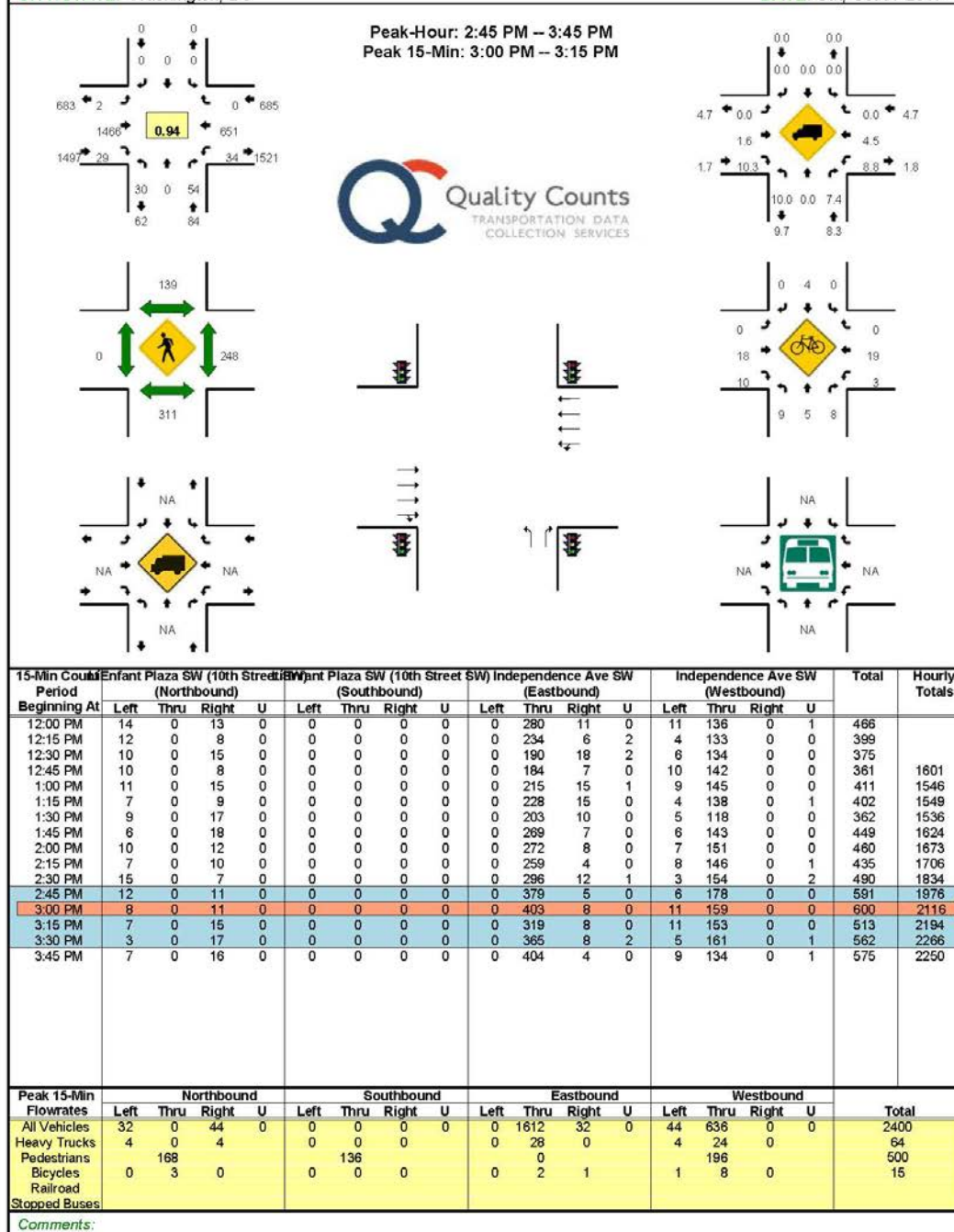
## APPENDIX B: STUDY AREA DATA

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

**LOCATION:** LIEnfant Plaza SW (10th Street SW) -- Independence Ave SW  
**CITY/STATE:** Washington, DC

**QC JOB #:** 14528503  
**DATE:** Sat, Oct 07 2017



Report generated on 10/13/2017 7:07 AM

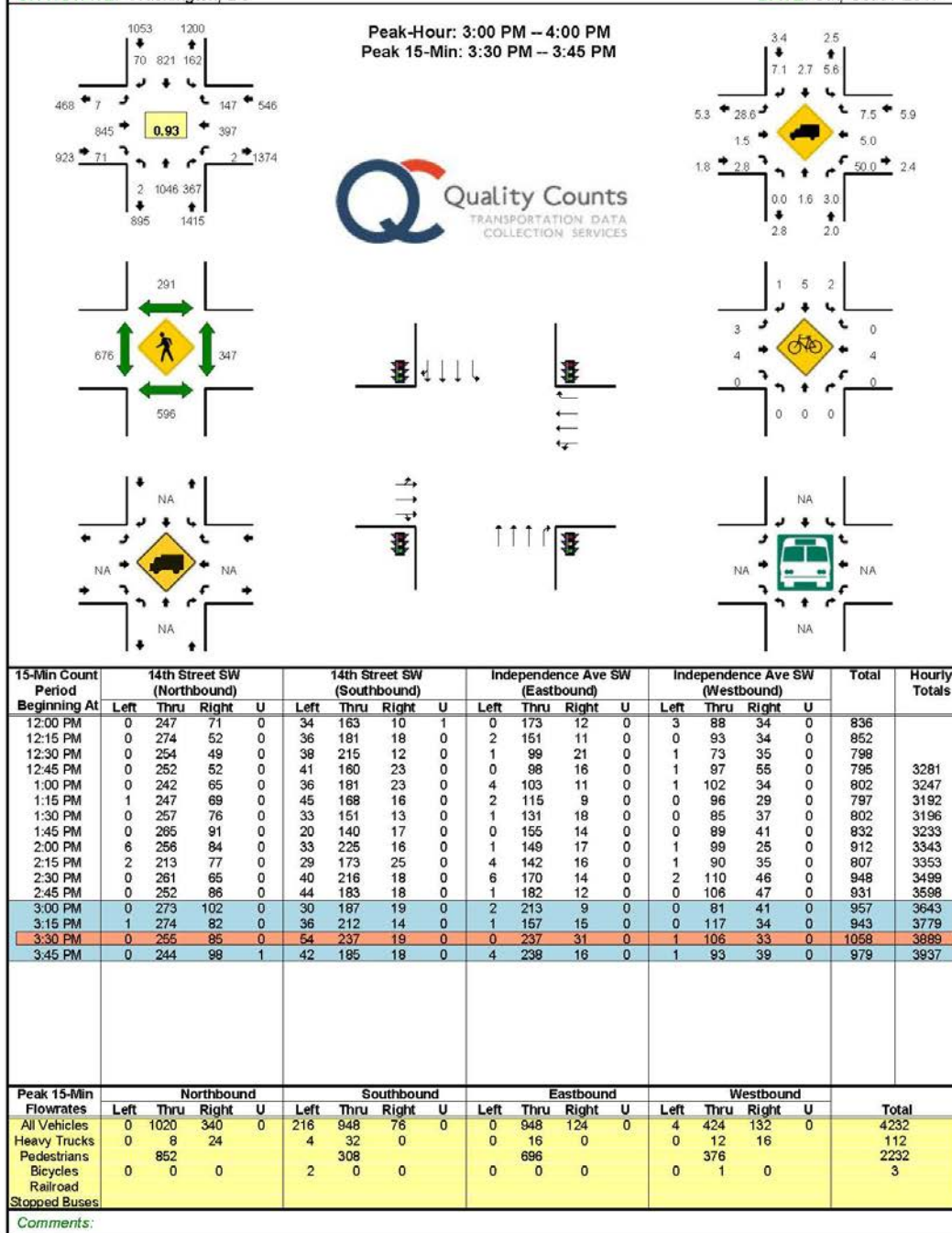
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 14th Street SW -- Independence Ave SW  
CITY/STATE: Washington, DC

QC JOB #: 14528501  
DATE: Sat, Oct 07 2017



Report generated on 10/13/2017 7:07 AM

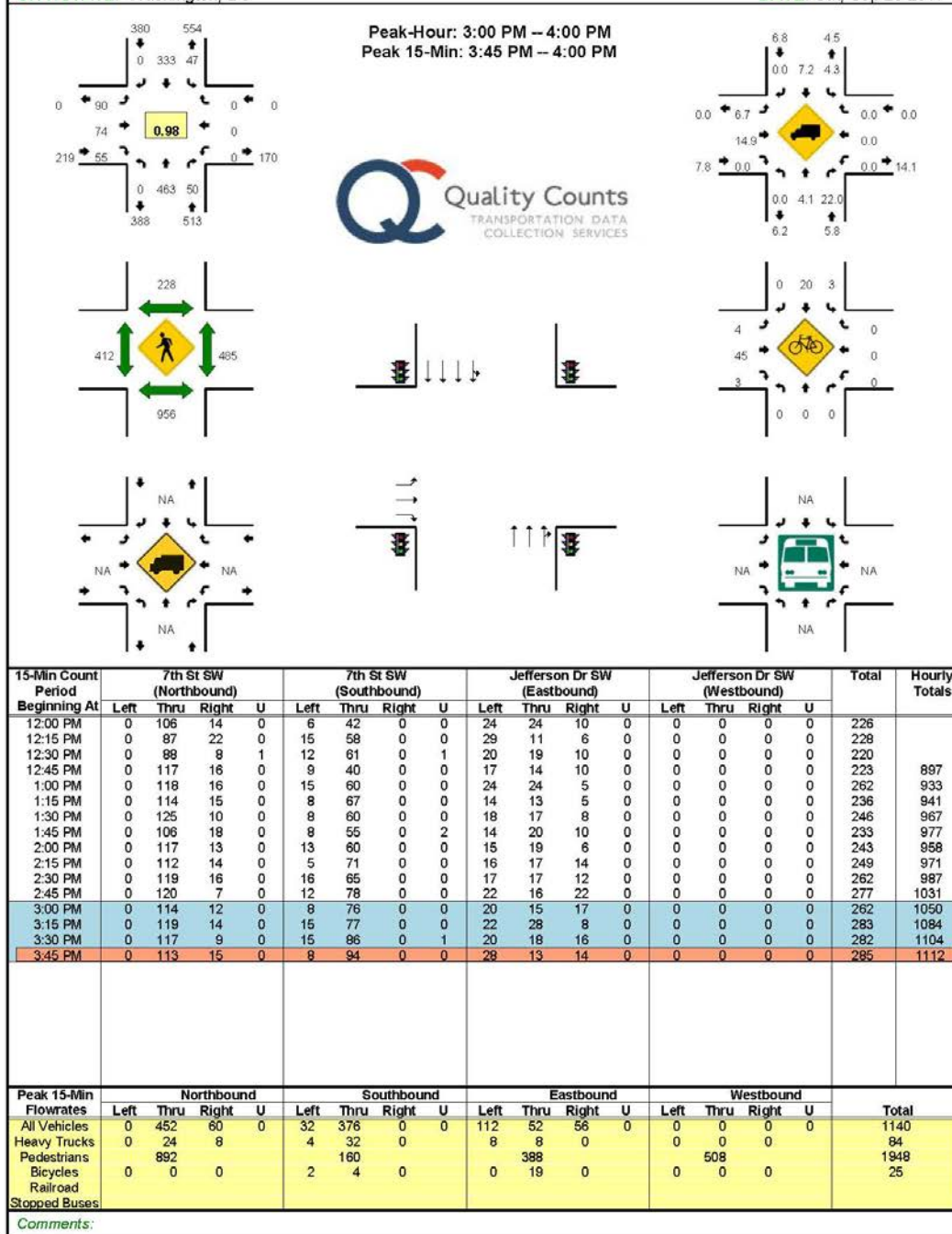
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 7th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494910  
DATE: Sat, Sep 23 2017



Report generated on 10/2/2017 7:48 AM

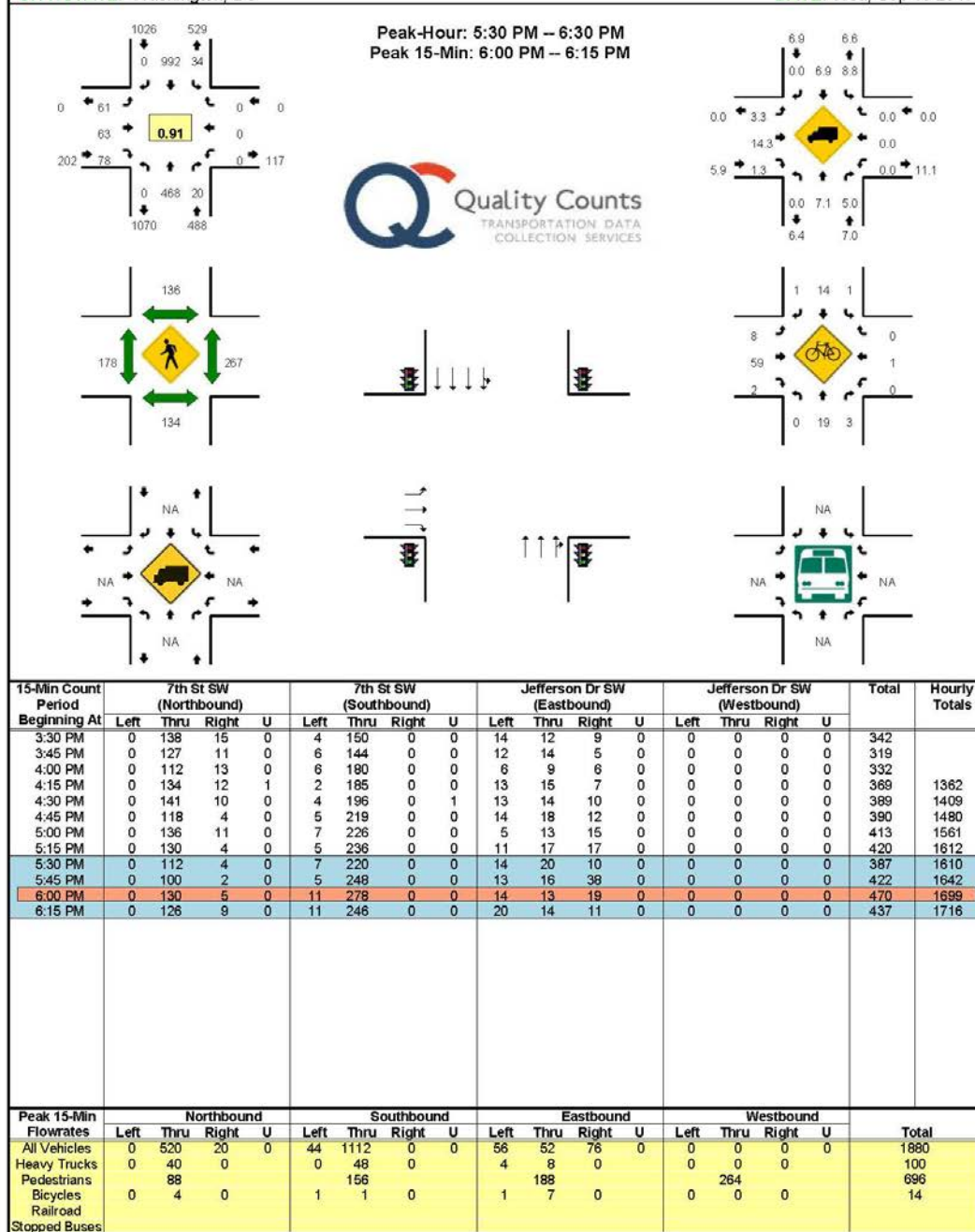
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 7th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494909  
DATE: Wed, Sep 13 2017



Report generated on 9/26/2017 8:25 AM

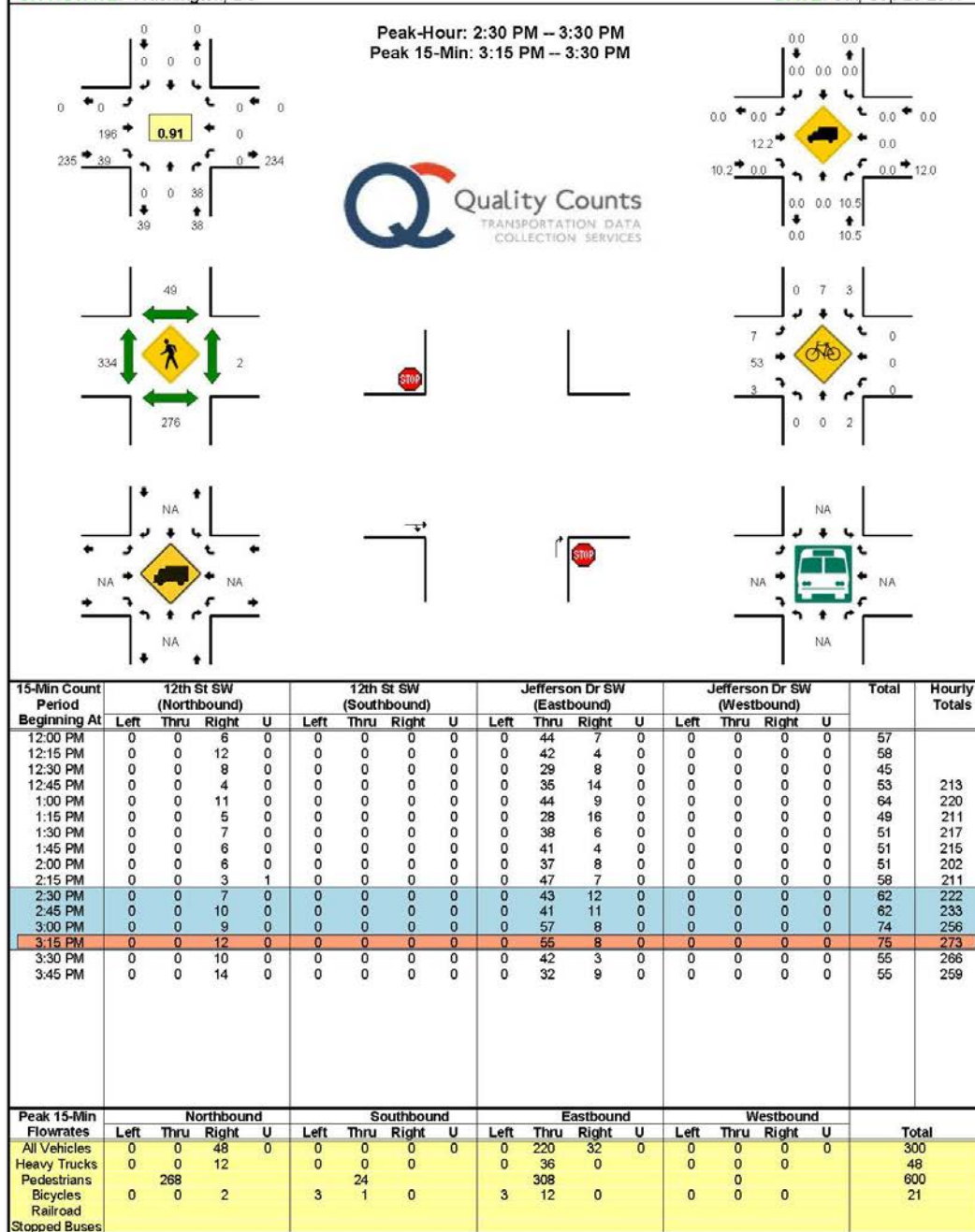
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 12th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494908  
DATE: Sat, Sep 23 2017



Report generated on 10/2/2017 7:48 AM

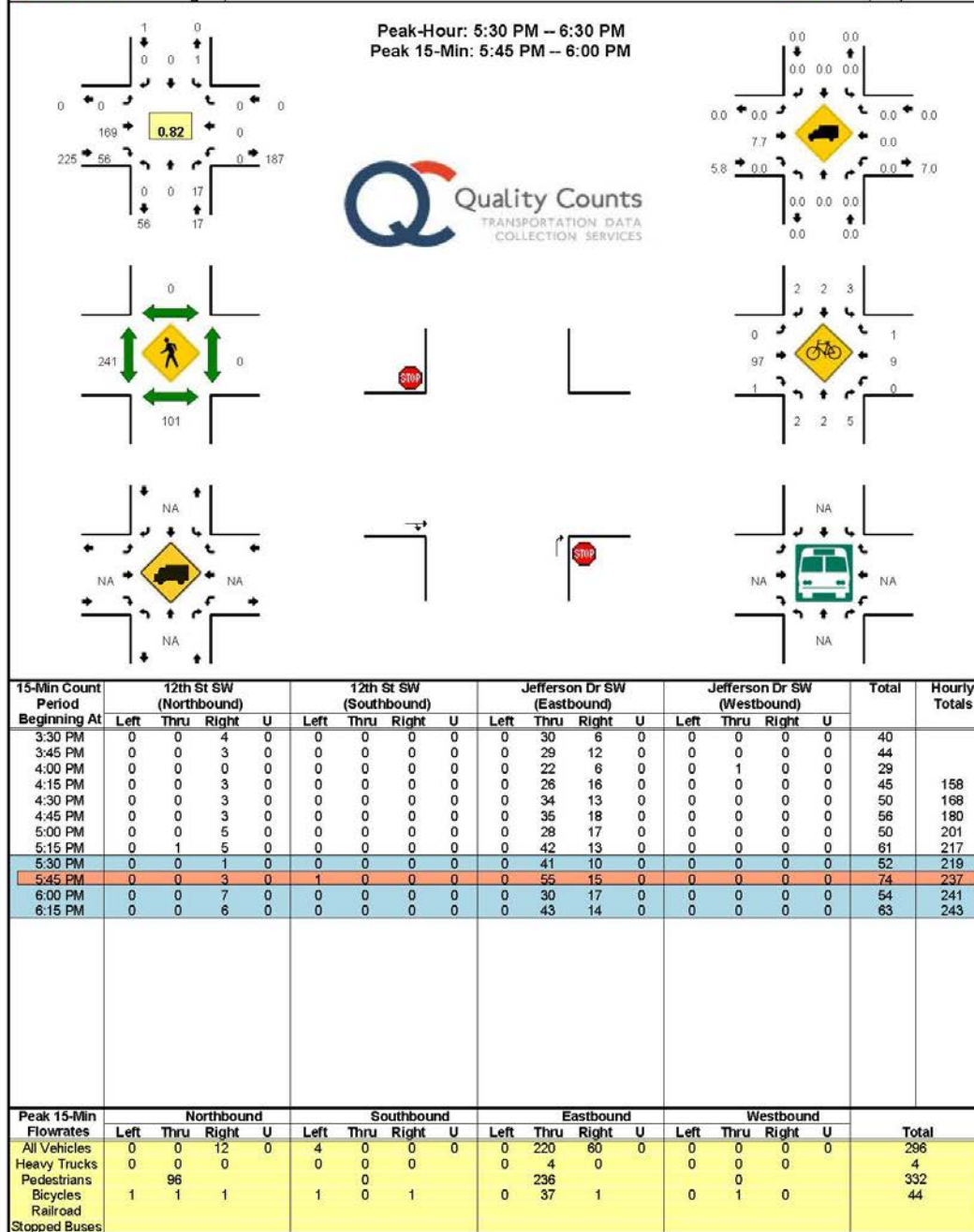
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 12th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494907  
DATE: Wed, Sep 13 2017



Report generated on 9/26/2017 8:25 AM

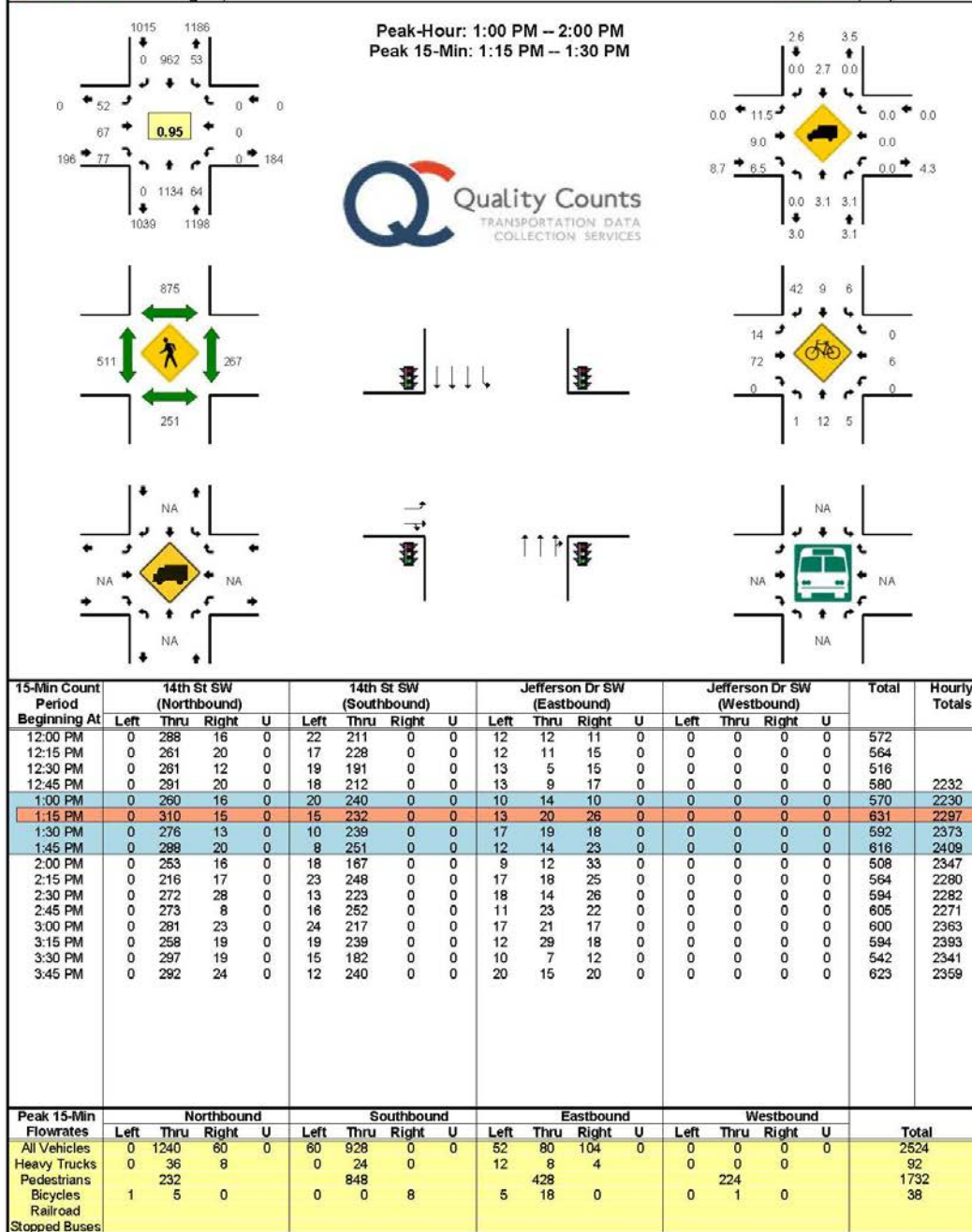
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 14th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494906  
DATE: Sat, Sep 23 2017



Comments:

Report generated on 10/2/2017 7:48 AM

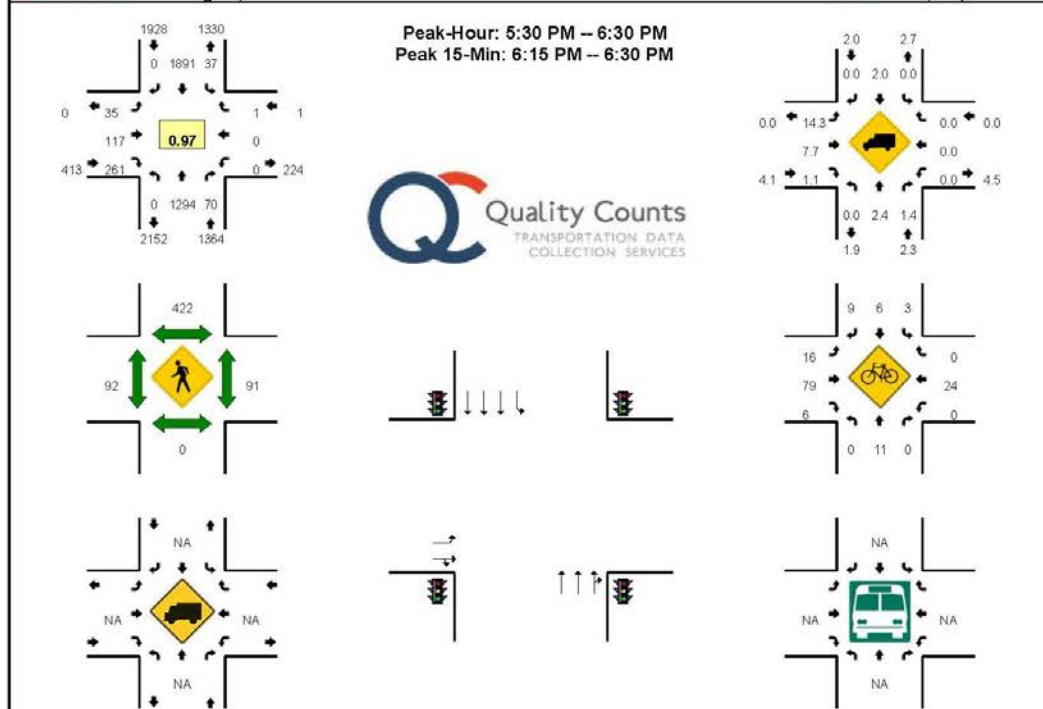
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 14th St SW – Jefferson Dr SW  
CITY/STATE: Washington, DC

QC JOB #: 14494905  
DATE: Wed, Sep 13 2017



15-Min Count Period Beginning At	14th St SW (Northbound)				14th St SW (Southbound)				Jefferson Dr SW (Eastbound)				Jefferson Dr SW (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:30 PM	0	324	17	0	3	391	0	0	9	16	69	0	0	0	0	0	819	
3:45 PM	0	333	15	0	10	415	0	0	6	11	57	0	0	0	1	0	848	
4:00 PM	0	339	10	1	8	401	0	0	5	11	61	0	0	0	0	0	935	
4:15 PM	0	325	24	1	8	433	0	0	7	15	54	0	0	0	0	0	867	3369
4:30 PM	0	331	21	0	8	468	0	0	12	18	61	0	0	0	0	0	919	3469
4:45 PM	0	338	16	0	7	468	0	0	4	19	74	0	0	0	0	0	926	3547
5:00 PM	0	320	20	0	5	450	0	0	10	19	69	0	0	0	0	0	893	3605
5:15 PM	0	327	19	0	11	484	0	0	13	16	66	0	0	0	0	0	936	3674
5:30 PM	0	346	12	0	8	483	0	0	14	23	50	0	0	0	1	0	937	3692
5:45 PM	0	315	21	0	16	469	0	0	11	38	59	0	0	0	0	0	929	3695
6:00 PM	0	324	16	0	11	431	0	0	8	21	71	0	0	0	0	0	882	3684
6:15 PM	0	309	21	0	2	508	0	0	2	35	81	0	0	0	0	0	958	3706

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1236	84	0	8	2032	0	0	8	140	324	0	0	0	0	0	3832
Heavy Trucks	0	28	0	0	0	28	0	0	0	8	4	0	0	0	0	0	68
Pedestrians	0	0	0	0	0	368	0	0	0	68	0	0	84	0	0	0	520
Bicycles	0	2	0	0	0	2	5	0	3	21	3	0	4	0	0	0	40
Railroad																	
Stopped Buses																	

Comments:

Report generated on 9/26/2017 8:25 AM

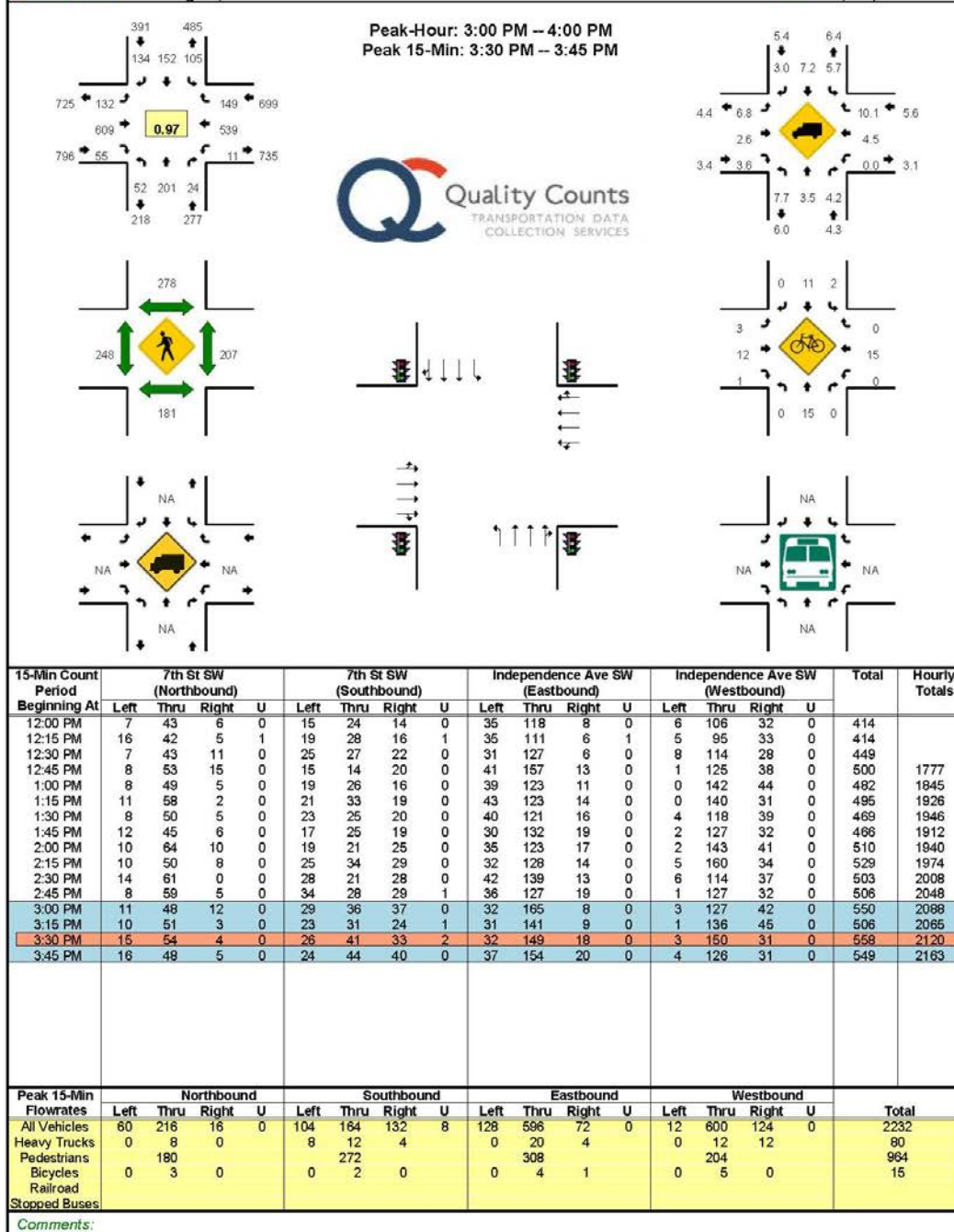
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 7th St SW – Independence Ave SW  
CITY/STATE: Washington, DC

QC JOB #: 14494904  
DATE: Sat, Sep 23 2017



Report generated on 10/2/2017 7:48 AM

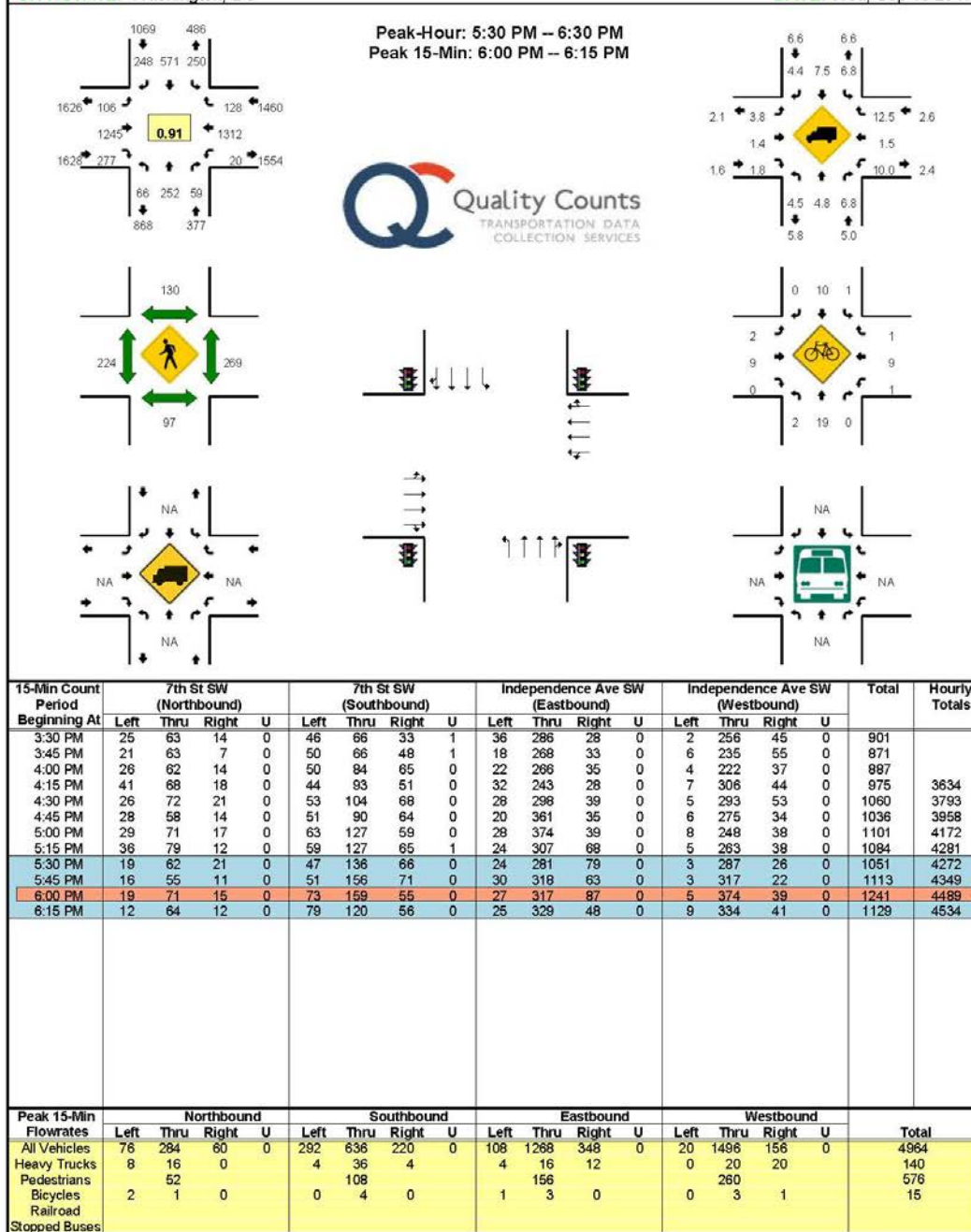
SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: 7th St SW – Independence Ave SW  
CITY/STATE: Washington, DC

QC JOB #: 14494903  
DATE: Wed, Sep 13 2017



Report generated on 9/26/2017 8:25 AM

SOURCE: Quality Counts, LLC (<http://www.qualitycounts.net>) 1-877-580-2212

Start Date: 12/8/2015  
 Start Time: 7:00:00 AM  
 Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	470	62	15	122	6	0	245	8	0	79	29
07:15	0	474	67	22	156	3	0	326	10	1	90	37
07:30	0	537	71	21	110	3	0	263	10	0	106	21
07:45	0	558	64	20	145	3	0	353	14	0	117	35
08:00	0	577	52	35	118	1	0	361	14	1	143	48
08:15	0	657	56	31	126	5	0	408	9	0	150	56
08:30	0	546	30	33	103	2	0	370	11	0	162	65
08:45	0	506	46	23	127	7	0	396	14	0	142	61
09:00	0	552	43	34	146	3	0	377	5	0	126	81
09:15	0	494	29	36	97	9	1	414	12	0	104	66
09:30	0	512	30	27	82	3	0	365	6	1	90	33
09:45	0	445	42	26	103	5	2	280	7	1	116	40
Peak Hour	0	2286	184	122	474	15	0	1535	48	1	597	230
15:00	0	257	26	29	261	8	0	80	10	1	112	23
15:15	0	306	49	35	286	10	1	117	7	1	89	22
15:30	0	184	30	27	307	5	1	66	2	0	118	20
15:45	0	189	22	43	331	10	0	72	5	3	154	32
16:00	0	281	57	52	362	8	1	68	7	3	245	27
16:15	0	370	92	51	457	6	0	101	4	2	281	30
16:30	0	366	65	26	344	6	0	117	3	0	189	25
16:45	0	356	87	39	314	3	0	81	4	2	204	27
17:00	0	358	92	34	331	11	0	117	12	1	210	23
17:15	0	373	87	38	360	6	0	127	5	0	229	22
17:30	0	368	77	26	332	0	1	130	6	0	207	19
17:45	0	370	96	38	421	4	0	99	13	2	226	22
18:00	0	389	85	29	422	8	0	65	2	3	123	51
18:15	0	326	54	23	356	11	0	96	3	2	213	43
18:30	0	309	50	32	400	11	0	106	8	3	172	29
18:45	0	230	43	17	395	9	1	98	4	2	148	23
Peak Hour	0	1469	352	136	1444	21	1	473	36	3	872	86

Passenger Cars

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
07:00	0	6	2	3	9	0	0	0	0	1	1	7
07:15	0	9	3	3	8	1	0	1	0	0	1	3
07:30	0	2	3	4	6	1	1	1	0	1	0	8
07:45	0	7	1	4	13	0	2	3	0	1	1	4
08:00	0	8	2	6	5	1	0	1	0	1	2	4
08:15	0	4	3	4	6	0	1	2	0	0	0	2
08:30	0	5	3	8	9	1	3	1	0	3	0	5
08:45	0	6	3	5	5	0	2	2	0	0	2	4
09:00	0	3	0	4	9	0	1	4	0	1	1	1
09:15	0	0	3	4	6	1	0	2	0	0	1	6
09:30	0	3	1	5	8	0	1	3	0	2	0	1
09:45	0	6	2	3	3	1	0	1	0	1	3	4
Peak Hour	0	23	11	23	25	2	6	6	0	4	4	15
15:00	0	3	2	2	6	0	0	0	0	0	7	2
15:15	0	5	1	2	3	0	2	0	0	0	5	2
15:30	0	3	2	5	4	0	0	1	0	1	7	2
15:45	0	7	0	0	3	0	1	1	1	3	7	5
16:00	0	4	1	5	4	0	0	2	0	2	3	2
16:15	0	5	2	5	3	0	1	3	0	4	7	9
16:30	0	8	2	3	8	0	3	2	0	2	3	5
16:45	0	3	2	4	3	0	2	3	0	1	8	4
17:00	0	2	3	0	1	0	1	2	0	2	15	5
17:15	0	7	1	1	8	0	2	1	1	2	6	1
17:30	0	4	2	3	10	0	0	3	0	2	5	3
17:45	0	1	2	4	7	0	1	1	0	5	4	6
18:00	0	2	2	2	6	0	2	2	0	4	0	1
18:15	0	3	1	0	3	0	1	1	0	0	2	2
18:30	0	4	1	3	2	0	2	1	0	3	0	5
18:45	0	1	3	2	6	0	0	0	0	2	2	1
Peak Hour	0	14	8	8	26	0	4	7	1	11	30	15

Heavy Vehicles

Start Date: 12/8/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	0	476	64	18	131	6	0	245	8	1	80	36	1065
07:15	0	483	70	25	164	4	0	327	10	1	91	40	1215
07:30	0	539	74	25	116	4	1	264	10	1	106	29	1169
07:45	0	565	65	24	158	3	2	356	14	1	118	39	1345
08:00	0	585	54	41	123	2	0	362	14	2	145	52	1380
08:15	0	661	59	35	132	5	1	410	9	0	150	58	1520
08:30	0	551	33	41	112	3	3	371	11	3	162	70	1360
08:45	0	512	49	28	132	7	2	398	14	0	144	65	1351
09:00	0	555	43	38	155	3	1	381	5	1	127	82	1391
09:15	0	494	32	40	103	10	1	416	12	0	105	72	1285
09:30	0	515	31	32	90	3	1	368	6	3	90	34	1173
09:45	0	451	44	29	106	6	2	281	7	2	119	44	1091
Peak Total	0	2309	195	145	499	17	6	1541	48	5	601	245	5611
PHF	#DIV/0!	0.873	0.826	0.884	0.945	0.607	0.500	0.940	0.857	0.417	0.927	0.875	0.923
%HV	#DIV/0!	1.0%	5.6%	15.9%	5.0%	11.8%	100.0%	0.4%	0.0%	80.0%	0.7%	6.1%	0.0%
15:00	0	260	28	31	267	8	0	80	10	1	119	25	829
15:15	0	311	50	37	289	10	3	117	7	1	94	24	943
15:30	0	187	32	32	311	5	1	67	2	1	125	22	785
15:45	0	196	22	43	334	10	1	73	6	6	161	37	889
16:00	0	285	58	57	366	8	1	70	7	5	248	29	1134
16:15	0	375	94	56	460	6	1	104	4	6	288	39	1433
16:30	0	374	67	29	352	6	3	119	3	2	192	30	1177
16:45	0	359	89	43	317	3	2	84	4	3	212	31	1147
17:00	0	360	95	34	332	11	1	119	12	3	225	28	1220
17:15	0	380	88	39	368	6	2	128	6	2	235	23	1277
17:30	0	372	79	29	342	0	1	133	6	2	212	22	1198
17:45	0	371	98	42	428	4	1	100	13	7	230	28	1322
18:00	0	391	87	31	428	8	2	67	2	7	123	52	1198
18:15	0	329	55	23	359	11	1	97	3	2	215	45	1140
18:30	0	313	51	35	402	11	2	107	8	6	172	34	1141
18:45	0	231	46	19	401	9	1	98	4	4	150	24	987
Peak Total	0	1483	360	144	1470	21	5	480	37	14	902	101	5017
PHF	#DIV/0!	0.976	0.918	0.857	0.859	0.477	0.625	0.902	0.712	0.500	0.960	0.902	0.949
%HV	#DIV/0!	0.9%	2.2%	5.6%	1.8%	0.0%	80.0%	1.5%	2.7%	78.6%	3.3%	14.9%	0.0%

Total Vehicles

Start Date: 12/8/2015  
 Start Time: 7:00:00 AM  
 Site Code: Independence Ave, SW at 14th St, SW

