TRAFFIC OPERATIONS

This section provides a summary of an analysis of the existing and future roadway capacity in the study area. Included is an analysis of potential vehicular impacts of the 1401 Pennsylvania Avenue SE project and a discussion of potential improvements.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed development on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips

This analysis was accomplished by determining the traffic volumes and roadway capacity for the following scenarios:

1. 2015 Existing Conditions
2. 2018 Future Conditions without the development (2018 Background)
3. 2018 Future Conditions with the development (2018 Future)

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area.

The following conclusions are reached within this chapter:

- The majority of intersections operate at an acceptable level of service during all analysis scenarios for both the morning and afternoon peak hours.
- There is one study intersection that operates at an unacceptable level of service as a result of the proposed development.
- Mitigation measures were analyzed and discussed for this intersection, which greatly improve the overall operations at this intersection.
- Overall, this report concludes that the project will not have a detrimental impact to the surrounding transportation network.

STUDY AREA, SCOPE, & METHODOLOGY

This section outlines the vehicular trips generated in the study area along the vehicular access routes and defines the analysis assumptions.

The scope of the analysis contained within this report was discussed with and agreed to with DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development.

Capacity Analysis Scenarios

The vehicular analyses are performed to determine if the proposed development of the 1401 Pennsylvania Avenue SE development will lead to adverse impacts on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background condition) and (2) with the development approved and constructed (referred to as the Future condition).

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2015 Existing Conditions
2. 2018 Background Conditions without the development (2018 Background)
3. 2018 Future Conditions with the development (2018 Total Future)

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses are performed for the scenarios listed above. The set of intersections decided upon during the study scoping process with DDOT are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed development. Although it is possible that impacts will occur outside of the study area, those impacts are not significant enough to be considered a detrimental impact nor worthy of mitigation measures.

Based on the projected future trip generation and the location of the site access points, the following intersections were chosen for analysis:

1. 13th Street SE and Potomac Avenue SE
2. Ives Place SE and Potomac Avenue SE
3. Ives Place SE and 14th Street SE
4. Ives Place SE and 15th Street SE
5. Southern node of 15th Street SE and Pennsylvania Avenue SE
6. Northern node 15th Street SE and Pennsylvania Avenue SE
7. Northeastern node of Pennsylvania Avenue SE and Potomac Avenue SE
8. Northern node of Pennsylvania Avenue SE and Potomac Avenue SE
9. Northwestern node of Pennsylvania Avenue SE and Potomac Avenue SE – Northwestbound
10. Northwestern node of Pennsylvania Avenue SE and Potomac Avenue SE – Southeastbound
11. Southwestern node of Pennsylvania Avenue SE and Potomac Avenue SE
12. Southern node of Pennsylvania Avenue SE and Potomac Avenue SE
13. Southwestern node of Pennsylvania Avenue SE and Potomac Avenue SE – Southeastbound
14. Southwestern node of Pennsylvania Avenue SE and Potomac Avenue SE – Northwestbound
15. Northern node of 13th Street SE and Pennsylvania Avenue SE
16. Southern node of 13th Street SE and Pennsylvania Avenue SE and G Street SE
17. 14th Street SE and K Street SE

Figure 17 shows a map of the study area intersections.

Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which was collected on Tuesday, May 19, 2015. The results of the traffic counts are included in the Technical Attachments. The existing peak hour traffic volumes are shown on Figure 18 and Figure 19. For all intersections the individual morning and afternoon peak hours were used.

2018 Background Traffic Volumes (without the project)

The traffic projections for the 2018 Background conditions consist of the existing volumes with two additions:

- Traffic generated by developments expected to be completed prior to the project (known as background developments); and
- Inherent growth on the roadway (representing regional traffic growth).

Following national and DDOT methodologies, a background development must meet the following criteria to be incorporated into the analysis:

- Be located in the study area, defined as having an origin or destination point within the cluster of study area intersections;
- Have entitlements; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, and as discussed previously, two developments were included in the 2018 Background scenario. These developments are:

1. 1442 Pennsylvania Avenue SE
2. 1500 Pennsylvania Avenue SE

There are no existing studies available for these developments therefore trip generation was calculated based on the Institute of Transportation Engineers' *Trip Generation Manual*, 9th Edition, with mode splits based on those used for similar developments in the Capitol Hill neighborhood. Trip distribution assumptions for the background developments were based on those determined for the 1401 Pennsylvania Avenue SE development and altered where necessary based on

Table 6: Summary of Background Development Trip Generation

Background Development	ITE Land Use Code Trip Generation, 9th Ed.	Quantity	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
1442 Pennsylvania Avenue SE	820 Shopping Center (Rate)	13,000 sf	7	5	12	23	25	48
	Non-Auto Reduction:	50%	-4	-3	-6	-12	-13	-24
	Total Trips		**4**	**3**	**6**	**12**	**13**	**24**
1500 Pennsylvania Aveune SE	220 Apartment	46 dwelling units	5	21	26	28	15	43
	Non-Auto Reduction:	50%	-3	-11	-13	-14	-8	-22
	Total Trips		**3**	**11**	**13**	**14**	**8**	**22**
	Net Background Site Trips		**6**	**13**	**19**	**26**	**20**	**46**

anticipated travel patterns. Mode split and trip generation assumptions for the background developments are shown Table 6.

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using percentage growth rates. The growth rates used in this analysis are derived using the Metropolitan Washington Council of Government's (MWCOG) currently adopted regional transportation model, comparing the difference between the year 2015 and 2020 model scenarios. The growth rates observed in this model served as a basis for analysis assumptions, and where negative growth was observed, a conservative 0.25 percent annual growth rate was applied to the roadway. The applied growth rates are shown in Table 7.

The traffic volumes generated by the inherent growth along the network were added to the existing traffic volumes in order to establish the 2018 Background traffic volumes. The traffic volumes for the 2018 Background conditions are shown on Figure 20 and Figure 21.

2018 Total Future Traffic Volumes (with the project)

The 2018 Total Future traffic volumes consist of the 2018 Background volumes with the addition of the traffic volumes generated by the proposed development (site-generated trips). Thus, the 2018 Total Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and the proposed project.

Trip distribution for the site-generated trips was determined based on: (1) CTPP TAZ data, (2) existing travel patterns in the study area, and (3) the allotted parking locations of various users of the development.

The residential trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound residential vehicular trips was the below-grade parking garage along the public alley to the south of the development. This planned operations of this alley would have vehicles entering from the southern access point on Ives Place and exiting from the western access point on 14th Street.

The retail distribution was mostly based on locations and proximity of other retail centers, with some influence on the CTPP TAZ flow data for drivers commuting to the site's TAZ (representing retail employees that drive). Thus, the retail trip distribution is weighted more towards nearby residential areas and less on regional origins. The origin of outbound and destination of inbound retail vehicular trips was on-street parking on Pennsylvania Avenue and 14th Street.

Based on this review and the site access locations, the site-generated trips were distributed through the study area intersections. A summary of trip distribution assumptions and specific routing is provided on Figure 22 for outbound trips and on Figure 23 for inbound trips.

The traffic volumes for the 2018 Total Future conditions were calculated by adding the development-generated traffic volumes to the 2018 Background traffic volumes. Thus, the future condition with the proposed development scenario includes traffic generated by: existing volumes, background developments through the year 2018, inherent growth on the network, and the proposed 1401 Pennsylvania Avenue SE development. The site-generated traffic volumes are shown on Figure 24 and Figure 25 and the 2018 Total Future traffic volumes are shown on Figure 26 and Figure 27.

Table 7: Applied Annual and Total Growth Rates

Road	Direction	Proposed Annual Growth Rate		Total Growth between 2015 and 2018	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Pennsylvania Ave SE (between Potomac Ave and 15th St)	SEB	0.75%	0.75%	2.30%	2.30%
	NWB	1.00%	1.50%	3.00%	4.60%
Potomac Ave SE (between 13th St and Pennsylvania Ave)	NEB	0.25%	0.75%	0.80%	2.30%
	SWB	1.50%	0.25%	4.60%	0.80%

Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses.