Start Time	14th St, SW Northbound			14th St, SW Southbound			Independence Ave, SW Eastbound			Independence Ave, SW Westbound		
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00	0	0	0	7	0	0	0	0	11	0	0	25
07:15	1	0	0	18	2	3	1	6	0	2	2	40
07:30	0	0	0	15	0	0	0	12	0	2	0	54
07:45	0	0	0	21	1	0	0	20	0	6	0	50
08:00	0	0	0	15	0	1	0	8	0	1	0	60
08:15	0	1	0	8	0	3	0	5	0	3	0	54
08:30	0	0	0	12	1	0	0	5	0	5	0	47
08:45	0	0	0	7	0	0	0	5	1	2	0	54
09:00	0	0	0	6	2	1	0	8	0	0	1	42
09:15	0	0	0	3	0	1	0	5	0	4	1	28
09:30	0	0	0	0	0	0	0	13	0	1	0	26
09:45	0	1	0	4	0	0	0	2	1	2	0	9
Peak Total	0	1	0	42	1	4	0	23	1	11	0	215
15:00	1	0	0	34	0	0	0	17	0	0	0	24
15:15	0	0	0	27	0	1	0	2	0	0	2	22
15:30	0	0	0	12	0	0	0	7	0	0	0	9
15:45	0	1	0	28	0	0	0	3	0	0	1	9
16:00	0	0	0	25	0	0	0	1	0	1	0	27
16:15	0	0	0	75	0	2	0	1	0	1	0	30
16:30	0	2	0	47	0	1	0	10	0	0	2	8
16:45	0	1	0	49	0	1	0	14	0	0	7	11
17:00	0	0	0	26	0	0	0	12	0	0	0	14
17:15	0	1	0	99	0	1	1	18	0	1	0	8
17:30	0	1	1	44	0	1	1	9	0	0	6	14
17:45	1	0	0	25	0	0	0	7	0	0	3	4
18:00	0	0	0	38	0	0	0	11	0	1	0	7
18:15	2	0	0	32	0	1	0	4	0	0	1	4
18:30	0	1	0	14	0	0	0	13	1	1	1	1
18:45	0	0	0	10	0	0	0	6	0	2	0	1
Peak Total	1	2	1	194	0	2	2	46	0	1	23	40

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: Independence Ave at 12th St, SW

Start Time	12th St, NW Northbound			12th St, NW Southbound			Independence Eastbound			Independence Ave SW Westbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00	19	27	13	0	0	0	13	324	49	40	153	21	659
07:15	13	30	8	0	3	1	6	361	45	30	198	24	719
07:30	22	60	20	0	4	2	15	356	38	35	142	20	714
07:45	11	32	25	0	2	0	5	285	49	36	160	35	640
08:00	32	80	31	3	2	1	13	359	37	33	180	31	802
08:15	46	44	21	2	2	2	7	324	32	32	160	35	707
08:30	44	44	23	2	5	2	11	308	40	37	168	30	714
08:45	44	32	34	3	4	3	17	351	25	37	142	32	724
09:00	49	66	39	1	4	1	4	357	22	35	155	38	771
09:15	31	21	49	0	4	4	10	281	28	47	174	38	687
09:30	67	31	45	0	3	4	13	284	15	30	157	23	672
09:45	36	54	48	5	4	1	5	276	19	30	102	23	603
Peak Total	166	200	109	10	13	8	48	1342	134	139	650	128	2947
PHF	0.902	0.625	0.801	0.833	0.650	0.667	0.706	0.935	0.838	0.939	0.903	0.914	0.919
15:00	25	39	61	1	6	2	8	209	14	34	160	31	590
15:15	17	24	55	4	5	2	10	192	12	30	169	31	551
15:30	29	40	63	3	7	2	8	184	24	44	183	21	608
15:45	26	36	52	1	3	5	3	213	15	35	179	26	594
16:00	25	31	34	3	5	3	3	221	6	51	184	26	592
16:15	30	47	55	1	0	0	3	229	8	56	226	14	669
16:30	44	43	71	0	1	2	2	243	14	69	249	24	762
16:45	51	59	88	3	6	8	2	242	10	78	262	34	843
17:00	30	35	78	4	5	4	0	217	6	73	348	39	839
17:15	25	47	56	3	5	2	0	196	8	84	307	43	776
17:30	18	84	54	2	4	3	0	238	3	93	278	34	811
17:45	20	42	56	3	6	0	0	215	5	84	294	49	774
18:00	21	61	72	1	2	2	2	156	0	94	322	48	781
18:15	26	29	44	1	4	2	4	205	2	101	270	36	724
18:30	19	29	63	1	1	2	24	179	0	96	257	29	700
18:45	21	30	53	0	0	1	10	156	0	55	216	17	559
Peak Total	93	208	244	12	20	9	0	866	22	334	1227	165	3200
PHF	0.775	0.619	0.782	0.750	0.833	0.563	#DIV/0!	0.910	0.688	0.898	0.881	0.842	0.954

Vehicles

Start Date: 9/29/2015  
 Start Time: 7:00:00 AM  
 Site Code: Independence Ave at 12th St, SW

12th St, NW																	
12th St, NW Northbound				12th St, NW Southbound				Independence Eastbound				Independence Ave SW Westbound					
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07:00	0	0	0	0	0	0	1	0	33	0	1	0	50	0	2	0	41
07:15	0	0	3	0	0	0	4	0	6	0	4	0	68	0	6	0	22
07:30	0	1	0	0	0	0	3	0	31	0	5	0	76	0	3	0	38
07:45	0	0	0	0	0	0	9	0	21	0	6	2	102	0	8	0	46
08:00	0	0	1	0	1	3	0	0	35	0	0	0	90	0	2	0	34
08:15	0	0	0	0	0	5	0	0	25	0	5	0	121	0	1	0	21
08:30	0	1	0	0	0	13	0	0	32	0	7	0	102	0	5	0	39
08:45	0	2	0	2	0	9	0	24	0	4	1	1	104	0	2	0	46
09:00	0	0	2	0	3	1	6	0	26	0	4	0	80	0	2	0	43
09:15	0	0	0	0	0	0	8	0	11	0	1	0	33	0	5	0	14
09:30	0	0	0	0	0	0	6	0	8	0	2	0	72	0	5	0	28
09:45	0	0	0	0	0	0	1	0	16	0	0	0	58	0	5	0	20
Peak Total	0	3	1	2	1	30	0	0	116	0	16	1	417	0	10	0	140
15:00	0	1	0	0	0	0	2	1	22	0	4	0	37	0	1	0	62
15:15	1	0	0	0	1	1	1	0	27	0	21	0	21	0	2	0	50
15:30	0	0	0	2	0	0	0	0	32	0	8	0	49	0	3	0	59
15:45	1	0	0	0	0	0	1	0	24	0	10	0	39	0	3	0	45
16:00	0	0	0	0	0	16	0	1	8	0	0	0	26	0	1	0	39
16:15	0	0	0	0	0	0	0	0	0	0	1	0	5	0	1	0	0
16:30	1	0	4	3	0	0	0	0	5	0	0	0	20	0	1	0	48
16:45	0	0	6	0	0	0	0	0	23	0	1	0	12	0	8	0	95
17:00	0	1	3	0	0	0	0	0	6	0	1	0	32	0	5	0	86
17:15	0	1	1	0	0	0	4	0	12	0	14	0	11	0	3	0	83
17:30	0	1	2	0	0	0	0	0	20	0	0	0	12	0	4	0	76
17:45	0	1	2	0	0	0	3	0	13	0	1	0	4	0	3	0	40
18:00	0	1	5	0	0	0	0	0	1	0	1	0	10	0	3	0	37
18:15	0	1	0	0	0	0	0	0	2	0	0	0	22	0	2	0	33
18:30	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	30
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Peak Total	0	4	8	0	0	0	7	0	51	0	16	0	59	0	15	0	285

Bicycles and Peds

Start Date: 9/29/2015

Start Time: 7:00:00 AM

Site Code: PEAK-HOUR COUNT AT L'ENFANT

Start Time	L'Enfant Plaza Northbound		Independence Ave Eastbound		Independence Ave Westbound		Total
	Left	Right	Thru	Right	Left	Thru	
07:00	8	8	293	42	12	218	581
07:15	10	21	349	14	19	245	658
07:30	10	19	332	37	20	180	598
07:45	13	23	305	14	17	223	595
08:00	11	33	361	23	18	216	662
08:15	12	45	348	15	19	235	674
08:30	17	24	300	27	7	229	604
08:45	16	50	376	20	22	200	684
09:00	19	29	377	25	15	204	669
09:15	18	26	317	13	18	224	616
09:30	3	21	310	17	4	186	541
09:45	7	17	294	16	5	145	484
Peak Total	56	152	1385	85	66	880	2624
PHF	0.824	0.760	0.921	0.787	0.750	0.936	0.959
15:00	10	16	252	19	10	218	525
15:15	16	15	238	16	14	204	503
15:30	21	20	231	25	15	248	560
15:45	15	16	236	23	12	231	533
16:00	15	19	242	22	7	252	557
16:15	27	9	271	17	15	323	662
16:30	32	18	303	15	17	316	701
16:45	23	15	299	22	8	353	720
17:00	46	34	286	20	18	412	816
17:15	66	4	261	10	12	381	734
17:30	54	13	259	14	9	365	714
17:45	60	4	251	10	11	346	682
18:00	59	14	226	10	8	419	736
18:15	25	11	255	5	4	369	669
18:30	14	6	245	3	6	362	636
18:45	9	5	203	3	2	293	515
Peak Total	226	55	1057	54	50	1504	2946
PHF	0.856	0.404	0.924	0.675	0.694	0.913	0.903

Vehicles

Start Date: 9/29/2015  
 Start Time: 7:00:00 AM  
 Site Code: PEAK-HOUR COUNT AT L'ENFANT AND INDEPENDENCE

Start Time	L'Enfant Plaza Northbound					L'Enfant Plaza Southbound					Independence Ave Eastbound					Independence Ave Westbound				
	Left	Thru	Right	Peds		Left	Thru	Right	Peds		Left	Thru	Right	Peds		Left	Thru	Right	Peds	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	7	0	0	0	0	13	0	0	0	1	0	0	3	0	4	0
07:30	0	0	0	0	10	0	0	0	0	16	0	7	0	0	11	1	6	0	28	0
07:45	1	0	2	0	20	0	0	0	0	16	0	2	0	0	7	2	8	0	21	0
08:00	0	2	0	0	0	0	0	0	0	1	0	1	1	1	8	1	5	0	14	0
08:15	0	0	1	0	11	0	0	0	0	7	0	2	1	1	9	0	3	0	17	0
08:30	0	1	0	0	9	0	0	0	0	19	0	3	2	2	24	0	4	0	25	0
08:45	1	2	0	0	7	0	0	0	0	13	0	3	0	0	12	0	8	0	13	0
09:00	0	0	0	0	8	0	0	0	0	1	0	2	3	3	5	0	4	0	10	0
09:15	0	0	0	0	35	0	0	0	0	0	0	2	0	0	12	0	2	0	5	0
09:30	0	0	0	0	7	0	0	0	0	7	0	0	0	0	30	0	0	0	0	0
09:45	0	0	0	0	10	0	0	0	0	0	0	0	0	0	34	0	0	0	0	0
Peak Total	1	5	1	1	27	0	0	0	0	40	0	9	4	4	53	1	20	0	69	0
15:00	0	0	0	0	4	0	0	0	0	8	0	5	0	0	42	0	2	0	16	0
15:15	0	0	0	0	4	0	0	0	0	35	0	2	1	1	28	0	5	0	2	0
15:30	0	1	0	0	27	0	0	0	0	36	0	3	0	0	58	0	2	0	31	0
15:45	0	1	0	0	12	0	0	0	0	26	0	10	0	0	39	0	3	0	1	0
16:00	0	0	0	0	20	0	0	0	0	17	0	1	0	0	65	4	9	0	3	0
16:15	0	0	0	0	14	0	0	0	0	1	0	3	0	0	63	0	1	0	0	0
16:30	0	1	0	0	26	0	0	0	0	16	0	0	0	0	83	3	2	0	2	0
16:45	2	1	0	0	23	0	0	0	0	2	0	2	0	0	35	3	5	0	0	0
17:00	0	1	1	0	3	0	0	0	0	20	0	2	0	0	68	0	4	0	0	0
17:15	0	0	0	0	5	0	0	0	0	22	0	5	0	0	23	5	2	0	5	0
17:30	0	1	0	0	1	0	0	0	0	8	0	2	0	0	38	2	1	0	2	0
17:45	0	3	0	1	1	0	0	0	0	2	0	4	0	0	25	4	0	0	0	0
18:00	0	0	0	0	1	0	0	0	0	0	0	1	0	0	14	1	0	0	0	0
18:15	0	0	0	0	3	0	0	0	0	0	0	0	0	0	31	0	0	0	0	0
18:30	9	0	0	0	10	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0
18:45	4	0	1	1	6	0	0	0	0	0	0	0	0	0	11	0	3	0	0	0
Peak Total	0	5	1	1	10	0	0	0	0	52	0	13	0	0	154	11	7	0	0	7

Bicycles and Peds

Ronald Catterton

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	62	3	Right turns left
	SB	26	0	
	EB	28	0	
	WB	12	0	
7:30 AM	NB	60	14	U-TURN MESSED UP TRAFFIC
	SB	21	4	Left turns left
	EB	32	0	
	WB	12	0	
7:45 AM	NB	58	2	Right turns left
	SB	13	0	
	EB	20	0	
	WB	13	0	
8:00 AM	NB	50	0	
	SB	15	4	Left turns left

7:00 AM 10 seconds  
8:00 AM 12 seconds

Signal - SB Lead left time

	EB	16	0	
	WB	15	0	
8:15 AM	NB	45	0	
	SB	16	4	left Turns left
	EB	10	0	
	WB	20	0	
8:30 AM	NB	43	0	
	SB	19	9	left Turns left.
	EB	10	0	
	WB	31	0	
8:45 AM	NB	45	0	
	SB	15	3	left Turns left
	EB	12	0	
	WB	30	0	
9:00 AM	NB	45	0	
	SB	11	1	11 11 11
	EB	15	0	
	WB	29	0	

Intersection: 14<sup>th</sup> Street and Independence Ave

Date: \_\_\_\_\_

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	15	0	
	SB	13	0	
	EB	0	0	
	WB	33	0	
4:30 PM	NB	16	0	
	SB	16	0	
	EB	2	0	
	WB	25	0	
4:45 PM	NB	23	0	
	SB	18	0	
	EB	4	0	
	WB	38	0	
5:00 PM	NB	30	0	
	SB	24	0	

4:00 pm  
5:00 pm

18 sec  
18 sec.

Signal - SB Lead  
Left time

	EB	6	0	
	WB	33	0	
5:15 PM	NB	15	0	
	SB	21	0	
	EB	2	0	
	WB	32	0	
5:30 PM	NB	18	0	
	SB	27	0	
	EB	6	0	
	WB	32	0	
5:45 PM	NB	8	0	
	SB	11	0	
	EB	6	0	
	WB	38	0	
6:00 PM	NB	16	0	
	SB	30	0	
	EB	4	0	
	WB	31	0	

Babinda Connor

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	3	0	
	SB	0	0	
	EB	24	0	
	WB	2	0	
7:30 AM	NB	5	0	
	SB	0	0	
	EB	7	0	
	WB	4	0	
7:45 AM	NB	0	0	
	SB	0	0	
	EB	1	0	
	WB	10	0	
8:00 AM	NB	10	0	
	SB	1	0	

# 12<sup>th</sup> @ Independence

	EB	17	0	
	WB	4	0	
8:15 AM	NB	3	0	
	SB	0	0	
	EB	12	6	All remaining were left turns in queue
	WB	9	0	
8:30 AM	NB	7	0	
	SB	0	0	
	EB	28	1	One left turn vehicle remaining
	WB	6	0	All lefts were in queue. All went through.
8:45 AM	NB	17	0	
	SB	0	0	
	EB	36	1	One through did not get through
	WB	2	0	both were lefts and got through
9:00 AM	NB	2	0	
	SB	4	0	
	EB	8	0	
	WB	4	0	

Intersection: 12<sup>th</sup> Street and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	5	0	
	SB	0	0	
	EB	25	0	
	WB	14	0	
4:30 PM	NB	10	0	
	SB	1	0	
	EB	32	2	The remaining were rights behind a stopped bus.
	WB	19	0	
4:45 PM	NB	6	0	
	SB	0	0	
	EB	40	0	
	WB	22	0	
5:00 PM	NB	10	0	
	SB	0	0	

# 12<sup>th</sup> St @ Independence

	EB	13	1	Bus stopped in right lane
	WB	20	0	
5:15 PM	NB	6	0	
	SB	1	0	
	EB	17	1	Bus stopped Right Lane
	WB	16	0	
5:30 PM	NB	4	0	
	SB	0	0	
	EB	28	1	Uber in right lane
	WB	19	0	
5:45 PM	NB	5	0	
	SB	0	0	
	EB	15	0	
	WB	19	0	
6:00 PM	NB	3	0	
	SB	0	0	
	EB	14	0	
	WB	16	0	

Brenda Connor

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Pic 1 EB  
2 NB  
3 WB



Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
7:15 AM	NB	0	0	
	<del>SB</del>	<del>0</del>	<del>0</del>	<del>2 made rights on red</del>
	EB	4	0	
	WB	18	0	
7:30 AM	NB	0	0	2 made rights on red
	<del>SB</del>	<del>0</del>	<del>0</del>	X
	EB	5	0	
	WB	21	0	
7:45 AM	NB	8	0	
	<del>SB</del>	<del>0</del> 1	<del>0</del>	>
	EB	11	0	
	WB	12	2	All left turns - thru's All get thru & rights
8:00 AM	NB	6	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	X

L Enfort @ Ind.

	EB	3	0	
	WB	22	0	
8:15 AM	NB	1 <del>scribble</del>	0	<del>scribble</del>
	<del>SB</del>	X	X	X
	EB	6	0	
	WB	33	1	Left-turn vehicle
8:30 AM	NB	4	0	
	<del>SB</del>	X	X	X
	EB	4	0	
	WB	28	0	
8:45 AM	NB	6	0	
	<del>SB</del>	X	X	X
	EB	2	0	
	WB	24	0	
9:00 AM	NB	<del>scribble</del> 2	0	
	<del>SB</del>	X	X	X
	EB	7	0	
	WB	18	0	

Intersection: L'Enfant Plaza and Independence Ave

Date: 12/8/15

Time	Approach	Vehicles in Queue at Start of Green	Vehicles Left in Queue at End of Green	Comments
4:15 PM	NB	0	0	
	<del>SB</del>	>	X	>
	EB	21	0	
	WB	2	0	
4:30 PM	NB	2	0	
	<del>SB</del>	>	>	>
	EB	11	0	
	WB	15	0	
4:45 PM	NB	5	0	
	<del>SB</del>	>	>	>
	EB	5	0	
	WB	17	0	
5:00 PM	NB	4	0	
	<del>SB</del>	>	>	>

# La'Entant Independence

	EB	4	0	
	WB	18	0	
5:15 PM	NB	7	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	4	0	
	WB	28	0	
5:30 PM	NB	1	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	5	0	
	WB	11	0	
5:45 PM	NB	0	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	6	0	
	WB	8	0	
6:00 PM	NB	3	0	
	<del>SB</del>	<del>X</del>	<del>X</del>	<del>X</del>
	EB	7	0	
	WB	5	0	

## **APPENDIX C – CAPACITY ANALYSIS**

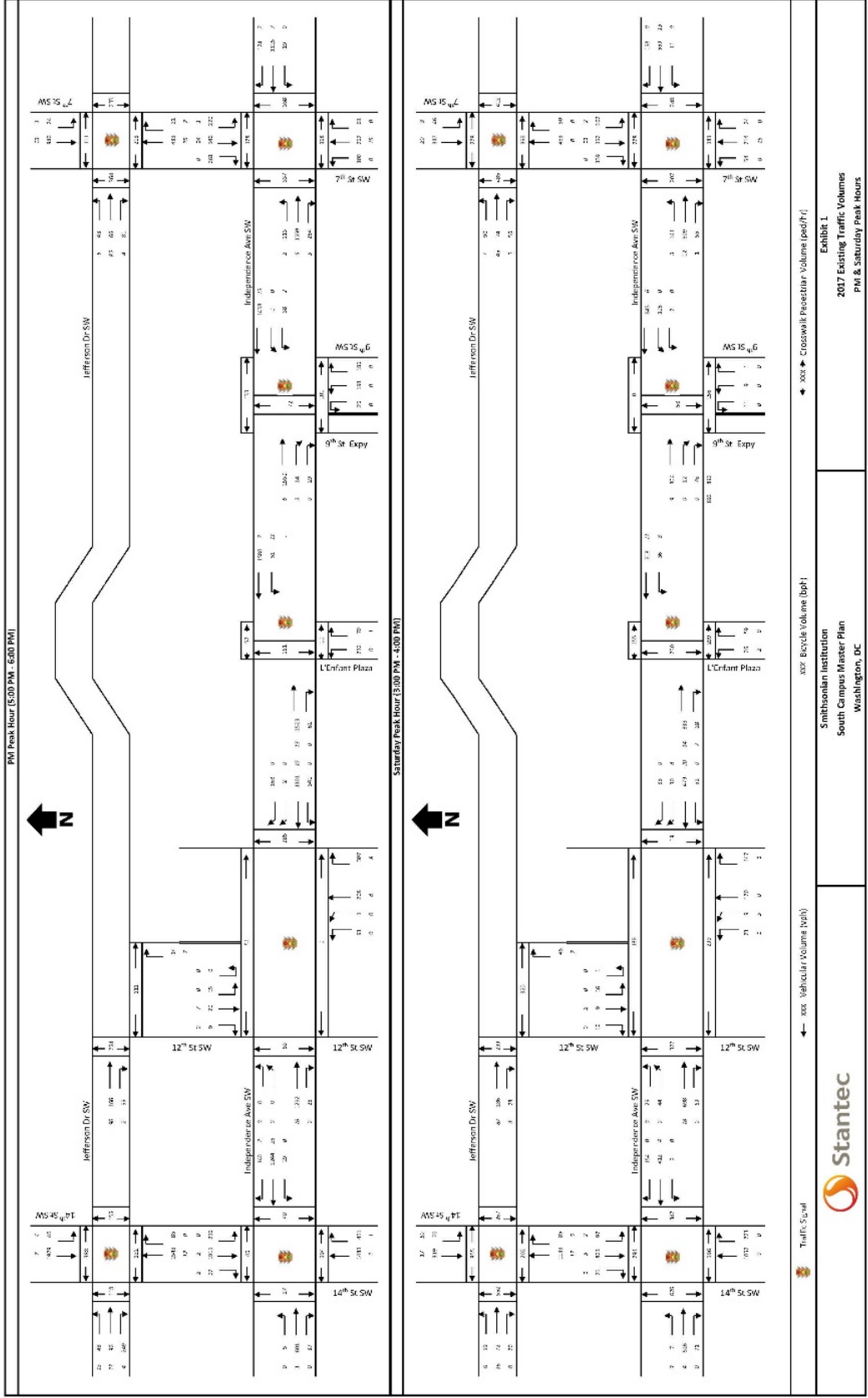


Exhibit 2  
PM Peak Hour (5:00 PM - 6:00 PM)  
Capacity Analysis Results

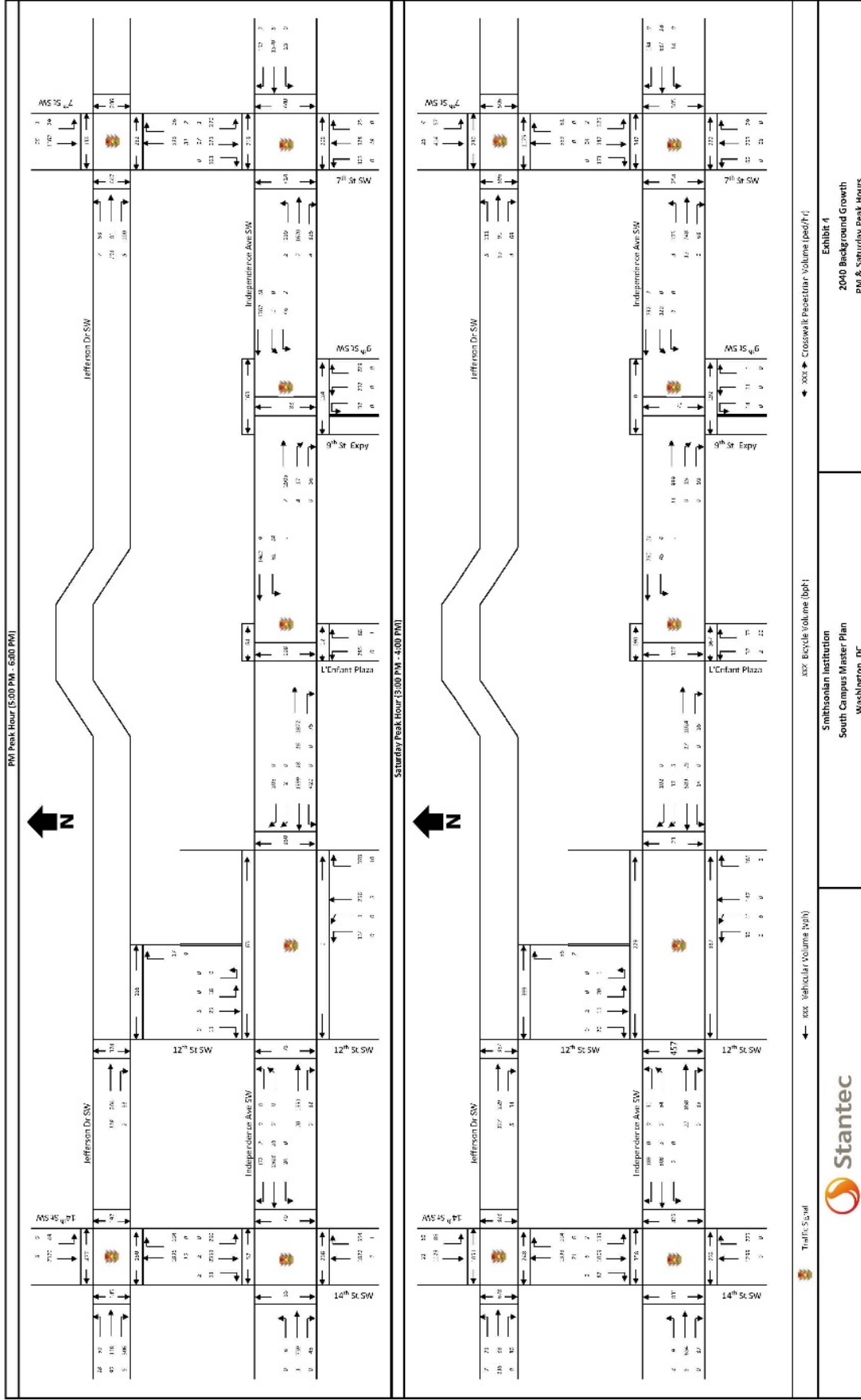
Intersection	LANE GROUP	2017 Existing Condition					2040 No Build Condition					2040 Build Condition					2040 Build with Mitigation Condition				
		V/c Ratio	Delay	Level of Service	Queue (ft)	50th Queue (ft)	V/c Ratio	Delay	Level of Service	Queue (ft)	50th Queue (ft)	V/c Ratio	Delay	Level of Service	Queue (ft)	50th Queue (ft)	V/c Ratio	Delay	Level of Service	Queue (ft)	50th Queue (ft)
14 <sup>th</sup> Street SW & SW Jefferson Drive Signalized	EB-L	0.15	30.7	C	25	56	0.20	31.6	C	32	68	0.20	31.7	C	32	66	0.20	30.4	D	48	58
	EB-TR	0.88	61.5	E	295	40.4	1.09	114.9	F	341	537	1.13	125.7	F	352	547	1.09	110.6	F	463	688
	WB-TR	0.54	11.2	B	11	271	0.67	57.6	E	523	577	0.68	57.4	E	537	577	0.78	6.7	A	53	62
	SB-L	0.35	20.6	C	21	44	0.79	90.3	F	23	63	0.82	97.2	F	25	66	0.42	25.0	C	19	48
	SB-T	0.66	14.4	B	1	346	0.81	18.6	B	437	508	0.81	18.6	B	437	508	0.82	26.3	C	637	702
Intersection		-	17.4	B	-	-	-	43.7	D	-	-	-	44.5	D	-	-	-	26.3	C	-	-
12 <sup>th</sup> Street SW & SW Jefferson Drive Unsignalized	EB-TR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.37	9.1	A	-	-
	WB-L	0.03	11.0	B	-	2	0.04	12.0	B	-	3	0.21	19.1	C	-	7	0.02	6.3	A	-	-
	Intersection	-	0.7	A	-	-	-	0.7	A	-	-	-	1.2	A	-	-	-	8.9	A	-	-
	EB-L	0.12	27.7	C	21	41	0.16	31.2	C	29	44	0.16	31.5	C	30	45	0.11	28.0	C	31	43
	EB-T	0.16	27.8	C	34	60	0.20	31.4	C	45	66	0.20	31.7	C	45	65	0.13	28.0	C	46	62
7 <sup>th</sup> Street SW & SW Jefferson Drive Signalized	EB-TR	0.29	18.6	B	23	54	0.38	25.7	C	39	65	0.50	30.3	C	57	90	0.34	26.5	C	65	90
	WB-TR	0.18	4.9	A	67	76	0.22	5.6	A	59	65	0.22	5.6	A	59	65	0.26	13.3	B	104	113
	SB-L	0.29	7.9	A	77	94	0.36	8.5	A	101	120	0.36	8.5	A	101	120	0.43	20.6	C	200	230
	Intersection	-	8.0	A	-	-	-	10.0	A	-	-	-	10.5	B	-	-	-	19.4	B	-	-
	WB-LTR	0.60	35.7	D	156	200	0.82	43.4	D	215	270	0.82	43.4	D	215	270	0.76	51.1	D	290	347
14 <sup>th</sup> Street SW & Independence Avenue SW Signalized	WB-LTR	1.13	86.0	F	425	400	1.52	527.8	F	662	384	1.59	297.6	F	667	764	1.49	243.2	F	915	517
	NP-L	0.34	2.7	A	2	2	0.46	3.2	A	9	0	0.47	12.6	B	26	96	0.49	15.9	B	134	54
	NP-TR	0.79	32.1	C	367	470	0.97	86.8	F	493	623	0.97	86.9	F	501	627	0.98	57.0	E	707	828
	NP-R	0.76	28.6	C	289	386	0.95	50.4	D	359	608	0.95	50.7	D	360	609	1.00	73.4	E	551	825
	SB-L	0.97	74.8	E	142	296	1.23	151.1	F	237	340	1.23	151.0	F	237	339	1.17	138.6	F	393	469
12 <sup>th</sup> Street SW & Independence Avenue SW Signalized	SB-TR	0.74	10.3	B	188	199	0.91	16.1	B	235	327	0.91	16.1	B	235	326	0.90	16.5	B	630	564
	Intersection	-	37.4	D	-	-	-	94.1	F	-	-	-	102.9	F	-	-	-	88.5	F	-	-
	EB-LTR	0.72	30.5	C	250	305	0.90	35.1	D	357	375	1.03	79.2	F	342	619	0.99	56.3	E	516	523
	WB-L	1.10	108.8	F	320	522	1.38	212.8	F	460	623	1.00	94.9	F	487	758	1.24	155.4	F	603	733
	WB-TR	1.05	56.7	F	312	388	1.46	231.7	F	783	901	1.28	158.2	F	856	953	1.46	234.4	F	1117	1215
9 <sup>th</sup> Street SW & Independence Avenue SW Signalized	NP-L	0.25	28.6	C	58	106	0.38	30.9	C	75	132	0.70	90.6	F	61	217	0.58	96.6	E	116	198
	NP-TR	0.75	54.7	D	197	331	0.94	77.1	E	266	467	0.79	115.8	F	267	403	0.66	63.7	E	253	359
	NP-R	0.43	3.9	A	8	40	0.54	5.5	A	18	57	0.61	13.6	B	149	223	0.66	9.3	A	107	166
	SB-LTR	0.13	2.7	A	0	2	0.16	3.8	A	0	2	0.24	3.3	A	0	8	0.22	4.7	A	0	2
	Intersection	-	47.1	D	-	-	-	130.2	E	-	-	-	108.7	F	-	-	-	133.6	F	-	-
Independence Avenue SW & L'Enfant Plaza Signalized	EB-LTR	0.59	22.8	C	358	379	0.73	25.1	C	445	484	0.73	25.4	C	536	582	0.71	9.8	A	101	109
	WB-LTR	0.62	12.7	B	172	197	0.83	18.2	B	251	284	0.83	18.3	B	252	286	0.90	20.1	C	179	250
	NP-L	0.65	47.3	D	164	254	0.88	56.7	E	209	347	0.80	56.7	E	209	347	0.82	51.5	D	264	373
	NP-R	0.14	10.8	B	12	44	0.16	14.1	B	24	60	0.16	14.1	B	24	60	0.16	20.4	C	40	82
	Intersection	-	19.5	B	-	-	-	23.0	C	-	-	-	23.0	C	-	-	-	17.6	B	-	-
9 <sup>th</sup> Street SW & Independence Avenue SW Signalized	EB-LTR	0.62	22.2	C	227	246	0.77	25.6	C	312	361	0.78	25.7	C	313	362	0.89	13.2	B	61	72
	WB-LTR	0.52	13.3	B	148	175	0.70	16.6	B	212	245	0.75	18.2	B	217	252	0.80	12.4	B	162	168
	NP-LTR	0.69	46.1	D	132	232	1.06	111.4	F	198	359	1.13	132.7	F	208	369	0.86	69.6	E	252	428
	NP-R	0.73	24.1	C	0	24	0.78	24.7	C	0	110	0.78	24.7	C	0	110	0.66	16.4	B	0	90
	SB-LTR	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0
7 <sup>th</sup> Street SW & Independence Avenue SW Signalized	Intersection	-	20.0	B	-	-	-	26.9	C	-	-	-	28.9	C	-	-	-	16.4	B	-	-
	EB-LTR	0.84	27.0	C	253	292	1.08	70.6	F	418	541	1.08	71.4	F	420	544	1.13	63.5	F	97	792
	WB-LTR	0.65	28.0	C	205	246	0.84	34.3	C	287	339	0.84	34.3	C	287	339	0.82	41.0	D	393	445
	NP-L	0.69	60.7	E	64	152	1.50	292.0	F	180	323	1.56	318.0	F	187	350	1.43	266.8	F	246	408
	NP-TR	0.27	31.1	C	66	93	0.43	33.3	C	101	136	0.43	33.3	C	101	136	0.35	36.7	D	127	182
Independence Avenue SW Signalized	SB-L	0.62	41.0	D	120	202	0.85	64.1	E	170	261	0.86	63.6	E	166	261	0.91	53.1	D	132	361
	SB-TR	0.48	23.0	C	120	167	0.61	30.0	C	182	229	0.63	30.1	C	187	230	0.61	17.9	B	279	331
	Intersection	-	28.3	C	-	-	-	57.0	E	-	-	-	58.1	E	-	-	-	53.1	D	-	-

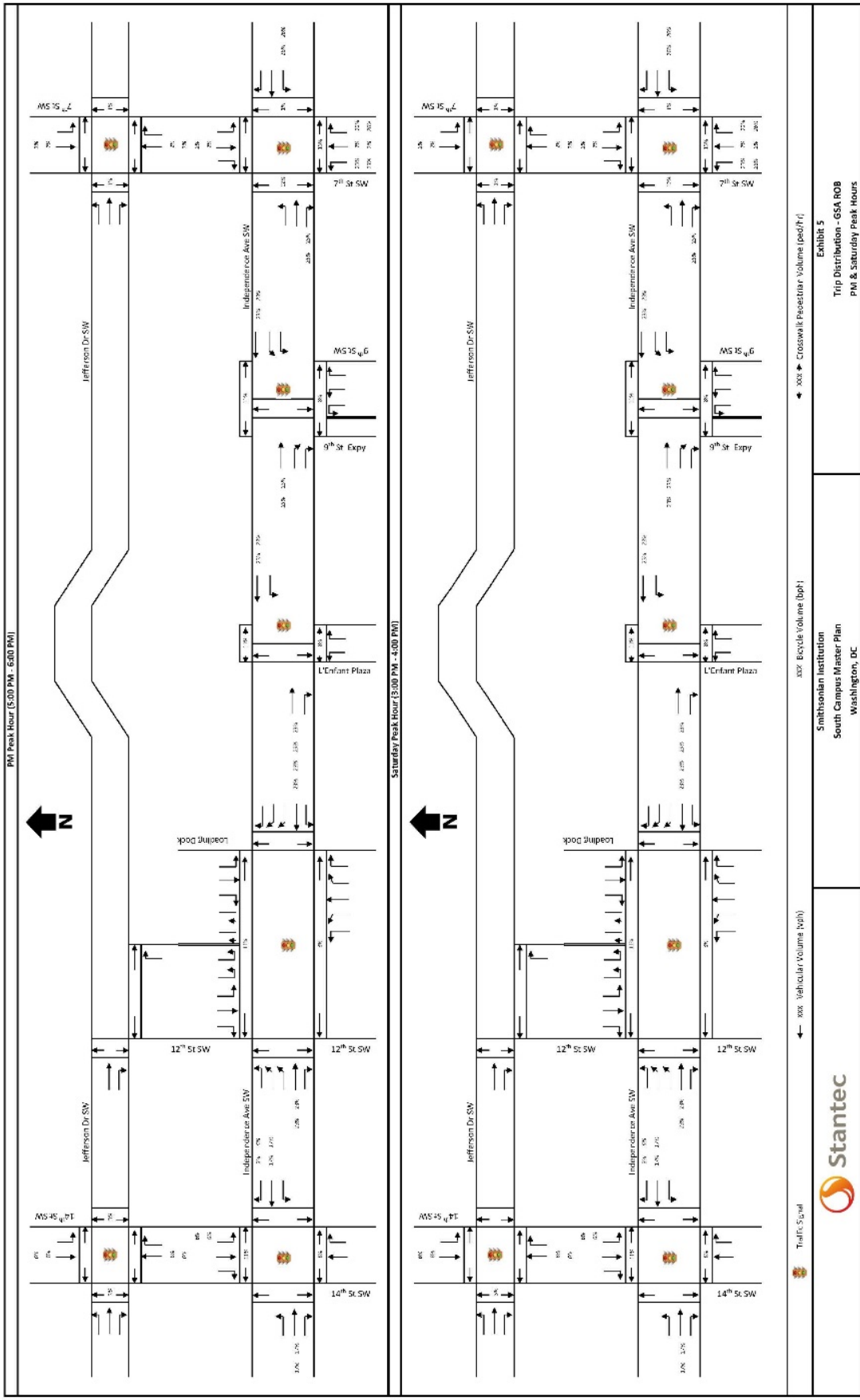
V/C ratio = volume/spacing/ratio  
Source: Synchro 9

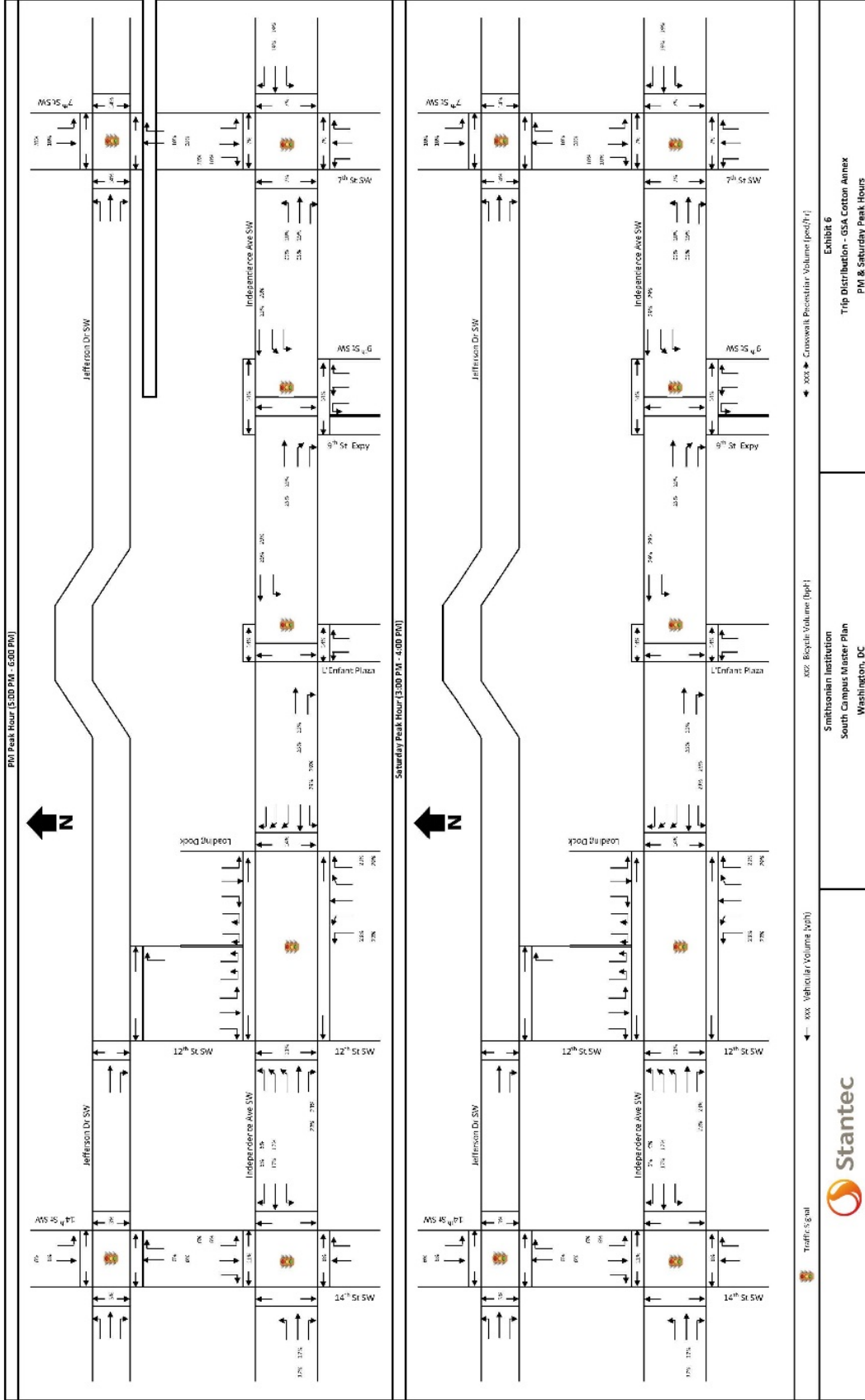
Exhibit 3  
Saturday Peak Hour (3:00 PM - 4:00 PM)  
Capacity Analysis Results

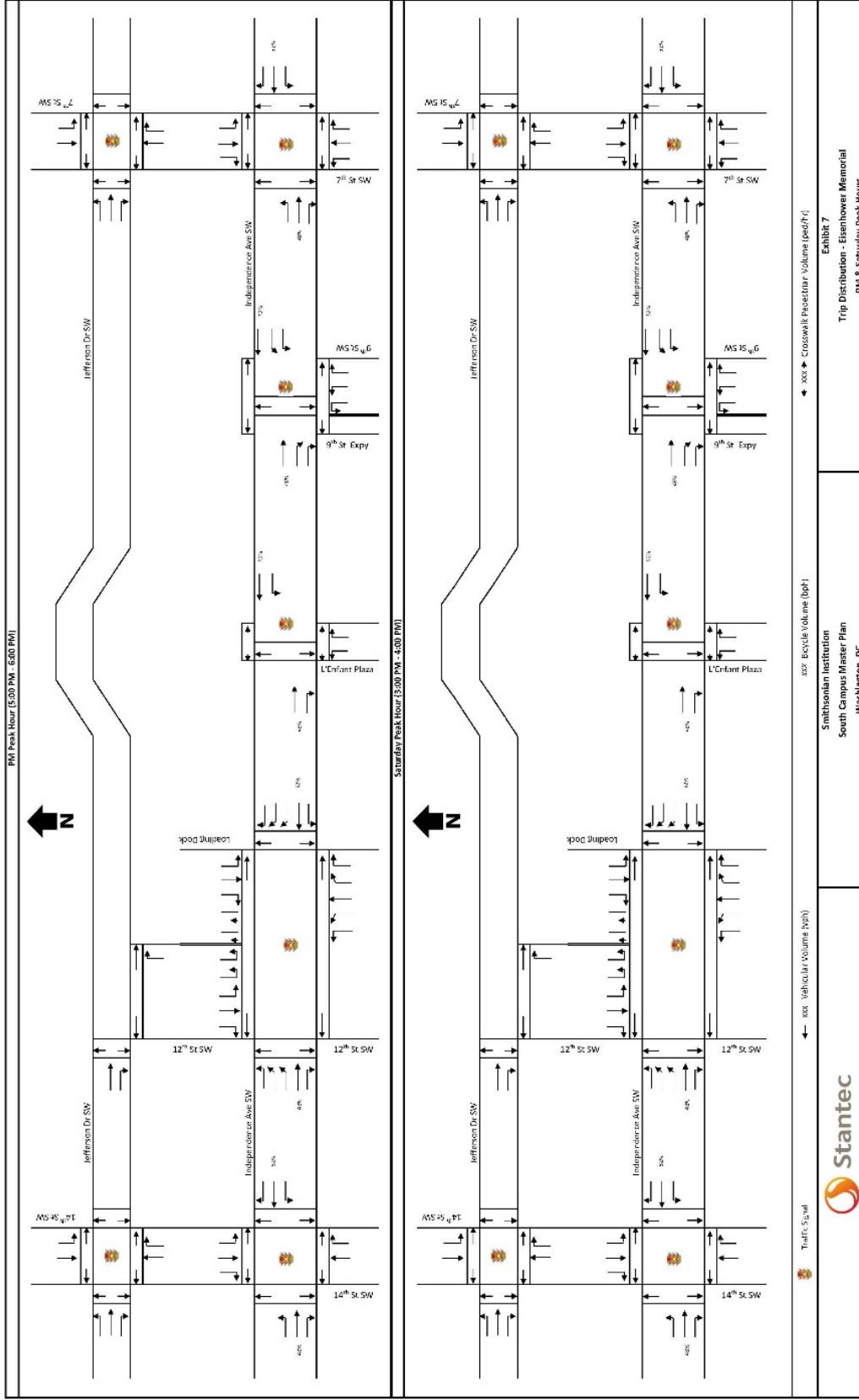
Intersection	LANE GROUP	2017 Existing Condition					2040 No Build Condition					2040 Build Condition					2040 Build with Mitigation Condition				
		V/c	Delay	Level of Service	50th Queue (ft)	95th Queue (ft)	V/c Ratio	Delay	Level of Service	50th Queue (ft)	95th Queue (ft)	V/c Ratio	Delay	Level of Service	50th Queue (ft)	95th Queue (ft)	V/c Ratio	Delay	Level of Service	50th Queue (ft)	95th Queue (ft)
14 <sup>th</sup> Street SW & SW Jefferson Drive <i>Signalized</i>	EB-L	0.30	26.4	C	30	65	0.32	31.6	C	38	81	0.35	33.0	C	38	82	0.35	33.0	C	38	82
	EB-TR	0.30	30.5	C	75	131	0.45	32.7	C	96	161	0.47	33.3	C	96	163	0.47	33.3	C	96	163
	NB-TR	0.44	6.4	A	224	231	0.54	8.7	A	311	387	0.57	10.0	A	328	406	0.74	18.8	B	154	215
	SB-L	0.44	20.9	C	23	69	0.81	66.1	F	41	147	0.87	80.3	F	48	159	0.42	16.8	B	24	62
	SB-T	0.34	10.0	A	302	127	0.42	10.8	B	135	165	0.42	10.8	B	135	165	0.42	10.8	B	135	165
12 <sup>th</sup> Street SW & SW Jefferson Drive <i>Unsignalized</i>	Intersection	-	10.2	B	-	-	-	13.1	B	-	-	-	14.4	B	-	-	-	16.9	B	-	-
	EB-TR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.41	10.0	A	-
	NB-R	0.14	16.4	C	-	12	0.24	23.0	C	-	23	1.92	6.246	F	-	222	0.10	7.7	A	-	-
	Intersection	-	2.9	A	-	-	-	4.0	A	-	-	-	12.16	F	-	-	-	9.6	A	-	-
	EB-L	0.28	32.9	C	45	93	0.36	36.2	D	61	105	0.41	38.1	D	69	115	0.41	34.5	C	66	122
7 <sup>th</sup> Street SW & SW Jefferson Drive <i>Signalized</i>	EB-T	0.17	30.7	C	36	78	0.20	32.6	C	49	87	0.20	33.4	C	49	84	0.20	29.4	C	45	87
	EB-R	0.21	12.7	B	2	36	0.30	23.7	C	14	52	0.48	33.0	C	41	84	0.48	29.6	C	38	95
	NB-TR	0.19	2.9	A	13	17	0.24	3.3	A	16	30	0.24	3.4	A	16	31	0.24	3.4	A	16	31
	SB-LT	0.13	7.6	A	26	37	0.17	7.8	A	34	46	0.17	7.8	A	34	46	0.17	7.8	A	34	46
	Intersection	-	9.3	A	-	-	-	10.4	B	-	-	-	12.0	B	-	-	-	11.2	B	-	-
14 <sup>th</sup> Street SW & Independence Avenue SW <i>Signalized</i>	EB-LTR	0.47	28.3	C	117	153	0.32	30.9	C	160	204	0.61	31.1	C	163	207	0.61	31.1	C	163	207
	WB-LTR	0.52	39.2	D	100	135	0.42	37.9	D	138	175	0.43	35.7	D	145	167	0.43	35.4	D	142	173
	NB-L	0.37	19.2	B	48	91	0.48	19.1	B	57	109	0.49	19.2	B	68	97	0.49	19.0	B	66	102
	NB-TR	0.56	22.7	C	193	298	0.68	26.1	C	256	309	0.70	26.8	C	264	318	0.70	25.5	C	264	318
	NB-R	0.49	14.5	B	53	126	0.63	20.5	C	89	187	0.66	22.0	C	99	205	0.66	22.0	C	99	205
12 <sup>th</sup> Street SW & Independence Avenue SW <i>Signalized</i>	SB-L	0.36	16.3	B	22	37	0.58	28.8	C	28	86	0.59	29.8	C	28	89	0.59	43.6	D	34	104
	SB-TR	0.37	8.6	A	71	84	0.46	9.2	A	89	101	0.46	9.1	A	90	100	0.46	15.6	B	207	258
	Intersection	-	21.2	C	-	-	-	23.5	C	-	-	-	23.7	C	-	-	-	25.2	C	-	-
	WB-L	0.54	12.0	B	63	87	0.74	17.1	B	250	323	0.92	21.7	C	280	362	0.90	30.4	C	280	356
	WB-TR	0.46	64.5	F	36	79	0.67	79.4	F	53	131	0.71	89.1	F	58	141	0.63	76.2	F	56	127
Independence Avenue SW & L'Enfant Plaza <i>Signalized</i>	WB-TR	0.89	18.3	B	55	91	1.14	25.6	F	104	149	1.79	43.4	F	98	106	1.56	39.2	F	84	94
	NB-UL	0.27	16.9	B	44	87	0.37	18.8	B	60	113	0.33	24.8	C	77	142	0.32	25.1	C	77	140
	NB-TR	0.32	15.2	B	75	134	0.41	16.1	B	98	167	0.37	17.7	B	85	145	0.36	18.4	B	84	143
	NB-R	0.22	3.5	A	5	58	0.29	4.3	A	4	86	0.35	5.5	A	59	124	0.36	5.2	A	49	111
	SB-LTR	0.09	0.7	A	0	3	0.12	1.3	A	0	2	0.16	0.9	A	0	0	0.24	0.8	A	0	0
9 <sup>th</sup> Street SW & Independence Avenue SW <i>Signalized</i>	WB-LTR	-	15.4	B	-	-	-	Movement Does Not Exist	-	-	-	0.00	0.0	A	0	0	0.00	0.0	A	0	0
	Intersection	-	-	-	-	-	-	Movement Does Not Exist	-	-	-	-	-	-	-	-	-	-	-	-	-
	EB-LTR	0.35	7.9	A	33	40	0.45	7.9	A	44	56	0.47	8.0	A	46	51	0.47	7.9	A	46	51
	WB-LT	0.33	11.2	B	102	126	0.37	11.5	B	130	171	0.38	12.1	B	131	179	0.38	12.2	B	131	179
	NB-L	0.08	29.2	C	14	36	0.09	29.4	C	17	42	0.10	29.5	C	17	43	0.10	29.5	C	17	43
7 <sup>th</sup> Street SW & Independence Avenue SW <i>Signalized</i>	NB-R	0.10	5.8	A	2	26	0.13	8.3	A	10	38	0.13	8.6	A	10	41	0.13	8.8	A	12	41
	Intersection	-	9.5	A	-	-	-	9.7	A	-	-	-	10.1	B	-	-	-	10.0	A	-	-
	EB-LTR	0.41	8.0	A	122	138	0.53	8.1	A	147	156	0.54	8.9	A	103	134	0.54	6.9	A	107	122
	WB-LTR	0.42	10.2	B	60	73	0.58	11.8	B	82	89	0.61	12.6	B	90	98	0.61	12.6	B	90	98
	NB-LT	0.05	25.6	C	9	27	0.07	25.8	C	12	32	0.08	26.0	C	12	32	0.08	26.0	C	12	32
Independence Avenue SW & L'Enfant Plaza <i>Signalized</i>	NB-R	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0
	SB-LTR	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0	0.00	0.0	A	0	0
	Intersection	-	9.2	A	-	-	-	10.0	A	-	-	-	9.7	A	-	-	-	9.7	A	-	-
	EB-LTR	0.37	1.2	A	6	14	0.49	2.0	A	20	20	0.49	1.6	A	9	16	0.49	1.5	A	9	15
	WB-LTR	0.38	18.7	B	83	109	0.47	20.5	C	113	143	0.48	20.6	C	113	144	0.48	20.6	C	113	144
Independence Avenue SW & L'Enfant Plaza <i>Signalized</i>	NB-L	0.25	32.1	C	28	63	0.48	39.7	D	50	104	0.49	40.9	D	51	105	0.49	40.9	D	51	105
	NB-TR	0.19	28.3	C	43	66	0.27	29.2	C	61	87	0.27	29.2	C	61	87	0.27	29.2	C	61	87
	SB-L	0.30	20.7	C	35	65	0.39	21.8	C	45	76	0.39	20.7	C	46	71	0.39	20.7	C	45	71
	SB-TR	0.19	9.3	A	16	29	0.25	11.1	B	29	37	0.28	11.1	B	25	38	0.28	11.2	B	25	38
	Intersection	-	12.6	B	-	-	-	14.2	B	-	-	-	14.0	B	-	-	-	14.0	B	-	-

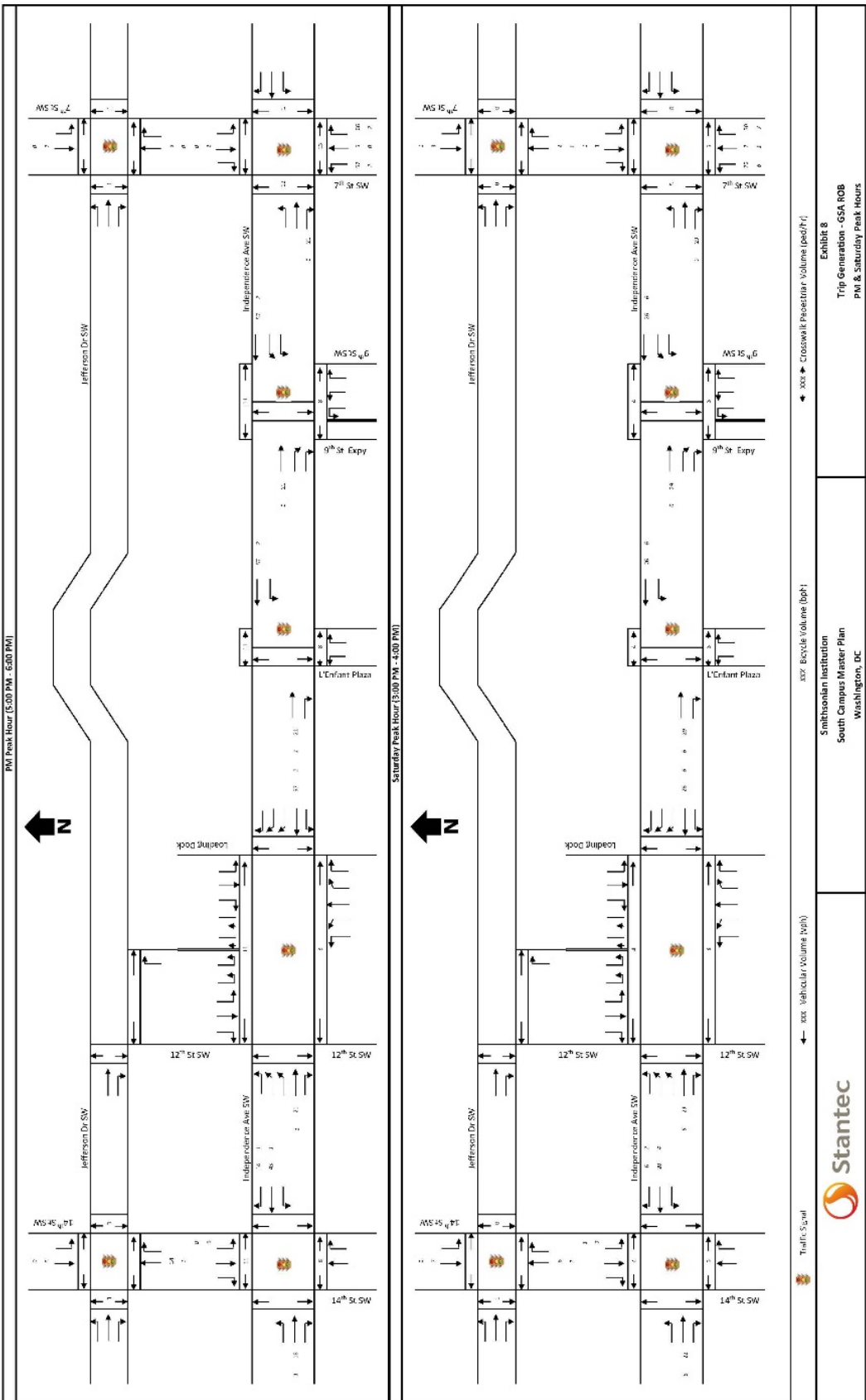
V/c ratio = volume/capacity ratio  
Source: Synchro 9

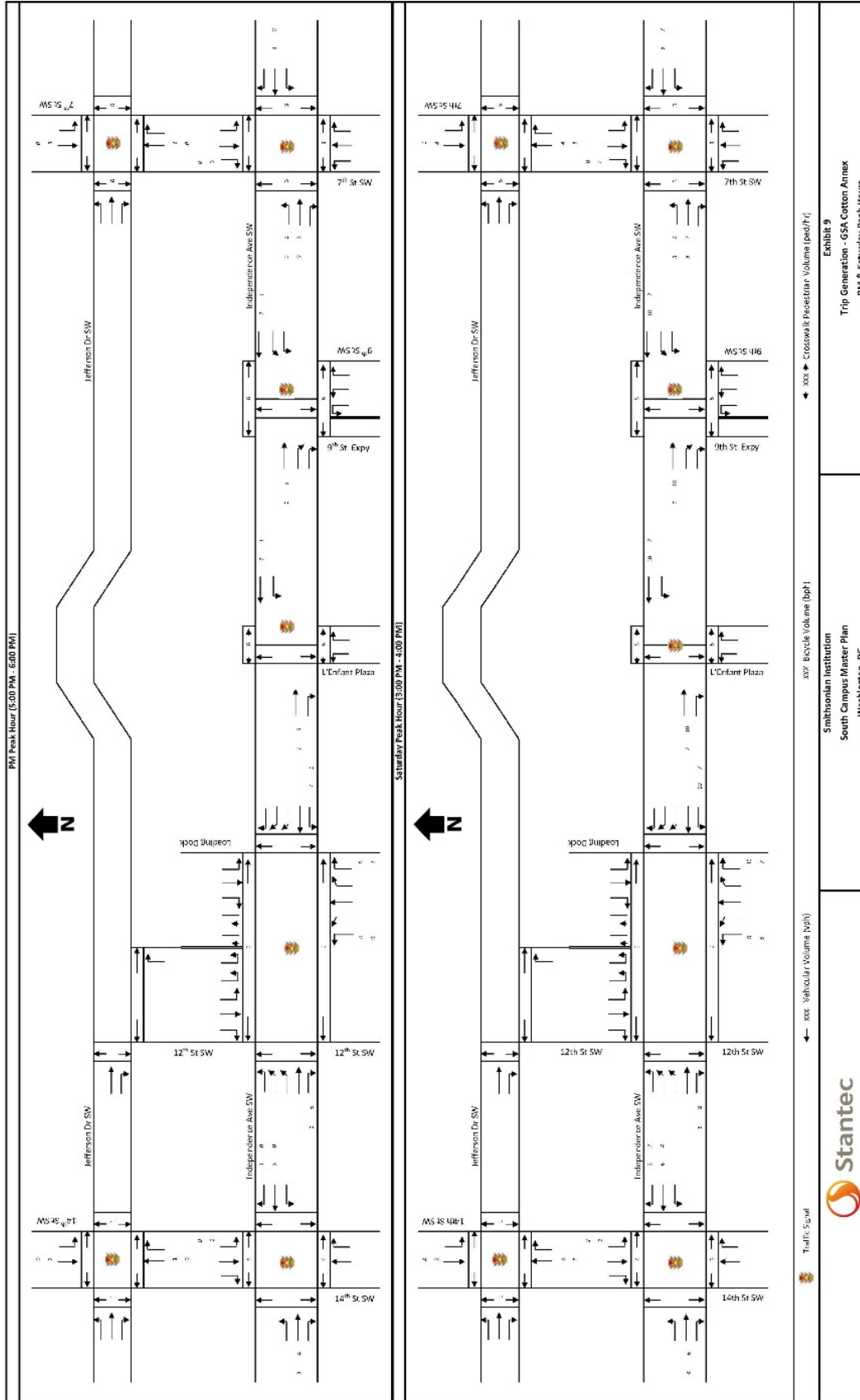


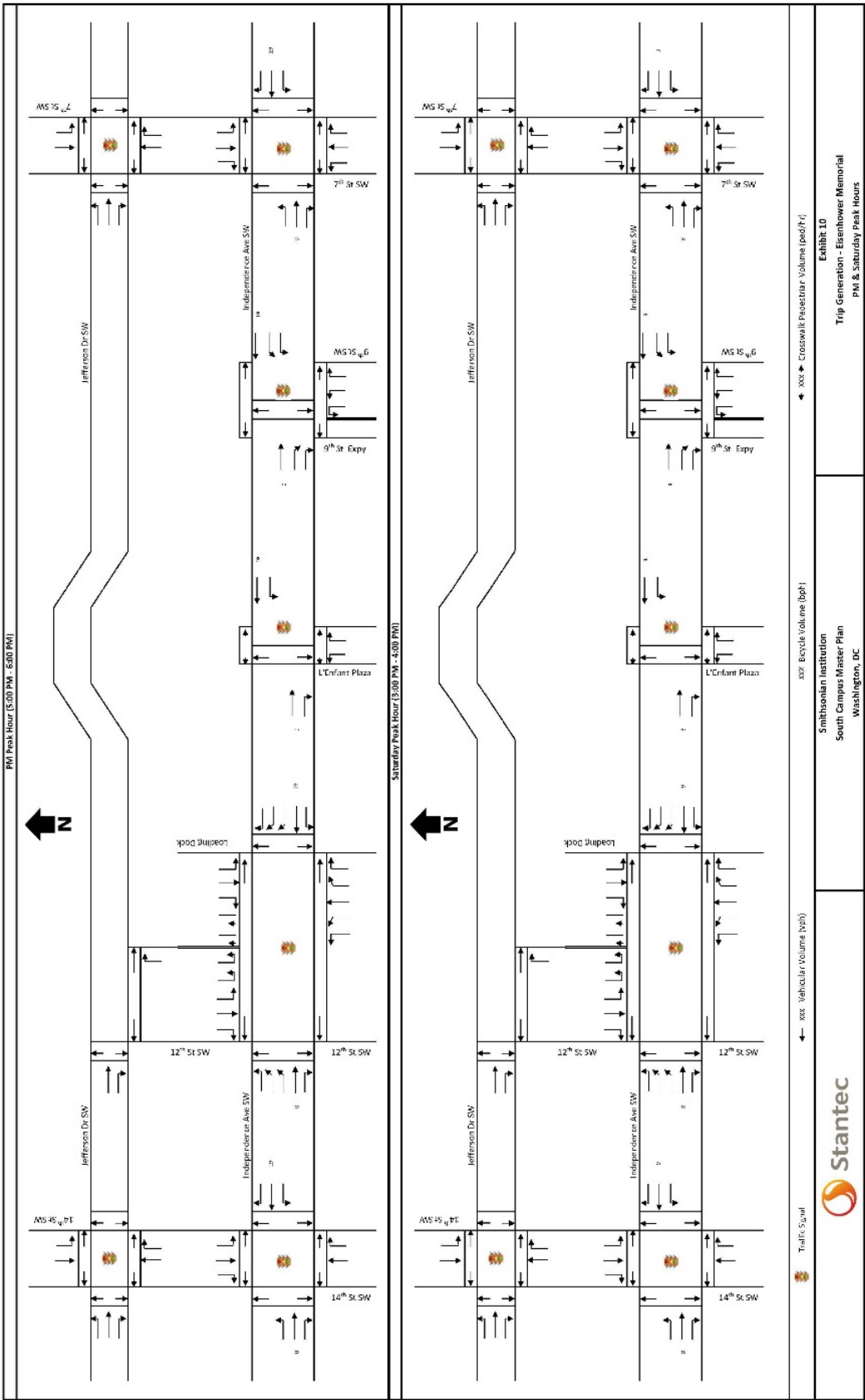


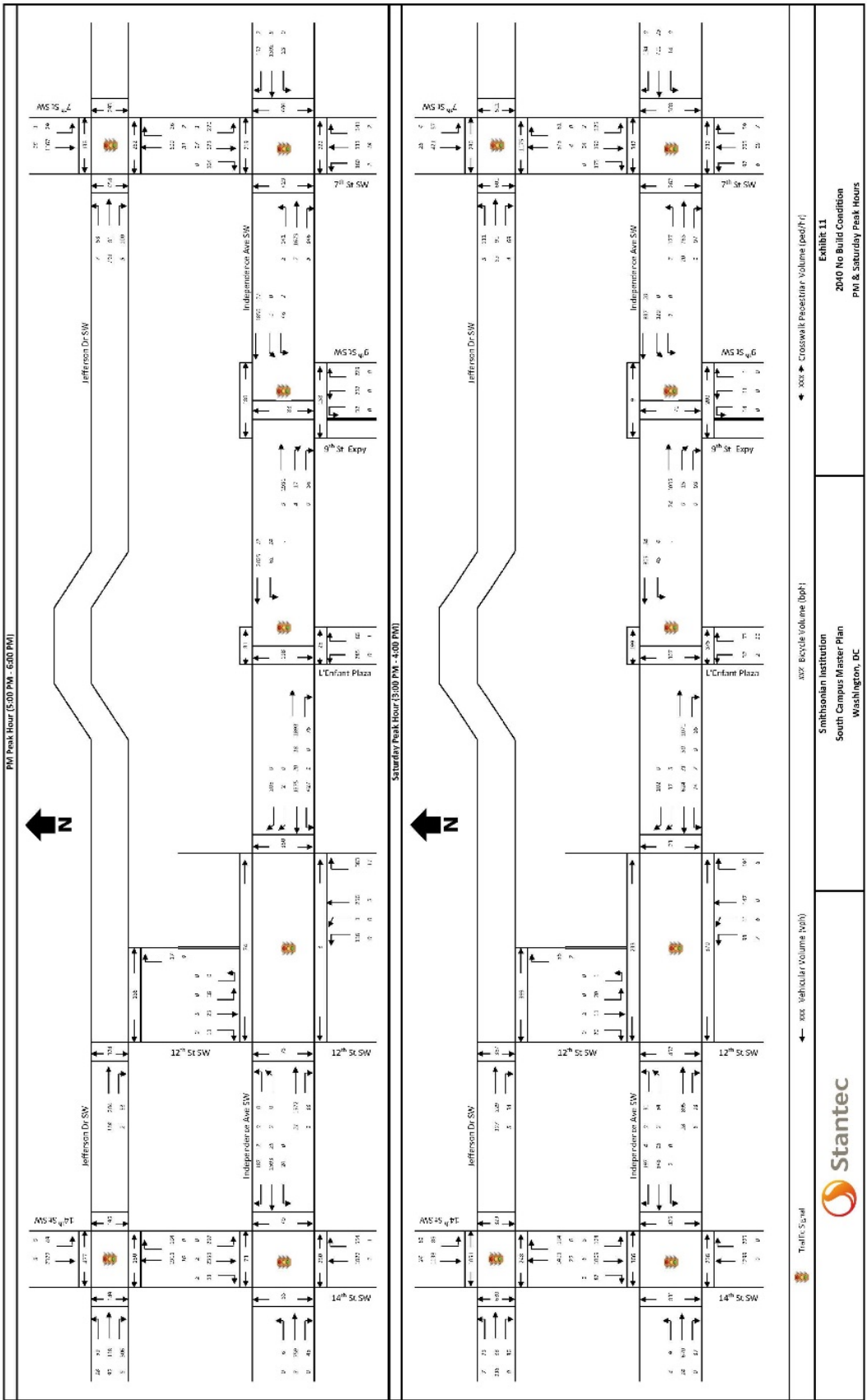


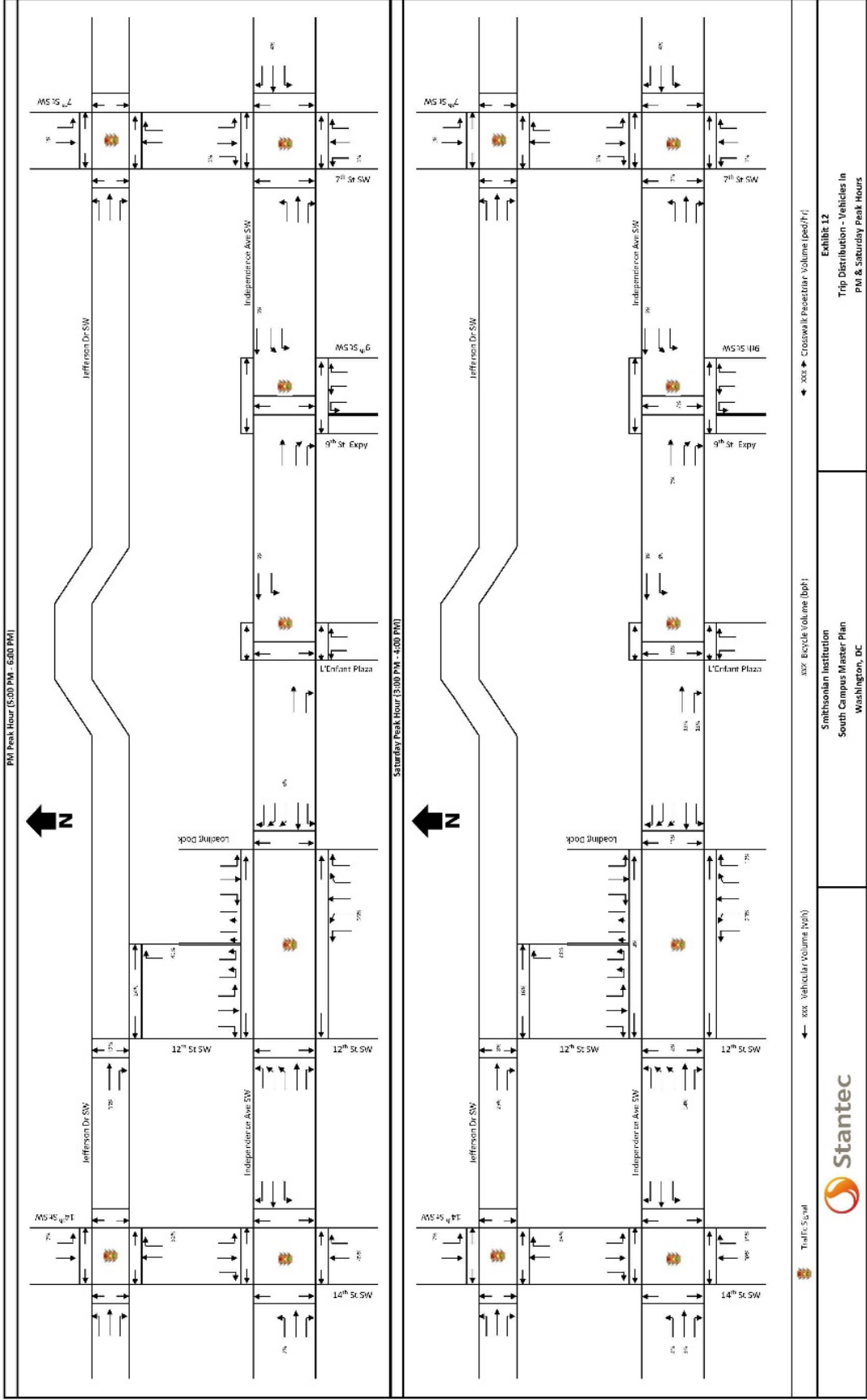


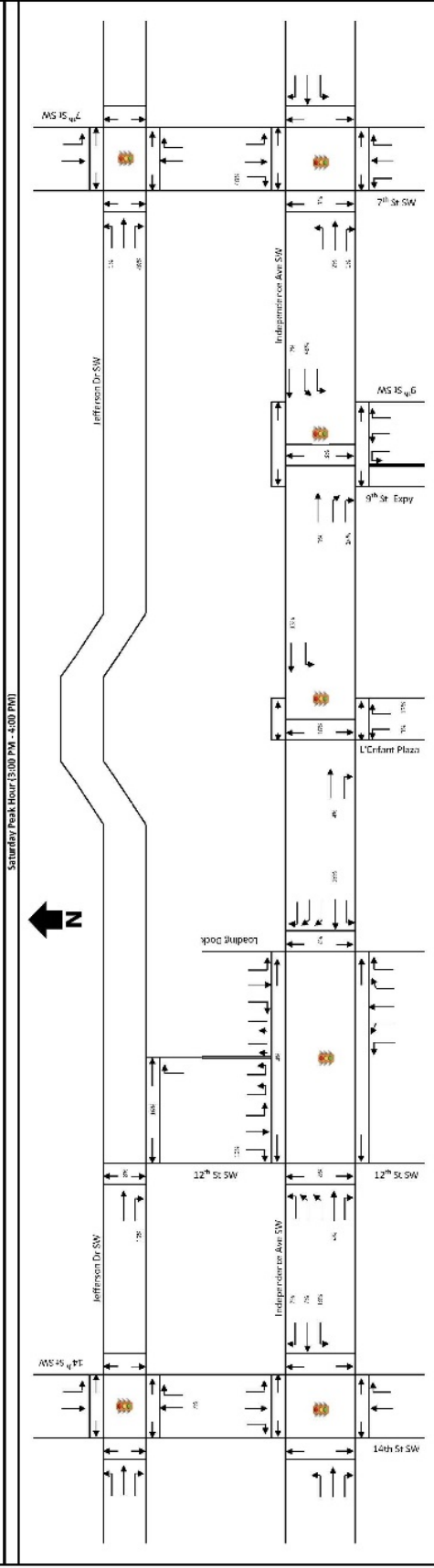
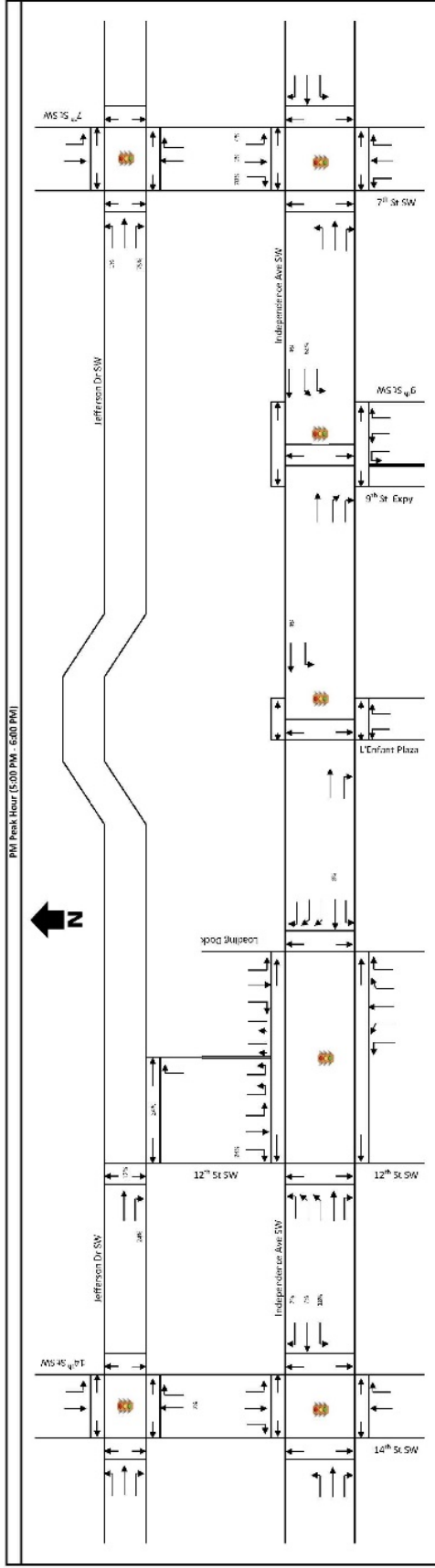












◆ xxx ◆ Crosswalk Pedestrian Volume (ped/hr)

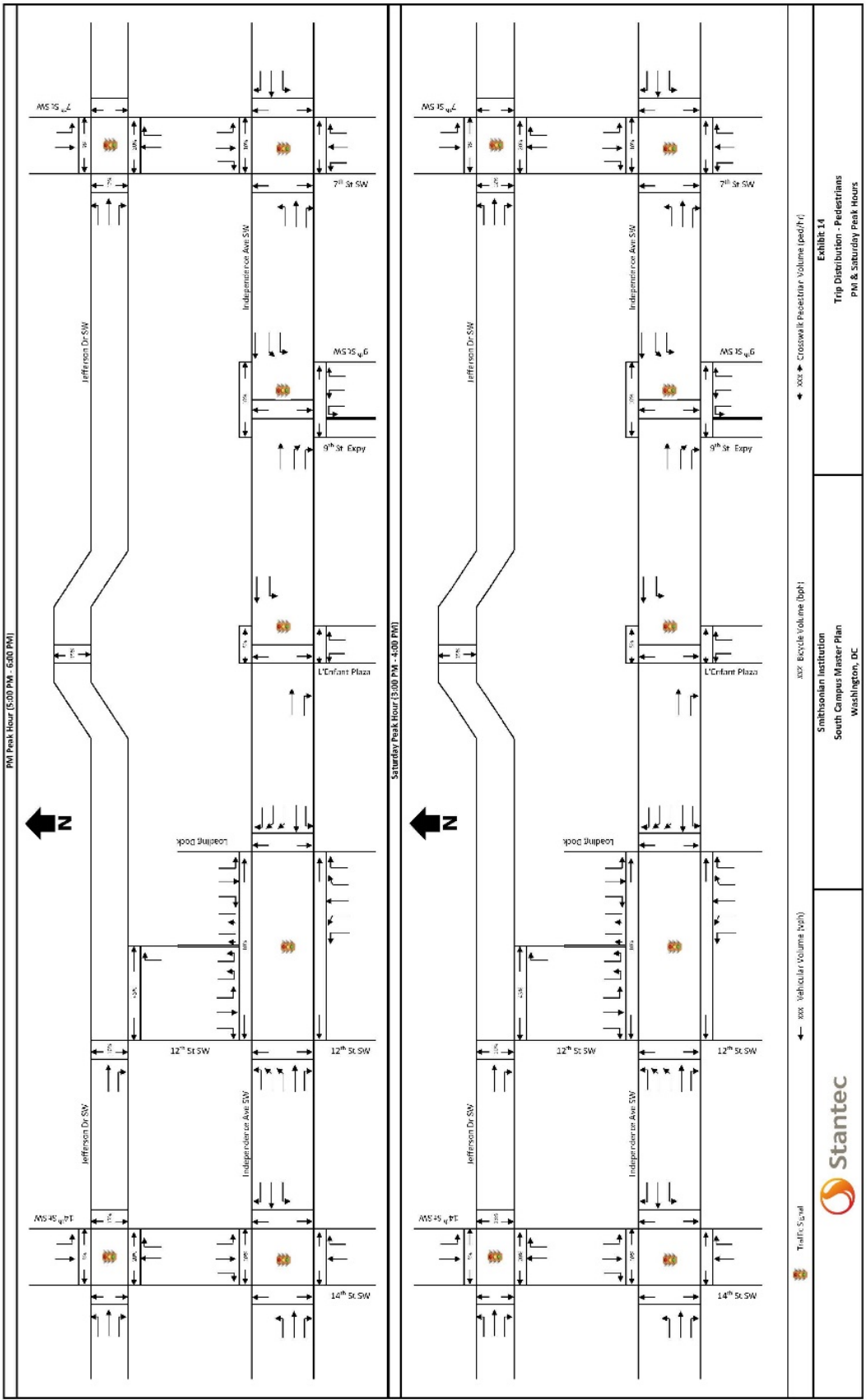
mmX Bicycle Volume (bpt)

← xxx Vehicular Volume (vph)

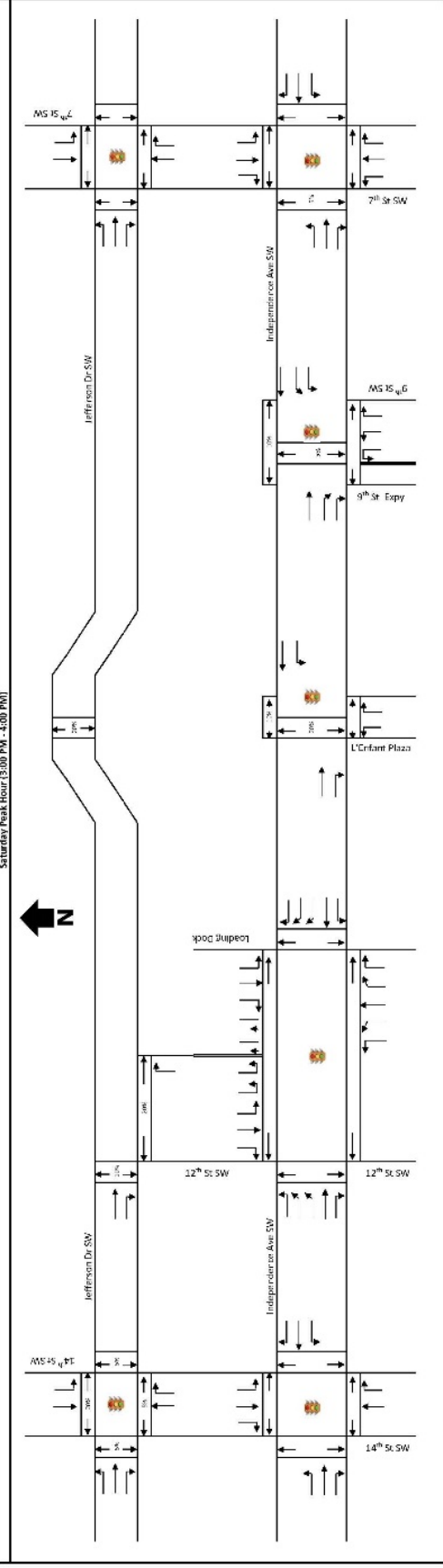
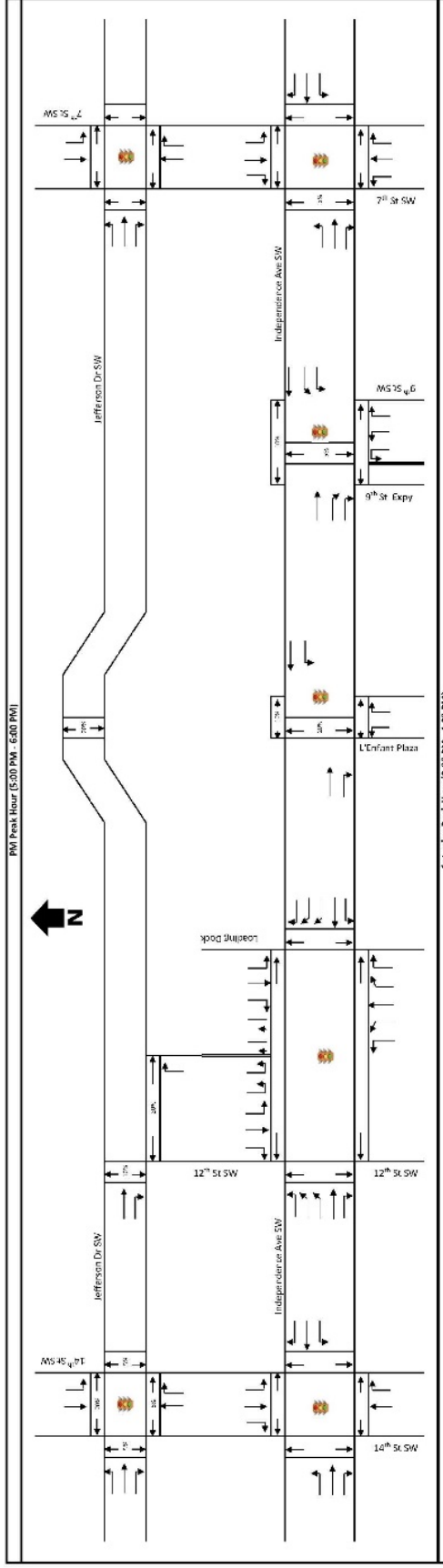
Traffic Signal

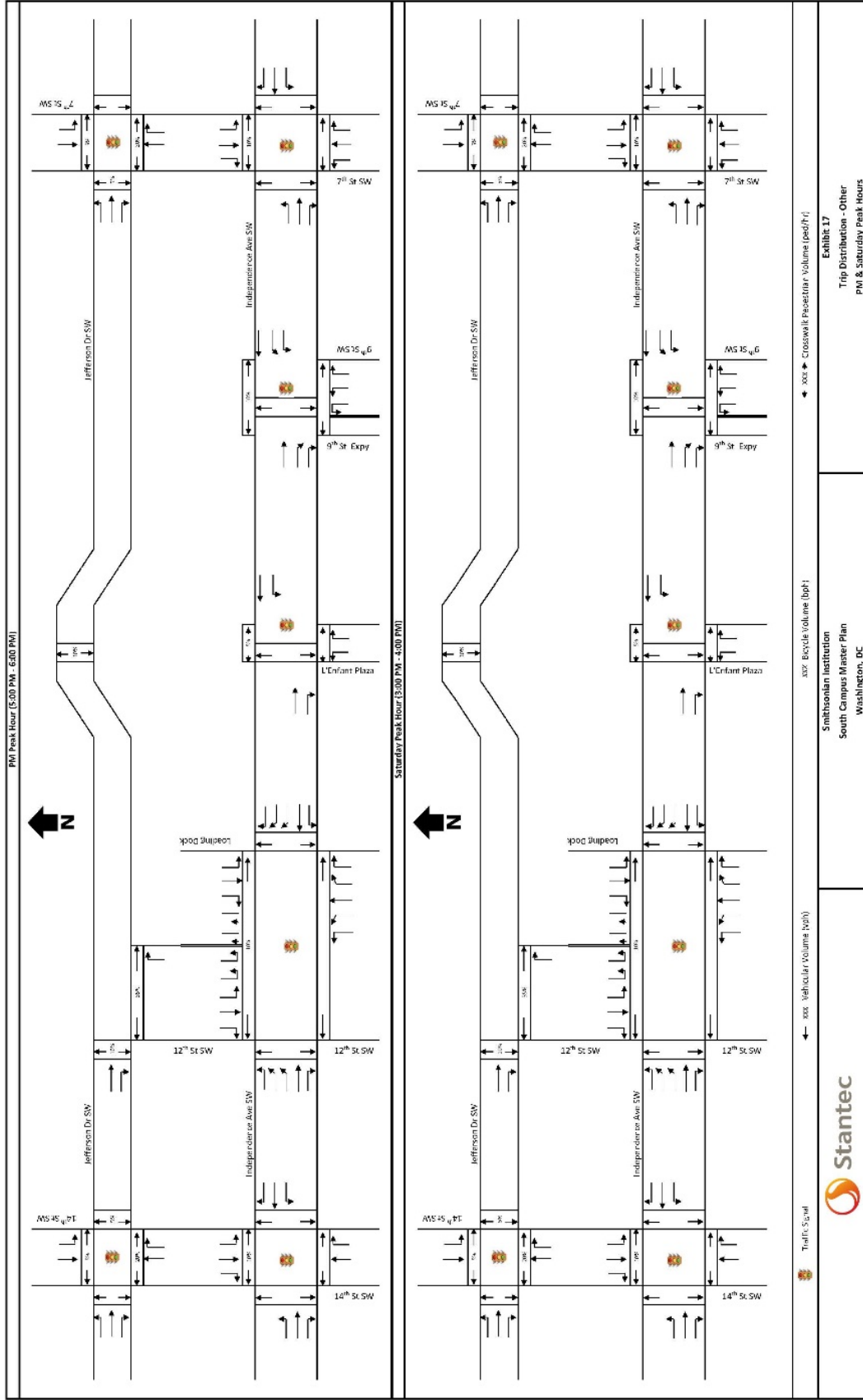
Smithsonian Institution  
South Campus Master Plan  
Washington, DC