Existing Geometry and Operations Assumptions

The geometry and operations assumed in the existing conditions scenario are those present when the main data collection occurred. Gorove/Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

The lane configurations and traffic controls for the Existing conditions are shown on Figure 28 and Figure 29.

Future Geometry and Operations Assumptions

Following national and DDOT methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, no background improvements were included in the future scenarios.

Of note, the proposed improvements to the Pennsylvania and Potomac Avenues SE intersection, which are currently being studied by DDOT, are planned to significantly improve the operations and safety of the Pennsylvania and Potomac Avenues intersections. Currently, three alternatives are being assessed, but since no alternative has been selected no geometry and operations assumptions were incorporated into the analysis.

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for the three scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. Synchro version 8.0 was used to analyze the study intersections based on the *Highway Capacity Manual* (HCM) 2010 methodology, or HCM 2000 methodology when the HCM 2010 was not possible.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using the *Synchro* software). The average delay of each approach and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments.

Table 8 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the Existing, 2018 Background, and 2018 Future scenarios. The capacity analysis results are shown on Figure 30 and Figure 31 for the morning peak hour, and Figure 32 and Figure 33 for the afternoon peak hour.

The majority of study intersections operate at acceptable conditions during the morning and afternoon peak hours for the Existing, 2018 Background, and 2018 Future scenarios. However, one intersection operates under unacceptable conditions during one or more peak hour:

- Potomac Avenue & Pennsylvania Avenue (Southeastern Node) – Southeastbound

Queuing Analysis

In addition to the capacity analyses presented above, a queuing analysis was performed at the study intersections. The queuing analysis was performed using Synchro software. The 50th percentile and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that is exceeded 5% of the time. For unsignalized

intersection, only the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM calculations.

Table 9 shows the queuing results for the study area intersections. Several of the study intersections have a lane group that exceeds its storage length during at least one peak hour in all of the study scenarios. These intersections are as follows:

- 13th Street & Potomac Avenue & I Street
- Potomac Avenue & Pennsylvania Avenue (Northern Node)
- Potomac Avenue & Pennsylvania Avenue (Northwestern Node – Northwestbound)
- Potomac Avenue & Pennsylvania Avenue (Northwestern Node – Southeastbound)
- Potomac Avenue & Pennsylvania Avenue (Southeastern Node – Southeastbound)
- Potomac Avenue & Pennsylvania Avenue (Southeastern Node – Northwestbound)

With the addition of the site-generated traffic, queues are slightly increased at all of the study intersections, but no major impacts are seen as a result of the development.

Mitigations

Generally speaking, the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an LOS E or F at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the existing or background conditions. The development is also considered to have an impact if there is an increase in delay at any approach or the overall intersection operating under LOS E or F of greater than 5 seconds, when compared to the background condition. Following these guidelines there are impacts to one intersections as a result of the development. Mitigation measures were tested at this intersection and the following conclusions were made:

- *Potomac Avenue & Pennsylvania Avenue (Southeastern Node) – Southeastbound*
  Under the 2018 Future Conditions, delay along the northbound approach of Potomac Avenue worsen by greater than 5 seconds over the 2018 Background Conditions during the AM peak hour.

As previously mentioned, DDOT is studying operations at this intersection as part of the Pennsylvania Potomac Avenues project. This report defers to the findings of the DDOT study, as it takes into account more stakeholder input and multimodal considerations.

This report did explore short-term operational mitigations that could be implemented prior to DDOT's preferred alternative from the Pennsylvania and Potomac Avenues Intersection project. This includes adjusting the signal timings such that the northbound approach receives more green time. Due to the heavy traffic along Pennsylvania Avenue, shifting more green time to the northbound movement will create capacity concerns along Pennsylvania Avenue, but will not deteriorate conditions to an unacceptable level.