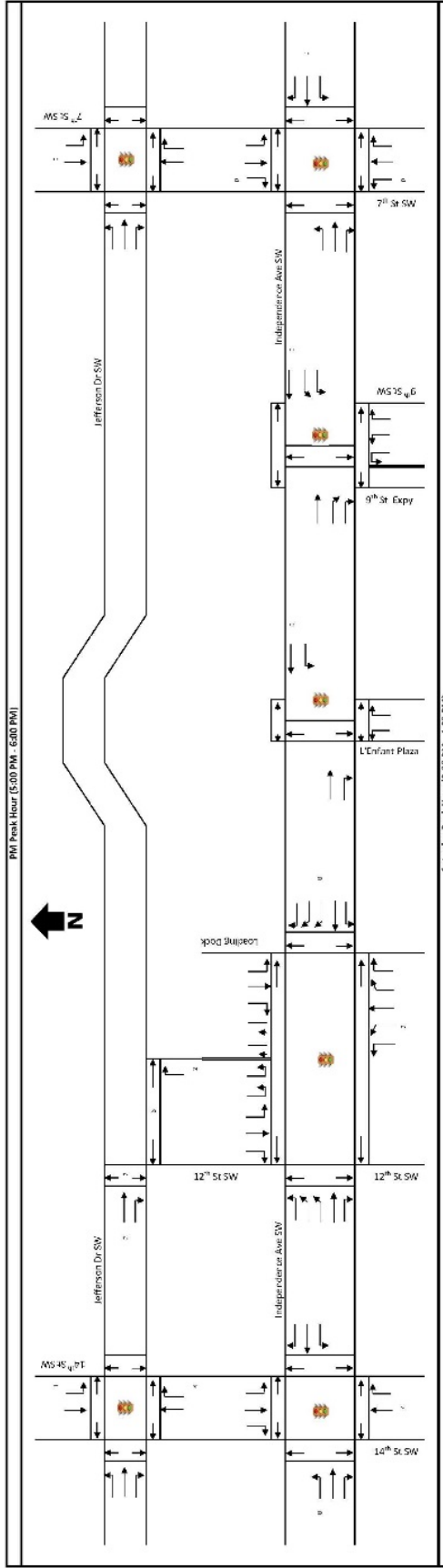


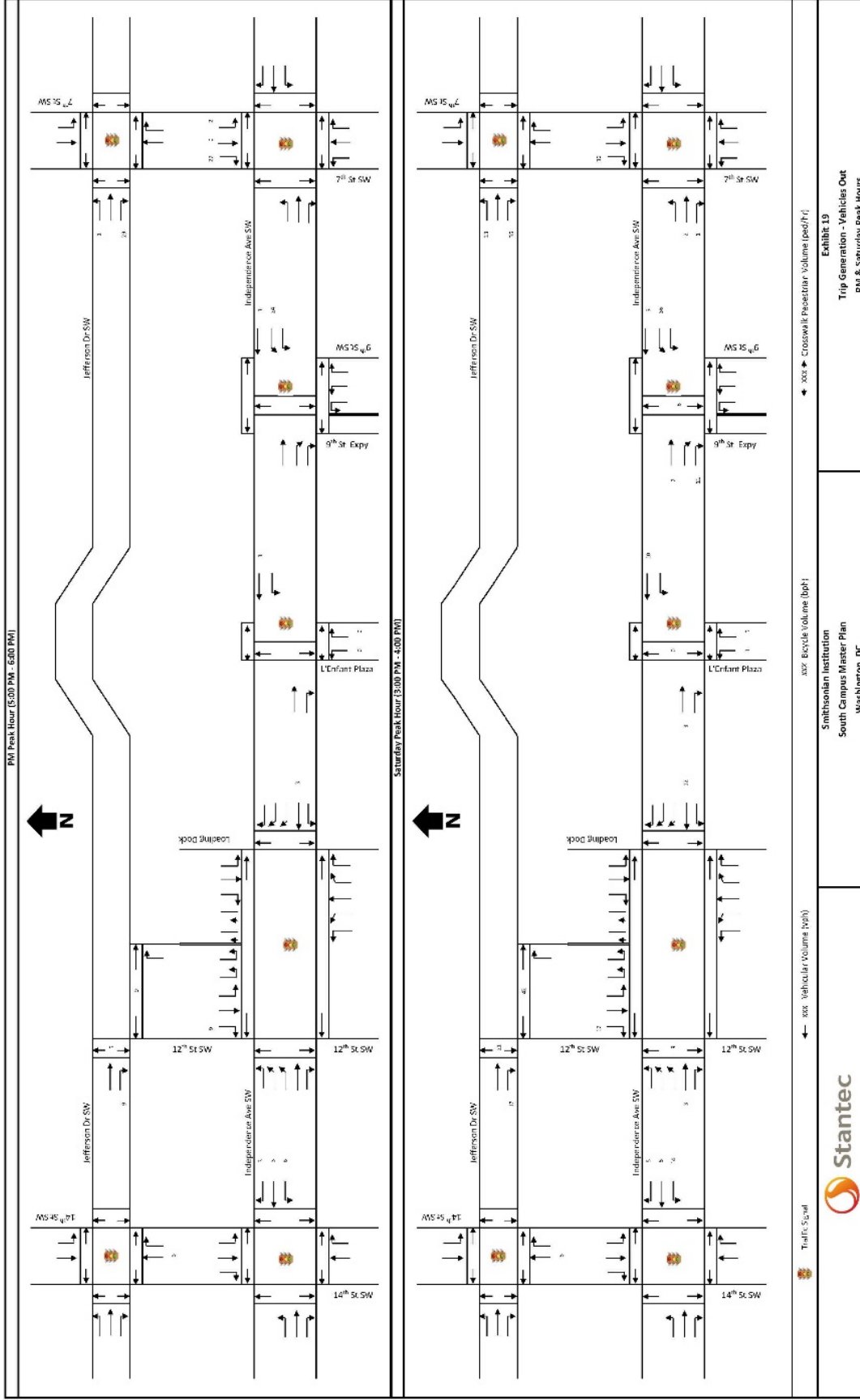


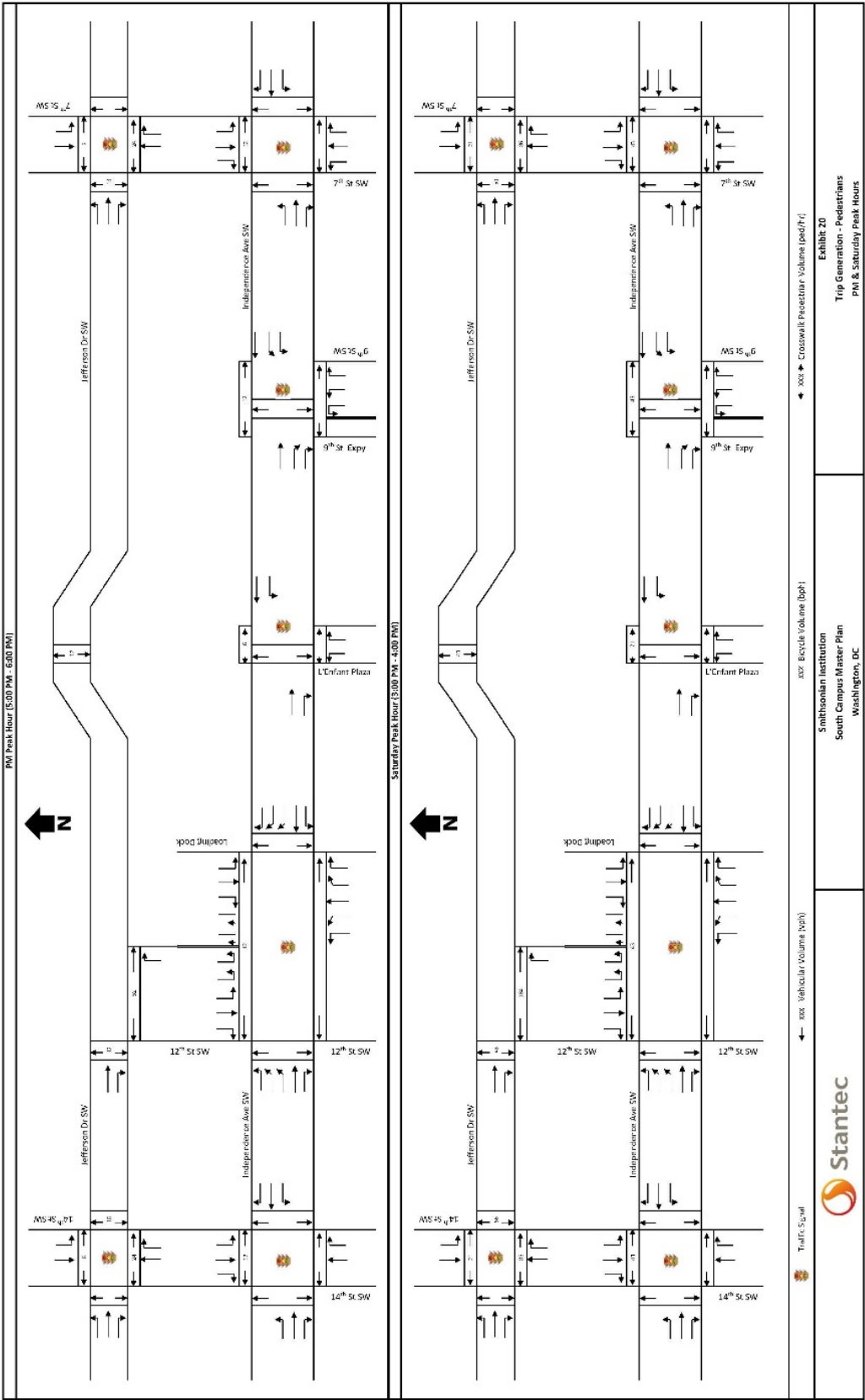


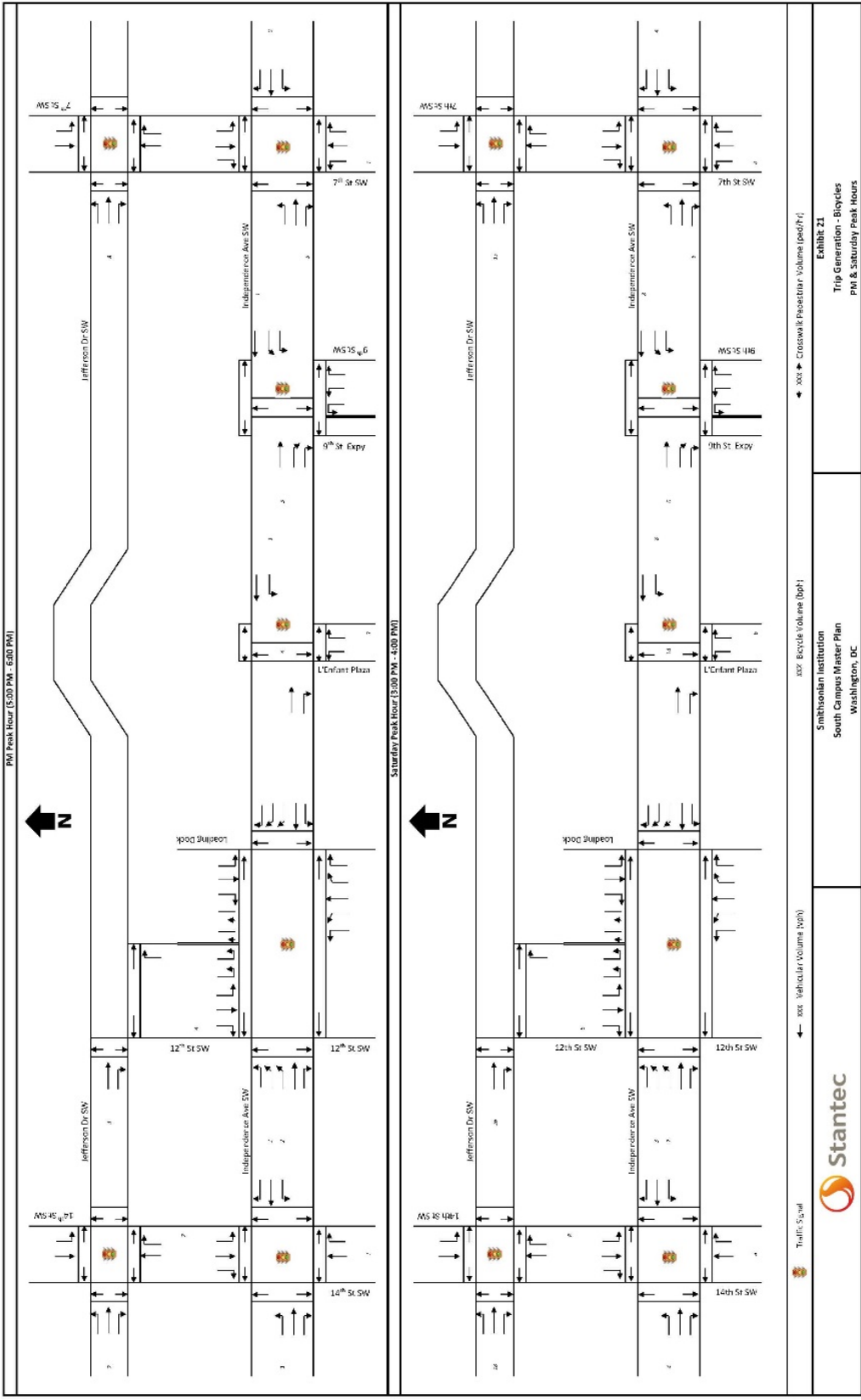


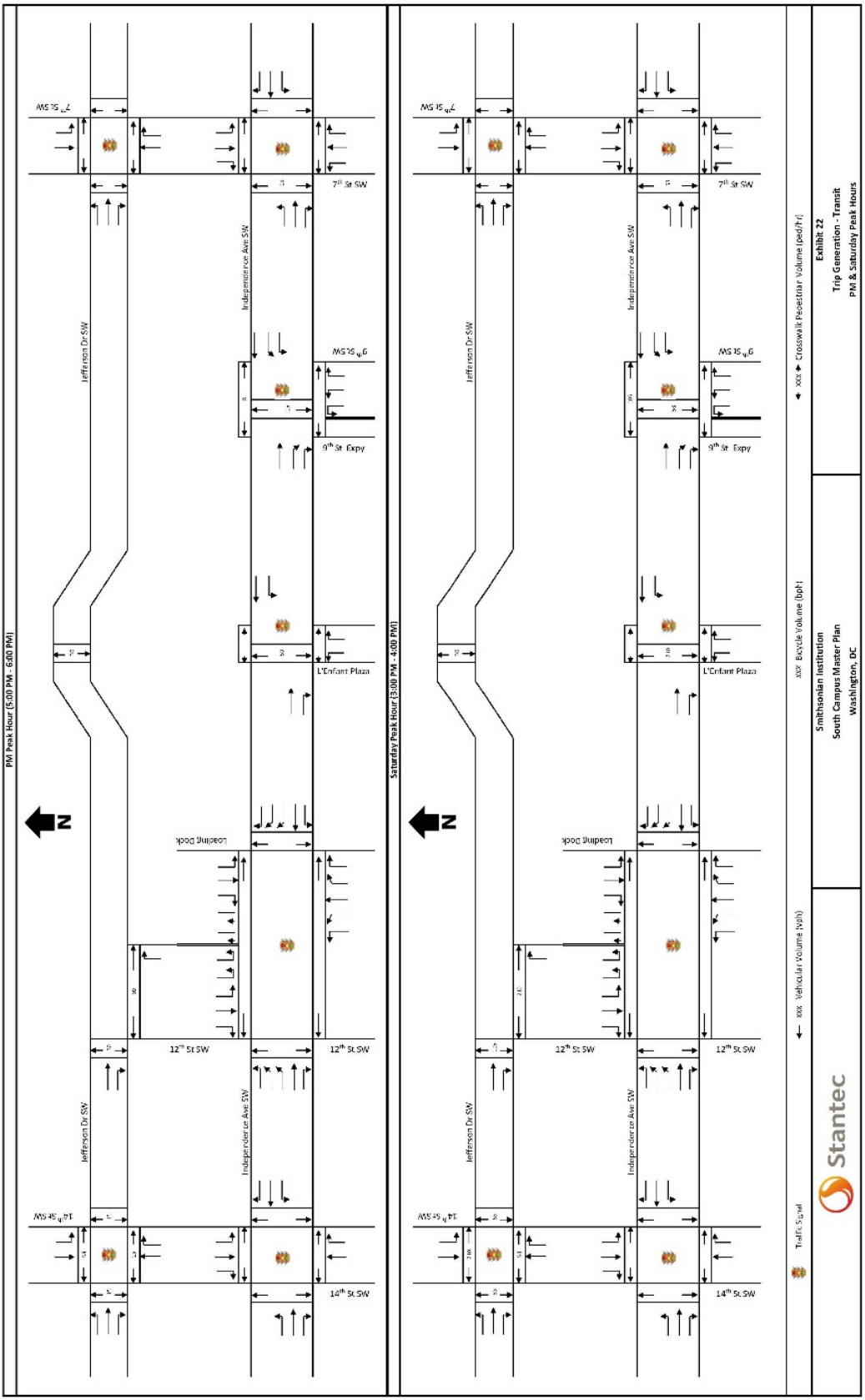


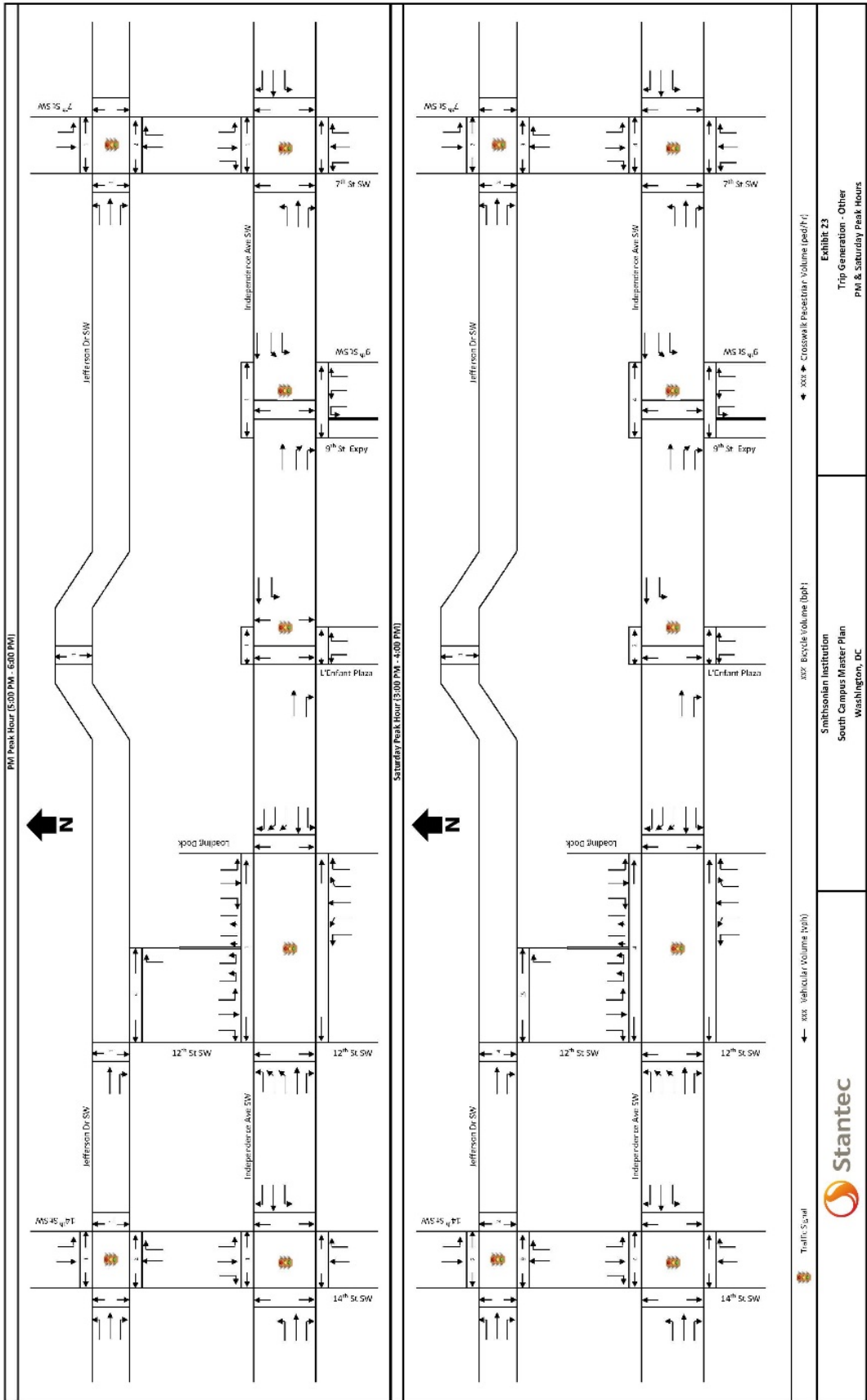


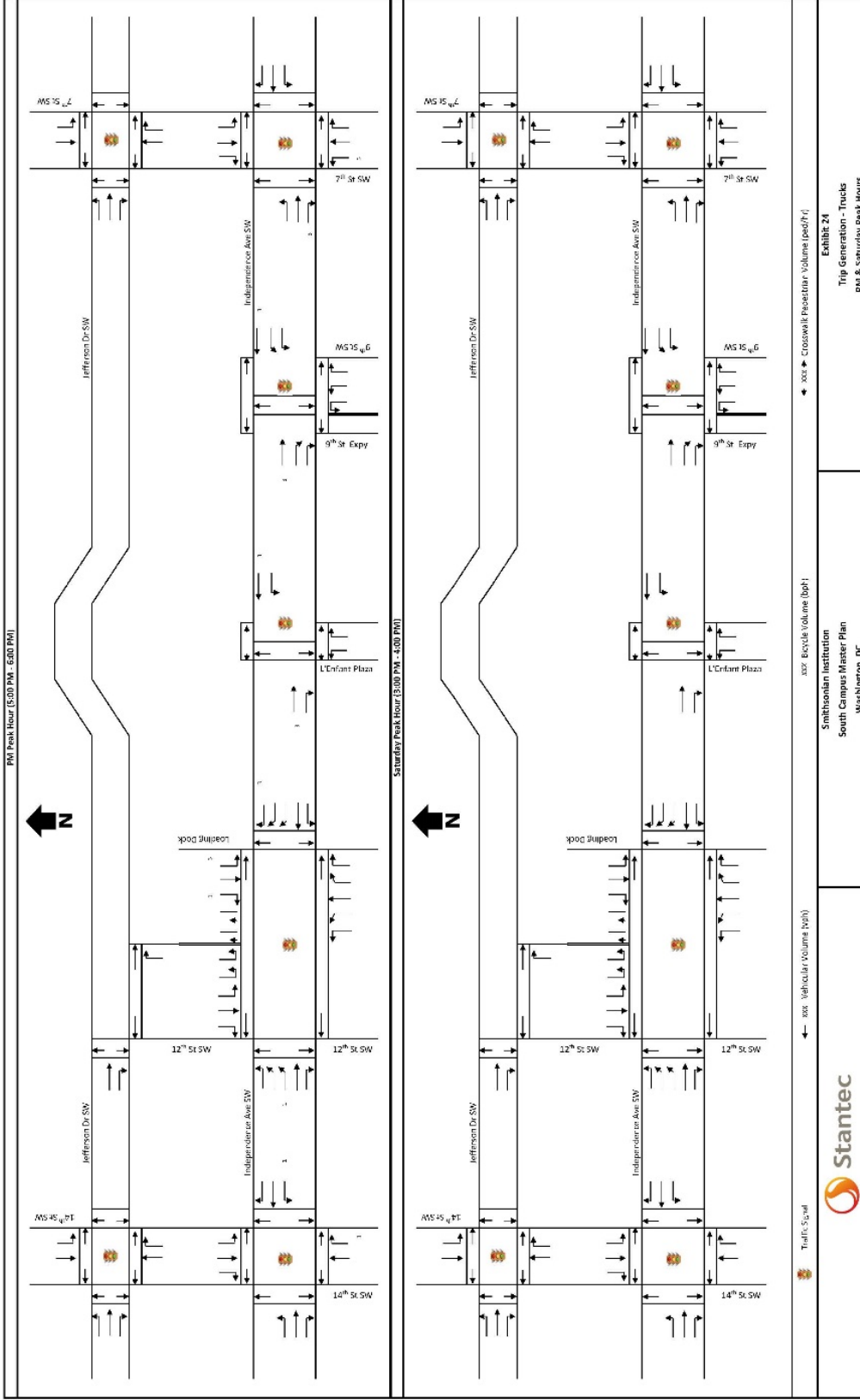


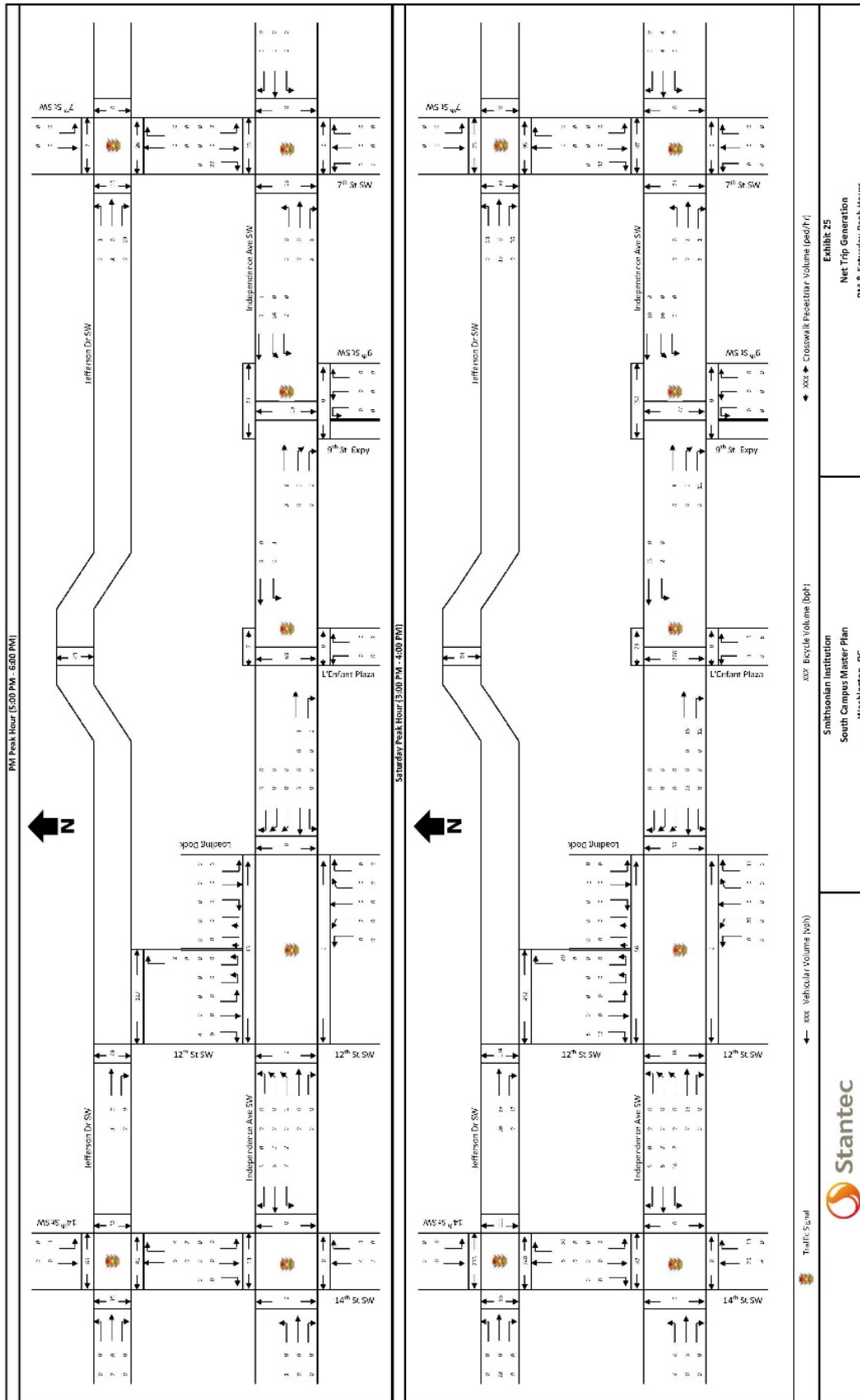


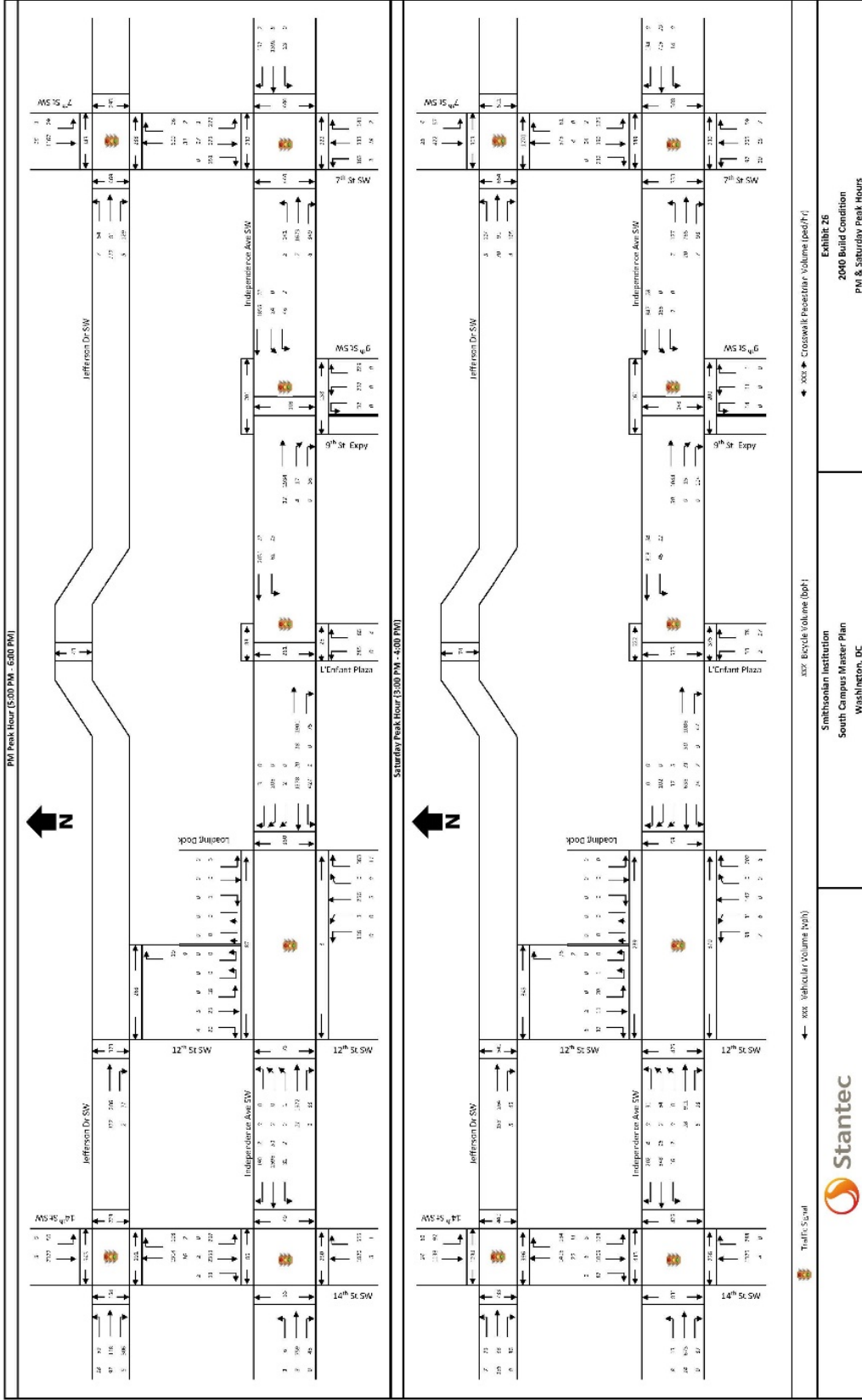












## **APPENDIX D: SYNCHRO OUTPUTS**



Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	5	601	37	19	1244	140	0	1483	451	236	1915	27
Future Volume (vph)	5	601	37	19	1244	140	0	1483	451	236	1915	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.99			1.00	0.92			0.94		1.00	
Frt		0.991				0.850			0.850		0.998	
Flt Protected					0.999					0.950		
Satd. Flow (prot)	0	4776	0	0	4644	1311	0	4793	1478	1589	4735	0
Flt Permitted		0.851			0.917					0.075		
Satd. Flow (perm)	0	4064	0	0	4259	1209	0	4793	1382	125	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				154			99		1	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	46		194	194		46	27		40	40		27
Confl. Bikes (#/hr)			1			23			2			2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Adj. Flow (vph)	6	668	41	21	1382	156	0	1648	501	262	2128	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	715	0	0	1403	156	0	1648	501	262	2158	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0	73.0	
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%	66.4%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		46.5	46.5	13.5	66.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	67.5	68.0	

## Lanes, Volumes, Timings

### 2: 14th Street SW & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↗	↑	↖	↗	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.61	0.62	
v/c Ratio		0.60			1.13	0.34		0.79	0.76	0.97	0.74	
Control Delay		35.7			86.0	2.6		30.0	29.6	74.8	10.2	
Queue Delay		0.0			0.0	0.0		2.0	0.0	0.0	0.1	
Total Delay		35.7			86.0	2.7		32.1	29.6	74.8	10.3	
LOS		D			F	A		C	C	E	B	
Approach Delay		35.7			77.7			31.5			17.3	
Approach LOS		D			E			C			B	
Queue Length 50th (ft)		156			~425	2		357	239	142	188	
Queue Length 95th (ft)		200			m#400	m2		420	386	m#296	199	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)												
Base Capacity (vph)		1187			1238	460		2091	658	269	2927	
Starvation Cap Reductn		0			0	0		0	0	0	135	
Spillback Cap Reductn		0			0	8		289	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.60			1.13	0.35		0.91	0.76	0.97	0.77	

#### Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 107 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 37.4

Intersection LOS: D

Intersection Capacity Utilization 92.0%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.


Splits and Phases: 2: 14th Street SW & Independence Ave SW

↑ Ø2 (R)	↖ Ø1	→ Ø4
53 s	20 s	37 s
↓ Ø6 (R)	↗ Ø8	
73 s	37 s	

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	96	249	0	0	0	0	1543	85	40	1929	0
Future Volume (vph)	48	96	249	0	0	0	0	1543	85	40	1929	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.67	0.84						0.97				
Frt		0.892						0.992				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1597	1366	0	0	0	0	0	4818	0	1636	4700	0
Flt Permitted	0.950									0.105		
Satd. Flow (perm)	1068	1366	0	0	0	0	0	4818	0	181	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								15				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	388		148	148		388	118		156	156		118
Confl. Bikes (#/hr)			77						12			7
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	13%	9%	2%	0%	0%	0%	0%	4%	1%	3%	3%	0%
Adj. Flow (vph)	48	97	252	0	0	0	0	1559	86	40	1948	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	349	0	0	0	0	0	1645	0	40	1948	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5	
Total Split (s)	37.0	37.0						73.0		73.0	73.0	
Total Split (%)	33.6%	33.6%						66.4%		66.4%	66.4%	
Maximum Green (s)	30.5	30.5						67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0						10.0		10.0	10.0	

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	73.0
Total Split (%)	66%
Maximum Green (s)	67.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0

10/20/2017



Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗					↖
Traffic Volume (vph)	166	55	0	0	0	14
Future Volume (vph)	166	55	0	0	0	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.966					0.865
Flt Protected						
Satd. Flow (prot)	1860	0	0	0	0	1698
Flt Permitted						
Satd. Flow (perm)	1860	0	0	0	0	1698
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		2	111		264	
Confl. Bikes (#/hr)		96				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehides (%)	7%	0%	0%	0%	0%	0%
Adj. Flow (vph)	208	69	0	0	0	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	277	0	0	0	0	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 22.2%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	← ↑ →		↙ ↑ ↘	← ↑ →				↙ ↑ ↘	↑	↙ ↑ ↘	↙ ↑ ↘	
Traffic Volume (vph)	1262	26	341	1301	2	168	93	1	208	307	15	20
Future Volume (vph)	1262	26	341	1301	2	168	93	1	208	307	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	11	11	11	13	10
Lane Util. Factor	0.86	0.86	0.86	0.86	0.91	0.91	1.00	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00			0.94				0.92	0.92	0.68	0.83	
Frt	0.997			0.983					0.964	0.850	0.912	
Flt Protected			0.950	0.999				0.950			0.983	
Satd. Flow (prot)	5902	0	1393	4066	0	0	0	1678	1493	1426	1250	0
Flt Permitted			0.950	0.875				0.950			0.983	
Satd. Flow (perm)	5902	0	1393	3561	0	0	0	1548	1493	967	1113	0
Right Turn on Red		Yes				Yes				Yes		
Satd. Flow (RTOR)	4			1					14	40	104	
Link Speed (mph)	35			35					30		30	
Link Distance (ft)	1104			603					153		401	
Travel Time (s)	21.5			11.7					3.5		9.1	
Confl. Peds. (#/hr)					51	51	59			285	285	
Confl. Bikes (#/hr)		16			15	15				4		7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Adj. Flow (vph)	1402	29	379	1446	2	187	103	1	231	341	17	22
Shared Lane Traffic (%)			10%							21%		
Lane Group Flow (vph)	1431	0	341	1673	0	0	0	104	303	269	49	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right	Left	Right
Median Width(ft)	0			10					56		13	
Link Offset(ft)	0			0					0		40	
Crosswalk Width(ft)	30			25					28		8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	0.96	1.09
Turning Speed (mph)		9	15		9	9	15	15		9	15	9
Turn Type	NA		Prot	NA			custom	custom	NA	custom	D.Pm	
Protected Phases	6		5	2					4	5		
Permitted Phases							4 8	4 8	8	4 8	4 8	
Minimum Split (s)	20.0		29.5	72.0					38.0	29.5		
Total Split (s)	42.5		29.5	72.0					38.0	29.5		
Total Split (%)	38.6%		26.8%	65.5%					34.5%	26.8%		
Maximum Green (s)	35.5		23.0	65.5					27.5	23.0		
Yellow Time (s)	4.0		4.0	4.0					4.0	4.0		
All-Red Time (s)	3.0		2.5	2.5					6.5	2.5		
Lost Time Adjust (s)	-1.5		-1.5	-1.5					-1.5	-1.5		
Total Lost Time (s)	5.5		5.0	5.0					9.0	5.0		
Lead/Lag	Lead		Lag							Lag		
Lead-Lag Optimize?	Yes		Yes							Yes		
Walk Time (s)	7.0			7.0					4.0			
Flash Dont Walk (s)	6.0			4.0					21.0			
Pedestrian Calls (#/hr)	0			0					0			
Act Effect Green (s)	37.0		24.5	67.0				29.0	29.0	57.5	29.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017



Lane Group	SER2	Ø8
Lane Configurations		
Traffic Volume (vph)	9	
Future Volume (vph)	9	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	59	
Confl. Bikes (#/hr)	7	
Peak Hour Factor	0.90	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	10	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Maximum Green (s)	31.5	
Yellow Time (s)	4.0	
All-Red Time (s)	2.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effect Green (s)		

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Actuated g/C Ratio	0.34		0.22	0.61				0.26	0.26	0.52	0.26	
v/c Ratio	0.72		1.10	1.05				0.25	0.75	0.43	0.13	
Control Delay	30.5		108.8	56.7				22.3	36.8	3.5	2.7	
Queue Delay	0.0		0.0	0.0				6.3	17.8	0.4	0.0	
Total Delay	30.5		108.8	56.7				28.6	54.7	3.9	2.7	
LOS	C		F	E				C	D	A	A	
Approach Delay	30.5			65.5					30.5		2.7	
Approach LOS	C			E					C		A	
Queue Length 50th (ft)	250		~320	~312				58	197	8	0	
Queue Length 95th (ft)	m305		#522	#398				106	#331	40	m2	
Internal Link Dist (ft)	1024			523					73		321	
Turn Bay Length (ft)												
Base Capacity (vph)	1987		310	1586				408	403	626	370	
Starvation Cap Reductn	0		0	0				253	91	98	0	
Spillback Cap Reductn	0		0	0				0	0	0	0	
Storage Cap Reductn	0		0	0				0	0	0	0	
Reduced v/c Ratio	0.72		1.10	1.05				0.67	0.97	0.51	0.13	

### Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 47.1

Intersection LOS: D

Intersection Capacity Utilization 111.4%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

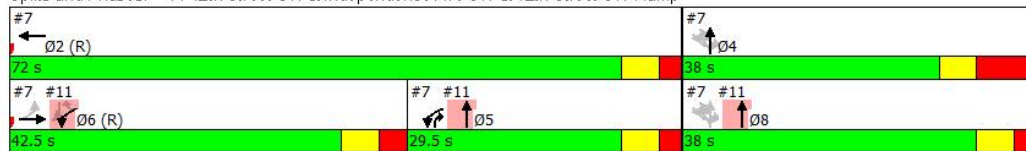
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp



# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017



Lane Group	SER2	Ø8
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

# Lanes, Volumes, Timings

## 9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↖	↗	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1523	61	51	1580	232	70	
Future Volume (vph)	1523	61	51	1580	232	70	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.86	0.86	1.00	1.00	
Ped Bike Factor	1.00				0.78	0.98	
Frt	0.994					0.850	
Flt Protected				0.998	0.950		
Satd. Flow (prot)	5872	0	0	5854	1685	1507	
Flt Permitted				0.790	0.950		
Satd. Flow (perm)	5872	0	0	4634	1321	1475	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	10					49	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		10	10		157	7	
Confl. Bikes (#/hr)		13					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Adj. Flow (vph)	1674	67	56	1736	255	77	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1741	0	0	1792	255	77	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	60.5		15.5	60.5	30.0	15.5	4.0
Total Split (%)	55.0%		14.1%	55.0%	27.3%	14.1%	4%
Maximum Green (s)	54.0		10.5	54.0	24.5	10.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Walk Time (s)	10.0				6.0	0.0	
Flash Dont Walk (s)	4.0				18.0	2.0	

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		0
Act Effct Green (s)	55.5			66.0	25.5	37.5	
Actuated g/C Ratio	0.50			0.60	0.23	0.34	
v/c Ratio	0.59			0.62	0.65	0.14	
Control Delay	22.8			12.7	47.3	10.8	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	22.8			12.7	47.3	10.8	
LOS	C			B	D	B	
Approach Delay	22.8			12.7	38.8		
Approach LOS	C			B	D		
Queue Length 50th (ft)	338			172	164	12	
Queue Length 95th (ft)	379			197	254	44	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2967			2896	390	538	
Starvation Cap Reductn	0			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.59			0.62	0.65	0.14	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 19.5

Intersection LOS: B

Intersection Capacity Utilization 78.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

→ Ø2 (R)	→ Ø4	↖ Ø9
60.5 s	4 s 30 s	15.5 s
← Ø6 (R)		
60.5 s		

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗					↑↑↑			↓↓↓	
Traffic Volume (vph)	43	66	81	0	0	0	0	483	21	24	946	0
Future Volume (vph)	43	66	81	0	0	0	0	483	21	24	946	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.86		0.68					0.97			0.99	
Frt			0.850					0.994				
Flt Protected	0.950										0.999	
Satd. Flow (prot)	1711	1652	1546	0	0	0	0	4473	0	0	5792	0
Flt Permitted	0.950										0.909	
Satd. Flow (perm)	1470	1652	1053	0	0	0	0	4473	0	0	5233	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			33									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	111		213	213		111	364		233	233		364
Confl. Bikes (#/hr)			85						25			13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	15%	1%	0%	0%	0%	0%	9%	0%	47%	8%	0%
Adj. Flow (vph)	44	68	84	0	0	0	0	498	22	25	975	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	68	84	0	0	0	0	520	0	0	1000	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					77.5		77.5	77.5	
Total Split (%)	29.5%	29.5%	29.5%					70.5%		70.5%	70.5%	
Maximum Green (s)	26.0	26.0	26.0					71.5		71.5	71.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive



10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	31.5
Total Split (s)	77.5	32.5
Total Split (%)	70%	30%
Maximum Green (s)	71.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	10.0

10/20/2017

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	0 (0%), Referenced to phase 2:NBSB and 6:Ped, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum w/c Ratio:	0.29
Intersection Signal Delay:	8.8
Intersection Capacity Utilization:	59.1%
Analysis Period (min):	15
m Volume for 95th percentile queue is metered by upstream signal.	
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

 Ø2 (R)	 Ø4
77.5 s	32.5 s
 Ø6 (R)	 Ø8
77.5 s	32.5 s


Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations	↰		↱		↕				↱			
Traffic Volume (vph)	0	0	0	0	609	0	0	0	387	0	0	
Future Volume (vph)	0	0	0	0	609	0	0	0	387	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	662	0	0	0	421	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	662	0	0	0	421	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			72.0
Total Split (s)	42.5		42.5						42.5			72.0
Total Split (%)	38.6%		38.6%						38.6%			65%
Maximum Green (s)	35.5		35.5						35.5			65.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					62.5				35.5			
Actuated g/C Ratio					0.57				0.32			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Turn Type			
Protected Phases	4	5	8
Permitted Phases			
Minimum Split (s)	38.0	29.5	38.0
Total Split (s)	38.0	29.5	38.0
Total Split (%)	35%	27%	35%
Maximum Green (s)	27.5	23.0	31.5
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	6.5	2.5	2.5
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag		Lag	
Lead-Lag Optimize?		Yes	
Walk Time (s)	4.0		
Flash Dont Walk (s)	21.0		
Pedestrian Calls (#/hr)	0		
Act Effct Green (s)			
Actuated g/C Ratio			

**Lanes, Volumes, Timings**  
**11: 12th Street SW**

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↖	↗	↘
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2		
v/c Ratio					0.25				0.20					
Control Delay					12.2				0.4					
Queue Delay					0.0				3.3					
Total Delay					12.2				3.7					
LOS					B				A					
Approach Delay					12.2			3.7						
Approach LOS					B			A						
Queue Length 50th (ft)					80				0					
Queue Length 95th (ft)					103				m0					
Internal Link Dist (ft)		132			189			73		90				
Turn Bay Length (ft)														
Base Capacity (vph)					2696				2139					
Starvation Cap Reductn					0				1596					
Spillback Cap Reductn					390				0					
Storage Cap Reductn					0				0					
Reduced v/c Ratio					0.29				0.78					

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 8.9

Intersection LOS: A

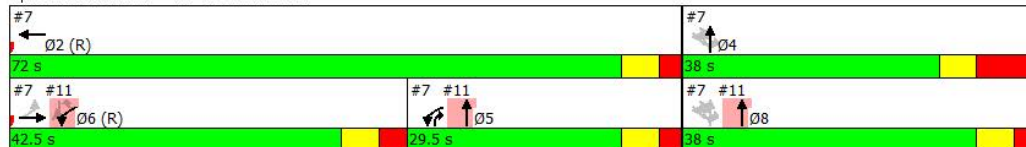
Intersection Capacity Utilization 19.4%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW



Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↗	↖	↑	↗	↖	↓
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		←↑↑↑			←↑↑↑				↑	↑		↓
Traffic Volume (vph)	0	1550	43	38	1438	0	26	193	0	186	0	0
Future Volume (vph)	0	1550	43	38	1438	0	26	193	0	186	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00							
Frt		0.996								0.850		
Flt Protected					0.999				0.950			
Satd. Flow (prot)	0	5930	0	0	5921	0	0	0	1627	1492	0	1773
Flt Permitted					0.830				0.757			
Satd. Flow (perm)	0	5930	0	0	4918	0	0	0	1297	1492	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		7								194		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	133		101	101		133						
Confl. Bikes (#/hr)			6			15						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	2%	2%	0%	3%	0%	0%	4%	0%	1%	0%	0%
Adj. Flow (vph)	0	1615	45	40	1498	0	27	201	0	194	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1660	0	0	1538	0	0	0	228	194	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA			Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6				8			8	
Minimum Split (s)	30.5	30.5		10.5	25.5			30.5	30.5	10.5	30.5	30.5
Total Split (s)	53.0	53.0		11.0	64.0			31.0	31.0	11.0	31.0	31.0
Total Split (%)	53.0%	53.0%		11.0%	64.0%			31.0%	31.0%	11.0%	31.0%	31.0%
Maximum Green (s)	43.5	43.5		5.5	58.5			25.5	25.5	5.5	25.5	25.5
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5			1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag				Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes				Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)	10.0	10.0			10.0			20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0			0			0	0		0	0
Act Effct Green (s)		45.0			58.5				25.5	5.5		
Actuated g/C Ratio		0.45			0.58				0.26	0.06		

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW









10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
v/c Ratio		0.62			0.52				0.69	0.73		
Control Delay		22.2			13.3				46.1	24.1		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		22.2			13.3				46.1	24.1		
LOS		C			B				D	C		
Approach Delay		22.2			13.3				36.0			
Approach LOS		C			B				D			
Queue Length 50th (ft)		227			148				132	0		
Queue Length 95th (ft)		266			175				#232	#94		
Internal Link Dist. (ft)		460			526				486			225
Turn Bay Length (ft)												
Base Capacity (vph)		2672			2932				330	265		
Starvation Cap Reductn		0			0				0	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.62			0.52				0.69	0.73		

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 20.0

Intersection LOS: C

Intersection Capacity Utilization 69.2%

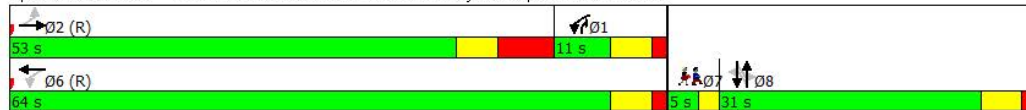
ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1359	264	19	1115	124	100	267	61	220	546	261
Future Volume (vph)	113	1359	264	19	1115	124	100	267	61	220	546	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		0	0		0	80		0	0		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96			0.97		0.90	0.93		0.80	0.89	
Frt		0.977			0.985			0.972			0.952	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	5614	0	0	5646	0	1662	4267	0	1616	3965	0
Flt Permitted		0.717			0.866		0.330			0.477		
Satd. Flow (perm)	0	4030	0	0	4893	0	517	4267	0	652	3965	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		17			28						130	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	178		168	168		178	337		358	358		337
Confl. Bikes (#/hr)			6			7			15			14
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	4%	2%	2%	11%	2%	15%	5%	6%	10%	8%	9%	4%
Adj. Flow (vph)	115	1387	269	19	1138	127	102	272	62	224	557	266
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1771	0	0	1284	0	102	334	0	224	823	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	60.0		49.0	49.0		36.5	36.5		13.5	50.0	
Total Split (%)	10.0%	54.5%		44.5%	44.5%		33.2%	33.2%		12.3%	45.5%	
Maximum Green (s)	5.5	53.5		42.5	42.5		30.0	30.0		8.5	43.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

**Lanes, Volumes, Timings**  
**22: 7th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		55.0			44.0		31.5	31.5		46.5	45.0	
Actuated g/C Ratio		0.50			0.40		0.29	0.29		0.42	0.41	
v/c Ratio		0.84			0.65		0.69	0.27		0.62	0.48	
Control Delay		27.0			28.0		60.7	31.1		41.0	23.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		27.0			28.0		60.7	31.1		41.0	23.0	
LOS		C			C		E	C		D	C	
Approach Delay		27.0			28.0			38.1			26.9	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)		253			205		64	66		120	120	
Queue Length 95th (ft)		292			246		#152	93		202	167	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2109			1974		148	1221		363	1698	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.84			0.65		0.69	0.27		0.62	0.48	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 32 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 28.3

Intersection LOS: C

Intersection Capacity Utilization 93.4%

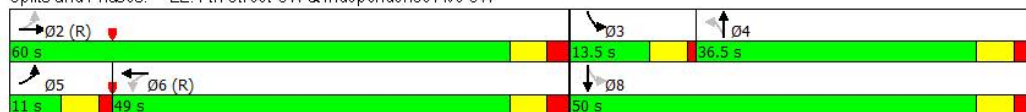
ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.