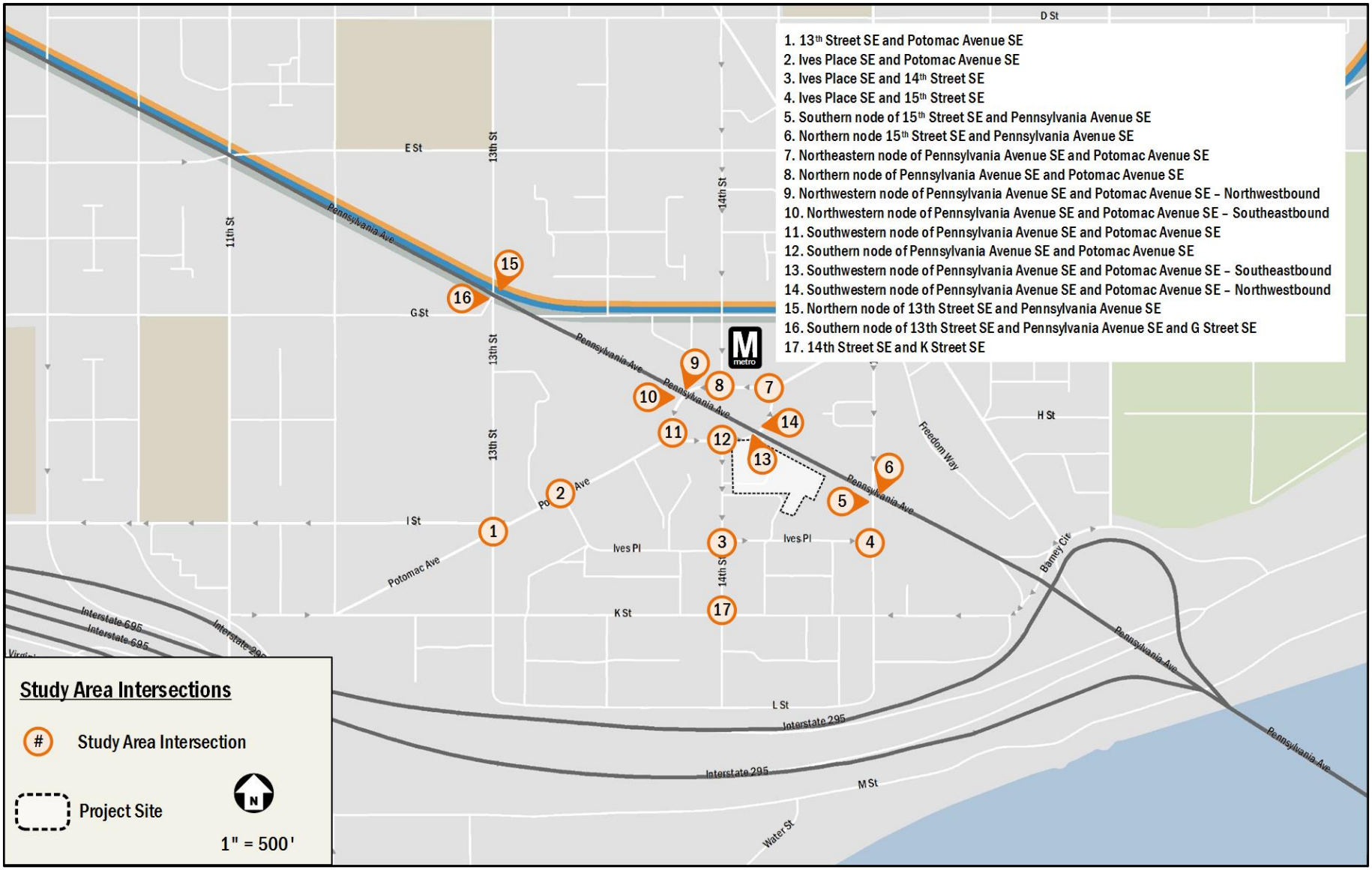

Figure 17: Study Area

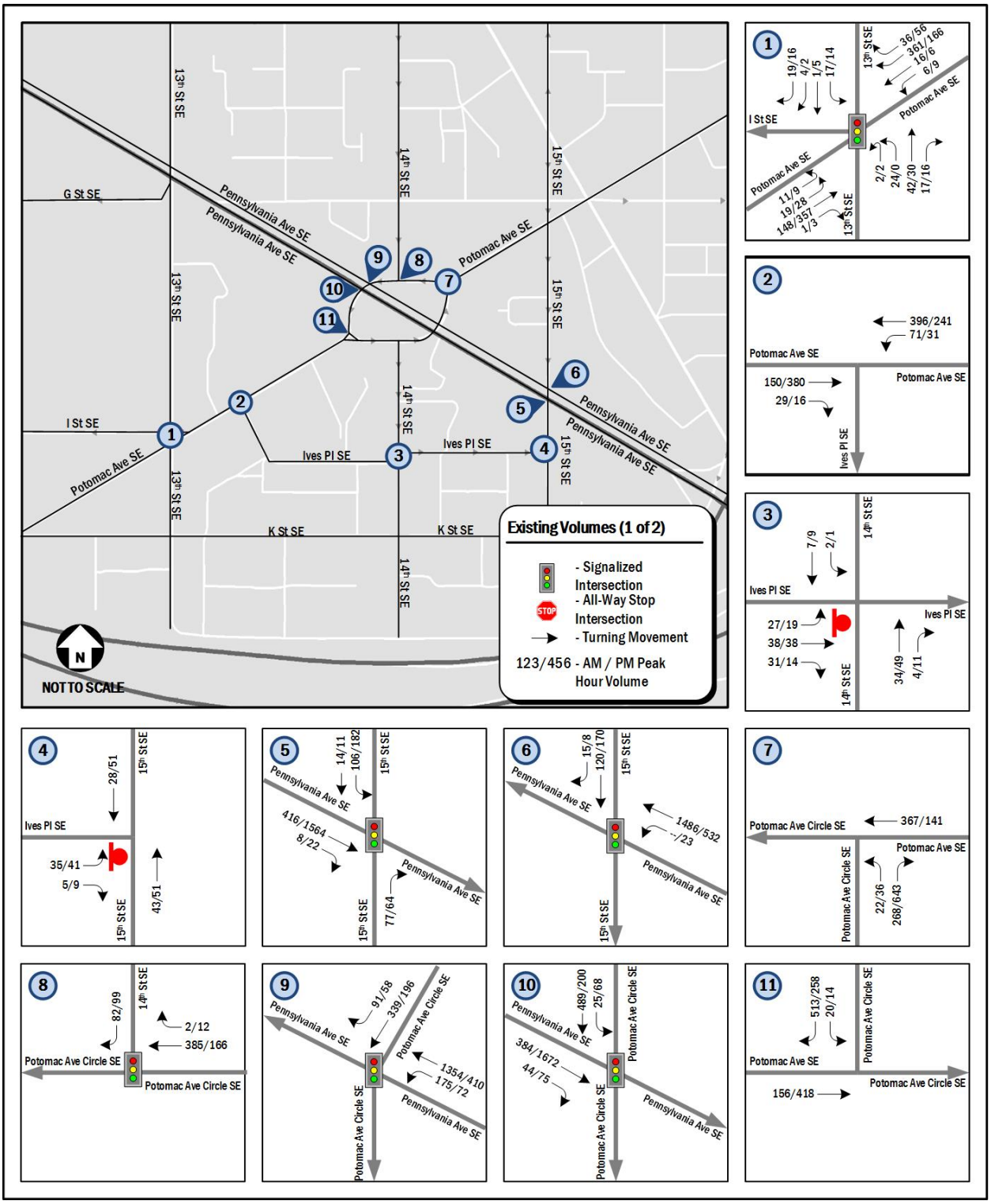

Figure 18: Existing Peak Hour Traffic Volumes (1)

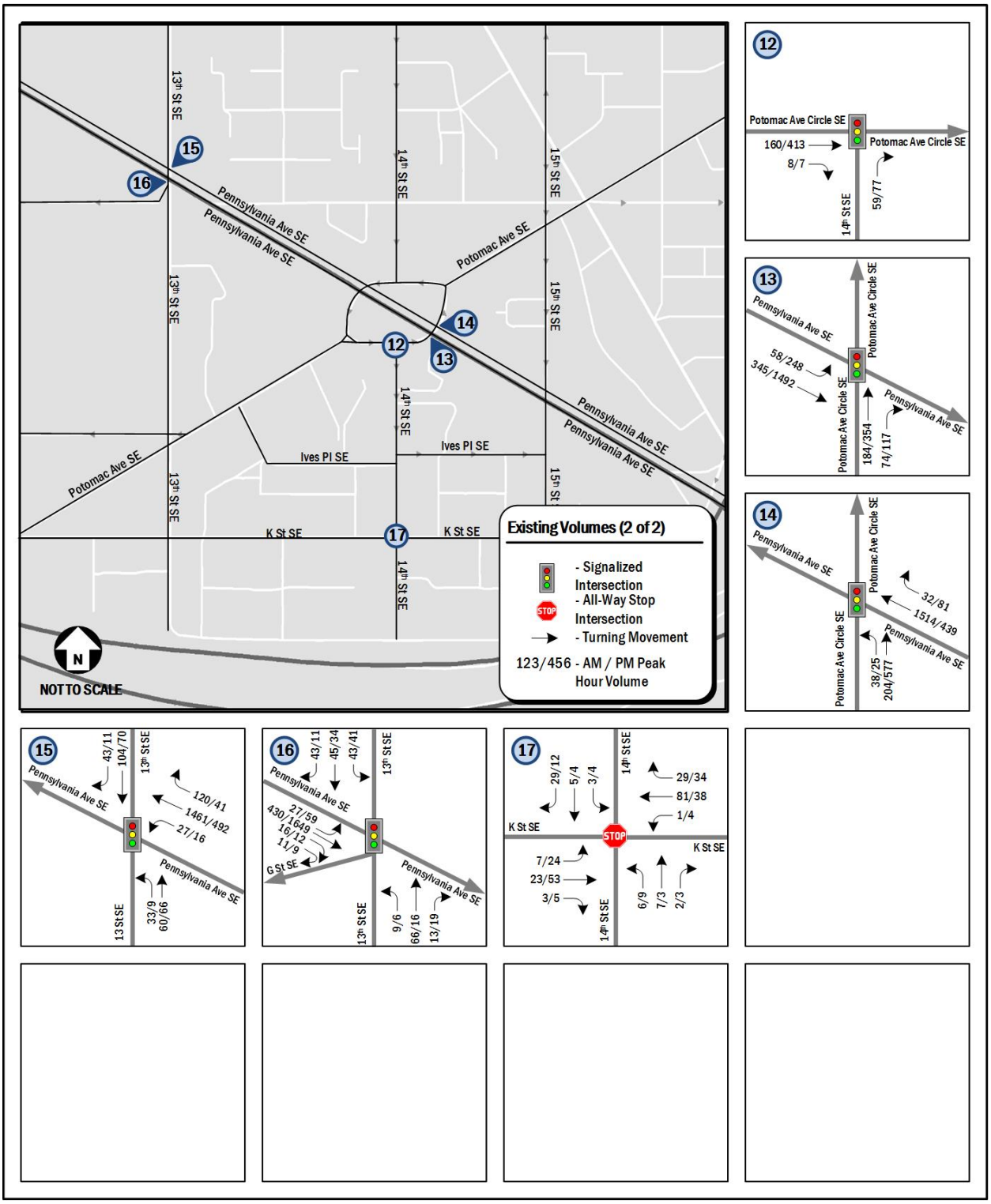

Figure 19: Existing Peak Hour Traffic Volumes (2)