Queue shown is maximum after two cycles.

Splits and Phases: 22: 7th Street SW & Independence Ave SW



Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	7	516	71	2	412	154	0	1057	223	97	821	71
Future Volume (vph)	7	516	71	2	412	154	0	1057	223	97	821	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.95			1.00	0.70			0.67	0.95	0.97	
Frt		0.982				0.850			0.850		0.988	
Flt Protected		0.999								0.950		
Satd. Flow (prot)	0	4592	0	0	4602	1478	0	4746	1463	1589	4480	0
Flt Permitted		0.933			0.937					0.178		
Satd. Flow (perm)	0	4281	0	0	4309	1036	0	4746	982	283	4480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				166			113		12	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	291		596	596		291	676		347	347		676
Confl. Bikes (#/hr)			4			4						5
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	29%	2%	3%	50%	5%	2%	0%	2%	3%	6%	3%	7%
Adj. Flow (vph)	8	555	76	2	443	166	0	1137	240	104	883	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	639	0	0	445	166	0	1137	240	104	959	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		48.0	48.0	15.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%	37.0%		48.0%	48.0%	15.0%	63.0%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		41.5	41.5	8.5	56.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		32.0			32.0	32.0		43.0	43.0	57.5	58.0	
Actuated g/C Ratio		0.32			0.32	0.32		0.43	0.43	0.58	0.58	
v/c Ratio		0.47			0.32	0.37		0.56	0.49	0.36	0.37	
Control Delay		28.3			39.2	19.1		22.7	14.5	16.3	8.7	
Queue Delay		0.0			0.0	0.0		0.1	0.0	0.0	0.1	
Total Delay		28.3			39.2	19.1		22.7	14.5	16.3	8.8	
LOS		C			D	B		C	B	B	A	
Approach Delay		28.3			33.7			21.3			9.5	
Approach LOS		C			C			C			A	
Queue Length 50th (ft)		117			100	48		193	53	22	71	
Queue Length 95th (ft)		153			135	92		238	126	37	84	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1373			1378	444		2040	486	286	2603	
Starvation Cap Reductn		0			0	0		0	0	0	503	
Spillback Cap Reductn		0			0	3		110	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.47			0.32	0.38		0.59	0.49	0.36	0.46	

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 83.3%

ICU Level of Service E

Analysis Period (min) 15


















Splits and Phases: 2: 14th Street SW & Independence Ave SW

↑ Ø2 (R)	↖ Ø1	→ Ø4
48 s	15 s	37 s
↓ Ø6 (R)	↗ Ø8	
63 s	37 s	

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	72	70	0	0	0	0	1133	85	70	919	0
Future Volume (vph)	59	72	70	0	0	0	0	1133	85	70	919	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.58	0.87						0.96		0.93		
Frt		0.926						0.990				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1517	1398	0	0	0	0	0	4771	0	1620	4700	0
Flt Permitted	0.950									0.172		
Satd. Flow (perm)	875	1398	0	0	0	0	0	4771	0	274	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								22				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	855		202	202		855	552		267	267		552
Confl. Bikes (#/hr)			96						17			17
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	19%	15%	3%	0%	0%	0%	0%	3%	6%	4%	3%	0%
Adj. Flow (vph)	62	76	74	0	0	0	0	1193	89	74	967	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	150	0	0	0	0	0	1282	0	74	967	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5	
Total Split (s)	35.0	35.0						65.0		65.0	65.0	
Total Split (%)	35.0%	35.0%						65.0%		65.0%	65.0%	
Maximum Green (s)	28.5	28.5						59.5		59.5	59.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0						10.0		10.0	10.0	

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	65.0
Total Split (%)	65%
Maximum Green (s)	59.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	18.0	18.0						5.0		5.0	5.0	
Pedestrian Calls (#/hr)	0	0						0		0	0	
Act Effct Green (s)	30.0	30.0						61.0		61.0	61.0	
Actuated g/C Ratio	0.30	0.30						0.61		0.61	0.61	
v/c Ratio	0.24	0.36						0.44		0.44	0.34	
Control Delay	29.4	30.5						5.9		20.9	10.0	
Queue Delay	0.0	0.0						0.5		0.0	0.0	
Total Delay	29.4	30.5						6.4		20.9	10.0	
LOS	C	C						A		C	A	
Approach Delay		30.2						6.4			10.8	
Approach LOS		C						A			B	
Queue Length 50th (ft)	30	75						224		23	102	
Queue Length 95th (ft)	65	131						243		69	127	
Internal Link Dist (ft)		177			988			297			261	
Turn Bay Length (ft)										170		
Base Capacity (vph)	262	419						2918		167	2867	
Starvation Cap Reductn	0	0						1071		0	0	
Spillback Cap Reductn	0	0						0		0	0	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.24	0.36						0.69		0.44	0.34	

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 31 (31%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 66.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: 14th Street SW & SW Jefferson Drive

↓↑ Ø2 (R)	65 s	→ Ø4	35 s
↖↗ Ø6 (R)	65 s		

Lanes, Volumes, Timings  
 4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive



















10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗					↖
Traffic Volume (vph)	186	28	0	0	0	45
Future Volume (vph)	186	28	0	0	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.982					0.865
Flt Protected						
Satd. Flow (prot)	1846	0	0	0	0	1587
Flt Permitted						
Satd. Flow (perm)	1846	0	0	0	0	1587
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		320				
Confl. Bikes (#/hr)		87				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	9%	0%	2%	2%	0%	7%
Adj. Flow (vph)	216	33	0	0	0	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	249	0	0	0	0	52
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.3%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	25	44	698	69	52	479	30	83	73	9	120	147
Future Volume (vph)	25	44	698	69	52	479	30	83	73	9	120	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	11	11	11
Storage Length (ft)		0		0	0		100			0		0
Storage Lanes		0		0	1		1			1		1
Taper Length (ft)		100			100					100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.86	0.86	0.91	0.91	1.00	1.00	0.95	0.95
Ped Bike Factor			0.95		0.89	0.86				0.67	0.99	0.97
Frt			0.988			0.972					0.976	0.850
Flt Protected			0.996		0.950					0.950		
Satd. Flow (prot)	0	0	4608	0	1449	3818	0	0	0	1745	1680	1483
Flt Permitted			0.807		0.950	0.935				0.950		
Satd. Flow (perm)	0	0	3648	0	1292	3568	0	0	0	1170	1680	1432
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			19			48					9	44
Link Speed (mph)			35			35					30	
Link Distance (ft)			1104			603					153	
Travel Time (s)			21.5			11.7					3.5	
Confl. Peds. (#/hr)	186	186		299	299		186	186	372			19
Confl. Bikes (#/hr)				18			20	20				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	27	47	751	74	56	515	32	89	78	10	129	158
Shared Lane Traffic (%)					10%							15%
Lane Group Flow (vph)	0	0	899	0	50	642	0	0	0	88	153	134
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			0			10					56	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			30			25					28	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	15		9	15		9	9	15	15		9
Turn Type	Perm	Perm	NA		Prot	NA			custom	custom	NA	custom
Protected Phases			6		5	2					4	5
Permitted Phases	6	6							4 8	4 8	8	4 8
Minimum Split (s)	20.0	20.0	20.0		12.5	63.0					37.0	12.5
Total Split (s)	50.5	50.5	50.5		12.5	63.0					37.0	12.5
Total Split (%)	50.5%	50.5%	50.5%		12.5%	63.0%					37.0%	12.5%
Maximum Green (s)	43.5	43.5	43.5		6.0	56.5					26.5	6.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0					4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		2.5	2.5					6.5	2.5
Lost Time Adjust (s)			-1.5		-1.5	-1.5					-1.5	-1.5
Total Lost Time (s)			5.5		5.0	5.0					9.0	5.0
Lead/Lag	Lead	Lead	Lead		Lag							Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							Yes
Walk Time (s)	7.0	7.0	7.0			7.0					4.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

Lane Group	SEL2	SEL	SER	SER2	Ø8
Lane Configurations					
Traffic Volume (vph)	1	16	9	19	
Future Volume (vph)	1	16	9	19	
Ideal Flow (vphpl)	1900	1900	1900	1900	
Lane Width (ft)	10	13	10	10	
Storage Length (ft)		0	0		
Storage Lanes		1	0		
Taper Length (ft)		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.78			
Frt		0.916			
Flt Protected		0.982			
Satd. Flow (prot)	0	1396	0	0	
Flt Permitted		0.982			
Satd. Flow (perm)	0	1384	0	0	
Right Turn on Red				Yes	
Satd. Flow (RTOR)		115			
Link Speed (mph)		30			
Link Distance (ft)		401			
Travel Time (s)		9.1			
Confl. Peds. (#/hr)		19		372	
Confl. Bikes (#/hr)				2	
Peak Hour Factor	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	0%	0%	
Adj. Flow (vph)	1	17	10	20	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	48	0	0	
Enter Blocked Intersection	No	No	No	No	
Lane Alignment	Left	Left	Right	Right	
Median Width(ft)		13			
Link Offset(ft)		40			
Crosswalk Width(ft)		8			
Two way Left Turn Lane					
Headway Factor	1.09	0.96	1.09	1.09	
Turning Speed (mph)	15	15	9	9	
Turn Type	D.Pm	D.Pm			
Protected Phases					8
Permitted Phases	4 8	4 8			
Minimum Split (s)					37.0
Total Split (s)					37.0
Total Split (%)					37%
Maximum Green (s)					30.5
Yellow Time (s)					4.0
All-Red Time (s)					2.5
Lost Time Adjust (s)					
Total Lost Time (s)					
Lead/Lag					
Lead-Lag Optimize?					
Walk Time (s)					

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

	↗	↘	→	↖	↙	←	↗	↘	↖	↙	↑	↗
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Flash Dont Walk (s)	6.0	6.0	6.0			4.0					21.0	
Pedestrian Calls (#/hr)	0	0	0			0					0	
Act Effect Green (s)			45.0		7.5	58.0				28.0	28.0	39.5
Actuated g/C Ratio			0.45		0.08	0.58				0.28	0.28	0.40
v/c Ratio			0.54		0.46	0.89dr				0.27	0.32	0.22
Control Delay			13.0		64.5	18.3				13.9	12.2	2.7
Queue Delay			0.0		0.0	0.0				2.9	3.0	0.8
Total Delay			13.0		64.5	18.3				16.9	15.2	3.5
LOS			B		E	B				B	B	A
Approach Delay			13.0			21.6					11.4	
Approach LOS			B			C					B	
Queue Length 50th (ft)			65		36	55				44	75	5
Queue Length 95th (ft)			87		79	91				87	134	58
Internal Link Dist (ft)			1024			523					73	
Turn Bay Length (ft)												
Base Capacity (vph)			1652		108	1199				327	476	596
Starvation Cap Reductn			0		0	0				160	231	258
Spillback Cap Reductn			0		0	0				0	0	0
Storage Cap Reductn			0		0	0				0	0	0
Reduced v/c Ratio			0.54		0.46	0.54				0.53	0.62	0.40

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 96 (96%), Referenced to phase 2: WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 15.4

Intersection LOS: B

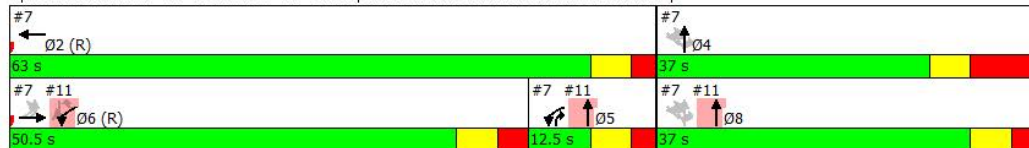
Intersection Capacity Utilization 93.5%

ICU Level of Service F

Analysis Period (min) 15

dr Defacto Right Lane. Recode with 1 though lane as a right lane.





Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp



# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

					
Lane Group	SEL2	SEL	SER	SER2	Ø8
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
Act Effect Green (s)		28.0			
Actuated g/C Ratio		0.28			
v/c Ratio		0.10			
Control Delay		0.9			
Queue Delay		0.0			
Total Delay		0.9			
LOS		A			
Approach Delay		0.9			
Approach LOS		A			
Queue Length 50th (ft)		0			
Queue Length 95th (ft)		3			
Internal Link Dist (ft)		321			
Turn Bay Length (ft)					
Base Capacity (vph)		470			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			
Storage Cap Reductn		0			
Reduced v/c Ratio		0.10			
Intersection Summary					

# Lanes, Volumes, Timings

## 9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↖	↗	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations	↑↑↑			↑↑↑	↖	↗	
Traffic Volume (vph)	833	28	36	618	26	59	
Future Volume (vph)	833	28	36	618	26	59	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.91	0.91	1.00	1.00	
Ped Bike Factor	0.98			0.99	0.70		
Frt	0.995					0.850	
Flt Protected				0.997	0.950		
Satd. Flow (prot)	5812	0	0	4624	1404	1396	
Flt Permitted				0.858	0.950		
Satd. Flow (perm)	5812	0	0	3953	979	1396	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	8					58	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		299	299		250		
Confl. Bikes (#/hr)		14					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	11%	11%	4%	20%	8%	
Adj. Flow (vph)	886	30	38	657	28	63	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	916	0	0	695	28	63	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		1	6	4	1	3
Permitted Phases			6			4	
Minimum Split (s)	20.5		10.0	16.5	30.0	10.0	4.0
Total Split (s)	49.5		16.5	66.0	30.0	16.5	4.0
Total Split (%)	49.5%		16.5%	66.0%	30.0%	16.5%	4%
Maximum Green (s)	43.0		11.5	59.5	24.5	11.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag	Lag		Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Walk Time (s)	10.0				6.0		
Flash Dont Walk (s)	4.0				18.0		

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		
Act Effct Green (s)	44.5			61.0	25.5	42.5	
Actuated g/C Ratio	0.44			0.61	0.26	0.42	
v/c Ratio	0.35			0.28	0.08	0.10	
Control Delay	7.9			11.2	29.2	5.8	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	7.9			11.2	29.2	5.8	
LOS	A			B	C	A	
Approach Delay	7.9			11.2	13.0		
Approach LOS	A			B	B		
Queue Length 50th (ft)	33			102	14	2	
Queue Length 95th (ft)	40			126	36	26	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2590			2488	358	626	
Starvation Cap Reductn	0			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.35			0.28	0.08	0.10	

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 10 (10%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 9.5

Intersection LOS: A

Intersection Capacity Utilization 43.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

--	--

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗					↑↑↑			↓↓↓	
Traffic Volume (vph)	90	74	56	0	0	0	0	463	50	46	337	0
Future Volume (vph)	90	74	56	0	0	0	0	463	50	46	337	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		50
Storage Lanes	1		1	0		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.74		0.53					0.93			0.96	
Frt			0.850					0.985				
Flt Protected	0.950										0.994	
Satd. Flow (prot)	1631	1652	1561	0	0	0	0	4351	0	0	5889	0
Flt Permitted	0.950										0.839	
Satd. Flow (perm)	1202	1652	825	0	0	0	0	4351	0	0	4770	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			57									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	228		956	956		228	485		412	412		485
Confl. Bikes (#/hr)			45									20
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	15%	0%	0%	0%	0%	0%	4%	22%	4%	7%	0%
Adj. Flow (vph)	92	76	57	0	0	0	0	472	51	47	344	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	76	57	0	0	0	0	523	0	0	391	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					67.5		67.5	67.5	
Total Split (%)	32.5%	32.5%	32.5%					67.5%		67.5%	67.5%	
Maximum Green (s)	26.0	26.0	26.0					61.5		61.5	61.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	28.5
Total Split (s)	67.5	32.5
Total Split (%)	68%	33%
Maximum Green (s)	61.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	7.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↗	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effct Green (s)	27.5	27.5	27.5					63.0			63.0	
Actuated g/C Ratio	0.28	0.28	0.28					0.63			0.63	
v/c Ratio	0.28	0.17	0.21					0.19			0.13	
Control Delay	33.0	30.7	12.6					2.9			7.6	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	33.0	30.7	12.6					2.9			7.6	
LOS	C	C	B					A			A	
Approach Delay		27.1						2.9			7.6	
Approach LOS		C						A			A	
Queue Length 50th (ft)	45	36	2					13			26	
Queue Length 95th (ft)	92	78	35					17			37	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	330	454	268					2741			3005	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			0	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.28	0.17	0.21					0.19			0.13	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 9.3

Intersection LOS: A

Intersection Capacity Utilization 56.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

↓ 02 (R)	67.5 s	↗ 04	32.5 s
↙ 06 (R)	67.5 s	↘ 08	32.5 s

















Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	349	0	0	0	130	0	0	
Future Volume (vph)	0	0	0	0	349	0	0	0	130	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	379	0	0	0	141	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	379	0	0	0	141	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			63.0
Total Split (s)	50.5		50.5						50.5			63.0
Total Split (%)	50.5%		50.5%						50.5%			63%
Maximum Green (s)	43.5		43.5						43.5			56.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					44.5				43.5			
Actuated g/C Ratio					0.44				0.44			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Turn Type			
Protected Phases	4	5	8
Permitted Phases			
Minimum Split (s)	37.0	12.5	37.0
Total Split (s)	37.0	12.5	37.0
Total Split (%)	37%	13%	37%
Maximum Green (s)	26.5	6.0	30.5
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	6.5	2.5	2.5
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag		Lag	
Lead-Lag Optimize?		Yes	
Walk Time (s)	4.0		
Flash Dont Walk (s)	21.0		
Pedestrian Calls (#/hr)	0		
Act Effct Green (s)			
Actuated g/C Ratio			

# Lanes, Volumes, Timings 11: 12th Street SW

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↖	↗	↘
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2		
v/c Ratio					0.18				0.06					
Control Delay					17.0				0.1					
Queue Delay					0.0				0.7					
Total Delay					17.0				0.7					
LOS					B				A					
Approach Delay					17.0			0.7						
Approach LOS					B			A						
Queue Length 50th (ft)					52				0					
Queue Length 95th (ft)					72				0					
Internal Link Dist (ft)		132			189			73		90				
Turn Bay Length (ft)														
Base Capacity (vph)					2111				2216					
Starvation Cap Reductn					0				1804					
Spillback Cap Reductn					153				0					
Storage Cap Reductn					0				0					
Reduced v/c Ratio					0.19				0.34					

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 96 (96%), Referenced to phase 2: WBT and 6 EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 12.6

Intersection LOS: B

Intersection Capacity Utilization 14.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: 12th Street SW

#7 Ø2 (R) 63 s						#7 Ø4 37 s					
#7 #11 Ø6 (R) 50.5 s						#7 #11 Ø5 12.5 s					#7 #11 Ø8 37 s

Lanes, Volumes, Timings  
11: 12th Street SW


















10/20/2017

Lane Group	Ø4	Ø5	Ø8
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	804	88	107	645	0	11	9	0	1	0	0
Future Volume (vph)	0	804	88	107	645	0	11	9	0	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0		0		0	0	
Storage Lanes	0		1	0		0		0		1	0	
Taper Length (ft)	100			100				100			25	
Lane Util. Factor	0.86	0.86	0.86	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.99				0.94			
Frt		0.985								0.850		
Flt Protected					0.993				0.950			
Satd. Flow (prot)	0	5709	0	0	4648	0	0	0	1685	1507	0	1773
Flt Permitted					0.704				0.757			
Satd. Flow (perm)	0	5709	0	0	3267	0	0	0	1265	1507	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		31								153		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)			156	156				58				
Confl. Bikes (#/hr)			9			6						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	838	92	111	672	0	11	9	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	930	0	0	783	0	0	0	20	1	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6			8	8			8	
Minimum Split (s)	29.5	29.5		10.5	25.5		35.5	35.5	35.5	10.5	35.5	35.5
Total Split (s)	47.5	47.5		12.0	59.5		35.5	35.5	35.5	12.0	35.5	35.5
Total Split (%)	47.5%	47.5%		12.0%	59.5%		35.5%	35.5%	35.5%	12.0%	35.5%	35.5%
Maximum Green (s)	38.0	38.0		6.5	54.0		30.0	30.0	30.0	6.5	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0		10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW













10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Ped Bike Factor		
Fr t		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	58	
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		39.5			54.0			30.0	6.5			
Actuated g/C Ratio		0.40			0.54			0.30	0.06			
v/c Ratio		0.41			0.42			0.05	0.00			
Control Delay		8.0			10.2			25.6	0.0			
Queue Delay		0.0			0.0			0.0	0.0			
Total Delay		8.0			10.2			25.6	0.0			
LOS		A			B			C	A			
Approach Delay		8.0			10.2			24.4				
Approach LOS		A			B			C				
Queue Length 50th (ft)		132			60			9	0			
Queue Length 95th (ft)		138			73			27	0			
Internal Link Dist (ft)		460			526			486			225	
Turn Bay Length (ft)												
Base Capacity (vph)		2273			1853			379	241			
Starvation Cap Reductn		0			0			0	0			
Spillback Cap Reductn		0			0			0	0			
Storage Cap Reductn		0			0			0	0			
Reduced v/c Ratio		0.41			0.42			0.05	0.00			

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 9.2

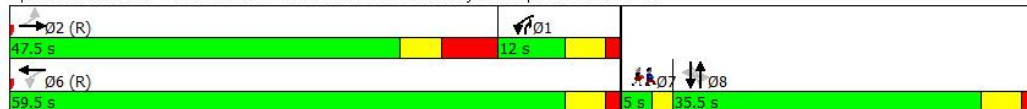
Intersection LOS: A

Intersection Capacity Utilization 72.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	609	55	11	559	158	54	214	24	102	152	139
Future Volume (vph)	141	609	55	11	559	158	54	214	24	102	152	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		75	0		0	80		0	0		50
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.97			0.93		0.84	0.97		0.80	0.88	
Frt		0.990			0.967			0.985			0.928	
Flt Protected		0.991			0.999		0.950			0.950		
Satd. Flow (prot)	0	5677	0	0	5203	0	1616	4636	0	1646	3900	0
Flt Permitted		0.726			0.914		0.562			0.526		
Satd. Flow (perm)	0	4091	0	0	4756	0	805	4636	0	729	3900	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		23			85						143	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	278		181	181		278	207		248	248		207
Confl. Bikes (#/hr)			12			15			15			11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	7%	3%	4%	0%	4%	10%	8%	3%	4%	6%	7%	3%
Adj. Flow (vph)	145	628	57	11	576	163	56	221	25	105	157	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	830	0	0	750	0	56	246	0	105	300	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	57.0		46.0	46.0		32.5	32.5		10.5	43.0	
Total Split (%)	11.0%	57.0%		46.0%	46.0%		32.5%	32.5%		10.5%	43.0%	
Maximum Green (s)	5.5	50.5		39.5	39.5		26.0	26.0		5.5	36.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		52.0			41.0		27.5	27.5		39.5	38.0	
Actuated g/C Ratio		0.52			0.41		0.28	0.28		0.40	0.38	
v/c Ratio		0.37			0.38		0.25	0.19		0.30	0.19	
Control Delay		1.2			18.7		32.1	28.3		20.6	9.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		1.2			18.7		32.1	28.3		20.6	9.3	
LOS		A			B		C	C		C	A	
Approach Delay		1.2			18.7			29.0			12.2	
Approach LOS		A			B			C			B	
Queue Length 50th (ft)		6			83		28	43		35	16	
Queue Length 95th (ft)		14			109		63	66		66	29	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2233			2000		221	1274		352	1570	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.37			0.38		0.25	0.19		0.30	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 51 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 12.6

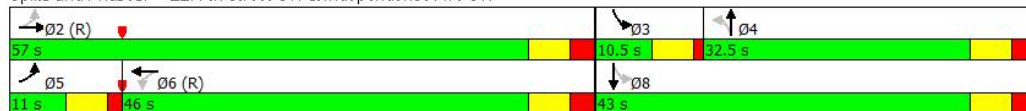
Intersection LOS: B

Intersection Capacity Utilization 83.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 22: 7th Street SW & Independence Ave SW















Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	6	759	45	24	1593	187	0	1822	554	297	2353	33
Future Volume (vph)	6	759	45	24	1593	187	0	1822	554	297	2353	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.98			1.00	0.89			0.92		1.00	
Frt		0.992				0.850			0.850		0.998	
Flt Protected					0.999					0.950		
Satd. Flow (prot)	0	4769	0	0	4644	1311	0	4793	1478	1589	4734	0
Flt Permitted		0.792			0.874					0.075		
Satd. Flow (perm)	0	3777	0	0	4059	1167	0	4793	1365	125	4734	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				160			99			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	73		250	250		73	33		49	49		33
Confl. Bikes (#/hr)			3			29			2			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Adj. Flow (vph)	7	843	50	27	1770	208	0	2024	616	330	2614	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	1797	208	0	2024	616	330	2651	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0	73.0	
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%	66.4%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		46.5	46.5	13.5	66.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		32.0			32.0	32.0		48.0	48.0	67.5	68.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**













10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.61	0.62	
v/c Ratio		0.82			1.52	0.46		0.97	0.95	1.23	0.91	
Control Delay		43.4			257.8	3.2		44.2	50.4	151.1	14.9	
Queue Delay		0.0			0.0	0.1		42.6	0.0	0.0	1.2	
Total Delay		43.4			257.8	3.2		86.8	50.4	151.1	16.1	
LOS		D			F	A		F	D	F	B	
Approach Delay		43.4			231.4			78.3			31.1	
Approach LOS		D			F			E			C	
Queue Length 50th (ft)		215			~662	9		499	359	~237	235	
Queue Length 95th (ft)		270			m#384	m0		#623	#608	m#340	m327	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)												
Base Capacity (vph)		1100			1180	452		2091	651	269	2926	
Starvation Cap Reductn		0			0	0		0	0	0	121	
Spillback Cap Reductn		0			0	12		374	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.82			1.52	0.47		1.18	0.95	1.23	0.95	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 107 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 110  
 Control Type: Pretimed  
 Maximum v/c Ratio: 1.52  
 Intersection Signal Delay: 94.1  
 Intersection LOS: F  
 Intersection Capacity Utilization 112.2%  
 ICU Level of Service H  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 14th Street SW & Independence Ave SW

					
Ø2 (R)			Ø1		Ø4
53 s			20 s		37 s
					
Ø6 (R)				Ø8	
73 s				37 s	

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017






















	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖						↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	59	118	306	0	0	0	0	1911	104	49	2377	0
Future Volume (vph)	59	118	306	0	0	0	0	1911	104	49	2377	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.65	0.83						0.97				
Frt		0.892						0.992				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1597	1352	0	0	0	0	0	4813	0	1636	4700	0
Flt Permitted	0.950									0.058		
Satd. Flow (perm)	1034	1352	0	0	0	0	0	4813	0	100	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								14				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	477		150	150		477	149		196	196		149
Confl. Bikes (#/hr)			95						16			9
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	13%	9%	2%	0%	0%	0%	0%	4%	1%	3%	3%	0%
Adj. Flow (vph)	60	119	309	0	0	0	0	1930	105	49	2401	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	428	0	0	0	0	0	2035	0	49	2401	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5	
Total Split (s)	37.0	37.0						73.0		73.0	73.0	
Total Split (%)	33.6%	33.6%						66.4%		66.4%	66.4%	
Maximum Green (s)	30.5	30.5						67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0						10.0		10.0	10.0	

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	73.0
Total Split (%)	66%
Maximum Green (s)	67.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0

10/20/2017

                             	                             	                             	                             	     
---	---	---	---	---

Lanes, Volumes, Timings  
 4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗					↖
Traffic Volume (vph)	204	68	0	0	0	17
Future Volume (vph)	204	68	0	0	0	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.966					0.865
Flt Protected						
Satd. Flow (prot)	1860	0	0	0	0	1698
Flt Permitted						
Satd. Flow (perm)	1860	0	0	0	0	1698
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		136	136		324	
Confl. Bikes (#/hr)		118				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%
Adj. Flow (vph)	255	85	0	0	0	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	340	0	0	0	0	21
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 26.6%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Lane Configurations	↑↑↑		↙	↑↑↑				↘	↑	↘	↙	
Traffic Volume (vph)	1572	38	427	1675	2	206	118	1	256	383	18	25
Future Volume (vph)	1572	38	427	1675	2	206	118	1	256	383	18	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	11	11	11	13	10
Lane Util. Factor	0.86	0.86	0.86	0.86	0.91	0.91	1.00	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00	0.94				0.90	0.92	0.66	0.82	
Frt	0.996			0.984					0.963	0.850	0.910	
Flt Protected			0.950	0.999				0.950			0.984	
Satd. Flow (prot)	5893	0	1393	4059	0	0	0	1678	1479	1426	1232	0
Flt Permitted			0.950	0.803				0.950			0.984	
Satd. Flow (perm)	5893	0	1391	3263	0	0	0	1514	1479	943	1096	0
Right Turn on Red		Yes				Yes				Yes		
Satd. Flow (RTOR)	4								15	40	104	
Link Speed (mph)	35			35					30		30	
Link Distance (ft)	1104			603					153		401	
Travel Time (s)	21.5			11.7					3.5		9.1	
Conf. Peds. (#/hr)		8	8		74	74	74			350	350	
Conf. Bikes (#/hr)		21			20	20				5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%	40%
Adj. Flow (vph)	1747	42	474	1861	2	229	131	1	284	426	20	28
Shared Lane Traffic (%)			10%							22%		
Lane Group Flow (vph)	1789	0	427	2139	0	0	0	132	378	332	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right	Left	Right
Median Width(ft)	0			10					56		13	
Link Offset(ft)	0			0					0		40	
Crosswalk Width(ft)	30			25					28		8	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	0.96	1.09
Turning Speed (mph)		9	15		9	9	15	15		9	15	9
Turn Type	NA		Prot	NA			custom	custom	NA	custom	D.Pm	
Protected Phases	6		5	2					4	5		
Permitted Phases							4 8	4 8	8	4 8	4 8	
Minimum Split (s)	20.0		29.5	72.0					38.0	29.5		
Total Split (s)	42.5		29.5	72.0					38.0	29.5		
Total Split (%)	38.6%		26.8%	65.5%					34.5%	26.8%		
Maximum Green (s)	35.5		23.0	65.5					27.5	23.0		
Yellow Time (s)	4.0		4.0	4.0					4.0	4.0		
All-Red Time (s)	3.0		2.5	2.5					6.5	2.5		
Lost Time Adjust (s)	-1.5		-1.5	-1.5					-1.5	-1.5		
Total Lost Time (s)	5.5		5.0	5.0					9.0	5.0		
Lead/Lag	Lead		Lag							Lag		
Lead-Lag Optimize?	Yes		Yes							Yes		
Walk Time (s)	7.0			7.0					4.0			
Flash Dont Walk (s)	6.0			4.0					21.0			
Pedestrian Calls (#/hr)	0			0					0			
Act Effect Green (s)	37.0		24.5	67.0				29.0	29.0	57.5	29.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017



Lane Group	SER2	Ø8
Lane Configurations		
Traffic Volume (vph)	11	
Future Volume (vph)	11	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	73	
Confl. Bikes (#/hr)	9	
Peak Hour Factor	0.90	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	12	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	8	
Permitted Phases		
Minimum Split (s)	38.0	
Total Split (s)	38.0	
Total Split (%)	35%	
Maximum Green (s)	31.5	
Yellow Time (s)	4.0	
All-Red Time (s)	2.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effect Green (s)		

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

	→	↘	↙	←	↖	↗	↘	↙	↑	↗	↘	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SEL	SER
Actuated g/C Ratio	0.34		0.22	0.61				0.26	0.26	0.52	0.26	
v/c Ratio	0.90		1.38	1.46				0.33	0.94	0.54	0.16	
Control Delay	35.1		212.5	231.7				23.2	60.5	5.1	3.8	
Queue Delay	0.0		0.2	0.0				7.7	16.6	0.3	0.0	
Total Delay	35.1		212.8	231.7				30.9	77.1	5.5	3.8	
LOS	D		F	F				C	E	A	A	
Approach Delay	35.1			228.6					41.6		3.8	
Approach LOS	D			F					D		A	
Queue Length 50th (ft)	357		~460	~793				75	266	18	0	
Queue Length 95th (ft)	m375		m#623	#901				132	#467	57	m2	
Internal Link Dist (ft)	1024			523					73		321	
Turn Bay Length (ft)												
Base Capacity (vph)	1984		310	1469				399	400	619	365	
Starvation Cap Reductn	0		0	0				222	30	53	0	
Spillback Cap Reductn	0		6	6				0	0	0	3	
Storage Cap Reductn	0		0	0				0	0	0	0	
Reduced v/c Ratio	0.90		1.40	1.46				0.75	1.02	0.59	0.17	

### Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 140

Control Type: Pretimed

Maximum v/c Ratio: 1.46

Intersection Signal Delay: 130.2

Intersection LOS: F

Intersection Capacity Utilization 127.0%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

#7 ← Ø2 (R) 72 s	#7 ↑ Ø4 38 s
#7 #11 → Ø6 (R) 42.5 s	#7 #11 ↖ Ø5 29.5 s
#7 #11 ↗ Ø8 38 s	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017



Lane Group	SER2	Ø8
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↖	↗	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations					↖	↗	
Traffic Volume (vph)	1898	75	62	2025	285	86	
Future Volume (vph)	1898	75	62	2025	285	86	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.86	0.86	1.00	1.00	
Ped Bike Factor	1.00				0.73		
Frt	0.994					0.850	
Flt Protected				0.999	0.950		
Satd. Flow (prot)	5858	0	0	5860	1685	1507	
Flt Permitted				0.748	0.950		
Satd. Flow (perm)	5858	0	0	4387	1226	1507	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	10					42	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		26	26		198		
Confl. Bikes (#/hr)		18					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Adj. Flow (vph)	2086	82	68	2225	313	95	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	2168	0	0	2293	313	95	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	60.5		15.5	60.5	30.0	15.5	4.0
Total Split (%)	55.0%		14.1%	55.0%	27.3%	14.1%	4%
Maximum Green (s)	54.0		10.5	54.0	24.5	10.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Walk Time (s)	10.0				6.0	0.0	
Flash Dont Walk (s)	4.0				18.0	2.0	

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		0
Act Effct Green (s)	55.5			66.0	25.5	41.5	
Actuated g/C Ratio	0.50			0.60	0.23	0.38	
v/c Ratio	0.73			0.83	0.80	0.16	
Control Delay	24.8			18.2	56.7	14.1	
Queue Delay	0.3			0.0	0.0	0.0	
Total Delay	25.1			18.2	56.7	14.1	
LOS	C			B	E	B	
Approach Delay	25.1			18.2	46.8		
Approach LOS	C			B	D		
Queue Length 50th (ft)	445			251	209	24	
Queue Length 95th (ft)	m484			284	#347	60	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2960			2772	390	594	
Starvation Cap Reductn	269			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.81			0.83	0.80	0.16	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 110  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 23.7 Intersection LOS: C  
 Intersection Capacity Utilization 87.0% ICU Level of Service E  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

→ Ø2 (R)	60.5 s	↘ Ø4	30 s	↗ Ø9	15.5 s
← Ø6 (R)	60.5 s				

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗					↑↑↑			↓↓↓	
Traffic Volume (vph)	53	81	100	0	0	0	0	600	26	29	1167	0
Future Volume (vph)	53	81	100	0	0	0	0	600	26	29	1167	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.83		0.64					0.97			0.99	
Frt			0.850					0.994				
Flt Protected	0.950										0.999	
Satd. Flow (prot)	1711	1652	1546	0	0	0	0	4465	0	0	5793	0
Flt Permitted	0.950										0.901	
Satd. Flow (perm)	1415	1652	993	0	0	0	0	4465	0	0	5194	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			30									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	136		262	262		136	454		293	293		545
Confl. Bikes (#/hr)			104						31			16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	15%	1%	0%	0%	0%	0%	9%	0%	47%	8%	0%
Adj. Flow (vph)	55	84	103	0	0	0	0	619	27	30	1203	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	84	103	0	0	0	0	646	0	0	1233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					77.5		77.5	77.5	
Total Split (%)	29.5%	29.5%	29.5%					70.5%		70.5%	70.5%	
Maximum Green (s)	26.0	26.0	26.0					71.5		71.5	71.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	31.5
Total Split (s)	77.5	32.5
Total Split (%)	70%	30%
Maximum Green (s)	71.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	10.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effct Green (s)	27.5	27.5	27.5					73.0			73.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.66			0.66	
v/c Ratio	0.16	0.20	0.38					0.22			0.36	
Control Delay	31.2	31.4	25.7					5.6			8.5	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	31.2	31.4	25.7					5.6			8.5	
LOS	C	C	C					A			A	
Approach Delay		28.9						5.6			8.5	
Approach LOS		C						A			A	
Queue Length 50th (ft)	29	45	39					59			101	
Queue Length 95th (ft)	m44	m66	m65					m65			120	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	353	413	270					2963			3446	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			0	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.16	0.20	0.38					0.22			0.36	

## Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

↑↓ Ø2 (R)	↔ Ø4
77.5 s	32.5 s
↔ Ø6 (R)	↔ Ø8
77.5 s	32.5 s
















Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	758	0	0	0	490	0	0	
Future Volume (vph)	0	0	0	0	758	0	0	0	490	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	824	0	0	0	533	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	824	0	0	0	533	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			72.0
Total Split (s)	42.5		42.5						42.5			72.0
Total Split (%)	38.6%		38.6%						38.6%			65%
Maximum Green (s)	35.5		35.5						35.5			65.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					62.5				35.5			
Actuated g/C Ratio					0.57				0.32			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Turn Type			
Protected Phases	4	5	8
Permitted Phases			
Minimum Split (s)	38.0	29.5	38.0
Total Split (s)	38.0	29.5	38.0
Total Split (%)	35%	27%	35%
Maximum Green (s)	27.5	23.0	31.5
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	6.5	2.5	2.5
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag		Lag	
Lead-Lag Optimize?		Yes	
Walk Time (s)	4.0		
Flash Dont Walk (s)	21.0		
Pedestrian Calls (#/hr)	0		
Act Effct Green (s)			
Actuated g/C Ratio			

**Lanes, Volumes, Timings**  
**11: 12th Street SW**

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↖	↗	↘
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2		
v/c Ratio					0.31				0.25					
Control Delay					12.8				1.7					
Queue Delay					0.0				12.8					
Total Delay					12.8				14.6					
LOS					B				B					
Approach Delay					12.8			14.6						
Approach LOS					B			B						
Queue Length 50th (ft)					105				9					
Queue Length 95th (ft)					131				m0					
Internal Link Dist (ft)		132			189			73		90				
Turn Bay Length (ft)														
Base Capacity (vph)					2696				2139					
Starvation Cap Reductn					0				1582					
Spillback Cap Reductn					393				0					
Storage Cap Reductn					0				0					
Reduced v/c Ratio					0.36				0.96					

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 4 (4%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 140

Control Type: Pretimed

Maximum v/c Ratio: 1.46

Intersection Signal Delay: 13.5

Intersection LOS: B

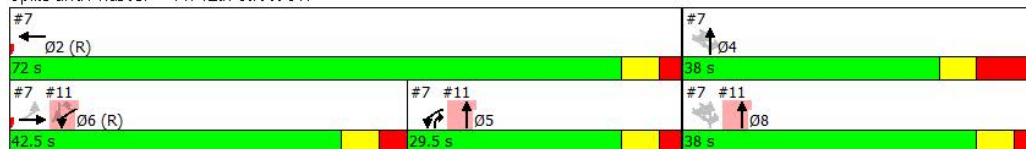
Intersection Capacity Utilization 23.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW



Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↖	↖	↑	↗	↘	↓
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		← ↑ →			← ↑ →				↑	↗		↓
Traffic Volume (vph)	0	1931	53	46	1850	0	32	237	0	229	0	0
Future Volume (vph)	0	1931	53	46	1850	0	32	237	0	229	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00				0.80			
Frt		0.996								0.850		
Flt Protected					0.999				0.950			
Satd. Flow (prot)	0	5923	0	0	5921	0	0	0	1627	1492	0	1773
Flt Permitted					0.792				0.757			
Satd. Flow (perm)	0	5923	0	0	4693	0	0	0	1032	1492	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		7								239		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	175		134	134		175	85	85				
Confl. Bikes (#/hr)			9			21						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	2%	2%	0%	3%	0%	0%	4%	0%	1%	0%	0%
Adj. Flow (vph)	0	2011	55	48	1927	0	33	247	0	239	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2066	0	0	1975	0	0	0	280	239	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA			Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6				8			8	
Minimum Split (s)	30.5	30.5		10.5	25.5			30.5	30.5	10.5	30.5	30.5
Total Split (s)	53.0	53.0		11.0	64.0			31.0	31.0	11.0	31.0	31.0
Total Split (%)	53.0%	53.0%		11.0%	64.0%			31.0%	31.0%	11.0%	31.0%	31.0%
Maximum Green (s)	43.5	43.5		5.5	58.5			25.5	25.5	5.5	25.5	25.5
Yellow Time (s)	4.0	4.0		4.0	4.0			4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5			1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag				Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes				Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)	10.0	10.0			10.0			20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0			0			0	0		0	0
Act Effct Green (s)		45.0			58.5				25.5	5.5		
Actuated g/C Ratio		0.45			0.58				0.26	0.06		

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW










10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
v/c Ratio		0.77			0.70				1.06	0.78		
Control Delay		25.6			16.6				111.4	24.7		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		25.6			16.6				111.4	24.7		
LOS		C			B				F	C		
Approach Delay		25.6			16.6				71.5			
Approach LOS		C			B				E			
Queue Length 50th (ft)		312			212				~198	0		
Queue Length 95th (ft)		361			246				#359	#110		
Internal Link Dist. (ft)		460			526				486			225
Turn Bay Length (ft)												
Base Capacity (vph)		2669			2812				263	307		
Starvation Cap Reductn		0			0				0	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.77			0.70				1.06	0.78		

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 26.9

Intersection LOS: C

Intersection Capacity Utilization 83.4%

ICU Level of Service E

Analysis Period (min) 15

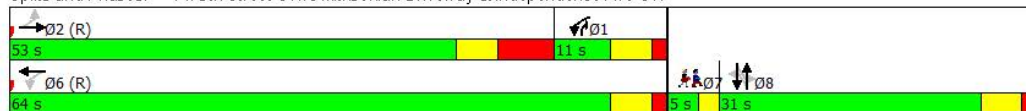
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1673	346	23	1392	152	180	333	141	270	673	324
Future Volume (vph)	141	1673	346	23	1392	152	180	333	141	270	673	324
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		0	0		0	80		0	0		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.95			0.97		0.92	0.89		0.84	0.88	
Frt		0.976			0.985			0.955			0.951	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	5532	0	0	5629	0	1662	3966	0	1616	3924	0
Flt Permitted		0.707			0.837		0.269			0.372		
Satd. Flow (perm)	0	3919	0	0	4716	0	431	3966	0	532	3924	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		5			27						126	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	219		222	222		219	429		444	444		429
Confl. Bikes (#/hr)			7			9			18			17
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	4%	2%	2%	11%	2%	15%	5%	6%	10%	8%	9%	4%
Parking (#/hr)												0
Adj. Flow (vph)	144	1707	353	23	1420	155	184	340	144	276	687	331
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2204	0	0	1598	0	184	484	0	276	1018	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	60.0		49.0	49.0		36.5	36.5		13.5	50.0	
Total Split (%)	10.0%	54.5%		44.5%	44.5%		33.2%	33.2%		12.3%	45.5%	
Maximum Green (s)	5.5	53.5		42.5	42.5		30.0	30.0		8.5	43.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		

**Lanes, Volumes, Timings**  
**22: 7th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		55.0			44.0		31.5	31.5		46.5	45.0	
Actuated g/C Ratio		0.50			0.40		0.29	0.29		0.42	0.41	
v/c Ratio		1.08			0.84		1.50	0.43		0.85	0.61	
Control Delay		70.6			34.3		292.0	33.3		64.1	29.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.2	
Total Delay		70.6			34.3		292.0	33.3		64.1	30.0	
LOS		E			C		F	C		E	C	
Approach Delay		70.6			34.3			104.6			37.3	
Approach LOS		E			C			F			D	
Queue Length 50th (ft)		~418			287		~180	101		170	182	
Queue Length 95th (ft)		#541			339		#323	136		#261	229	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2049			1902		123	1135		323	1679	
Starvation Cap Reductn		0			0		0	0		0	128	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.08			0.84		1.50	0.43		0.85	0.66	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 32 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 1.50

Intersection Signal Delay: 57.0

Intersection LOS: E

Intersection Capacity Utilization 107.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.













Queue shown is maximum after two cycles.

Splits and Phases: 22: 7th Street SW & Independence Ave SW

↗ Ø2 (R)	↖ Ø3	↑ Ø4
60 s	13.5 s	36.5 s
↖ Ø5	↘ Ø6 (R)	↓ Ø8
11 s	49 s	50 s

Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	9	670	87	2	543	197	0	1299	275	128	1009	87
Future Volume (vph)	9	670	87	2	543	197	0	1299	275	128	1009	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.95			1.00	0.68			0.65	0.97	0.96	
Frt		0.983				0.850			0.850		0.988	
Flt Protected		0.999								0.950		
Satd. Flow (prot)	0	4590	0	0	4604	1478	0	4746	1463	1589	4466	0
Flt Permitted		0.930			0.937					0.114		
Satd. Flow (perm)	0	4266	0	0	4312	1000	0	4746	955	185	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				186			109		3	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	366		738	738		366	831		426	426		831
Confl. Bikes (#/hr)			14			13						6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	29%	2%	3%	50%	5%	2%	0%	2%	3%	6%	3%	7%
Adj. Flow (vph)	10	720	94	2	584	212	0	1397	296	138	1085	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	824	0	0	586	212	0	1397	296	138	1179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		48.0	48.0	15.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%	37.0%		48.0%	48.0%	15.0%	63.0%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		41.5	41.5	8.5	56.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		32.0			32.0	32.0		43.0	43.0	57.5	58.0	
Actuated g/C Ratio		0.32			0.32	0.32		0.43	0.43	0.58	0.58	
v/c Ratio		0.60			0.42	0.48		0.68	0.63	0.58	0.46	
Control Delay		30.9			37.9	19.0		25.2	20.5	28.8	9.1	
Queue Delay		0.0			0.0	0.1		0.9	0.0	0.0	0.1	
Total Delay		30.9			37.9	19.1		26.1	20.5	28.8	9.2	
LOS		C			D	B		C	C	C	A	
Approach Delay		30.9			32.9			25.1			11.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)		160			138	57		256	89	28	89	
Queue Length 95th (ft)		204			175	m108		309	187	86	101	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1365			1379	446		2040	472	239	2591	
Starvation Cap Reductn		0			0	0		0	0	0	289	
Spillback Cap Reductn		0			0	13		347	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.60			0.42	0.49		0.83	0.63	0.58	0.51	

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 23.5

Intersection LOS: C

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.




















Splits and Phases: 2: 14th Street SW & Independence Ave SW

↑ Ø2 (R)	↘ Ø1	→ Ø4
48 s	15 s	37 s
↓ Ø6 (R)		← Ø8
63 s		37 s

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	73	88	86	0	0	0	0	1401	104	86	1138	0		
Future Volume (vph)	73	88	86	0	0	0	0	1401	104	86	1138	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10		
Storage Length (ft)	0		0	0		0	0		20	170				
Storage Lanes	1		0	0		0	0		0	1				
Taper Length (ft)	100			100			100			100				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00		
Ped Bike Factor	0.53	0.84						0.96		0.96				
Frt		0.926						0.990						
Flt Protected	0.950									0.950				
Satd. Flow (prot)	1517	1357	0	0	0	0	0	4759	0	1620	4700	0		
Flt Permitted	0.950									0.113				
Satd. Flow (perm)	811	1357	0	0	0	0	0	4759	0	186	4700	0		
Right Turn on Red			No			Yes			Yes			Yes		
Satd. Flow (RTOR)								21						
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		257			1068			377			341			
Travel Time (s)		5.8			24.3			8.6			7.8			
Confl. Peds. (#/hr)	1051		248	248		1051	680		329	329		680		
Confl. Bikes (#/hr)			118						25			24		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles (%)	19%	15%	3%	0%	0%	0%	0%	3%	6%	4%	3%	0%		
Adj. Flow (vph)	77	93	91	0	0	0	0	1475	109	91	1198	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	77	184	0	0	0	0	0	1584	0	91	1198	0		
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No		
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right		
Median Width(ft)		15			12			0			10			
Link Offset(ft)		0			15			0			5			
Crosswalk Width(ft)		30			35			37			35			
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09		
Turning Speed (mph)	15		9	15		9	15		9	15		9		
Turn Type	Perm	NA						NA		Perm	NA			
Protected Phases		4						2			2			
Permitted Phases	4									2				
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5			
Total Split (s)	35.0	35.0						65.0		65.0	65.0			
Total Split (%)	35.0%	35.0%						65.0%		65.0%	65.0%			
Maximum Green (s)	28.5	28.5						59.5		59.5	59.5			
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0			
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5			
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5			
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0			
Lead/Lag														
Lead-Lag Optimize?														
Walk Time (s)	10.0	10.0						10.0		10.0	10.0			

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	65.0
Total Split (%)	65%
Maximum Green (s)	59.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0



Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive



















10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗					↖
Traffic Volume (vph)	229	34	0	0	0	55
Future Volume (vph)	229	34	0	0	0	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.982					0.865
Flt Protected						
Satd. Flow (prot)	1846	0	0	0	0	1587
Flt Permitted						
Satd. Flow (perm)	1846	0	0	0	0	1587
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		393				
Confl. Bikes (#/hr)		107				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehides (%)	9%	0%	2%	2%	0%	7%
Adj. Flow (vph)	266	40	0	0	0	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	306	0	0	0	0	64
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 25.4%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	31	54	895	93	74	624	37	102	98	11	147	191
Future Volume (vph)	31	54	895	93	74	624	37	102	98	11	147	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	11	11	11
Storage Length (ft)		0		0	0		100			0		0
Storage Lanes		0		0	1		1			1		1
Taper Length (ft)		100			100					100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.86	0.86	0.91	0.91	1.00	1.00	0.95	0.95
Ped Bike Factor			0.95		0.92	0.85				0.65	0.99	0.96
Frt			0.987			0.973					0.973	0.850
Flt Protected			0.996		0.950					0.950		
Satd. Flow (prot)	0	0	4582	0	1449	3780	0	0	0	1745	1672	1483
Flt Permitted			0.759		0.950	0.930				0.950		
Satd. Flow (perm)	0	0	3433	0	1329	3514	0	0	0	1135	1672	1425
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			20			45					11	44
Link Speed (mph)			35			35					30	
Link Distance (ft)			1104			603					153	
Travel Time (s)			21.5			11.7					3.5	
Confl. Peds. (#/hr)	233	233		370	370		233	233	457			23
Confl. Bikes (#/hr)				27			30	30				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	33	58	962	100	80	671	40	110	105	12	158	205
Shared Lane Traffic (%)					10%							17%
Lane Group Flow (vph)	0	0	1153	0	72	829	0	0	0	117	193	170
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			0			10					56	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			30			25					28	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	15		9	15		9	9	15	15		9
Turn Type	Perm	Perm	NA		Prot	NA			custom	custom	NA	custom
Protected Phases			6		5	2					4	5
Permitted Phases	6	6							4 8	4 8	8	4 8
Minimum Split (s)	20.0	20.0	20.0		12.5	63.0					37.0	12.5
Total Split (s)	50.5	50.5	50.5		12.5	63.0					37.0	12.5
Total Split (%)	50.5%	50.5%	50.5%		12.5%	63.0%					37.0%	12.5%
Maximum Green (s)	43.5	43.5	43.5		6.0	56.5					26.5	6.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0					4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		2.5	2.5					6.5	2.5
Lost Time Adjust (s)			-1.5		-1.5	-1.5					-1.5	-1.5
Total Lost Time (s)			5.5		5.0	5.0					9.0	5.0
Lead/Lag	Lead	Lead	Lead		Lag							Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							Yes
Walk Time (s)	7.0	7.0	7.0			7.0					4.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp












10/20/2017

					Ø8
Lane Configurations					
Traffic Volume (vph)	1	20	11	20	
Future Volume (vph)	1	20	11	20	
Ideal Flow (vphpl)	1900	1900	1900	1900	
Lane Width (ft)	10	13	10	10	
Storage Length (ft)		0	0		
Storage Lanes		1	0		
Taper Length (ft)		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.77			
Frt		0.919			
Flt Protected		0.980			
Satd. Flow (prot)	0	1394	0	0	
Flt Permitted		0.980			
Satd. Flow (perm)	0	1368	0	0	
Right Turn on Red				Yes	
Satd. Flow (RTOR)		115			
Link Speed (mph)		30			
Link Distance (ft)		401			
Travel Time (s)		9.1			
Confl. Peds. (#/hr)	23			457	
Confl. Bikes (#/hr)				2	
Peak Hour Factor	0.93	0.93	0.93	0.93	
Heavy Vehicles (%)	0%	0%	0%	0%	
Adj. Flow (vph)	1	22	12	22	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	0	57	0	0	
Enter Blocked Intersection	No	No	No	No	
Lane Alignment	Left	Left	Right	Right	
Median Width(ft)		13			
Link Offset(ft)		40			
Crosswalk Width(ft)		8			
Two way Left Turn Lane					
Headway Factor	1.09	0.96	1.09	1.09	
Turning Speed (mph)	15	15	9	9	
Turn Type	D.Pm	D.Pm			
Protected Phases				8	
Permitted Phases	4 8	4 8			
Minimum Split (s)				37.0	
Total Split (s)				37.0	
Total Split (%)				37%	
Maximum Green (s)				30.5	
Yellow Time (s)				4.0	
All-Red Time (s)				2.5	
Lost Time Adjust (s)					
Total Lost Time (s)					
Lead/Lag					
Lead-Lag Optimize?					
Walk Time (s)					

# Lanes, Volumes, Timings

## 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Flash Dont Walk (s)	6.0	6.0	6.0			4.0					21.0	
Pedestrian Calls (#/hr)	0	0	0			0					0	
Act Effct Green (s)			45.0		7.5	58.0				28.0	28.0	39.5
Actuated g/C Ratio			0.45		0.08	0.58				0.28	0.28	0.40
v/c Ratio			0.74		0.67	1.14dr				0.37	0.41	0.29
Control Delay			17.1		79.4	25.6				15.7	13.3	3.6
Queue Delay			0.0		0.0	0.0				3.1	2.8	0.7
Total Delay			17.1		79.4	25.6				18.8	16.1	4.3
LOS			B		E	C				B	B	A
Approach Delay			17.1			29.9					12.6	
Approach LOS			B			C					B	
Queue Length 50th (ft)			250		53	104				60	98	4
Queue Length 95th (ft)			313		#131	149				113	167	86
Internal Link Dist (ft)			1024			523					73	
Turn Bay Length (ft)												
Base Capacity (vph)			1555		108	1167				317	476	593
Starvation Cap Reductn			0		0	0				122	186	206
Spillback Cap Reductn			0		0	0				0	0	0
Storage Cap Reductn			0		0	0				0	0	0
Reduced v/c Ratio			0.74		0.67	0.71				0.60	0.67	0.44

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 96 (96%), Referenced to phase 2: WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 20.4

Intersection LOS: C

Intersection Capacity Utilization 101.1%

ICU Level of Service G

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.





Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp



# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp

10/20/2017

					
Lane Group	SEL2	SEL	SER	SER2	Ø8
Flash Dont Walk (s)					
Pedestrian Calls (#/hr)					
Act Effct Green (s)		28.0			
Actuated g/C Ratio		0.28			
v/c Ratio		0.12			
Control Delay		1.3			
Queue Delay		0.0			
Total Delay		1.3			
LOS		A			
Approach Delay		1.3			
Approach LOS		A			
Queue Length 50th (ft)		0			
Queue Length 95th (ft)		m2			
Internal Link Dist (ft)		321			
Turn Bay Length (ft)					
Base Capacity (vph)		465			
Starvation Cap Reductn		0			
Spillback Cap Reductn		0			
Storage Cap Reductn		0			
Reduced v/c Ratio		0.12			
Intersection Summary					

# Lanes, Volumes, Timings

## 9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↖	↗	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations	↑↑↑↑			↑↑↑↑	↖	↗	
Traffic Volume (vph)	1071	35	43	805	32	73	
Future Volume (vph)	1071	35	43	805	32	73	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.91	0.91	1.00	1.00	
Ped Bike Factor	0.98			1.00	0.68		
Frt	0.995					0.850	
Flt Protected				0.997	0.950		
Satd. Flow (prot)	5807	0	0	4625	1404	1396	
Flt Permitted				0.827	0.950		
Satd. Flow (perm)	5807	0	0	3821	959	1396	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	8					51	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		375	375		307		
Confl. Bikes (#/hr)		30					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	11%	11%	4%	20%	8%	
Adj. Flow (vph)	1139	37	46	856	34	78	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1176	0	0	902	34	78	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		1	6	4	1	3
Permitted Phases			6			4	
Minimum Split (s)	20.5		10.0	16.5	30.0	10.0	4.0
Total Split (s)	49.5		16.5	66.0	30.0	16.5	4.0
Total Split (%)	49.5%		16.5%	66.0%	30.0%	16.5%	4%
Maximum Green (s)	43.0		11.5	59.5	24.5	11.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag	Lag		Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Walk Time (s)	10.0				6.0		
Flash Dont Walk (s)	4.0				18.0		

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		
Act Effct Green (s)	44.5			61.0	25.5	42.5	
Actuated g/C Ratio	0.44			0.61	0.26	0.42	
v/c Ratio	0.45			0.37	0.09	0.13	
Control Delay	7.9			11.5	29.4	8.3	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	7.9			11.5	29.4	8.3	
LOS	A			B	C	A	
Approach Delay	7.9			11.5	14.7		
Approach LOS	A			B	B		
Queue Length 50th (ft)	44			130	17	10	
Queue Length 95th (ft)	56			171	42	38	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2588			2423	358	622	
Starvation Cap Reductn	0			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.45			0.37	0.09	0.13	

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 10 (10%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 50.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

 16.5 s	 49.5 s	 4 s	 30 s
 66 s			

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗					↑↑↑			↓↑↑↑	
Traffic Volume (vph)	111	91	69	0	0	0	0	575	61	57	421	0
Future Volume (vph)	111	91	69	0	0	0	0	575	61	57	421	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		50
Storage Lanes	1		1	0		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.70		0.49					0.93			0.97	
Frt			0.850					0.986				
Flt Protected	0.950										0.994	
Satd. Flow (prot)	1631	1652	1561	0	0	0	0	4338	0	0	5889	0
Flt Permitted	0.950										0.818	
Satd. Flow (perm)	1138	1652	764	0	0	0	0	4338	0	0	4677	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			34									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	270		1133	270		1133	580		493	493		580
Confl. Bikes (#/hr)			53						4			24
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	15%	0%	0%	0%	0%	0%	4%	22%	4%	7%	0%
Adj. Flow (vph)	113	93	70	0	0	0	0	587	62	58	430	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	93	70	0	0	0	0	649	0	0	488	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					67.5		67.5	67.5	
Total Split (%)	32.5%	32.5%	32.5%					67.5%		67.5%	67.5%	
Maximum Green (s)	26.0	26.0	26.0					61.5		61.5	61.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	28.5
Total Split (s)	67.5	32.5
Total Split (%)	68%	33%
Maximum Green (s)	61.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	7.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effct Green (s)	27.5	27.5	27.5					63.0			63.0	
Actuated g/C Ratio	0.28	0.28	0.28					0.63			0.63	
v/c Ratio	0.36	0.20	0.30					0.24			0.17	
Control Delay	36.2	32.6	23.7					3.3			7.8	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	36.2	32.6	23.7					3.3			7.8	
LOS	D	C	C					A			A	
Approach Delay		31.8						3.3			7.8	
Approach LOS		C						A			A	
Queue Length 50th (ft)	61	49	14					16			34	
Queue Length 95th (ft)	m105	m87	m52					30			46	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	312	454	234					2732			2946	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			0	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.36	0.20	0.30					0.24			0.17	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 10.4

Intersection LOS: B

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

↑↓ Ø2 (R)	67.5 s	↔ Ø4	32.5 s
↔ Ø6 (R)	67.5 s	↔ Ø8	32.5 s


Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations	↰		↱		↰↱				↰↱			
Traffic Volume (vph)	0	0	0	0	447	0	0	0	178	0	0	
Future Volume (vph)	0	0	0	0	447	0	0	0	178	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	486	0	0	0	193	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	486	0	0	0	193	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			63.0
Total Split (s)	50.5		50.5						50.5			63.0
Total Split (%)	50.5%		50.5%						50.5%			63%
Maximum Green (s)	43.5		43.5						43.5			56.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					44.5				43.5			
Actuated g/C Ratio					0.44				0.44			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Storage Length (ft)			
Storage Lanes			
Taper Length (ft)			
Lane Util. Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Peak Hour Factor			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Turn Type			
Protected Phases	4	5	8
Permitted Phases			
Minimum Split (s)	37.0	12.5	37.0
Total Split (s)	37.0	12.5	37.0
Total Split (%)	37%	13%	37%
Maximum Green (s)	26.5	6.0	30.5
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	6.5	2.5	2.5
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag		Lag	
Lead-Lag Optimize?		Yes	
Walk Time (s)	4.0		
Flash Dont Walk (s)	21.0		
Pedestrian Calls (#/hr)	0		
Act Effct Green (s)			
Actuated g/C Ratio			

**Lanes, Volumes, Timings**  
**11: 12th Street SW**

10/20/2017

	↙	↖	↗	↘	↑	↙	↘	↓	↙	↘		
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
v/c Ratio					0.23				0.09			
Control Delay					17.5				0.1			
Queue Delay					0.0				1.1			
Total Delay					17.5				1.1			
LOS					B				A			
Approach Delay					17.5			1.1				
Approach LOS					B			A				
Queue Length 50th (ft)					68				0			
Queue Length 95th (ft)					92				m0			
Internal Link Dist (ft)		132			189			73		90		
Turn Bay Length (ft)												
Base Capacity (vph)					2111				2216			
Starvation Cap Reductn					0				1796			
Spillback Cap Reductn					163				0			
Storage Cap Reductn					0				0			
Reduced v/c Ratio					0.25				0.46			

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 96 (96%), Referenced to phase 2: WBT and 6 EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 12.9

Intersection LOS: B

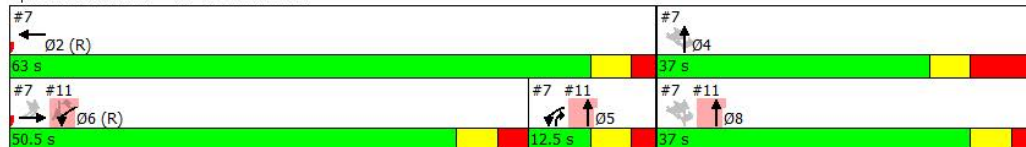
Intersection Capacity Utilization 14.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW



Lanes, Volumes, Timings  
11: 12th Street SW


















10/20/2017

Lane Group	Ø4	Ø5	Ø8
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	1036	108	131	837	0	14	11	0	1	0	0
Future Volume (vph)	0	1036	108	131	837	0	14	11	0	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0		0		0	0	
Storage Lanes	0		1	0		0		0		1	0	
Taper Length (ft)	100			100				100			25	
Lane Util. Factor	0.86	0.86	0.86	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.99				0.93			
Frt		0.986								0.850		
Flt Protected					0.993				0.950			
Satd. Flow (prot)	0	5682	0	0	4647	0	0	0	1685	1507	0	1773
Flt Permitted					0.652				0.757			
Satd. Flow (perm)	0	5682	0	0	3031	0	0	0	1247	1507	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		29								153		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	9		200	200		9		71				
Confl. Bikes (#/hr)			24			20						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1079	113	136	872	0	15	11	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1192	0	0	1008	0	0	0	26	1	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6			8	8			8	
Minimum Split (s)	29.5	29.5		10.5	25.5		35.5	35.5	35.5	10.5	35.5	35.5
Total Split (s)	47.5	47.5		12.0	59.5		35.5	35.5	35.5	12.0	35.5	35.5
Total Split (%)	47.5%	47.5%		12.0%	59.5%		35.5%	35.5%	35.5%	12.0%	35.5%	35.5%
Maximum Green (s)	38.0	38.0		6.5	54.0		30.0	30.0	30.0	6.5	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0		10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW













10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Ped Bike Factor		
Frnt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	71	
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		39.5			54.0			30.0	6.5			
Actuated g/C Ratio		0.40			0.54			0.30	0.06			
v/c Ratio		0.53			0.58			0.07	0.00			
Control Delay		8.1			11.8			25.8	0.0			
Queue Delay		0.0			0.0			0.0	0.0			
Total Delay		8.1			11.8			25.8	0.0			
LOS		A			B			C	A			
Approach Delay		8.1			11.8			24.8				
Approach LOS		A			B			C				
Queue Length 50th (ft)		147			82			12	0			
Queue Length 95th (ft)		156			89			32	0			
Internal Link Dist (ft)		460			526			486			225	
Turn Bay Length (ft)												
Base Capacity (vph)		2261			1741			374	241			
Starvation Cap Reductn		0			0			0	0			
Spillback Cap Reductn		0			0			0	0			
Storage Cap Reductn		0			0			0	0			
Reduced v/c Ratio		0.53			0.58			0.07	0.00			

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 10.0

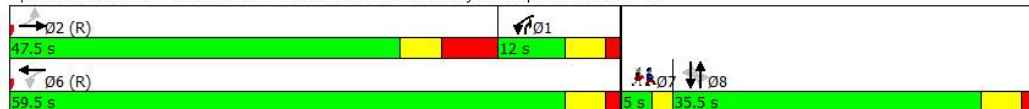
Intersection LOS: A

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	763	97	14	701	194	92	265	59	125	190	175
Future Volume (vph)	177	763	97	14	701	194	92	265	59	125	190	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		75	0		0	80		0	0		50
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96			0.93		0.82	0.94		0.82	0.85	
Frt		0.986			0.968			0.973			0.928	
Flt Protected		0.992			0.999		0.950			0.950		
Satd. Flow (prot)	0	5595	0	0	5194	0	1616	4441	0	1646	3770	0
Flt Permitted		0.715			0.904		0.520			0.476		
Satd. Flow (perm)	0	3984	0	0	4696	0	727	4441	0	672	3770	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		36			83						141	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	342		230	230		342	262		308	308		262
Confl. Bikes (#/hr)			20			25			19			14
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	7%	3%	4%	0%	4%	10%	8%	3%	4%	6%	7%	3%
Adj. Flow (vph)	182	787	100	14	723	200	95	273	61	129	196	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1069	0	0	937	0	95	334	0	129	376	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	57.0		46.0	46.0		32.5	32.5		10.5	43.0	
Total Split (%)	11.0%	57.0%		46.0%	46.0%		32.5%	32.5%		10.5%	43.0%	
Maximum Green (s)	5.5	50.5		39.5	39.5		26.0	26.0		5.5	36.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

	↗	→	↘	↙	←	↖	↗	↑	↘	↙	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		52.0			41.0		27.5	27.5		39.5	38.0	
Actuated g/C Ratio		0.52			0.41		0.28	0.28		0.40	0.38	
v/c Ratio		0.49			0.47		0.48	0.27		0.39	0.25	
Control Delay		2.0			20.5		39.7	29.2		21.8	11.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		2.0			20.5		39.7	29.2		21.8	11.1	
LOS		A			C		D	C		C	B	
Approach Delay		2.0			20.5			31.5			13.8	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)		20			113		50	61		45	23	
Queue Length 95th (ft)		20			143		104	87		76	37	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2185			1974		199	1221		333	1520	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.49			0.47		0.48	0.27		0.39	0.25	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 51 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

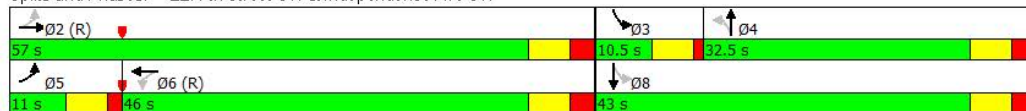
Intersection LOS: B

Intersection Capacity Utilization 83.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 22: 7th Street SW & Independence Ave SW



Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	6	759	45	31	1596	190	0	1826	555	297	2353	33
Future Volume (vph)	6	759	45	31	1596	190	0	1826	555	297	2353	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.98			1.00	0.88			0.92		1.00	
Frt		0.992				0.850			0.850		0.998	
Flt Protected					0.999					0.950		
Satd. Flow (prot)	0	4769	0	0	4631	1311	0	4793	1478	1589	4734	0
Flt Permitted		0.792			0.846					0.075		
Satd. Flow (perm)	0	3777	0	0	3917	1147	0	4793	1364	125	4734	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				162			99			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Conf. Peds. (#/hr)	86		250	250		86	33		49	49		33
Conf. Bikes (#/hr)			3			31			3			2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Adj. Flow (vph)	7	843	50	34	1773	211	0	2029	617	330	2614	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	1807	211	0	2029	617	330	2651	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		53.0	53.0	20.0	73.0	
Total Split (%)	33.6%	33.6%		33.6%	33.6%	33.6%		48.2%	48.2%	18.2%	66.4%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		46.5	46.5	13.5	66.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		32.0			32.0	32.0		48.0	48.0	67.5	68.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**

10/20/2017

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.29			0.29	0.29		0.44	0.44	0.61	0.62	
v/c Ratio		0.82			1.59	0.47		0.97	0.95	1.23	0.91	
Control Delay		43.4			297.6	12.6		44.6	50.7	151.0	14.8	
Queue Delay		0.0			0.0	0.1		42.3	0.0	0.0	1.2	
Total Delay		43.4			297.6	12.6		86.9	50.7	151.0	16.1	
LOS		D			F	B		F	D	F	B	
Approach Delay		43.4			267.8			78.5			31.0	
Approach LOS		D			F			E			C	
Queue Length 50th (ft)		215			~667	26		501	360	~237	235	
Queue Length 95th (ft)		270			#764	95		#627	#609	m#339	m326	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)												
Base Capacity (vph)		1100			1139	448		2091	651	269	2926	
Starvation Cap Reductn		0			0	0		0	0	0	121	
Spillback Cap Reductn		0			0	12		369	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.82			1.59	0.48		1.18	0.95	1.23	0.95	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 107 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.59

Intersection Signal Delay: 102.9

Intersection LOS: F

Intersection Capacity Utilization 117.5%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

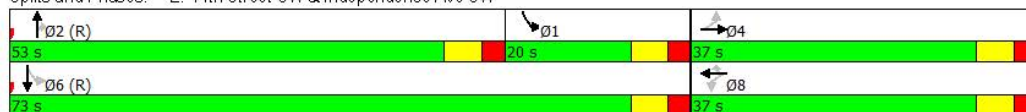
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.


Splits and Phases: 2: 14th Street SW & Independence Ave SW



# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	118	306	0	0	0	0	1914	108	50	2377	0
Future Volume (vph)	59	118	306	0	0	0	0	1914	108	50	2377	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.63	0.80						0.97				
Frt		0.892						0.992				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1597	1302	0	0	0	0	0	4802	0	1636	4700	0
Flt Permitted	0.950									0.058		
Satd. Flow (perm)	1010	1302	0	0	0	0	0	4802	0	100	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								15				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	543		191	191		543	164		228	228		164
Confl. Bikes (#/hr)			97						16			9
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	13%	9%	2%	0%	0%	0%	0%	4%	1%	3%	3%	0%
Adj. Flow (vph)	60	119	309	0	0	0	0	1933	109	51	2401	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	428	0	0	0	0	0	2042	0	51	2401	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5	
Total Split (s)	37.0	37.0						73.0		73.0	73.0	
Total Split (%)	33.6%	33.6%						66.4%		66.4%	66.4%	
Maximum Green (s)	30.5	30.5						67.5		67.5	67.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0						10.0		10.0	10.0	

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	73.0
Total Split (%)	66%
Maximum Green (s)	67.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0

4: 14th Street SW & SW Jefferson Drive

### Intersection Summary

Case	Age	Sex	Location	Time	Time
1	10	M	10	10	10
2	10	M	10	10	10
3	10	M	10	10	10
4	10	M	10	10	10
5	10	M	10	10	10
6	10	M	10	10	10
7	10	M	10	10	10
8	10	M	10	10	10
9	10	M	10	10	10
10	10	M	10	10	10
11	10	M	10	10	10
12	10	M	10	10	10
13	10	M	10	10	10
14	10	M	10	10	10
15	10	M	10	10	10
16	10	M	10	10	10
17	10	M	10	10	10
18	10	M	10	10	10
19	10	M	10	10	10
20	10	M	10	10	10
21	10	M	10	10	10
22	10	M	10	10	10
23	10	M	10	10	10
24	10	M	10	10	10
25	10	M	10	10	10
26	10	M	10	10	10
27	10	M	10	10	10
28	10	M	10	10	10
29	10	M	10	10	10
30	10	M	10	10	10
31	10	M	10	10	10
32	10	M	10	10	10
33	10	M	10	10	10
34	10	M	10	10	10
35	10	M	10	10	10
36	10	M	10	10	10
37	10	M	10	10	10
38	10	M	10	10	10
39	10	M	10	10	10
40	10	M	10	10	10
41	10	M	10	10	10
42	10	M	10	10	10
43	10	M	10	10	10
44	10	M	10	10	10
45	10	M	10	10	10
46	10	M	10	10	10
47	10	M	10	10	10
48	10	M	10	10	10
49	10	M	10	10	10
50	10	M	10	10	10
51	10	M	10	10	10
52	10	M	10	10	10
53	10	M	10	10	10
54	10	M	10	10	10
55	10	M	10	10	10
56	10	M	10	10	10
57	10	M	10	10	10
58	10	M	10	10	10
59	10	M	10	10	10
60	10	M	10	10	10
61	10	M	10	10	10
62	10	M	10	10	10
63	10	M	10	10	10
64	10	M	10	10	10
65	10	M	10	10	10
66	10	M	10	10	10
67	10	M	10	10	10
68	10	M	10	10	10
69	10	M	10	10	10
70	10	M	10	10	10
71	10	M	10	10	10
72	10	M	10	10	10
73	10	M	10	10	10
74	10	M	10	10	10
75	10	M	10	10	10
76	10	M	10	10	10
77					

73 s

37 s

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	




















Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰					↱
Traffic Volume (vph)	206	77	0	0	0	19
Future Volume (vph)	206	77	0	0	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.963					0.865
Flt Protected						
Satd. Flow (prot)	1857	0	0	0	0	1698
Flt Permitted						
Satd. Flow (perm)	1857	0	0	0	0	1698
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		373	263		373	
Confl. Bikes (#/hr)		122				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%
Adj. Flow (vph)	258	96	0	0	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	354	0	0	0	0	24
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.0%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2	SEL
Lane Configurations												
Traffic Volume (vph)	1	1572	38	427	1678	2	209	118	2	256	383	18
Future Volume (vph)	1	1572	38	427	1678	2	209	118	2	256	383	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	13
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.91	0.91	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	0.93				0.56		0.63	0.72
Frt		0.996			0.984						0.850	0.904
Flt Protected				0.950	0.999				0.950			0.986
Satd. Flow (prot)	0	5892	0	1393	4017	0	0	0	1679	1766	1501	1098
Flt Permitted		0.931		0.950	0.757				0.950			0.986
Satd. Flow (perm)	0	5485	0	1390	3044	0	0	0	943	1766	943	983
Right Turn on Red			Yes								Yes	
Satd. Flow (RTOR)		3									96	113
Link Speed (mph)		35			35					30		30
Link Distance (ft)		1104			603					153		401
Travel Time (s)		21.5			11.7					3.5		9.1
Confl. Peds. (#/hr)	87		8	8		87	87	73	73		350	350
Confl. Bikes (#/hr)			21			20	20				5	
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%
Adj. Flow (vph)	1	1747	42	474	1864	2	232	131	2	284	426	20
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	1790	0	427	2145	0	0	0	133	284	426	70
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right	Left
Median Width(ft)		0			10					56		13
Link Offset(ft)		0			0					0		40
Crosswalk Width(ft)		30			25					28		20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	0.96
Turning Speed (mph)	15		9	15		9	9	15	15		9	15
Turn Type	Perm	NA		Prot	NA			custom	custom	NA	custom	D.Pm
Protected Phases		6		5	2					4	5	
Permitted Phases	6							4 8	4 8	8	4 8	4 8
Minimum Split (s)	20.0	20.0		27.0	66.0					32.0	27.0	
Total Split (s)	53.0	53.0		51.0	104.0					36.0	51.0	
Total Split (%)	35.3%	35.3%		34.0%	69.3%					24.0%	34.0%	
Maximum Green (s)	46.0	46.0		44.5	97.5					29.0	44.5	
Yellow Time (s)	4.0	4.0		4.0	4.0					4.0	4.0	
All-Red Time (s)	3.0	3.0		2.5	2.5					3.0	2.5	
Lost Time Adjust (s)		-1.5		-1.5	-1.5					-1.5	-1.5	
Total Lost Time (s)		5.5		5.0	5.0					5.5	5.0	
Lead/Lag	Lag	Lag		Lead							Lead	
Lead-Lag Optimize?	Yes	Yes		Yes							Yes	
Walk Time (s)	7.0	7.0			7.0					4.0		
Flash Dont Walk (s)	6.0	6.0			4.0					21.0		
Pedestrian Calls (#/hr)	0	0			0					0		
Act Effct Green (s)		47.5		46.0	99.0				30.5	30.5	77.0	30.5

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	<div> <div>↘</div> <div>↙</div> <div>↶</div> <div>↷</div> <div>↵</div> </div>					
Lane Group	SER	SER2	SWL2	SWL	SWR	Ø8
Lane Configurations						
Traffic Volume (vph)	25	20	3	0	1	
Future Volume (vph)	25	20	3	0	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	10	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor						
Frt				0.966		
Flt Protected				0.964		
Satd. Flow (prot)	0	0	0	826	0	
Flt Permitted				0.964		
Satd. Flow (perm)	0	0	0	826	0	
Right Turn on Red		Yes				
Satd. Flow (RTOR)						
Link Speed (mph)				30		
Link Distance (ft)				296		
Travel Time (s)				6.7		
Confl. Peds. (#/hr)	73	73				
Confl. Bikes (#/hr)	9	9				
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	40%	0%	100%	100%	100%	
Adj. Flow (vph)	28	22	3	0	1	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	
Enter Blocked Intersection	No	No	No	No	No	
Lane Alignment	Right	Right	Left	Left	Right	
Median Width(ft)				10		
Link Offset(ft)				0		
Crosswalk Width(ft)				0		
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	9	9	15	15	9	
Turn Type			Perm	Prot		
Protected Phases				9	8	
Permitted Phases			9			
Minimum Split (s)			10.0	10.0	32.0	
Total Split (s)			10.0	10.0	36.0	
Total Split (%)			6.7%	6.7%	24%	
Maximum Green (s)			5.0	5.0	29.5	
Yellow Time (s)			3.0	3.0	4.0	
All-Red Time (s)			2.0	2.0	2.5	
Lost Time Adjust (s)				0.0		
Total Lost Time (s)				5.0		
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
Act Effect Green (s)				5.0		

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	←	→	↙	↘	←	↙	↘	↙	↘	↙	↘	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2	SEL
Actuated g/C Ratio		0.32		0.31	0.66				0.20	0.20	0.51	0.20
v/c Ratio		1.03		1.00	1.28				0.70	0.79	0.61	0.24
Control Delay		79.2		94.9	158.2				61.0	58.9	13.4	3.3
Queue Delay		0.0		0.0	0.0				38.6	56.9	0.3	0.0
Total Delay		79.2		94.9	158.2				99.6	115.8	13.6	3.3
LOS		E		F	F				F	F	B	A
Approach Delay		79.2			147.7					61.6		3.3
Approach LOS		E			F					E		A
Queue Length 50th (ft)		~542		487	~856				61	267	149	0
Queue Length 95th (ft)		#619		#758	#953				#217	#403	223	8
Internal Link Dist (ft)		1024			523					73		321
Turn Bay Length (ft)												
Base Capacity (vph)		1738		427	1671				191	359	701	289
Starvation Cap Reductn		0		0	0				59	110	38	0
Spillback Cap Reductn		0		0	0				0	0	0	0
Storage Cap Reductn		0		0	0				0	0	0	0
Reduced v/c Ratio		1.03		1.00	1.28				1.01	1.14	0.64	0.24

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Pretimed

Maximum v/c Ratio: 1.28

Intersection Signal Delay: 108.7

Intersection LOS: F

Intersection Capacity Utilization 126.2%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock

#7 ← Ø2 (R)		#7 ↑ Ø4	#7 ↘ Ø9
104 s		36 s	10 s
#7 #11 ↑ Ø5	#7 #11 → Ø6 (R)	#7 #11 ↑ Ø8	
51 s	53 s	36 s	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	↘	↗	↖	↙	↘	
Lane Group	SER	SER2	SWL2	SWL	SWR	Ø8
Actuated g/C Ratio				0.03		
v/c Ratio				0.15		
Control Delay				82.5		
Queue Delay				0.0		
Total Delay				82.5		
LOS				F		
Approach Delay				82.5		
Approach LOS				F		
Queue Length 50th (ft)				4		
Queue Length 95th (ft)				18		
Internal Link Dist (ft)				216		
Turn Bay Length (ft)						
Base Capacity (vph)				27		
Starvation Cap Reductn				0		
Spillback Cap Reductn				0		
Storage Cap Reductn				0		
Reduced v/c Ratio				0.15		
Intersection Summary						

Lanes, Volumes, Timings  
9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations					↘	↗	
Traffic Volume (vph)	1901	75	62	2031	285	86	
Future Volume (vph)	1901	75	62	2031	285	86	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.86	0.86	1.00	1.00	
Ped Bike Factor	1.00				0.69		
Frt	0.994					0.850	
Flt Protected				0.999	0.950		
Satd. Flow (prot)	5858	0	0	5860	1685	1507	
Flt Permitted				0.748	0.950		
Satd. Flow (perm)	5858	0	0	4387	1159	1507	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	10					42	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		26	26		261		
Confl. Bikes (#/hr)		18					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Adj. Flow (vph)	2089	82	68	2232	313	95	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	2171	0	0	2300	313	95	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	60.5		15.5	60.5	30.0	15.5	4.0
Total Split (%)	55.0%		14.1%	55.0%	27.3%	14.1%	4%
Maximum Green (s)	54.0		10.5	54.0	24.5	10.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Walk Time (s)	10.0				6.0	0.0	
Flash Dont Walk (s)	4.0				18.0	2.0	

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		0
Act Effct Green (s)	55.5			66.0	25.5	41.5	
Actuated g/C Ratio	0.50			0.60	0.23	0.38	
v/c Ratio	0.73			0.83	0.80	0.16	
Control Delay	23.2			18.3	56.7	14.1	
Queue Delay	0.2			0.0	0.0	0.0	
Total Delay	23.4			18.3	56.7	14.1	
LOS	C			B	E	B	
Approach Delay	23.4			18.3	46.8		
Approach LOS	C			B	D		
Queue Length 50th (ft)	336			252	209	24	
Queue Length 95th (ft)	382			286	#347	60	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2960			2772	390	594	
Starvation Cap Reductn	204			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.79			0.83	0.80	0.16	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 38 (35%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 23.0

Intersection LOS: C

Intersection Capacity Utilization 87.1%

ICU Level of Service E

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.


















Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

→ Ø2 (R)	↖ Ø4	↗ Ø9
60.5 s	4 s 30 s	15.5 s
↙ Ø6 (R)		
60.5 s		

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	81	129	0	0	0	0	600	26	29	1167	0
Future Volume (vph)	54	81	129	0	0	0	0	600	26	29	1167	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.82		0.63					0.97			0.99	
Frt			0.850					0.994				
Flt Protected	0.950										0.999	
Satd. Flow (prot)	1711	1652	1546	0	0	0	0	4465	0	0	5793	0
Flt Permitted	0.950										0.901	
Satd. Flow (perm)	1400	1652	979	0	0	0	0	4465	0	0	5194	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			30									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	143		288	288		143	469		293	293		469
Confl. Bikes (#/hr)			112						31			16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	15%	1%	0%	0%	0%	0%	9%	0%	47%	8%	0%
Adj. Flow (vph)	56	84	133	0	0	0	0	619	27	30	1203	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	84	133	0	0	0	0	646	0	0	1233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					77.5		77.5	77.5	
Total Split (%)	29.5%	29.5%	29.5%					70.5%		70.5%	70.5%	
Maximum Green (s)	26.0	26.0	26.0					71.5		71.5	71.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	31.5
Total Split (s)	77.5	32.5
Total Split (%)	70%	30%
Maximum Green (s)	71.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	10.0

10/20/2017

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	0 (0%), Referenced to phase 2:NBSB and 6:Ped, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	10.5
Intersection LOS:	B
Intersection Capacity Utilization	63.2%
ICU Level of Service	B
Analysis Period (min)	15
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

Ø2 (R)	Ø4
77.5 s	32.5 s
Ø6 (R)	Ø8
77.5 s	32.5 s

















Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	759	0	0	0	498	0	0	
Future Volume (vph)	0	0	0	0	759	0	0	0	498	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	825	0	0	0	541	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	825	0	0	0	541	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			66.0
Total Split (s)	53.0		53.0						53.0			104.0
Total Split (%)	35.3%		35.3%						35.3%			69%
Maximum Green (s)	46.0		46.0						46.0			97.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lag		Lag						Lag			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					77.0				46.0			
Actuated g/C Ratio					0.51				0.31			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	4	5	8	9
Permitted Phases				
Minimum Split (s)	32.0	27.0	32.0	10.0
Total Split (s)	36.0	51.0	36.0	10.0
Total Split (%)	24%	34%	24%	7%
Maximum Green (s)	29.0	44.5	29.5	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0
All-Red Time (s)	3.0	2.5	2.5	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead		
Lead-Lag Optimize?		Yes		
Walk Time (s)	4.0			
Flash Dont Walk (s)	21.0			
Pedestrian Calls (#/hr)	0			
Act Effct Green (s)				
Actuated g/C Ratio				

# Lanes, Volumes, Timings 11: 12th Street SW

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↘
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
v/c Ratio					0.34				0.25			
Control Delay					14.9				0.1			
Queue Delay					0.1				4.1			
Total Delay					15.0				4.2			
LOS					B				A			
Approach Delay					15.0			4.2				
Approach LOS					B			A				
Queue Length 50th (ft)					132				0			
Queue Length 95th (ft)					157				m0			
Internal Link Dist (ft)		132			189			73		90		
Turn Bay Length (ft)												
Base Capacity (vph)					2436				2128			
Starvation Cap Reductn					0				1485			
Spillback Cap Reductn					434				0			
Storage Cap Reductn					0				0			
Reduced v/c Ratio					0.41				0.84			

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Pretimed

Maximum v/c Ratio: 1.28

Intersection Signal Delay: 10.7

Intersection LOS: B

Intersection Capacity Utilization 23.3%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW

#7 ↙ Ø2 (R) 104 s		#7 ↖ Ø4 36 s	#7 ↗ Ø9 10 s
#7 #11 ↖ Ø5 51 s	#7 #11 ↗ Ø6 (R) 53 s	#7 #11 ↖ Ø8 36 s	

Lanes, Volumes, Timings  
11: 12th Street SW




















10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT		
Lane Configurations														
Traffic Volume (vph)	0	1934	53	70	1856	0	32	237	0	229	0	0		
Future Volume (vph)	0	1934	53	70	1856	0	32	237	0	229	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor		0.99			1.00				0.75					
Frt		0.996								0.850				
Flt Protected					0.998				0.950					
Satd. Flow (prot)	0	5922	0	0	5917	0	0	0	1627	1492	0	1773		
Flt Permitted					0.744				0.757					
Satd. Flow (perm)	0	5922	0	0	4410	0	0	0	976	1492	0	1773		
Right Turn on Red			Yes			Yes				Yes				
Satd. Flow (RTOR)		7								239				
Link Speed (mph)		35			35				30			15		
Link Distance (ft)		540			606				566			305		
Travel Time (s)		10.5			11.8				12.9			13.9		
Confl. Peds. (#/hr)	201		138	138		201	103	103						
Confl. Bikes (#/hr)			12			22								
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96		
Heavy Vehicles (%)	0%	2%	2%	0%	3%	0%	0%	4%	0%	1%	0%	0%		
Adj. Flow (vph)	0	2015	55	73	1933	0	33	247	0	239	0	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	2070	0	0	2006	0	0	0	280	239	0	0		
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No		
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left		
Median Width(ft)		0			0				90			0		
Link Offset(ft)		0			0				5			-70		
Crosswalk Width(ft)		45			20				20			20		
Two way Left Turn Lane														
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09		
Turning Speed (mph)	15		9	15		9	9	15		9	15			
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over				
Protected Phases		2		1	6				8	1		8		
Permitted Phases		2		6			8	8			8			
Minimum Split (s)	30.5	30.5		10.5	25.5		30.5	30.5	30.5	10.5	30.5	30.5		
Total Split (s)	53.0	53.0		11.0	64.0		31.0	31.0	31.0	11.0	31.0	31.0		
Total Split (%)	53.0%	53.0%		11.0%	64.0%		31.0%	31.0%	31.0%	11.0%	31.0%	31.0%		
Maximum Green (s)	43.5	43.5		5.5	58.5		25.5	25.5	25.5	5.5	25.5	25.5		
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5		
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0		
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5		
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes		
Walk Time (s)	10.0	10.0			10.0		5.0	5.0	5.0		5.0	5.0		
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0		
Pedestrian Calls (#/hr)	0	0			0		0	0	0		0	0		
Act Effct Green (s)		45.0			58.5				25.5	5.5				
Actuated g/C Ratio		0.45			0.58				0.26	0.06				

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW







10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
v/c Ratio		0.78			0.75				1.13	0.78		
Control Delay		25.7			18.2				132.7	24.7		
Queue Delay		0.0			0.0				0.0	0.0		
Total Delay		25.7			18.2				132.7	24.7		
LOS		C			B				F	C		
Approach Delay		25.7			18.2				83.0			
Approach LOS		C			B				F			
Queue Length 50th (ft)		313			217				~208	0		
Queue Length 95th (ft)		362			252				#369	#110		
Internal Link Dist. (ft)		460			526				486			225
Turn Bay Length (ft)												
Base Capacity (vph)		2668			2662				248	307		
Starvation Cap Reductn		0			0				0	0		
Spillback Cap Reductn		0			0				0	0		
Storage Cap Reductn		0			0				0	0		
Reduced v/c Ratio		0.78			0.75				1.13	0.78		

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 28.9

Intersection LOS: C

Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

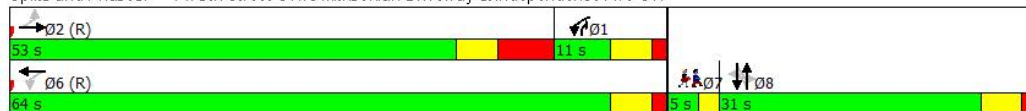
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1673	349	23	1392	152	183	333	141	272	673	351
Future Volume (vph)	141	1673	349	23	1392	152	183	333	141	272	673	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		0	0		0	80		0	0		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.95			0.97		0.92	0.89		0.84	0.88	
Frt		0.976			0.985			0.955			0.949	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	5530	0	0	5627	0	1662	3966	0	1616	3886	0
Flt Permitted		0.707			0.837		0.262			0.372		
Satd. Flow (perm)	0	3917	0	0	4714	0	420	3966	0	532	3886	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		5			27						126	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	232		222	222		232	444		444	444		444
Confl. Bikes (#/hr)			7			9			18			17
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	4%	2%	2%	11%	2%	15%	5%	6%	10%	8%	9%	4%
Adj. Flow (vph)	144	1707	356	23	1420	155	187	340	144	278	687	358
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2207	0	0	1598	0	187	484	0	278	1045	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	60.0		49.0	49.0		36.5	36.5		13.5	50.0	
Total Split (%)	10.0%	54.5%		44.5%	44.5%		33.2%	33.2%		12.3%	45.5%	
Maximum Green (s)	5.5	53.5		42.5	42.5		30.0	30.0		8.5	43.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

**Lanes, Volumes, Timings**  
**22: 7th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		55.0			44.0		31.5	31.5		46.5	45.0	
Actuated g/C Ratio		0.50			0.40		0.29	0.29		0.42	0.41	
v/c Ratio		1.08			0.84		1.56	0.43		0.86	0.63	
Control Delay		71.4			34.3		318.0	33.3		63.6	29.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.2	
Total Delay		71.4			34.3		318.0	33.3		63.6	30.1	
LOS		E			C		F	C		E	C	
Approach Delay		71.4			34.3			112.7			37.1	
Approach LOS		E			C			F			D	
Queue Length 50th (ft)		~420			287		~187	101		166	187	
Queue Length 95th (ft)		#544			339		#330	136		#261	230	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2048			1901		120	1135		323	1664	
Starvation Cap Reductn		0			0		0	0		0	113	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.08			0.84		1.56	0.43		0.86	0.67	

**Intersection Summary**

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 32 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 1.56

Intersection Signal Delay: 58.1

Intersection LOS: E

Intersection Capacity Utilization 108.3%

ICU Level of Service G

Analysis Period (min) 15

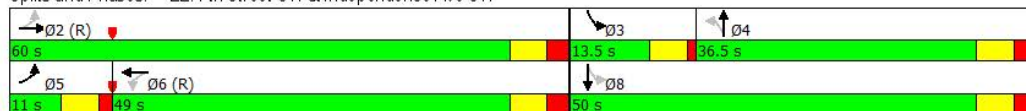
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.