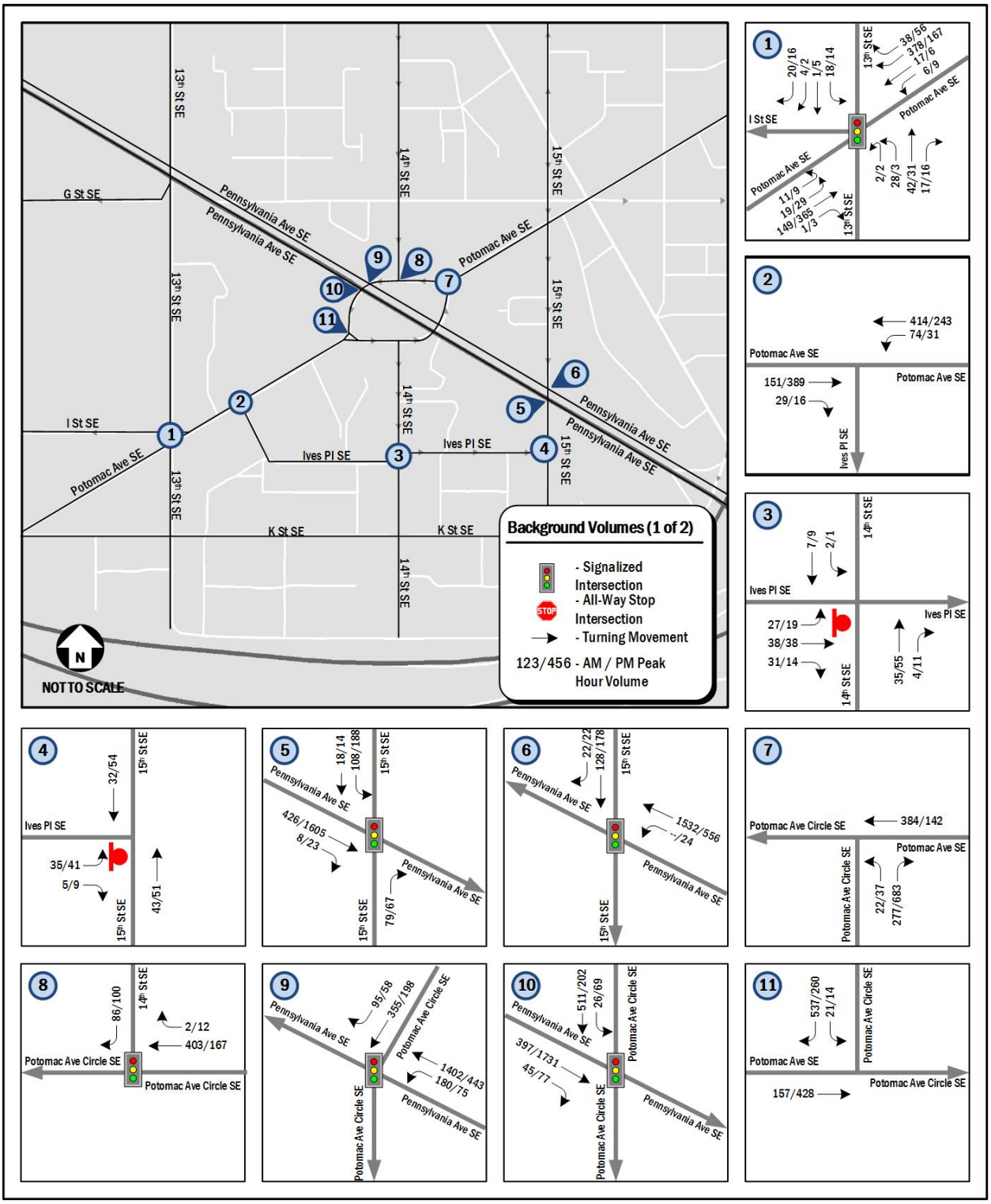

Figure 20: Background Peak Hour Traffic Volumes (1)

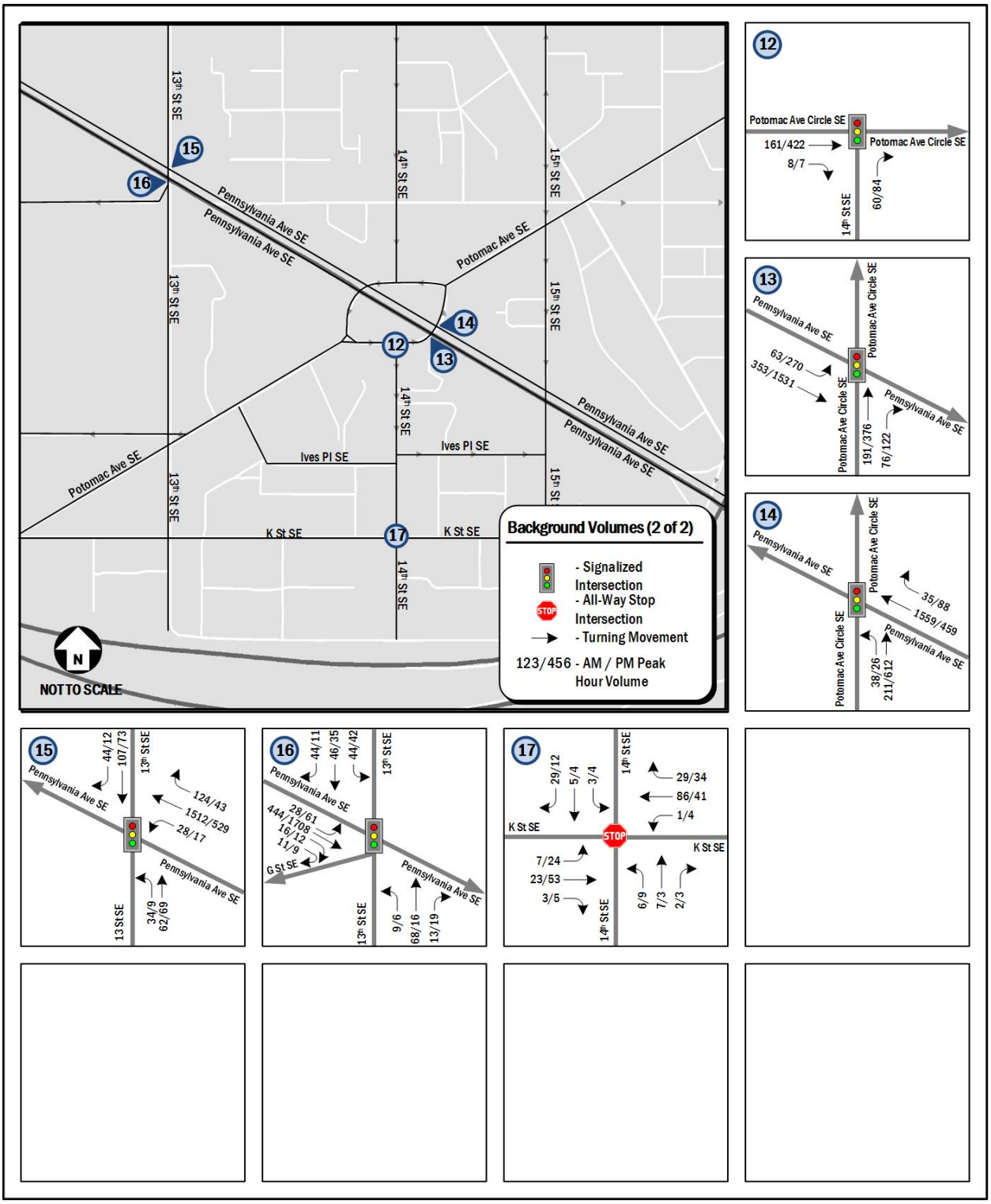

Figure 21: Background Peak Hour Traffic Volumes (2)

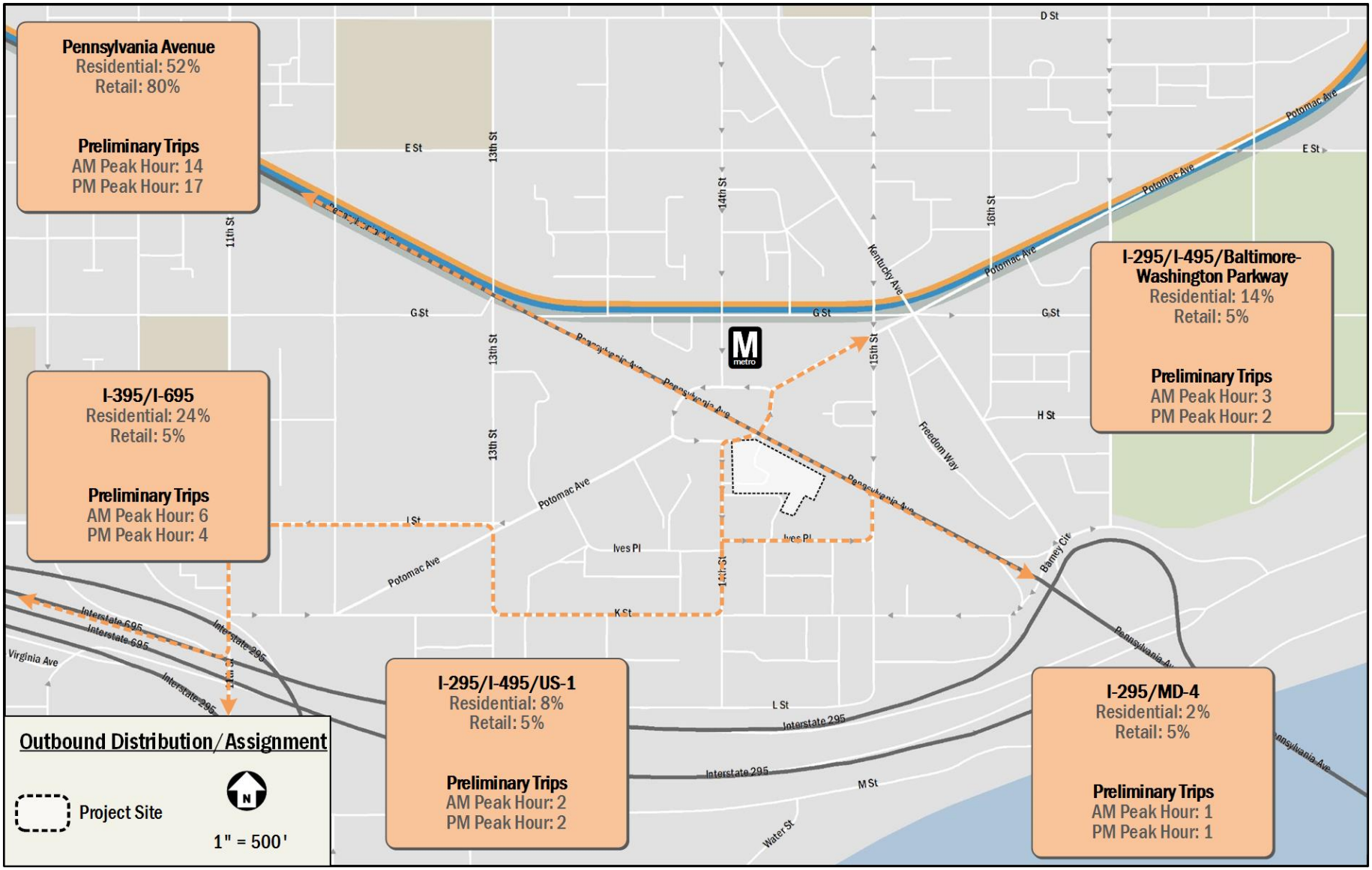

Figure 22: Outbound Trip Distribution and Routing

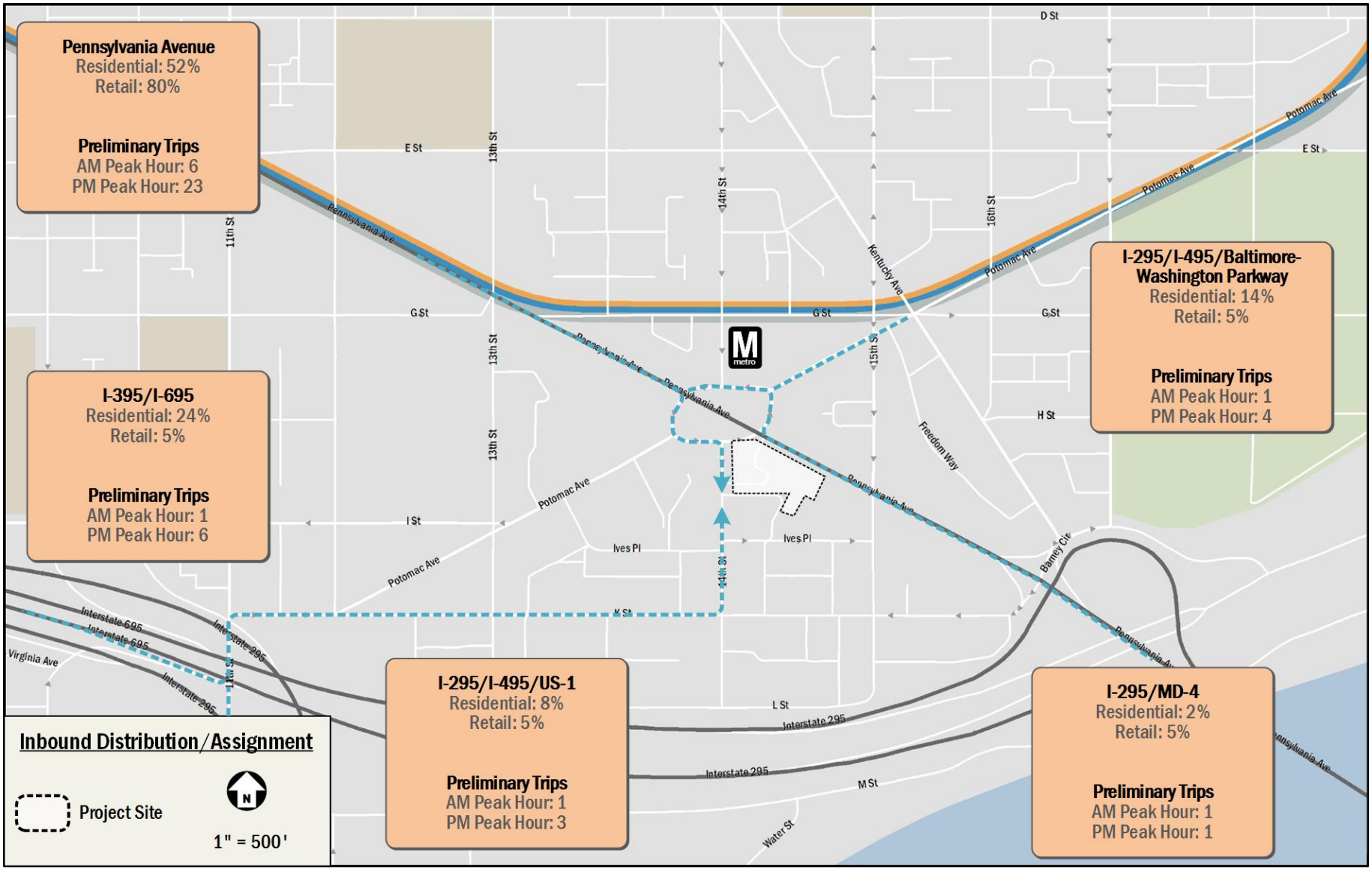

Figure 23: Inbound Trip Distribution and Routing