Queue shown is maximum after two cycles.

Splits and Phases: 22: 7th Street SW & Independence Ave SW



Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	6	759	45	31	1596	190	0	1826	555	297	2353	33
Future Volume (vph)	6	759	45	31	1596	190	0	1826	555	297	2353	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.98			1.00	0.84			0.90		1.00	
Frt		0.992				0.850			0.850		0.998	
Flt Protected					0.999					0.950		
Satd. Flow (prot)	0	4758	0	0	4631	1311	0	4793	1478	1589	4733	0
Flt Permitted		0.795			0.837					0.057		
Satd. Flow (perm)	0	3783	0	0	3876	1107	0	4793	1330	95	4733	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				123			73			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	86		250	250		86	33		49	49		33
Confl. Bikes (#/hr)			3			31			3			2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	80%	2%	3%	79%	3%	15%	0%	1%	2%	6%	2%	0%
Adj. Flow (vph)	7	843	50	34	1773	211	0	2029	617	330	2614	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	900	0	0	1807	211	0	2029	617	330	2651	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	52.0	52.0		52.0	52.0	52.0		70.0	70.0	28.0	98.0	
Total Split (%)	34.7%	34.7%		34.7%	34.7%	34.7%		46.7%	46.7%	18.7%	65.3%	
Maximum Green (s)	45.5	45.5		45.5	45.5	45.5		63.5	63.5	21.5	91.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		47.0			47.0	47.0		65.0	65.0	92.5	93.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**

10/20/2017

	↖	→	↘	↙	←	↖	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.31			0.31	0.31		0.43	0.43	0.62	0.62	
v/c Ratio		0.76			1.49	0.49		0.98	1.00	1.17	0.90	
Control Delay		51.1			253.2	15.8		56.7	73.4	136.6	15.0	
Queue Delay		0.0			0.0	0.0		0.3	0.0	0.0	1.5	
Total Delay		51.1			253.2	15.8		57.0	73.4	136.6	16.5	
LOS		D			F	B		E	E	F	B	
Approach Delay		51.1			228.3			60.8			29.8	
Approach LOS		D			F			E			C	
Queue Length 50th (ft)		290			~915	134		707	551	~339	830	
Queue Length 95th (ft)		347			m#517	m54		#828	#825	m#469	m564	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)												
Base Capacity (vph)		1187			1214	431		2076	617	282	2934	
Starvation Cap Reductn		0			0	0		0	0	0	140	
Spillback Cap Reductn		0			0	0		4	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.76			1.49	0.49		0.98	1.00	1.17	0.95	

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 147 (98%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.49

Intersection Signal Delay: 88.5

Intersection LOS: F

Intersection Capacity Utilization 117.5%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

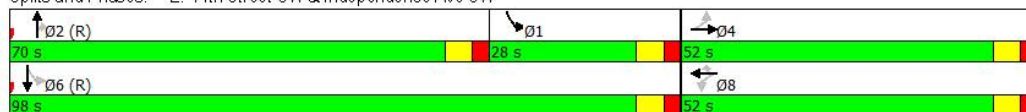
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 2: 14th Street SW & Independence Ave SW



# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	118	306	0	0	0	0	1914	108	50	2377	0
Future Volume (vph)	59	118	306	0	0	0	0	1914	108	50	2377	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.59	0.75						0.97				
Frt		0.892						0.992				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1597	1229	0	0	0	0	0	4786	0	1636	4700	0
Flt Permitted	0.950									0.047		
Satd. Flow (perm)	935	1229	0	0	0	0	0	4786	0	81	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	543		191	191		543	164		228	228		164
Confl. Bikes (#/hr)			97						16			9
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	13%	9%	2%	0%	0%	0%	0%	4%	1%	3%	3%	0%
Adj. Flow (vph)	60	119	309	0	0	0	0	1933	109	51	2401	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	428	0	0	0	0	0	2042	0	51	2401	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		10.5	20.5	
Total Split (s)	53.0	53.0						86.0		11.0	97.0	
Total Split (%)	35.3%	35.3%						57.3%		7.3%	64.7%	
Maximum Green (s)	46.5	46.5						80.5		5.5	91.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Walk Time (s)	10.0	10.0						10.0			10.0	

10/20/2017





















Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	TH					TH
Traffic Volume (vph)	206	77	0	0	0	19
Future Volume (vph)	206	77	0	0	0	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.963					0.865
Flt Protected						
Satd. Flow (prot)	1857	0	0	0	0	1698
Flt Permitted						
Satd. Flow (perm)	1857	0	0	0	0	1698
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		373	263		373	
Confl. Bikes (#/hr)		122				
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	7%	0%	0%	0%	0%	0%
Adj. Flow (vph)	258	96	0	0	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	354	0	0	0	0	24
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Stop			Stop	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 28.0%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2	SEL
Lane Configurations												
Traffic Volume (vph)	1	1572	38	427	1678	2	209	118	2	256	383	18
Future Volume (vph)	1	1572	38	427	1678	2	209	118	2	256	383	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	11	11	11	13
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.91	0.91	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00		1.00	0.93				0.56		0.63	0.72
Frt		0.996			0.984						0.850	0.904
Flt Protected				0.950	0.999				0.950			0.986
Satd. Flow (prot)	0	5892	0	1393	4017	0	0	0	1679	1766	1501	1100
Flt Permitted		0.908		0.950	0.764				0.950			0.986
Satd. Flow (perm)	0	5350	0	1390	3072	0	0	0	943	1766	943	985
Right Turn on Red			Yes								Yes	
Satd. Flow (RTOR)		3									93	113
Link Speed (mph)		35			35					30		30
Link Distance (ft)		1104			603					153		401
Travel Time (s)		21.5			11.7					3.5		9.1
Confl. Peds. (#/hr)	87		8			87	87	73	73		350	350
Confl. Bikes (#/hr)			21			20	20				5	
Peak Hour Factor	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	3%	4%	4%	0%	4%	4%	0%	4%	4%	40%
Adj. Flow (vph)	1	1747	42	474	1864	2	232	131	2	284	426	20
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	0	1790	0	427	2145	0	0	0	133	284	426	70
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right	Left
Median Width(ft)		0			10					56		13
Link Offset(ft)		0			0					0		40
Crosswalk Width(ft)		30			25					28		20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	0.96
Turning Speed (mph)	15		9	15		9	9	15	15		9	15
Turn Type	Perm	NA		Prot	NA			custom	custom	NA	custom	D.Pm
Protected Phases		6		5	2					4	5	
Permitted Phases	6							4 8	4 8	8	4 8	4 8
Minimum Split (s)	20.0	20.0		27.0	66.0					32.0	27.0	
Total Split (s)	56.0	56.0		42.0	98.0					42.0	42.0	
Total Split (%)	37.3%	37.3%		28.0%	65.3%					28.0%	28.0%	
Maximum Green (s)	49.0	49.0		35.5	91.5					35.0	35.5	
Yellow Time (s)	4.0	4.0		4.0	4.0					4.0	4.0	
All-Red Time (s)	3.0	3.0		2.5	2.5					3.0	2.5	
Lost Time Adjust (s)		-1.5		-1.5	-1.5					-1.5	-1.5	
Total Lost Time (s)		5.5		5.0	5.0					5.5	5.0	
Lead/Lag	Lead	Lead		Lag							Lag	
Lead-Lag Optimize?	Yes	Yes		Yes							Yes	
Walk Time (s)	7.0	7.0			7.0					4.0		
Flash Dont Walk (s)	6.0	6.0			4.0					21.0		
Pedestrian Calls (#/hr)	0	0			0					0		
Act Effect Green (s)		50.5		37.0	93.0				36.5	36.5	74.0	36.5

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

Lane Group	SER	SER2	SWL2	SWL	SWR	Ø8
Lane Configurations						
Traffic Volume (vph)	25	20	3	0	1	
Future Volume (vph)	25	20	3	0	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	10	10	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor						
Frt				0.966		
Flt Protected				0.964		
Satd. Flow (prot)	0	0	0	826	0	
Flt Permitted				0.964		
Satd. Flow (perm)	0	0	0	826	0	
Right Turn on Red		Yes				
Satd. Flow (RTOR)						
Link Speed (mph)				30		
Link Distance (ft)				296		
Travel Time (s)				6.7		
Confl. Peds. (#/hr)	73	73				
Confl. Bikes (#/hr)	9	9				
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92	
Heavy Vehicles (%)	40%	0%	100%	100%	100%	
Adj. Flow (vph)	28	22	3	0	1	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	4	0	
Enter Blocked Intersection	No	No	No	No	No	
Lane Alignment	Right	Right	Left	Left	Right	
Median Width(ft)				10		
Link Offset(ft)				0		
Crosswalk Width(ft)				0		
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	9	9	15	15	9	
Turn Type			Perm	Prot		
Protected Phases				9	8	
Permitted Phases			9			
Minimum Split (s)			10.0	10.0	32.0	
Total Split (s)			10.0	10.0	42.0	
Total Split (%)			6.7%	6.7%	28%	
Maximum Green (s)			5.0	5.0	35.5	
Yellow Time (s)			3.0	3.0	4.0	
All-Red Time (s)			2.0	2.0	2.5	
Lost Time Adjust (s)				-1.5		
Total Lost Time (s)				3.5		
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)						
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
Act Effect Green (s)				6.5		

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	←	→	↙	↘	←	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2	SEL	
Actuated g/C Ratio		0.34		0.25	0.62				0.24	0.24	0.49	0.24	
v/c Ratio		0.99		1.24	1.46				0.58	0.66	0.66	0.22	
Control Delay		58.0		155.3	233.9				41.2	39.4	8.9	2.7	
Queue Delay		1.1		0.1	0.4				15.5	24.3	0.4	0.0	
Total Delay		59.1		155.4	234.4				56.6	63.7	9.3	2.7	
LOS		E		F	F				E	E	A	A	
Approach Delay		59.1			221.2					35.1		2.7	
Approach LOS		E			F					D		A	
Queue Length 50th (ft)		516		~603	~1117				116	253	107	0	
Queue Length 95th (ft)		m#523		m#733	#1215				193	359	166	8	
Internal Link Dist (ft)		1024			523					73		321	
Turn Bay Length (ft)													
Base Capacity (vph)		1803		343	1465				229	429	649	325	
Starvation Cap Reductn		0		0	163				77	142	37	0	
Spillback Cap Reductn		9		3	3				0	0	0	2	
Storage Cap Reductn		0		0	0				0	0	0	0	
Reduced v/c Ratio		1.00		1.26	1.65				0.88	0.99	0.70	0.22	

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 141 (94%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Pretimed

Maximum v/c Ratio: 1.46

Intersection Signal Delay: 133.5

Intersection LOS: F

Intersection Capacity Utilization 125.4%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock

#7 ← Ø2 (R) 98 s		#7 ↑ Ø4 42 s	#7 ↙ Ø9 10 s
#7 #11 ↘ Ø6 (R) 56 s	#7 #11 ↙ Ø5 42 s	#7 #11 ↑ Ø8 42 s	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	↘	↗	↖	↙	↘	
Lane Group	SER	SER2	SWL2	SWL	SWR	Ø8
Actuated g/C Ratio				0.04		
v/c Ratio				0.11		
Control Delay				76.2		
Queue Delay				0.0		
Total Delay				76.2		
LOS				E		
Approach Delay				76.3		
Approach LOS				E		
Queue Length 50th (ft)				4		
Queue Length 95th (ft)				18		
Internal Link Dist (ft)				216		
Turn Bay Length (ft)						
Base Capacity (vph)				35		
Starvation Cap Reductn				0		
Spillback Cap Reductn				0		
Storage Cap Reductn				0		
Reduced v/c Ratio				0.11		
Intersection Summary						

Lanes, Volumes, Timings  
9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations					↘	↗	
Traffic Volume (vph)	1901	75	62	2031	285	86	
Future Volume (vph)	1901	75	62	2031	285	86	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.86	0.86	1.00	1.00	
Ped Bike Factor	0.99				0.66		
Frt	0.994					0.850	
Flt Protected				0.999	0.950		
Satd. Flow (prot)	5850	0	0	5860	1685	1507	
Flt Permitted				0.726	0.950		
Satd. Flow (perm)	5850	0	0	4258	1115	1507	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	7					31	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		26	26		261		
Confl. Bikes (#/hr)		18					
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Heavy Vehicles (%)	3%	3%	4%	4%	0%	0%	
Adj. Flow (vph)	2089	82	68	2232	313	95	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	2171	0	0	2300	313	95	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		9	6	4	9	3
Permitted Phases			6			4	
Minimum Split (s)	58.5		13.5	58.5	30.0	13.5	4.0
Total Split (s)	83.0		13.5	83.0	49.5	13.5	4.0
Total Split (%)	55.3%		9.0%	55.3%	33.0%	9.0%	3%
Maximum Green (s)	76.5		8.5	76.5	44.0	8.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	
Walk Time (s)	10.0				6.0	0.0	
Flash Dont Walk (s)	4.0				18.0	2.0	

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		0
Act Effct Green (s)	78.0			86.5	45.0	59.0	
Actuated g/C Ratio	0.52			0.58	0.30	0.39	
v/c Ratio	0.71			0.90	0.62	0.16	
Control Delay	8.5			16.7	51.5	20.4	
Queue Delay	1.4			3.4	0.0	0.0	
Total Delay	9.8			20.1	51.5	20.4	
LOS	A			C	D	C	
Approach Delay	9.8			20.1	44.2		
Approach LOS	A			C	D		
Queue Length 50th (ft)	101			179	264	40	
Queue Length 95th (ft)	m109			250	373	82	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	3045			2546	505	611	
Starvation Cap Reductn	615			1	0	0	
Spillback Cap Reductn	31			175	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.89			0.97	0.62	0.16	

**Intersection Summary**


















Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 150  
 Offset: 143 (95%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 110  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 17.6 Intersection LOS: B  
 Intersection Capacity Utilization 87.1% ICU Level of Service E  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

→ Ø2 (R)	83 s	↖ Ø4	49.5 s	↗ Ø9	13.5 s
↙ Ø6 (R)	83 s				

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	81	129	0	0	0	0	600	26	29	1167	0
Future Volume (vph)	54	81	129	0	0	0	0	600	26	29	1167	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		0
Storage Lanes	1		1	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.75		0.63					0.97			0.99	
Frt			0.850					0.994				
Flt Protected	0.950										0.999	
Satd. Flow (prot)	1711	1652	1546	0	0	0	0	4449	0	0	5793	0
Flt Permitted	0.950										0.895	
Satd. Flow (perm)	1287	1652	969	0	0	0	0	4449	0	0	5161	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			22									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	143		288	288		143	469		293	293		469
Confl. Bikes (#/hr)			112						31			16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	2%	15%	1%	0%	0%	0%	0%	9%	0%	47%	8%	0%
Adj. Flow (vph)	56	84	133	0	0	0	0	619	27	30	1203	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	84	133	0	0	0	0	646	0	0	1233	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	63.0	63.0	63.0					87.0		87.0	87.0	
Total Split (%)	42.0%	42.0%	42.0%					58.0%		58.0%	58.0%	
Maximum Green (s)	56.5	56.5	56.5					81.0		81.0	81.0	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive













10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	31.5
Total Split (s)	87.0	63.0
Total Split (%)	58%	42%
Maximum Green (s)	81.0	56.5
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	10.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effect Green (s)	58.0	58.0	58.0					82.5			82.5	
Actuated g/C Ratio	0.39	0.39	0.39					0.55			0.55	
v/c Ratio	0.11	0.13	0.34					0.26			0.43	
Control Delay	30.4	30.5	29.9					13.9			20.6	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	30.4	30.5	29.9					13.9			20.6	
LOS	C	C	C					B			C	
Approach Delay		30.2						13.9			20.6	
Approach LOS		C						B			C	
Queue Length 50th (ft)	35	53	76					104			200	
Queue Length 95th (ft)	68	93	136					m113			230	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	497	638	388					2446			2838	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			61	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.11	0.13	0.34					0.26			0.44	

## Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 66 (44%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 19.8

Intersection LOS: B









Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

			
02 (R)			04
87 s			63 s
			
06 (R)			08
87 s			63 s

















Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	759	0	0	0	498	0	0	
Future Volume (vph)	0	0	0	0	759	0	0	0	498	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	825	0	0	0	541	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	825	0	0	0	541	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			66.0
Total Split (s)	56.0		56.0						56.0			98.0
Total Split (%)	37.3%		37.3%						37.3%			65%
Maximum Green (s)	49.0		49.0						49.0			91.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					79.0				49.0			
Actuated g/C Ratio					0.53				0.33			


Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	4	5	8	9
Permitted Phases				
Minimum Split (s)	32.0	27.0	32.0	10.0
Total Split (s)	42.0	42.0	42.0	10.0
Total Split (%)	28%	28%	28%	7%
Maximum Green (s)	35.0	35.5	35.5	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0
All-Red Time (s)	3.0	2.5	2.5	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lag		
Lead-Lag Optimize?		Yes		
Walk Time (s)	4.0			
Flash Dont Walk (s)	21.0			
Pedestrian Calls (#/hr)	0			
Act Effct Green (s)				
Actuated g/C Ratio				

**Lanes, Volumes, Timings**  
**11: 12th Street SW**

10/20/2017

												
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
v/c Ratio					0.33				0.25			
Control Delay					20.8				1.3			
Queue Delay					0.1				14.4			
Total Delay					20.9				15.8			
LOS					C				B			
Approach Delay					20.9			15.8				
Approach LOS					C			B				
Queue Length 50th (ft)					165				0			
Queue Length 95th (ft)					196				m0			
Internal Link Dist (ft)		132			189			73		90		
Turn Bay Length (ft)												
Base Capacity (vph)					2499				2142			
Starvation Cap Reductn					0				1583			
Spillback Cap Reductn					414				0			
Storage Cap Reductn					0				0			
Reduced v/c Ratio					0.40				0.97			

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 141 (94%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 150

Control Type: Pretimed

Maximum v/c Ratio: 1.46

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 23.3%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW

#7 Ø2 (R) 98 s	#7 Ø4 42 s	#7 Ø9 10 s
#7 #11 Ø6 (R) 56 s	#7 #11 Ø5 42 s	#7 #11 Ø8 42 s

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↗	↖	↑	↗	↖	↓
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↖↖↖			↖↖↖				↖	↖		↖
Traffic Volume (vph)	0	1934	53	70	1856	0	32	237	0	229	0	0
Future Volume (vph)	0	1934	53	70	1856	0	32	237	0	229	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99							0.69			
Frt		0.996								0.850		
Flt Protected					0.998				0.950			
Satd. Flow (prot)	0	5907	0	0	5917	0	0	0	1627	1492	0	1773
Flt Permitted					0.723				0.757			
Satd. Flow (perm)	0	5907	0	0	4287	0	0	0	889	1492	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		4								239		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	201		138	138		201	103	103				
Confl. Bikes (#/hr)			12			22						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	2%	2%	0%	3%	0%	0%	4%	0%	1%	0%	0%
Adj. Flow (vph)	0	2015	55	73	1933	0	33	247	0	239	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2070	0	0	2006	0	0	0	280	239	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6			8	8			8	
Minimum Split (s)	30.5	30.5		10.5	25.5		30.5	30.5	30.5	10.5	30.5	30.5
Total Split (s)	67.0	67.0		19.0	86.0		59.0	59.0	59.0	19.0	59.0	59.0
Total Split (%)	44.7%	44.7%		12.7%	57.3%		39.3%	39.3%	39.3%	12.7%	39.3%	39.3%
Maximum Green (s)	57.5	57.5		13.5	80.5		53.5	53.5	53.5	13.5	53.5	53.5
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			-1.5				-1.5	-1.5		-1.5
Total Lost Time (s)		8.0			4.0				4.0	4.0		4.0
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0		5.0	5.0	5.0		5.0	5.0
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0		0	0
Act Effct Green (s)		59.0			82.0				55.0	15.0		
Actuated g/C Ratio		0.39			0.55				0.37	0.10		

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW













10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	3%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
v/c Ratio		0.89			0.80			0.86	0.66			
Control Delay		12.7			12.0			69.6	16.4			
Queue Delay		0.5			0.4			0.0	0.0			
Total Delay		13.2			12.4			69.6	16.4			
LOS		B			B			E	B			
Approach Delay		13.2			12.4			45.1				
Approach LOS		B			B			D				
Queue Length 50th (ft)		61			162			252	0			
Queue Length 95th (ft)		72			m168			#428	90			
Internal Link Dist. (ft)		460			526			486			225	
Turn Bay Length (ft)												
Base Capacity (vph)		2325			2506			325	364			
Starvation Cap Reductn		56			141			0	0			
Spillback Cap Reductn		0			0			0	0			
Storage Cap Reductn		0			0			0	0			
Reduced v/c Ratio		0.91			0.85			0.86	0.66			

### Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 3 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 16.4

Intersection LOS: B

Intersection Capacity Utilization 85.3%

ICU Level of Service E

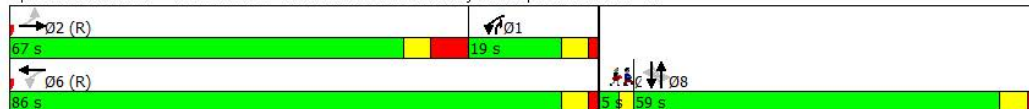
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	1673	349	23	1392	152	183	333	141	272	673	351
Future Volume (vph)	141	1673	349	23	1392	152	183	333	141	272	673	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		0	0		0	80		0	0		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.95			0.97		0.92	0.87		0.83	0.86	
Frt		0.976			0.985			0.955			0.949	
Flt Protected		0.997			0.999		0.950			0.950		
Satd. Flow (prot)	0	5506	0	0	5613	0	1662	3908	0	1616	3826	0
Flt Permitted		0.701			0.806		0.232			0.391		
Satd. Flow (perm)	0	3871	0	0	4529	0	373	3908	0	552	3826	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		7			21						75	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	232		222	222		232	444		444	444		444
Confl. Bikes (#/hr)			7			9			18			17
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	4%	2%	2%	11%	2%	15%	5%	6%	10%	8%	9%	4%
Adj. Flow (vph)	144	1707	356	23	1420	155	187	340	144	278	687	358
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2207	0	0	1598	0	187	484	0	278	1045	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	80.0		69.0	69.0		58.0	58.0		12.0	70.0	
Total Split (%)	7.3%	53.3%		46.0%	46.0%		38.7%	38.7%		8.0%	46.7%	
Maximum Green (s)	5.5	73.5		62.5	62.5		51.5	51.5		7.0	63.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lag			Lead	Lead		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

**Lanes, Volumes, Timings**  
**22: 7th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		75.0			64.0		53.0	53.0		66.5	65.0	
Actuated g/C Ratio		0.50			0.43		0.35	0.35		0.44	0.43	
v/c Ratio		1.13dl			0.82		1.43	0.35		0.91	0.61	
Control Delay		63.5			41.8		266.8	36.7		53.2	17.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.1	
Total Delay		63.5			41.8		266.8	36.7		53.2	18.0	
LOS		E			D		F	D		D	B	
Approach Delay		63.5			41.8			100.8			25.4	
Approach LOS		E			D			F			C	
Queue Length 50th (ft)		~97			393		~246	127		192	279	
Queue Length 95th (ft)		#792			445		#408	162		#361	331	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2004			1944		131	1380		305	1700	
Starvation Cap Reductn		0			0		0	0		0	75	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		1.10			0.82		1.43	0.35		0.91	0.64	

**Intersection Summary**

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 10 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.43

Intersection Signal Delay: 53.2

Intersection LOS: D

Intersection Capacity Utilization 108.3%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 22: 7th Street SW & Independence Ave SW

↗ Ø2 (R)	↖ Ø3	↑ Ø4
80 s	12 s	58 s
↖ Ø6 (R)	↗ Ø5	↓ Ø8
69 s	11 s	70 s

Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	13	673	87	2	548	202	0	1325	288	128	1009	87
Future Volume (vph)	13	673	87	2	548	202	0	1325	288	128	1009	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.95			1.00	0.67			0.65	0.97	0.96	
Frt		0.983				0.850			0.850		0.988	
Flt Protected		0.999								0.950		
Satd. Flow (prot)	0	4586	0	0	4604	1478	0	4746	1463	1589	4466	0
Flt Permitted		0.924			0.937					0.109		
Satd. Flow (perm)	0	4233	0	0	4312	985	0	4746	954	177	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				186			109		2	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	413		738	738		413	831		426	426		831
Confl. Bikes (#/hr)			14			16			4			6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	29%	2%	3%	50%	5%	2%	0%	2%	3%	6%	3%	7%
Adj. Flow (vph)	14	724	94	2	589	217	0	1425	310	138	1085	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	832	0	0	591	217	0	1425	310	138	1179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		48.0	48.0	15.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%	37.0%		48.0%	48.0%	15.0%	63.0%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		41.5	41.5	8.5	56.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	

## Lanes, Volumes, Timings

### 2: 14th Street SW & Independence Ave SW

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effect Green (s)		32.0			32.0	32.0		43.0	43.0	57.5	58.0	
Actuated g/C Ratio		0.32			0.32	0.32		0.43	0.43	0.58	0.58	
v/c Ratio		0.61			0.43	0.49		0.70	0.66	0.59	0.46	
Control Delay		31.1			35.7	19.1		25.5	22.0	29.8	9.1	
Queue Delay		0.0			0.0	0.1		1.3	0.0	0.0	0.1	
Total Delay		31.1			35.7	19.2		26.8	22.0	29.8	9.2	
LOS		C			D	B		C	C	C	A	
Approach Delay		31.1			31.3			26.0			11.3	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)		163			144	68		264	99	28	90	
Queue Length 95th (ft)		207			m167	m97		318	205	89	100	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1355			1379	441		2040	472	235	2591	
Starvation Cap Reductn		0			0	0		0	0	0	289	
Spillback Cap Reductn		0			0	14		382	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.61			0.43	0.51		0.86	0.66	0.59	0.51	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 23.7

Intersection LOS: C

Intersection Capacity Utilization 88.1%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 2: 14th Street SW & Independence Ave SW

↑ Ø2 (R)	↙ Ø1	→ Ø4
48 s	15 s	37 s
↓ Ø6 (R)		← Ø8
63 s		37 s

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	88	86	0	0	0	0	1406	134	92	1138	0
Future Volume (vph)	73	88	86	0	0	0	0	1406	134	92	1138	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.48	0.81						0.94				
Frt		0.926						0.987				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1517	1313	0	0	0	0	0	4654	0	1620	4700	0
Flt Permitted	0.950									0.107		
Satd. Flow (perm)	735	1313	0	0	0	0	0	4654	0	182	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								16				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	1284		396	396		1284	733		440	440		733
Confl. Bikes (#/hr)			136						25			24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	19%	15%	3%	0%	0%	0%	0%	3%	6%	4%	3%	0%
Adj. Flow (vph)	77	93	91	0	0	0	0	1480	141	97	1198	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	184	0	0	0	0	0	1621	0	97	1198	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		20.5	20.5	
Total Split (s)	35.0	35.0						65.0		65.0	65.0	
Total Split (%)	35.0%	35.0%						65.0%		65.0%	65.0%	
Maximum Green (s)	28.5	28.5						59.5		59.5	59.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0						10.0		10.0	10.0	

Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	6
Permitted Phases	
Minimum Split (s)	22.5
Total Split (s)	65.0
Total Split (%)	65%
Maximum Green (s)	59.5
Yellow Time (s)	4.0
All-Red Time (s)	1.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	10.0

10/20/2017

Queue shown is maximum after two cycles.



Lanes, Volumes, Timings  
4: 14th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6
Flash Dont Walk (s)	7.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	













Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖					↗
Traffic Volume (vph)	264	46	0	0	0	75
Future Volume (vph)	264	46	0	0	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.980					0.865
Flt Protected						
Satd. Flow (prot)	1845	0	0	0	0	1587
Flt Permitted						
Satd. Flow (perm)	1845	0	0	0	0	1587
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		845			541	
Confl. Bikes (#/hr)		133				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	9%	0%	2%	2%	0%	7%
Adj. Flow (vph)	307	53	0	0	0	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	360	0	0	0	0	87
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 29.7%	ICU Level of Service A					
Analysis Period (min) 15						

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2
Lane Configurations			↑↑↑		↑	↑↑↑				↑	↑	↑
Traffic Volume (vph)	31	54	911	93	74	636	37	102	98	31	147	202
Future Volume (vph)	31	54	911	93	74	636	37	102	98	31	147	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	11	11	11
Storage Length (ft)		0		0	0		100			0		
Storage Lanes		0		0	1		0			1		
Taper Length (ft)		100			100					100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.86	0.86	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor			0.95		0.92	0.84				0.63		0.91
Frt			0.987			0.973						0.850
Flt Protected			0.996		0.950					0.950		
Satd. Flow (prot)	0	0	4582	0	1449	3733	0	0	0	1745	1818	1561
Flt Permitted			0.735		0.950	0.930				0.950		
Satd. Flow (perm)	0	0	3341	0	1332	3472	0	0	0	1100	1818	1419
Right Turn on Red				Yes								Yes
Satd. Flow (RTOR)			18									187
Link Speed (mph)			35			35					30	
Link Distance (ft)			1104			603					153	
Travel Time (s)			21.5			11.7					3.5	
Confl. Peds. (#/hr)	289			370	370		289	289	475			59
Confl. Bikes (#/hr)				27			30	30				
Peak Hour Factor	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	33	59	980	100	80	684	40	110	105	33	158	217
Shared Lane Traffic (%)					10%							
Lane Group Flow (vph)	0	0	1172	0	72	842	0	0	0	138	158	217
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			0			10					56	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			30			25					28	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	15		9	15		9	9	15	15		9
Turn Type	Perm	Perm	NA		Prot	NA			custom	custom	NA	custom
Protected Phases			6		5	2					4	5
Permitted Phases	6	6							4 8	4 8	8	4 8
Minimum Split (s)	20.0	20.0	20.0		11.4	54.0					32.5	11.4
Total Split (s)	43.5	43.5	43.5		12.0	55.5					32.5	12.0
Total Split (%)	43.5%	43.5%	43.5%		12.0%	55.5%					32.5%	12.0%
Maximum Green (s)	36.5	36.5	36.5		5.5	49.0					22.0	5.5
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0					4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		2.5	2.5					6.5	2.5
Lost Time Adjust (s)			-1.5		-1.5	-1.5					-1.5	-1.5
Total Lost Time (s)			5.5		5.0	5.0					9.0	5.0
Lead/Lag	Lead	Lead	Lead		Lag							Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							Yes
Walk Time (s)	7.0	7.0	7.0			7.0					4.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

						Ø8
Lane Group	SEL2	SEL	SER	SER2	SWL	Ø8
Lane Configurations		Y			Y	
Traffic Volume (vph)	1	20	11	32	0	
Future Volume (vph)	1	20	11	32	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	10	13	10	10	10	
Storage Length (ft)		0	0		0	
Storage Lanes		1	0		1	
Taper Length (ft)		100			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.73				
Frt		0.910				
Flt Protected		0.984				
Satd. Flow (prot)	0	1318	0	0	1739	
Flt Permitted		0.984				
Satd. Flow (perm)	0	1283	0	0	1739	
Right Turn on Red				Yes		
Satd. Flow (RTOR)		164				
Link Speed (mph)		30			30	
Link Distance (ft)		401			276	
Travel Time (s)		9.1			6.3	
Confl. Peds. (#/hr)		59		475		
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	
Heavy Vehicles (%)	2%	0%	0%	0%	2%	
Adj. Flow (vph)	1	22	12	34	0	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	69	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Right	Left	
Median Width(ft)		13			10	
Link Offset(ft)		40			0	
Crosswalk Width(ft)		20			16	
Two way Left Turn Lane						
Headway Factor	1.09	0.96	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	9	15	
Turn Type	D.Pm	D.Pm			Prot	
Protected Phases					9	8
Permitted Phases	4 8	4 8				
Minimum Split (s)					12.0	11.5
Total Split (s)					12.0	32.5
Total Split (%)					12.0%	33%
Maximum Green (s)					7.5	26.0
Yellow Time (s)					3.5	4.0
All-Red Time (s)					1.0	2.5
Lost Time Adjust (s)					-1.5	
Total Lost Time (s)					3.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)						

## Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	↖	↗	→	↘	↙	←	↖	↗	↘	↙	↑	↗
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2
Flash Dont Walk (s)	6.0	6.0	6.0			4.0					18.0	
Pedestrian Calls (#/hr)	0	0	0			0					0	
Act Effct Green (s)			38.0		7.0	50.5				23.5	23.5	34.5
Actuated g/C Ratio			0.38		0.07	0.50				0.24	0.24	0.34
v/c Ratio			0.92		0.71	1.79dr				0.53	0.37	0.35
Control Delay			31.7		89.1	43.4				21.3	14.3	4.9
Queue Delay			0.0		0.0	0.0				3.5	3.5	0.7
Total Delay			31.7		89.1	43.4				24.8	17.7	5.5
LOS			C		F	D				C	B	A
Approach Delay			31.7			47.0					14.5	
Approach LOS			C			D					B	
Queue Length 50th (ft)			280		58	99				77	85	59
Queue Length 95th (ft)			#362		#141	#106				142	145	124
Internal Link Dist (ft)			1024			523					73	
Turn Bay Length (ft)												
Base Capacity (vph)			1280		101	988				258	427	621
Starvation Cap Reductn			0		0	0				59	187	176
Spillback Cap Reductn			0		0	0				0	0	0
Storage Cap Reductn			0		0	0				0	0	0
Reduced v/c Ratio			0.92		0.71	0.85				0.69	0.66	0.49

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 32.8

Intersection LOS: C

Intersection Capacity Utilization 96.7%

ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.






dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock

#7 ← Ø2 (R)	#7 ↑ Ø4	#7 ↙ Ø9
55.5 s	32.5 s	12 s
#7 #11 ↘ Ø6 (R)	#7 #11 ↑ Ø5	#7 #11 ↑ Ø8
43.5 s	12 s	32.5 s

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

						
Lane Group	SEL2	SEL	SER	SER2	SWL	Ø8
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
Act Effect Green (s)		23.5				
Actuated g/C Ratio		0.24				
v/c Ratio		0.16				
Control Delay		0.9				
Queue Delay		0.0				
Total Delay		0.9				
LOS		A				
Approach Delay		0.9				
Approach LOS		A				
Queue Length 50th (ft)		0				
Queue Length 95th (ft)		m0				
Internal Link Dist (ft)		321			196	
Turn Bay Length (ft)						
Base Capacity (vph)		426				
Starvation Cap Reductn		0				
Spillback Cap Reductn		0				
Storage Cap Reductn		0				
Reduced v/c Ratio		0.16				
Intersection Summary						

Lanes, Volumes, Timings  
9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations					↘	↗	
Traffic Volume (vph)	1086	47	45	818	33	78	
Future Volume (vph)	1086	47	45	818	33	78	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.91	0.91	1.00	1.00	
Ped Bike Factor	0.97			1.00	0.62		
Frt	0.994					0.850	
Flt Protected				0.997	0.950		
Satd. Flow (prot)	5755	0	0	4625	1404	1396	
Flt Permitted				0.820	0.950		
Satd. Flow (perm)	5755	0	0	3789	866	1396	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	11					51	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		375	375		573		
Confl. Bikes (#/hr)		30					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	11%	11%	4%	20%	8%	
Adj. Flow (vph)	1155	50	48	870	35	83	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1205	0	0	918	35	83	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		1	6	4	1	3
Permitted Phases			6			4	
Minimum Split (s)	20.5		10.0	16.5	30.0	10.0	4.0
Total Split (s)	49.5		16.5	66.0	30.0	16.5	4.0
Total Split (%)	49.5%		16.5%	66.0%	30.0%	16.5%	4%
Maximum Green (s)	43.0		11.5	59.5	24.5	11.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag	Lag		Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Walk Time (s)	10.0				6.0		
Flash Dont Walk (s)	4.0				18.0		

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		
Act Effct Green (s)	44.5			61.0	25.5	42.5	
Actuated g/C Ratio	0.44			0.61	0.26	0.42	
v/c Ratio	0.47			0.38	0.10	0.13	
Control Delay	8.0			12.1	29.5	8.8	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	8.0			12.1	29.5	8.8	
LOS	A			B	C	A	
Approach Delay	8.0			12.1	14.9		
Approach LOS	A			B	B		
Queue Length 50th (ft)	46			131	17	12	
Queue Length 95th (ft)	m51			179	43	41	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2567			2407	358	622	
Starvation Cap Reductn	0			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.47			0.38	0.10	0.13	

**Intersection Summary**


















Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 10 (10%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.47  
 Intersection Signal Delay: 10.1  
 Intersection LOS: B  
 Intersection Capacity Utilization 51.5%  
 ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

Ø1 16.5 s	Ø2 (R) 49.5 s	Ø4 30 s
Ø6 (R) 66 s		

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	91	105	0	0	0	0	575	61	57	422	0
Future Volume (vph)	124	91	105	0	0	0	0	575	61	57	422	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		50
Storage Lanes	1		1	0		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.69		0.46					0.93			0.96	
Frt			0.850					0.986				
Flt Protected	0.950										0.994	
Satd. Flow (prot)	1631	1652	1561	0	0	0	0	4332	0	0	5889	0
Flt Permitted	0.950										0.818	
Satd. Flow (perm)	1125	1652	717	0	0	0	0	4332	0	0	4675	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			33									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	303		1270	303		1270	654		511	511		654
Confl. Bikes (#/hr)			70						4			25
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	15%	0%	0%	0%	0%	0%	4%	22%	4%	7%	0%
Adj. Flow (vph)	127	93	107	0	0	0	0	587	62	58	431	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	93	107	0	0	0	0	649	0	0	489	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					67.5		67.5	67.5	
Total Split (%)	32.5%	32.5%	32.5%					67.5%		67.5%	67.5%	
Maximum Green (s)	26.0	26.0	26.0					61.5		61.5	61.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	28.5
Total Split (s)	67.5	32.5
Total Split (%)	68%	33%
Maximum Green (s)	61.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	7.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effct Green (s)	27.5	27.5	27.5					63.0			63.0	
Actuated g/C Ratio	0.28	0.28	0.28					0.63			0.63	
v/c Ratio	0.41	0.20	0.48					0.24			0.17	
Control Delay	38.1	33.4	33.0					3.4			7.8	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	38.1	33.4	33.0					3.4			7.8	
LOS	D	C	C					A			A	
Approach Delay		35.1						3.4			7.8	
Approach LOS		D						A			A	
Queue Length 50th (ft)	69	49	41					16			34	
Queue Length 95th (ft)	m115	m84	m84					31			46	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	309	454	221					2729			2945	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			0	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.41	0.20	0.48					0.24			0.17	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 12.0

Intersection LOS: B

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

↑↓ Ø2 (R)	↔ Ø4
67.5 s	32.5 s
⤴⤵ Ø6 (R)	⤴⤵ Ø8
67.5 s	32.5 s

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↙	↖	↗
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations	↙		↗		↕				↗			
Traffic Volume (vph)	0	0	0	0	478	0	0	0	178	0	0	
Future Volume (vph)	0	0	0	0	478	0	0	0	178	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	520	0	0	0	193	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	520	0	0	0	193	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			54.0
Total Split (s)	43.5		43.5						43.5			55.5
Total Split (%)	43.5%		43.5%						43.5%			56%
Maximum Green (s)	36.5		36.5						36.5			49.0
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					39.5				36.5			
Actuated g/C Ratio					0.40				0.36			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	4	5	8	9
Permitted Phases				
Minimum Split (s)	32.5	11.4	11.5	12.0
Total Split (s)	32.5	12.0	32.5	12.0
Total Split (%)	33%	12%	33%	12%
Maximum Green (s)	22.0	5.5	26.0	7.5
Yellow Time (s)	4.0	4.0	4.0	3.5
All-Red Time (s)	6.5	2.5	2.5	1.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lag		
Lead-Lag Optimize?		Yes		
Walk Time (s)	4.0			
Flash Dont Walk (s)	18.0			
Pedestrian Calls (#/hr)	0			
Act Effct Green (s)				
Actuated g/C Ratio				

**Lanes, Volumes, Timings**  
**11: 12th Street SW**

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↘
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
v/c Ratio					0.28				0.09			
Control Delay					21.1				0.1			
Queue Delay					0.0				1.4			
Total Delay					21.1				1.5			
LOS					C				A			
Approach Delay					21.1			1.5				
Approach LOS					C			A				
Queue Length 50th (ft)					80				0			
Queue Length 95th (ft)					108				m0			
Internal Link Dist (ft)		132			189			73		90		
Turn Bay Length (ft)												
Base Capacity (vph)					1874				2168			
Starvation Cap Reductn					0				1784			
Spillback Cap Reductn					166				0			
Storage Cap Reductn					0				0			
Reduced v/c Ratio					0.30				0.50			

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 14.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW

#7 ↙ Ø2 (R) 55.5 s	#7 ↑ Ø4 32.5 s	#7 ↘ Ø9 12 s
#7 #11 ↙ Ø6 (R) 43.5 s	#7 #11 ↑ Ø5 12 s	#7 #11 ↑ Ø8 32.5 s

Lanes, Volumes, Timings  
11: 12th Street SW


















10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	1044	119	167	847	0	14	11	0	1	0	0
Future Volume (vph)	0	1044	119	167	847	0	14	11	0	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0		0		0	0	
Storage Lanes	0		1	0		0		0		1	0	
Taper Length (ft)	100			100				100			25	
Lane Util. Factor	0.86	0.86	0.86	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.99				0.85			
Frt		0.985								0.850		
Flt Protected					0.992				0.950			
Satd. Flow (prot)	0	5663	0	0	4647	0	0	0	1685	1507	0	1773
Flt Permitted					0.643				0.757			
Satd. Flow (perm)	0	5663	0	0	2989	0	0	0	1144	1507	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		32								153		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	161		200	200		161		148				
Confl. Bikes (#/hr)			30			28						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1088	124	174	882	0	15	11	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1212	0	0	1056	0	0	0	26	1	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6			8	8			8	
Minimum Split (s)	29.5	29.5		10.5	25.5		35.5	35.5	35.5	10.5	35.5	35.5
Total Split (s)	47.5	47.5		12.0	59.5		35.5	35.5	35.5	12.0	35.5	35.5
Total Split (%)	47.5%	47.5%		12.0%	59.5%		35.5%	35.5%	35.5%	12.0%	35.5%	35.5%
Maximum Green (s)	38.0	38.0		6.5	54.0		30.0	30.0	30.0	6.5	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0		10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW













10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Ped Bike Factor		
Frnt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	148	
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		39.5			54.0			30.0	6.5			
Actuated g/C Ratio		0.40			0.54			0.30	0.06			
v/c Ratio		0.54			0.61			0.08	0.00			
Control Delay		6.8			12.6			26.0	0.0			
Queue Delay		0.0			0.0			0.0	0.0			
Total Delay		6.8			12.6			26.0	0.0			
LOS		A			B			C	A			
Approach Delay		6.8			12.6			25.0				
Approach LOS		A			B			C				
Queue Length 50th (ft)		108			90			12	0			
Queue Length 95th (ft)		134			98			32	0			
Internal Link Dist (ft)		460			526			486			225	
Turn Bay Length (ft)												
Base Capacity (vph)		2256			1721			343	241			
Starvation Cap Reductn		0			0			0	0			
Spillback Cap Reductn		0			0			0	0			
Storage Cap Reductn		0			0			0	0			
Reduced v/c Ratio		0.54			0.61			0.08	0.00			

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 9.7

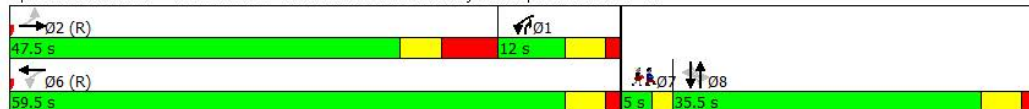
Intersection LOS: A

Intersection Capacity Utilization 78.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	765	98	14	705	194	92	265	59	125	190	212
Future Volume (vph)	177	765	98	14	705	194	92	265	59	125	190	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		75	0		0	80		0	0		50
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96			0.92		0.82	0.94		0.82	0.83	
Frt		0.986			0.968			0.973			0.921	
Flt Protected		0.992			0.999		0.950			0.950		
Satd. Flow (prot)	0	5594	0	0	5180	0	1616	4441	0	1646	3644	0
Flt Permitted		0.715			0.904		0.500			0.476		
Satd. Flow (perm)	0	3982	0	0	4683	0	699	4441	0	672	3644	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		36			82						139	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	389		230	230		389	333		308	308		333
Confl. Bikes (#/hr)			20			29			19			14
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	7%	3%	4%	0%	4%	10%	8%	3%	4%	6%	7%	3%
Adj. Flow (vph)	182	789	101	14	727	200	95	273	61	129	196	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1072	0	0	941	0	95	334	0	129	415	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	57.0		46.0	46.0		32.5	32.5		10.5	43.0	
Total Split (%)	11.0%	57.0%		46.0%	46.0%		32.5%	32.5%		10.5%	43.0%	
Maximum Green (s)	5.5	50.5		39.5	39.5		26.0	26.0		5.5	36.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		52.0			41.0		27.5	27.5		39.5	38.0	
Actuated g/C Ratio		0.52			0.41		0.28	0.28		0.40	0.38	
v/c Ratio		0.49			0.48		0.49	0.27		0.39	0.28	
Control Delay		1.6			20.6		40.9	29.2		20.7	11.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		1.6			20.6		40.9	29.2		20.7	11.1	
LOS		A			C		D	C		C	B	
Approach Delay		1.6			20.6			31.8			13.4	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)		9			113		51	61		45	25	
Queue Length 95th (ft)		16			144		105	87		71	38	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2184			1968		192	1221		333	1470	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.49			0.48		0.49	0.27		0.39	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 51 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.0

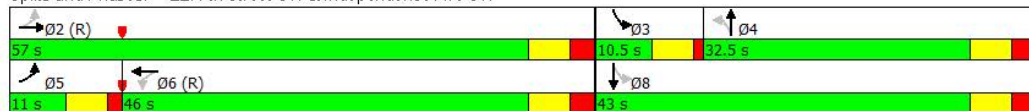
Intersection LOS: B

Intersection Capacity Utilization 83.3%

ICU Level of Service E













Analysis Period (min) 15

Splits and Phases: 22: 7th Street SW & Independence Ave SW



Lanes, Volumes, Timings  
2: 14th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑	↑		↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	13	673	87	2	548	202	0	1325	288	128	1009	87
Future Volume (vph)	13	673	87	2	548	202	0	1325	288	128	1009	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	0		0	0		100	0		0	0		0
Storage Lanes	0		0	0		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	1.00	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor		0.95			1.00	0.67			0.65	0.97	0.96	
Frt		0.983				0.850			0.850		0.988	
Flt Protected		0.999								0.950		
Satd. Flow (prot)	0	4586	0	0	4604	1478	0	4746	1463	1589	4466	0
Flt Permitted		0.924			0.937					0.109		
Satd. Flow (perm)	0	4233	0	0	4312	985	0	4746	954	177	4466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				186			109		2	
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		370			1104			509			377	
Travel Time (s)		7.2			21.5			11.6			8.6	
Confl. Peds. (#/hr)	413		738	738		413	831		426	426		831
Confl. Bikes (#/hr)			14			16			4			6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	29%	2%	3%	50%	5%	2%	0%	2%	3%	6%	3%	7%
Adj. Flow (vph)	14	724	94	2	589	217	0	1425	310	138	1085	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	832	0	0	591	217	0	1425	310	138	1179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			4			10	
Link Offset(ft)		0			0			5			0	
Crosswalk Width(ft)		20			30			30			26	
Two way Left Turn Lane												
Headway Factor	1.09	1.04	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8			2	6		
Minimum Split (s)	36.5	36.5		36.5	36.5	36.5		31.5	31.5	10.5	31.5	
Total Split (s)	37.0	37.0		37.0	37.0	37.0		48.0	48.0	15.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%	37.0%		48.0%	48.0%	15.0%	63.0%	
Maximum Green (s)	30.5	30.5		30.5	30.5	30.5		41.5	41.5	8.5	56.5	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.5		2.5	2.5	2.5	2.5	
Lost Time Adjust (s)		-1.5			-1.5	-1.5		-1.5	-1.5	-1.0	-1.5	
Total Lost Time (s)		5.0			5.0	5.0		5.0	5.0	5.5	5.0	
Lead/Lag								Lead	Lead	Lag		
Lead-Lag Optimize?								Yes	Yes	Yes		
Walk Time (s)	7.0	7.0		7.0	7.0	7.0		6.0	6.0		6.0	

**Lanes, Volumes, Timings**  
**2: 14th Street SW & Independence Ave SW**

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	23.0	23.0		23.0	23.0	23.0		19.0	19.0		19.0	
Pedestrian Calls (#/hr)	0	0		0	0	0		0	0		0	
Act Effct Green (s)		32.0			32.0	32.0		43.0	43.0	57.5	58.0	
Actuated g/C Ratio		0.32			0.32	0.32		0.43	0.43	0.58	0.58	
v/c Ratio		0.61			0.43	0.49		0.70	0.66	0.59	0.46	
Control Delay		31.1			35.4	19.0		25.5	22.0	43.6	15.0	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.5	
Total Delay		31.1			35.4	19.0		25.5	22.0	43.6	15.6	
LOS		C			D	B		C	C	D	B	
Approach Delay		31.1			31.0			24.9			18.5	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)		163			142	66		264	99	54	207	
Queue Length 95th (ft)		207			m173	m102		318	205	104	258	
Internal Link Dist (ft)		290			1024			429			297	
Turn Bay Length (ft)						100						
Base Capacity (vph)		1355			1379	441		2040	472	235	2591	
Starvation Cap Reductn		0			0	0		0	0	0	894	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.61			0.43	0.49		0.70	0.66	0.59	0.69	

**Intersection Summary**

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 25.2

Intersection LOS: C

Intersection Capacity Utilization 88.1%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.



