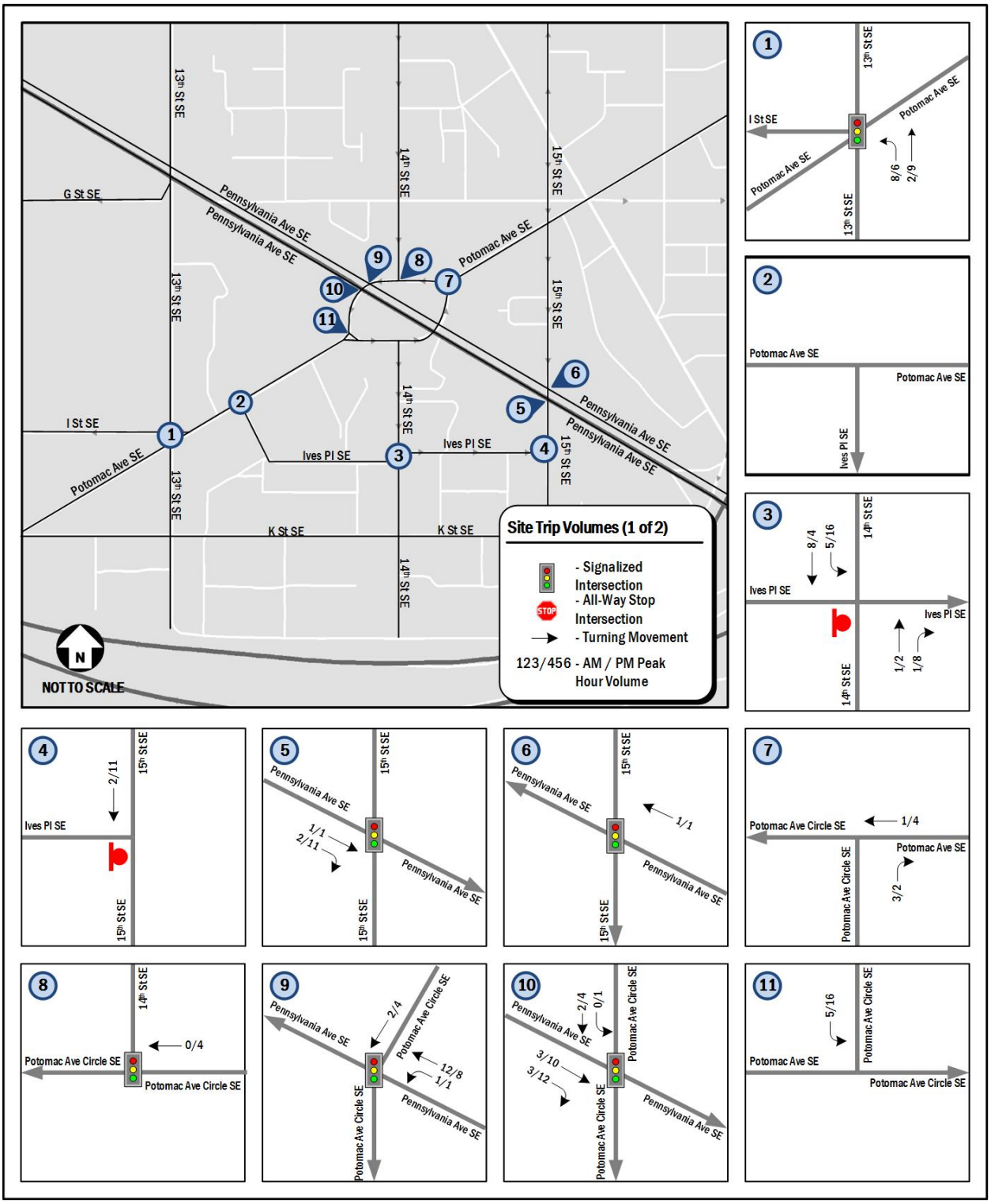

Figure 24: Site-Generated Peak Hour Traffic Volumes (1)

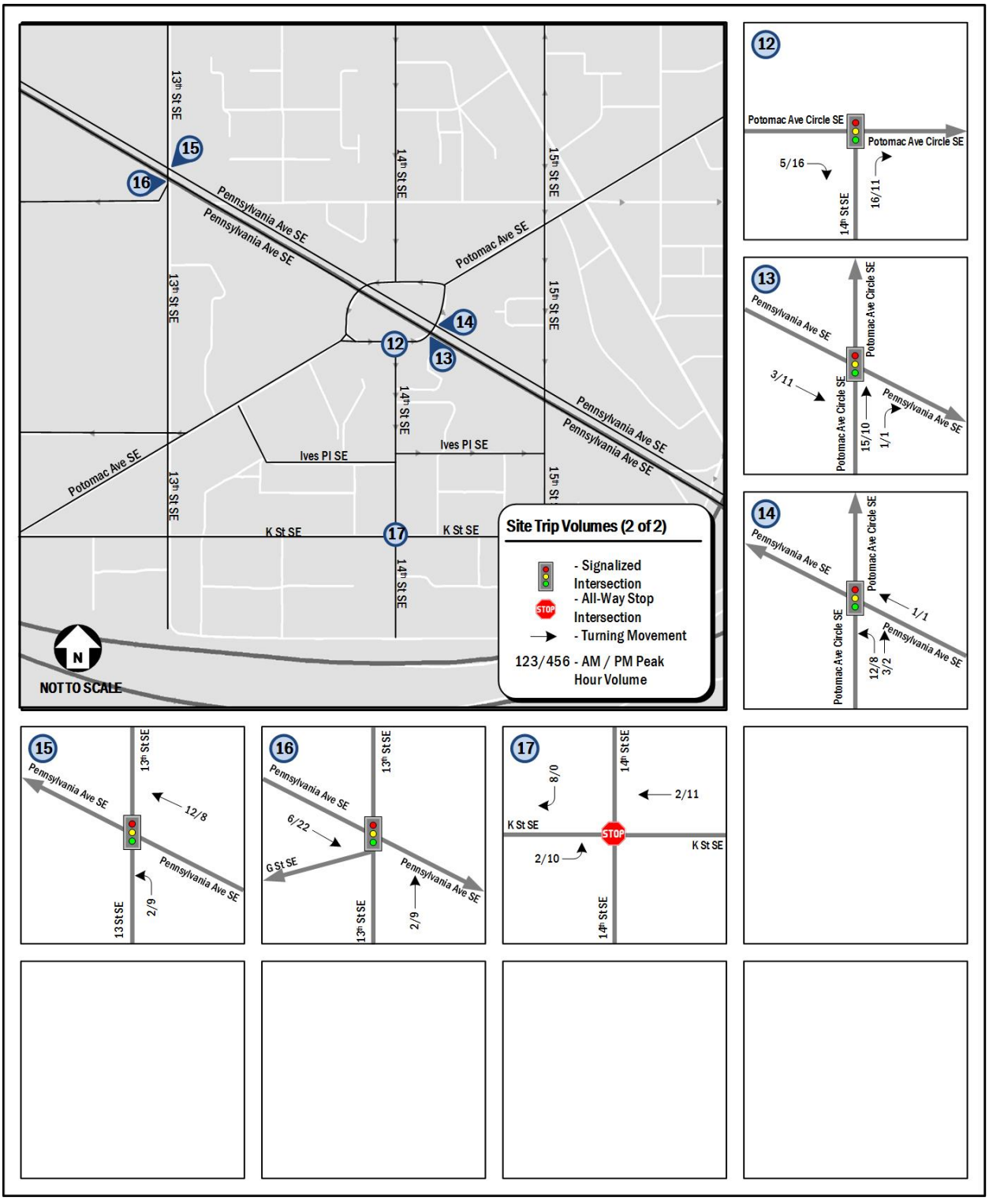

Figure 25: Site-Generated Peak Hour Traffic Volumes (2)

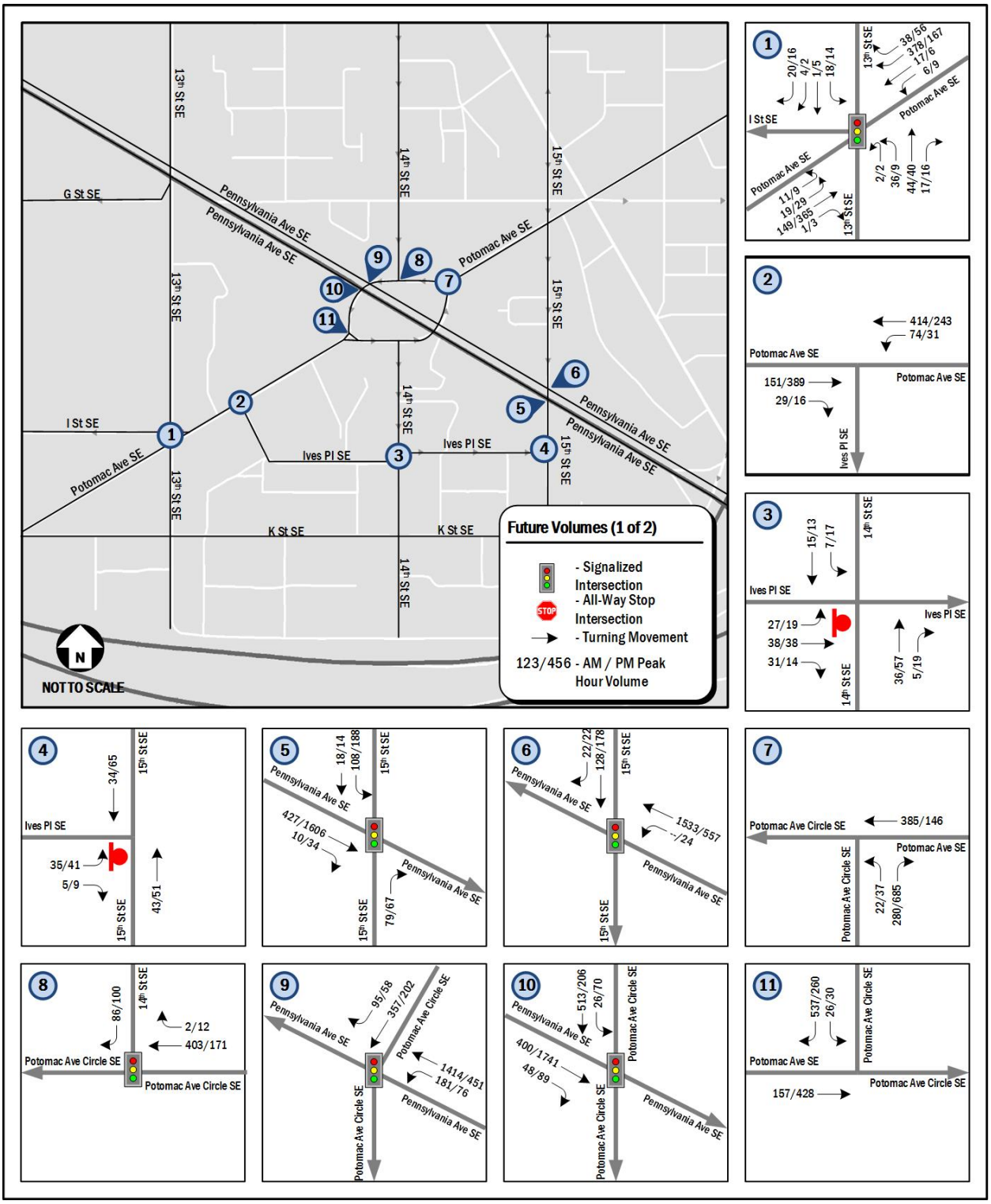

Figure 26: Total Future Peak Hour Traffic Volumes (1)

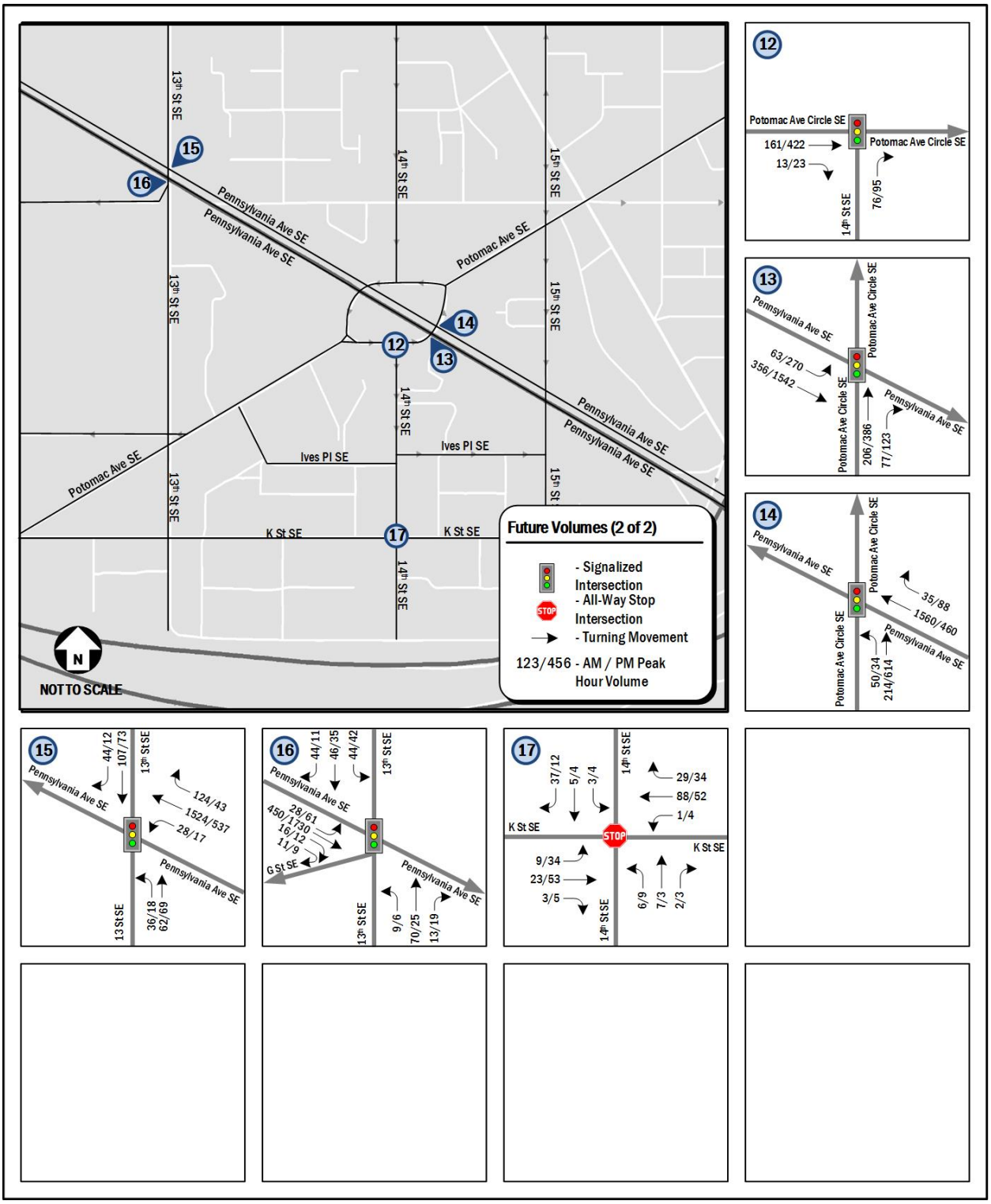

Figure 27: Total Future Peak Hour Traffic Volumes (2)