Splits and Phases: 2: 14th Street SW & Independence Ave SW

↑ Ø2 (R)	↘ Ø1	→ Ø4
48 s	15 s	37 s
↓ Ø6 (R)		← Ø8
63 s		37 s

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	88	86	0	0	0	0	1406	134	92	1138	0
Future Volume (vph)	73	88	86	0	0	0	0	1406	134	92	1138	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	10	10	10	10	10	12	12	10	10	10
Storage Length (ft)	0		0	0		0	0		20	170		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.48	0.81						0.94				
Frt		0.926						0.987				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1517	1313	0	0	0	0	0	4654	0	1620	4700	0
Flt Permitted	0.950									0.078		
Satd. Flow (perm)	735	1313	0	0	0	0	0	4654	0	133	4700	0
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)								21				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		257			1068			377			341	
Travel Time (s)		5.8			24.3			8.6			7.8	
Confl. Peds. (#/hr)	1284		396	396		1284	733		440	440		733
Confl. Bikes (#/hr)			136						25			24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	19%	15%	3%	0%	0%	0%	0%	3%	6%	4%	3%	0%
Adj. Flow (vph)	77	93	91	0	0	0	0	1480	141	97	1198	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	184	0	0	0	0	0	1621	0	97	1198	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		15			12			0			10	
Link Offset(ft)		0			15			0			5	
Crosswalk Width(ft)		30			35			37			35	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						6		5	2	
Permitted Phases	4									2		
Minimum Split (s)	34.5	34.5						20.5		10.5	20.5	
Total Split (s)	35.0	35.0						51.0		14.0	65.0	
Total Split (%)	35.0%	35.0%						51.0%		14.0%	65.0%	
Maximum Green (s)	28.5	28.5						45.5		8.5	59.5	
Yellow Time (s)	4.0	4.0						4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5						1.5		1.5	1.5	
Lost Time Adjust (s)	-1.5	-1.5						-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0						4.0		4.0	4.0	
Lead/Lag								Lag		Lead		
Lead-Lag Optimize?								Yes		Yes		
Walk Time (s)	10.0	10.0						10.0			10.0	

# Lanes, Volumes, Timings

## 4: 14th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	18.0	18.0						5.0			5.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)	30.0	30.0						47.0		61.0	61.0	
Actuated g/C Ratio	0.30	0.30						0.47		0.61	0.61	
v/c Ratio	0.35	0.47						0.74		0.42	0.42	
Control Delay	33.0	33.3						18.8		16.8	10.8	
Queue Delay	0.0	0.0						0.0		0.0	0.0	
Total Delay	33.0	33.3						18.8		16.8	10.8	
LOS	C	C						B		B	B	
Approach Delay		33.2						18.8			11.2	
Approach LOS		C						B			B	
Queue Length 50th (ft)	38	95						154		24	135	
Queue Length 95th (ft)	82	163						215		62	165	
Internal Link Dist (ft)		177			988			297			261	
Turn Bay Length (ft)										170		
Base Capacity (vph)	220	393						2198		229	2867	
Starvation Cap Reductn	0	0						4		0	0	
Spillback Cap Reductn	0	0						0		0	15	
Storage Cap Reductn	0	0						0		0	0	
Reduced v/c Ratio	0.35	0.47						0.74		0.42	0.42	

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 16.9

Intersection LOS: B

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: 14th Street SW & SW Jefferson Drive















Lanes, Volumes, Timings  
6: 12th Street SW & SW Jefferson Drive

10/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘					↗
Traffic Volume (vph)	264	46	0	0	0	75
Future Volume (vph)	264	46	0	0	0	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	10	10	10	10	13
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.980					0.865
Flt Protected						
Satd. Flow (prot)	1845	0	0	0	0	1587
Flt Permitted						
Satd. Flow (perm)	1845	0	0	0	0	1587
Link Speed (mph)	30			30	30	
Link Distance (ft)	1068			661	401	
Travel Time (s)	24.3			15.0	9.1	
Confl. Peds. (#/hr)		845			541	
Confl. Bikes (#/hr)		133				
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	9%	0%	2%	2%	0%	7%
Adj. Flow (vph)	307	53	0	0	0	87
Shared Lane Traffic (%)						
Lane Group Flow (vph)	360	0	0	0	0	87
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	-2	
Crosswalk Width(ft)	16			16	24	
Two way Left Turn Lane						
Headway Factor	0.92	1.09	1.09	1.09	1.09	0.96
Turning Speed (mph)		9	15		15	9
Sign Control	Stop			Stop	Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 29.7%	ICU Level of Service A					
Analysis Period (min) 15						


# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2
Lane Configurations			↑↑↑		↑	↑↑↑				↑	↑	↑
Traffic Volume (vph)	31	54	911	93	74	636	37	102	98	31	147	202
Future Volume (vph)	31	54	911	93	74	636	37	102	98	31	147	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	11	11	11
Storage Length (ft)		0		0	0		100			0		
Storage Lanes		0		0	1		0			1		
Taper Length (ft)		100			100					100		
Lane Util. Factor	0.91	0.91	0.91	0.91	0.86	0.86	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor			0.95		0.92	0.84				0.63		0.91
Frt			0.987			0.973						0.850
Flt Protected			0.996		0.950					0.950		
Satd. Flow (prot)	0	0	4582	0	1449	3733	0	0	0	1745	1818	1561
Flt Permitted			0.738		0.950	0.931				0.950		
Satd. Flow (perm)	0	0	3354	0	1332	3475	0	0	0	1100	1818	1419
Right Turn on Red				Yes								Yes
Satd. Flow (RTOR)			18									131
Link Speed (mph)			35			35					30	
Link Distance (ft)			1104			603					153	
Travel Time (s)			21.5			11.7					3.5	
Confl. Peds. (#/hr)	289			370	370		289	289	475			59
Confl. Bikes (#/hr)				27			30	30				
Peak Hour Factor	0.93	0.92	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	33	59	980	100	80	684	40	110	105	33	158	217
Shared Lane Traffic (%)					10%							
Lane Group Flow (vph)	0	0	1172	0	72	842	0	0	0	138	158	217
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			0			10					56	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			30			25					28	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04
Turning Speed (mph)	15	15		9	15		9	9	15	15		9
Turn Type	Perm	Perm	NA		Prot	NA			custom	custom	NA	custom
Protected Phases			6		5	2					4	5
Permitted Phases	6	6							4 8	4 8	8	4 8
Minimum Split (s)	20.0	20.0	20.0		11.4	54.0					32.5	11.4
Total Split (s)	44.0	44.0	44.0		13.0	57.0					33.0	13.0
Total Split (%)	44.0%	44.0%	44.0%		13.0%	57.0%					33.0%	13.0%
Maximum Green (s)	37.0	37.0	37.0		6.5	50.5					22.5	6.5
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0					4.0	4.0
All-Red Time (s)	3.0	3.0	3.0		2.5	2.5					6.5	2.5
Lost Time Adjust (s)			-1.5		-1.5	-1.5					-1.5	-1.5
Total Lost Time (s)			5.5		5.0	5.0					9.0	5.0
Lead/Lag	Lead	Lead	Lead		Lag							Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes							Yes
Walk Time (s)	7.0	7.0	7.0			7.0					4.0	

# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

						Ø8
Lane Group	SEL2	SEL	SER	SER2	SWL	Ø8
Lane Configurations		Y			Y	
Traffic Volume (vph)	1	20	11	32	0	
Future Volume (vph)	1	20	11	32	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	
Lane Width (ft)	10	13	10	10	10	
Storage Length (ft)		0	0		0	
Storage Lanes		1	0		1	
Taper Length (ft)		100			25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.73				
Frt		0.910				
Flt Protected		0.984				
Satd. Flow (prot)	0	1318	0	0	1739	
Flt Permitted		0.984				
Satd. Flow (perm)	0	1283	0	0	1739	
Right Turn on Red				Yes		
Satd. Flow (RTOR)		169				
Link Speed (mph)		30			30	
Link Distance (ft)		401			276	
Travel Time (s)		9.1			6.3	
Confl. Peds. (#/hr)		59		475		
Confl. Bikes (#/hr)				2		
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	
Heavy Vehicles (%)	2%	0%	0%	0%	2%	
Adj. Flow (vph)	1	22	12	34	0	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	69	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Right	Left	
Median Width(ft)		13			10	
Link Offset(ft)		40			0	
Crosswalk Width(ft)		20			16	
Two way Left Turn Lane						
Headway Factor	1.09	0.96	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	9	15	
Turn Type	D.Pm	D.Pm			Prot	
Protected Phases					9	8
Permitted Phases	4 8	4 8				
Minimum Split (s)					10.0	11.5
Total Split (s)					10.0	33.0
Total Split (%)					10.0%	33%
Maximum Green (s)					5.0	26.5
Yellow Time (s)					3.0	4.0
All-Red Time (s)					2.0	2.5
Lost Time Adjust (s)					-1.5	
Total Lost Time (s)					3.5	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)						

## Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

	↖	↗	→	↘	↙	←	↖	↗	↘	↙	↑	↗
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR2
Flash Dont Walk (s)	6.0	6.0	6.0			4.0					18.0	
Pedestrian Calls (#/hr)	0	0	0			0					0	
Act Effect Green (s)			38.5		8.0	52.0				24.0	24.0	36.0
Actuated g/C Ratio			0.38		0.08	0.52				0.24	0.24	0.36
v/c Ratio			0.90		0.63	1.56dr				0.52	0.36	0.36
Control Delay			30.4		76.2	39.2				21.4	14.7	4.6
Queue Delay			0.0		0.0	0.0				3.7	3.7	0.6
Total Delay			30.4		76.2	39.2				25.1	18.4	5.2
LOS			C		E	D				C	B	A
Approach Delay			30.4			42.1					14.6	
Approach LOS			C			D					B	
Queue Length 50th (ft)			280		56	94				77	84	49
Queue Length 95th (ft)			#356		#127	94				140	143	111
Internal Link Dist (ft)			1024			523					73	
Turn Bay Length (ft)												
Base Capacity (vph)			1302		115	1035				264	436	606
Starvation Cap Reductn			0		0	0				65	198	159
Spillback Cap Reductn			0		0	0				0	0	0
Storage Cap Reductn			0		0	0				0	0	0
Reduced v/c Ratio			0.90		0.63	0.81				0.69	0.66	0.49

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 30.6

Intersection LOS: C

Intersection Capacity Utilization 96.7%

ICU Level of Service F

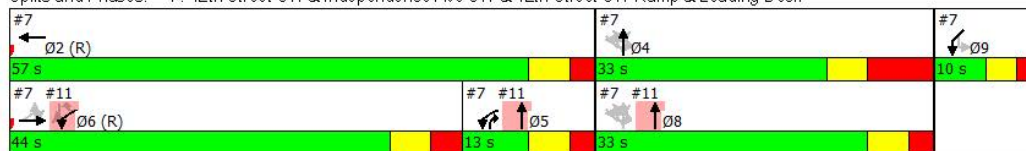
Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.






dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock



# Lanes, Volumes, Timings

7: 12th Street SW & Independence Ave SW & 12th Street SW Ramp & Loading Dock 10/20/2017

						
Lane Group	SEL2	SEL	SER	SER2	SWL	Ø8
Flash Dont Walk (s)						
Pedestrian Calls (#/hr)						
Act Effect Green (s)		24.0				
Actuated g/C Ratio		0.24				
v/c Ratio		0.16				
Control Delay		0.8				
Queue Delay		0.0				
Total Delay		0.8				
LOS		A				
Approach Delay		0.8				
Approach LOS		A				
Queue Length 50th (ft)		0				
Queue Length 95th (ft)		0				
Internal Link Dist (ft)		321			196	
Turn Bay Length (ft)						
Base Capacity (vph)		436				
Starvation Cap Reductn		0				
Spillback Cap Reductn		0				
Storage Cap Reductn		0				
Reduced v/c Ratio		0.16				
Intersection Summary						

Lanes, Volumes, Timings  
9: L'Enfant Plaza & Independence Ave SW

10/20/2017

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Lane Configurations	↑↑↑↑			↑↑↑↑	↘	↗	
Traffic Volume (vph)	1086	47	45	818	33	78	
Future Volume (vph)	1086	47	45	818	33	78	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		0	0		0	210	
Storage Lanes		0	0		1	1	
Taper Length (ft)			100		100		
Lane Util. Factor	0.86	0.86	0.91	0.91	1.00	1.00	
Ped Bike Factor	0.97			1.00	0.62		
Frt	0.994					0.850	
Flt Protected				0.997	0.950		
Satd. Flow (prot)	5755	0	0	4625	1404	1396	
Flt Permitted				0.820	0.950		
Satd. Flow (perm)	5755	0	0	3789	866	1396	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	11					51	
Link Speed (mph)	35			35	25		
Link Distance (ft)	603			540	714		
Travel Time (s)	11.7			10.5	19.5		
Confl. Peds. (#/hr)		375	375		573		
Confl. Bikes (#/hr)		30					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	
Heavy Vehicles (%)	2%	11%	11%	4%	20%	8%	
Adj. Flow (vph)	1155	50	48	870	35	83	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1205	0	0	918	35	83	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			0	60		
Link Offset(ft)	0			0	-10		
Crosswalk Width(ft)	30			10	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		pm+pt	NA	Prot	pm+ov	
Protected Phases	2		1	6	4	1	3
Permitted Phases			6			4	
Minimum Split (s)	20.5		10.0	16.5	30.0	10.0	4.0
Total Split (s)	49.5		16.5	66.0	30.0	16.5	4.0
Total Split (%)	49.5%		16.5%	66.0%	30.0%	16.5%	4%
Maximum Green (s)	43.0		11.5	59.5	24.5	11.5	2.0
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0	2.0
All-Red Time (s)	2.5		1.0	2.5	1.5	1.0	0.0
Lost Time Adjust (s)	-1.5			-1.5	-1.0	-1.0	
Total Lost Time (s)	5.0			5.0	4.5	4.0	
Lead/Lag	Lag		Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Walk Time (s)	10.0				6.0		
Flash Dont Walk (s)	4.0				18.0		

**Lanes, Volumes, Timings**  
**9: L'Enfant Plaza & Independence Ave SW**

10/20/2017

	→	↘	↙	←	↖	↗	Ø3
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø3
Pedestrian Calls (#/hr)	0				0		
Act Effct Green (s)	44.5			61.0	25.5	42.5	
Actuated g/C Ratio	0.44			0.61	0.26	0.42	
v/c Ratio	0.47			0.38	0.10	0.13	
Control Delay	7.9			12.2	29.5	8.8	
Queue Delay	0.0			0.0	0.0	0.0	
Total Delay	7.9			12.2	29.5	8.8	
LOS	A			B	C	A	
Approach Delay	7.9			12.2	14.9		
Approach LOS	A			B	B		
Queue Length 50th (ft)	46			131	17	12	
Queue Length 95th (ft)	m51			179	43	41	
Internal Link Dist (ft)	523			460	634		
Turn Bay Length (ft)						210	
Base Capacity (vph)	2567			2407	358	622	
Starvation Cap Reductn	0			0	0	0	
Spillback Cap Reductn	0			0	0	0	
Storage Cap Reductn	0			0	0	0	
Reduced v/c Ratio	0.47			0.38	0.10	0.13	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 10 (10%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 65  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.47  
 Intersection Signal Delay: 10.0 Intersection LOS: B  
 Intersection Capacity Utilization 51.5% ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 9: L'Enfant Plaza & Independence Ave SW

Ø1 16.5 s	Ø2 (R) 49.5 s	Ø4 30 s
Ø6 (R) 66 s		

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	91	105	0	0	0	0	575	61	57	422	0
Future Volume (vph)	124	91	105	0	0	0	0	575	61	57	422	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	10	10	10	11	11	11	11	11	11
Storage Length (ft)	200		200	0		0	0		0	0		50
Storage Lanes	1		1	0		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	0.86	0.86	1.00
Ped Bike Factor	0.69		0.46					0.93			0.96	
Frt			0.850					0.986				
Flt Protected	0.950										0.994	
Satd. Flow (prot)	1631	1652	1561	0	0	0	0	4332	0	0	5889	0
Flt Permitted	0.950										0.818	
Satd. Flow (perm)	1125	1652	717	0	0	0	0	4332	0	0	4675	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)			33									
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		454			399			424			394	
Travel Time (s)		10.3			9.1			8.3			7.7	
Confl. Peds. (#/hr)	303		1270	303		1270	654		511	511		654
Confl. Bikes (#/hr)			70						4			25
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	7%	15%	0%	0%	0%	0%	0%	4%	22%	4%	7%	0%
Adj. Flow (vph)	127	93	107	0	0	0	0	587	62	58	431	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	93	107	0	0	0	0	649	0	0	489	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		11			11			0			0	
Link Offset(ft)		-15			15			10			-10	
Crosswalk Width(ft)		35			20			35			55	
Two way Left Turn Lane												
Headway Factor	1.04	1.00	1.04	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm					NA		Perm	NA	
Protected Phases		4						2			2	
Permitted Phases	4		4							2		
Minimum Split (s)	32.5	32.5	32.5					20.0		20.0	20.0	
Total Split (s)	32.5	32.5	32.5					67.5		67.5	67.5	
Total Split (%)	32.5%	32.5%	32.5%					67.5%		67.5%	67.5%	
Maximum Green (s)	26.0	26.0	26.0					61.5		61.5	61.5	
Yellow Time (s)	4.0	4.0	4.0					4.0		4.0	4.0	
All-Red Time (s)	2.5	2.5	2.5					2.0		2.0	2.0	
Lost Time Adjust (s)	-1.5	-1.5	-1.5					-1.5		-1.5	-1.5	
Total Lost Time (s)	5.0	5.0	5.0					4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	10.0	10.0	10.0					10.0		10.0	10.0	

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Heavy Vehicles (%)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	6	8
Permitted Phases		
Minimum Split (s)	21.0	28.5
Total Split (s)	67.5	32.5
Total Split (%)	68%	33%
Maximum Green (s)	61.5	26.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	10.0	7.0

# Lanes, Volumes, Timings

10: 7th Street SW & SW Jefferson Drive

10/20/2017

	↖	→	↗	↖	←	↖	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	16.0	16.0	16.0					4.0		4.0	4.0	
Pedestrian Calls (#/hr)	0	0	0					0		0	0	
Act Effct Green (s)	27.5	27.5	27.5					63.0			63.0	
Actuated g/C Ratio	0.28	0.28	0.28					0.63			0.63	
v/c Ratio	0.41	0.20	0.48					0.24			0.17	
Control Delay	34.5	29.4	29.6					3.4			7.8	
Queue Delay	0.0	0.0	0.0					0.0			0.0	
Total Delay	34.5	29.4	29.6					3.4			7.8	
LOS	C	C	C					A			A	
Approach Delay		31.5						3.4			7.8	
Approach LOS		C						A			A	
Queue Length 50th (ft)	66	45	39					16			34	
Queue Length 95th (ft)	122	87	95					31			46	
Internal Link Dist (ft)		374			319			344			314	
Turn Bay Length (ft)	200		200									
Base Capacity (vph)	309	454	221					2729			2945	
Starvation Cap Reductn	0	0	0					0			0	
Spillback Cap Reductn	0	0	0					0			0	
Storage Cap Reductn	0	0	0					0			0	
Reduced v/c Ratio	0.41	0.20	0.48					0.24			0.17	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 2:NBSB and 6:Ped, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 11.2

Intersection LOS: B

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: 7th Street SW & SW Jefferson Drive

↓↑ Ø2 (R)	67.5 s	↔ Ø4	32.5 s
↔ Ø6 (R)	67.5 s	↔ Ø8	32.5 s

Lanes, Volumes, Timings  
10: 7th Street SW & SW Jefferson Drive

10/20/2017

Lane Group	Ø6	Ø8
Flash Dont Walk (s)	5.0	15.0
Pedestrian Calls (#/hr)	0	0
Act Effect Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↙	↖	↗
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
Lane Configurations	↙		↗		↕				↗			
Traffic Volume (vph)	0	0	0	0	478	0	0	0	178	0	0	
Future Volume (vph)	0	0	0	0	478	0	0	0	178	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	12	10	10	10	10	10	10	10	10	
Storage Length (ft)		0	100	0		0	0		0	0	0	
Storage Lanes		1	1	0		0	0		2	0	0	
Taper Length (ft)		100		100			100			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	0.88	1.00	1.00	
Frt									0.850			
Flt Protected												
Satd. Flow (prot)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Flt Permitted												
Satd. Flow (perm)	1863	0	1863	0	4746	0	0	0	2601	0	0	
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)									1920			
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		212			269			153		170		
Travel Time (s)		4.8			6.1			3.5		3.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	0	520	0	0	0	193	0	0	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	520	0	0	0	193	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Right	
Median Width(ft)		12			0			25		0		
Link Offset(ft)		0			5			3		0		
Crosswalk Width(ft)		16			30			16		16		
Two way Left Turn Lane												
Headway Factor	1.00	1.09	1.00	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Turning Speed (mph)	15	15	9	15		9	15		9	15	9	
Turn Type	Prot		Perm		NA				Perm			
Protected Phases	6				5 8							2
Permitted Phases			6						6			
Minimum Split (s)	20.0		20.0						20.0			54.0
Total Split (s)	44.0		44.0						44.0			57.0
Total Split (%)	44.0%		44.0%						44.0%			57%
Maximum Green (s)	37.0		37.0						37.0			50.5
Yellow Time (s)	4.0		4.0						4.0			4.0
All-Red Time (s)	3.0		3.0						3.0			2.5
Lost Time Adjust (s)	-1.5		-1.5						0.0			
Total Lost Time (s)	5.5		5.5						7.0			
Lead/Lag	Lead		Lead						Lead			
Lead-Lag Optimize?	Yes		Yes						Yes			
Walk Time (s)	7.0		7.0						7.0			7.0
Flash Dont Walk (s)	6.0		6.0						6.0			4.0
Pedestrian Calls (#/hr)	0		0						0			0
Act Effct Green (s)					41.0				37.0			
Actuated g/C Ratio					0.41				0.37			

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Lane Width (ft)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	4	5	8	9
Permitted Phases				
Minimum Split (s)	32.5	11.4	11.5	10.0
Total Split (s)	33.0	13.0	33.0	10.0
Total Split (%)	33%	13%	33%	10%
Maximum Green (s)	22.5	6.5	26.5	5.0
Yellow Time (s)	4.0	4.0	4.0	3.0
All-Red Time (s)	6.5	2.5	2.5	2.0
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lag		
Lead-Lag Optimize?		Yes		
Walk Time (s)	4.0			
Flash Dont Walk (s)	18.0			
Pedestrian Calls (#/hr)	0			
Act Effct Green (s)				
Actuated g/C Ratio				

# Lanes, Volumes, Timings 11: 12th Street SW

10/20/2017

	↙	↖	↗	↘	↑	↙	↖	↗	↘	↓	↙	↖
Lane Group	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	Ø2
v/c Ratio					0.27				0.09			
Control Delay					20.0				0.1			
Queue Delay					0.0				1.2			
Total Delay					20.0				1.3			
LOS					C				A			
Approach Delay					20.0			1.3				
Approach LOS					C			A				
Queue Length 50th (ft)					78				0			
Queue Length 95th (ft)					105				m0			
Internal Link Dist (ft)		132			189			73		90		
Turn Bay Length (ft)												
Base Capacity (vph)					1945				2171			
Starvation Cap Reductn					0				1771			
Spillback Cap Reductn					182				0			
Storage Cap Reductn					0				0			
Reduced v/c Ratio					0.29				0.48			

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBTL, Start of Green

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 15.0

Intersection LOS: B

Intersection Capacity Utilization 14.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: 12th Street SW

#7 ↙ Ø2 (R) 57 s	#7 ↑ Ø4 33 s	#7 ↘ Ø9 10 s
#7 #11 ↙ Ø6 (R) 44 s	#7 #11 ↙ Ø5 13 s	#7 #11 ↙ Ø8 33 s

Lanes, Volumes, Timings  
11: 12th Street SW

10/20/2017

Lane Group	Ø4	Ø5	Ø8	Ø9
v/c Ratio				
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

	↖	→	↗	↖	←	↖	↗	↖	↑	↗	↖	↓
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑	↑		↑
Traffic Volume (vph)	0	1044	119	167	847	0	14	11	0	1	0	0
Future Volume (vph)	0	1044	119	167	847	0	14	11	0	1	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		50	0		0		0		0	0	
Storage Lanes	0		1	0		0		0		1	0	
Taper Length (ft)	100			100				100			25	
Lane Util. Factor	0.86	0.86	0.86	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.99				0.85			
Frt		0.985								0.850		
Flt Protected					0.992				0.950			
Satd. Flow (prot)	0	5663	0	0	4647	0	0	0	1685	1507	0	1773
Flt Permitted					0.643				0.757			
Satd. Flow (perm)	0	5663	0	0	2989	0	0	0	1144	1507	0	1773
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		32								153		
Link Speed (mph)		35			35				30			15
Link Distance (ft)		540			606				566			305
Travel Time (s)		10.5			11.8				12.9			13.9
Confl. Peds. (#/hr)	161		200	200		161		148				
Confl. Bikes (#/hr)			30			28						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1088	124	174	882	0	15	11	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1212	0	0	1056	0	0	0	26	1	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				90			0
Link Offset(ft)		0			0				5			-70
Crosswalk Width(ft)		45			20				20			20
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type		NA		pm+pt	NA		Perm	Perm	NA	Over		
Protected Phases		2		1	6				8	1		8
Permitted Phases	2			6			8	8			8	
Minimum Split (s)	29.5	29.5		10.5	25.5		35.5	35.5	35.5	10.5	35.5	35.5
Total Split (s)	47.5	47.5		12.0	59.5		35.5	35.5	35.5	12.0	35.5	35.5
Total Split (%)	47.5%	47.5%		12.0%	59.5%		35.5%	35.5%	35.5%	12.0%	35.5%	35.5%
Maximum Green (s)	38.0	38.0		6.5	54.0		30.0	30.0	30.0	6.5	30.0	30.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5.5	5.5		1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		-1.5			0.0				0.0	0.0		0.0
Total Lost Time (s)		8.0			5.5				5.5	5.5		5.5
Lead/Lag	Lead	Lead		Lag			Lag	Lag	Lag	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)	10.0	10.0			10.0		10.0	10.0	10.0		10.0	10.0
Flash Dont Walk (s)	10.0	10.0			10.0		20.0	20.0	20.0		20.0	20.0

# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW


















10/20/2017

Lane Group	SBR	Ø7
Lane Configurations		
Traffic Volume (vph)	0	
Future Volume (vph)	0	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Ped Bike Factor		
Frnt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	148	
Confl. Bikes (#/hr)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	0	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	7	
Permitted Phases		
Minimum Split (s)	5.0	
Total Split (s)	5.0	
Total Split (%)	5%	
Maximum Green (s)	3.0	
Yellow Time (s)	2.0	
All-Red Time (s)	0.0	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Walk Time (s)		
Flash Dont Walk (s)		

# Lanes, Volumes, Timings

## 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW

10/20/2017

																	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT					
Pedestrian Calls (#/hr)	0	0			0		0	0			0	0					
Act Effect Green (s)		39.5			54.0				30.0	6.5							
Actuated g/C Ratio		0.40			0.54				0.30	0.06							
v/c Ratio		0.54			0.61				0.08	0.00							
Control Delay		6.8			12.6				26.0	0.0							
Queue Delay		0.0			0.0				0.0	0.0							
Total Delay		6.8			12.6				26.0	0.0							
LOS		A			B				C	A							
Approach Delay		6.8			12.6				25.0								
Approach LOS		A			B				C								
Queue Length 50th (ft)		107			90				12	0							
Queue Length 95th (ft)		132			98				32	0							
Internal Link Dist (ft)		460			526				486			225					
Turn Bay Length (ft)																	
Base Capacity (vph)		2256			1721				343	241							
Starvation Cap Reductn		0			0				0	0							
Spillback Cap Reductn		0			0				0	0							
Storage Cap Reductn		0			0				0	0							
Reduced v/c Ratio		0.54			0.61				0.08	0.00							

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 9.7

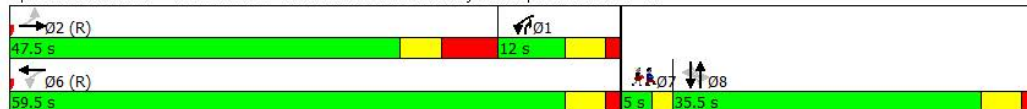
Intersection LOS: A

Intersection Capacity Utilization 78.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



# Lanes, Volumes, Timings

14: 9th Street SW/Smithsonian Driveway & Independence Ave SW



















10/20/2017



Lane Group	SBR	Ø7
Pedestrian Calls (#/hr)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	765	98	14	705	194	92	265	59	125	190	212
Future Volume (vph)	177	765	98	14	705	194	92	265	59	125	190	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	11	11	11	11	11	11
Storage Length (ft)	0		75	0		0	80		0	0		50
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.86	0.86	0.86	0.86	0.86	0.86	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor		0.96			0.92		0.82	0.94		0.82	0.83	
Frt		0.986			0.968			0.973			0.921	
Flt Protected		0.992			0.999		0.950			0.950		
Satd. Flow (prot)	0	5594	0	0	5180	0	1616	4441	0	1646	3644	0
Flt Permitted		0.715			0.904		0.500			0.476		
Satd. Flow (perm)	0	3982	0	0	4683	0	699	4441	0	672	3644	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		36			82						139	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		606			437			393			424	
Travel Time (s)		11.8			8.5			7.7			8.3	
Confl. Peds. (#/hr)	389		230	230		389	333		308	308		333
Confl. Bikes (#/hr)			20			29			19			14
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	7%	3%	4%	0%	4%	10%	8%	3%	4%	6%	7%	3%
Adj. Flow (vph)	182	789	101	14	727	200	95	273	61	129	196	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1072	0	0	941	0	95	334	0	129	415	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			11			11	
Link Offset(ft)		5			0			-6			5	
Crosswalk Width(ft)		32			30			22			35	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.04	1.04	1.04	1.04	1.04	1.04
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			4		3	8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	10.5	31.5		28.5	28.5		29.5	29.5		10.0	32.5	
Total Split (s)	11.0	57.0		46.0	46.0		32.5	32.5		10.5	43.0	
Total Split (%)	11.0%	57.0%		46.0%	46.0%		32.5%	32.5%		10.5%	43.0%	
Maximum Green (s)	5.5	50.5		39.5	39.5		26.0	26.0		5.5	36.5	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.5	2.5		2.5	2.5		2.5	2.5		1.0	2.5	
Lost Time Adjust (s)		-1.5			-1.5		-1.5	-1.5		-1.5	-1.5	
Total Lost Time (s)		5.0			5.0		5.0	5.0		3.5	5.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Walk Time (s)		7.0		4.0	4.0		4.0	4.0			7.0	

Lanes, Volumes, Timings  
22: 7th Street SW & Independence Ave SW

10/20/2017

	↗	→	↘	↖	←	↙	↘	↑	↙	↘	↓	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)		18.0		18.0	18.0		19.0	19.0			19.0	
Pedestrian Calls (#/hr)		0		0	0		0	0			0	
Act Effct Green (s)		52.0			41.0		27.5	27.5		39.5	38.0	
Actuated g/C Ratio		0.52			0.41		0.28	0.28		0.40	0.38	
v/c Ratio		0.49			0.48		0.49	0.27		0.39	0.28	
Control Delay		1.5			20.6		40.9	29.2		20.7	11.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		1.5			20.6		40.9	29.2		20.7	11.2	
LOS		A			C		D	C		C	B	
Approach Delay		1.5			20.6			31.8			13.4	
Approach LOS		A			C			C			B	
Queue Length 50th (ft)		9			113		51	61		45	25	
Queue Length 95th (ft)		15			144		105	87		71	38	
Internal Link Dist (ft)		526			357			313			344	
Turn Bay Length (ft)							80					
Base Capacity (vph)		2184			1968		192	1221		333	1470	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.49			0.48		0.49	0.27		0.39	0.28	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 51 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.0

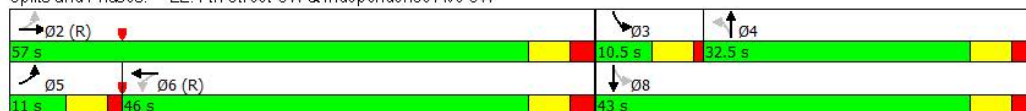
Intersection LOS: B

Intersection Capacity Utilization 83.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 22: 7th Street SW & Independence Ave SW



## **APPENDIX E – PARKING INVENTORY**

**Exhibit 1**

**Smithsonian Institution, South Campus Master Plan  
Parking Inventory  
Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
Jefferson Dr EB between 14th St and 12th St	81	8	70	3	1. 3-hour metered parking 2. USDA pick up/drop-off only 3. No Parking 1-6AM, USDA 6AM-6PM Mon-Fri; 3-hour limit all other
Jefferson Dr EB between 12th St and 7th St	56	16	27	13	1. No Parking 2. Loading zone 3. 3-hour metered parking
7th St SB between Jefferson Dr and Independence Ave	0	0	0	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-10PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat
7th St SB between Independence Ave and C St/Maryland Ave	10	0	10	0	1. No Parking or Standing Anytime 2. No Standing or Parking 7AM-9:30AM Mon-Fri 3. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour
7th St SB between C St/Maryland Ave and Virginia Ave	5	4 WMATA	0	1	1. No Parking Metrobus Zone 2. WMATA Employees Only
7th St SB between Virginia Ave and D St	0	0	0	0	1. No Parking
Independence EB b/w 14th and 12th	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Tow Away - Metro Bus Zone
Independence EB b/w 12th and L'Enfant	20	0	20	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 3. Pay by Phone
Independence EB b/w L'Enfant and 9th	12	0	12	0	Has 3 main Signs
Independence Ave EB between 9th St and 7th St	9	0	9	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat
Independence Ave EB between 7th St and 6th St	8	0	8	0	1. No Parking or Standing 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking 10AM-5PM Tuesday Except Holidays, Street Cleaning 3. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit

**Exhibit 1**  
**Smithsonian Institution, South Campus Master Plan**  
**Parking Inventory**  
**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
Independence Ave EB between 6th St and Maryland Ave	9	0	9	0	1. No Parking or Standing 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking 10AM-5PM Tuesday Except Holidays, Street Cleaning 3. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit
Independence Ave EB between Maryland Ave and 4th St	5	0	5	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat
Independence Ave EB between 4th St and 3rd St	18	0	18	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat
Maryland Ave EB between 7th St and 6th St	2	0	2	0	1. No Parking or Standing Anytime 2. No Standing or Parking 10:30AM-2:30PM Mon-Fri, Mobile Roadway Vending Permit Holders Excepted 10:30AM-2:30PM
Maryland Ave EB between 6th St and Independence Ave	27	0	27	0	1. No Parking 2. 2 Hour 7AM-6:30PM Mon-Fri
Maryland Ave EB between 6th St and 4th St	45	13	32	0	2 Hour Parking 7AM-10PM Mon-Sat
12th St SB b/w C St and Independence	9	0	9	0	1. Snow Emergency Route - Tow Away 2. 2-Hour Parking 9:30AM-4PM, M-Sat
14th St SB b/w C St and Independence	4	4	0	0	1. No Standing or Parking Metro Bus Zones 2. Snow Emergency Route - Tow Away 3. Special Permit Parking (all times)
14th St SB b/w Independence and Jefferson	0	0	0	0	1. Snow Emergency Route - Tow Away 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F
6th St SB between Independence Ave and Maryland Ave	4	0	4	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat: 3.5 Hour Parking 6:30PM-10PM Mon-Sat
6th St SB between Maryland Ave and C St	9	0	8	1	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat: 3.5 Hour Parking 6:30PM-10PM Mon-Sat

**Exhibit 1**  
**Smithsonian Institution, South Campus Master Plan**  
**Parking Inventory**  
**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
6th St SB between C St and Virginia Ave	7	2 URE	4	1	1. No Standing or Parking 4-6:30PM Bus Zone Mon-Fri 2. No Parking 3. 2 Hour Parking 7AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking
6th St SB between Virginia Ave and D St	0	0	0	0	1. No Parking
4th St SB between Independence Ave and C St	17	0	17	0	1. No Standing or Parking 7AM-9:30AM Mon-Fri 2. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat
4th St SB between C St and D St	0	0	10	0	1. No Parking Metro Bus Zone 2. No Parking Shuttle Stand 3. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM, Mon-Fri
3rd St SB between Independence Ave and C St	20	0	19	1	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat
3rd St SB between C St and D St	11	0	11	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri
C St EB between 6th St and 4th St	18	4 6 GSA	8	0	1. Taxi Stand 2. 15 Minute Parking 3. Government Parking Only
C St EB between 4th St and 3rd St	16	2 GSA	14	0	1. 2 Hour Parking 7AM-6:30PM Mon-Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat 2. GSA Official Parking 7AM-10PM Mon-Sat
D St EB between 4th St and 3rd St	24	1	23	0	1. No Parking 2. 15 Minute Parking GSA Child Development Center Only 6AM-6:30PM Mon-Fri

**Exhibit 1**  
**Smithsonian Institution, South Campus Master Plan**  
**Parking Inventory**  
**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
Jefferson Dr WB between 7th St and 12th St	0	0	0	0	1. 3 Hour Limit 2. Taxi Stand
Jefferson Dr WB between 12th St and 14th St	0	0	0	0	1. 3 Hour Limit 2. Smithsonian Vehicles Only 3. No Parking
7th St NB between D St and Virginia Ave	7	0	7	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking Anytime 3. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat
7th St NB between Virginia Ave and C St/Maryland Ave	0	0	0	0	1. No Parking 2. No Parking Metrobus Zone
7th St NB between C St/Maryland Ave and Independence Ave	14	0	14	0	1. No Parking or Standing Anytime 2. No Standing or Parking 7AM-9:30AM Mon-Fri 3. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat
7th St NB between Independence Ave and Jefferson Dr	0	0	0	0	1. No Parking
Independence Ave WB between 3rd St and 4th St	14	0	14	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat 3. No Parking Bus Zone
Independence Ave WB between 4th St and Maryland Ave	10	0	9	1	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking 10AM-5PM Tuesday Except Holidays, Street Cleaning 3. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat
Independence Ave WB between Maryland Ave and 6th St	9	0	9	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking Vendor Stand 9:30AM-4PM Mon-Fri, 8AM-10PM Sat-Sun 3. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat 4. No Parking Bus Zone

**Exhibit 1**  
**Smithsonian Institution, South Campus Master Plan**  
**Parking Inventory**  
**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
Independence Ave WB between 6th St and 7th St	6	0	6	0	1. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 2. No Parking 9:30AM-4PM Mon-Fri, 8AM-10PM Sat-Sun, Vendor Stand 3. No Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 4. No Parking 10PM-5AM Mon Except Holidays, Street Cleaning 5. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat, No Time Limit Parking 6:30PM-10PM Mon-Sat
Independence Ave WB between 7th St and 9th St	3	3 Vendor	0	0	1. No Standing or Parking Metrobus Zone 2. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri 3. No Parking 10PM-5AM Monday, Except Holidays, Street Cleaning 4. No Parking 9:30AM-4PM Mon-Fri, 8AM-10PM Sat-Sun, Vendor Stand 5. No Parking - Entrance 6. No Parking 9:30AM-11:30AM Monday, Except Holidays, Street Cleaning
Independence WB b/w 9th and L'Enfant	17	0	17	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. Snow Emergency Route - Tow Away
Independence WB b/w L'Enfant and 12th	18	0	18	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F
Independence WB b/w 12th and 14th	15	0	15	0	1. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 2. No Parking 9:30-11:30AM - Street Cleaning Tuesday 3. Metro Bus 4. Snow Emergency Route - Tow Away 5. Vendor Stand
Maryland Ave WB between Independence Ave and 6th St	11	0	10	1	1. 2 Hour 7AM-6:30PM Mon-Fri 2. No Parking Except Official Government Vehicles 7AM-6:30PM Mon-Fri 3. No Parking 4. No Standing or Parking 7AM-9:30AM, 4PM-6:30PM Mon-Fri
Maryland Ave WB between 6th St and 7th St	28	2 Zipcar 11 GSA	15	0	1. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat
Virginia Ave WB between 6th St and 7th St	23	0	23	0	1. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat

**Exhibit 1**

**Smithsonian Institution, South Campus Master Plan**

**Parking Inventory**

**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
14th St NB b/w C St and Independence	3	0	0	0	1. 15-min Tour Bus Stand 9:30AM-4PM, No Parking All Other Times
14th St NB b/w Independence and Jefferson	0	0	0	0	1. Snow Emergency Route - Tow Away
14th St SB b/w Independence and Jefferson	8	0	0	0	1. Snow Emergency Route - Tow Away 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F
12th St NB b/w C St and Independence	14	0	14	2	1. ADA Parking 2. Tow Away/No Standing or Parking 7-9:30AM, 4-6:30PM M-F 3. 2-Hour Parking 9:30AM-4PM, M-F, 7AM-6:30PM Saturday 4. Snow Emergency Route - Tow Away
6th St NB between D St and Virginia Ave	0	0	0	0	1. No Parking
6th St NB between Virginia Ave and C St	6	0	5	1	1. No Standing or Parking 4-6:30PM Bus Zone Mon-Fri 2. No Parking 3. 2 Hour Parking 7AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat
6th St NB between C St and Maryland Ave	8	0	8	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat
6th St NB between Maryland Ave and Independence Ave	6	0	6	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat
4th St NB between D St and C St	12	0	12	0	1. 2 Hour Parking 7AM-6:30PM Mon-Sat 2. No Parking
4th St NB between C St and Independence Ave	15	0	15	0	1. No Standing or Parking 7AM-9:30AM Mon-Fri 2. 2 Hour Parking 9:30AM-6:30PM Mon-Fri, 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10PM Mon-Sat 3. No Parking Bus Zone
3rd St NB between D St and C St	12	0	12	0	1. No Parking or Standing Anytime 2. SFB Permit Parking Only
3rd St NB between C St and Independence Ave	15	0	15	0	1. 2 Hour Parking 9:30AM-4PM Mon-Fri, 7AM-6:30PM Sat; 3.5 Hour Parking 6:30PM-10PM Mon-Sat

**Exhibit 1**  
**Smithsonian Institution, South Campus Master Plan**  
**Parking Inventory**  
**Tuesday December 8<sup>th</sup>, 2015 & Monday, October 16<sup>th</sup>, 2017**

Segment	Total Number of On-Street Parking Spaces	Number of Permit Spaces	Number of Metered Spaces	Number of ADA Spaces	Parking Regulations
C St WB between 3rd St and 4th St	17	0	17	0	1. 2 Hour Parking 7AM-6:30PM Mon-Sat, 3.5 Hour Parking 6:30PM-10:30PM Mon-Sat 2. 2 Hour Parking 7AM-6:30PM Sat, 3.5 Hour Parking 6:30PM-10:30PM Sat 3. No Parking
C St WB between 4th St and 6th St	25	4 GSA	21	0	1. 2 Hour Parking 7AM-6:30PM Mon-Sat, 3.5 Hour Parking 6:30PM-10:30PM Mon-Sat by permit