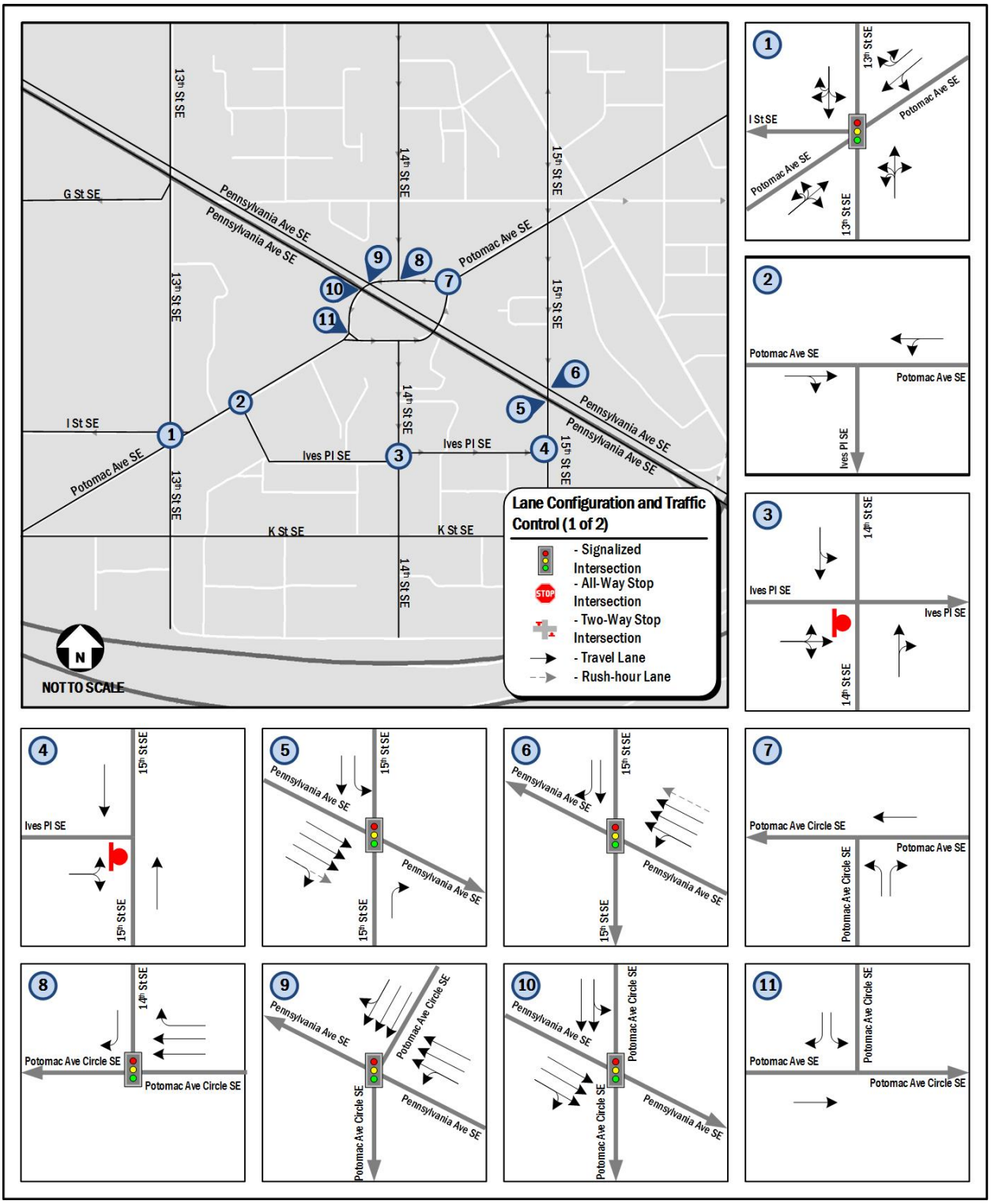

Figure 28: Current Lane Configuration and Traffic Control (1)

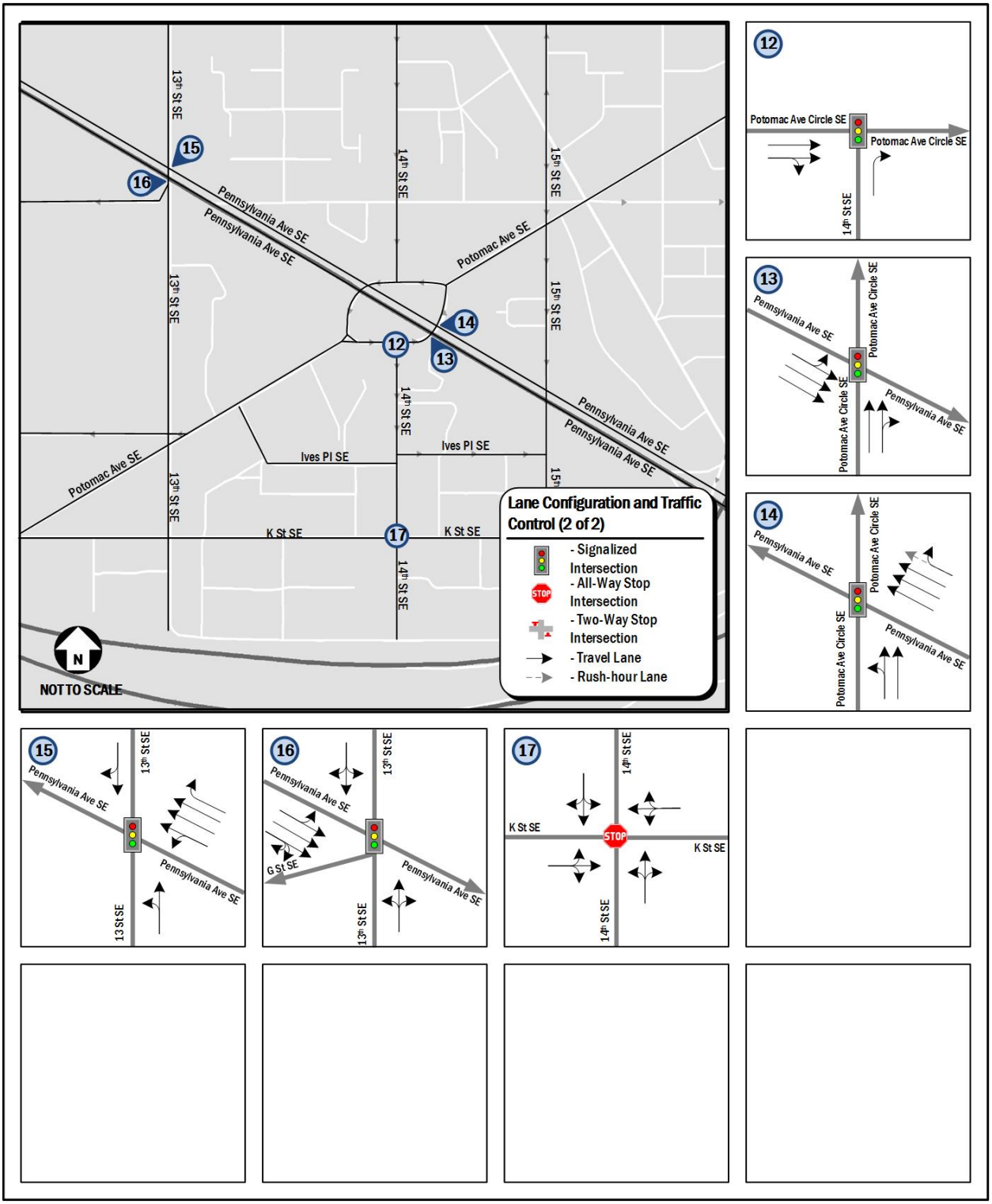

Figure 29: Current Lane Configuration and Traffic Control (2)

Table 8: LOS Results

Intersection	Approach	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. 13th Street & Potomac Avenue & I Street	**Overall**	**16.9**	**B**	**8.4**	**A**	**17.5**	**B**	**8.5**	**A**	**18.3**	**B**	**9.0**	**A**
	Eastbound	3.6	A	3.5	A	3.7	A	3.6	A	4.0	A	3.9	A
	Westbound	12.1	B	2.4	A	12.7	B	2.5	A	13.2	B	2.8	A
	Northbound	45.4	D	44.2	D	45.7	D	44.4	D	46.2	D	44.5	D
	Southbound	64.0	E	47.2	D	64.3	E	45.2	D	64.1	E	35.2	D
2. Ives Place & Potomac Avenue	**Overall**	**0.9**	**A**	**0.4**	**A**	**0.9**	**A**	**0.4**	**A**	**0.9**	**A**	**0.4**	**A**
	Westbound	1.2	A	1.0	A	1.2	A	1.0	A	1.2	A	1.0	A
3. Ives Place & 14th Street	**Overall**	**6.4**	**A**	**4.9**	**A**	**6.4**	**A**	**4.7**	**A**	**6.1**	**A**	**4.7**	**A**
	Eastbound	9.4	A	9.6	A	9.4	A	9.6	A	9.5	A	9.9	A
	Southbound	1.6	A	0.7	A	1.6	A	0.7	A	2.4	A	4.4	A
4. Ives Place & 15th Street	**Overall**	**3.3**	**A**	**3.2**	**A**	**3.2**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**
	Eastbound	9.1	A	9.4	A	9.2	A	9.4	A	9.2	A	9.5	A
5. 15th Street & Pennsylvania Avenue (Southern Node)	**Overall**	**4.0**	**A**	**4.0**	**A**	**3.9**	**A**	**4.3**	**A**	**3.8**	**A**	**4.4**	**A**
	Southeastbound	4.0	A	4.0	A	3.9	A	4.2	A	3.9	A	4.3	A
	Northbound	8.4	A	8.3	A	8.4	A	8.4	A	8.4	A	8.4	A
	Southbound	1.0	A	3.6	A	0.5	A	3.7	A	0.5	A	3.7	A
6. 15th Street & Pennsylvania Avenue (Northern Node)	**Overall**	**9.4**	**A**	**14.0**	**B**	**9.7**	**A**	**14.4**	**B**	**9.7**	**A**	**14.4**	**B**
	Northwestbound	7.1	A	6.4	A	7.2	A	6.5	A	7.2	A	6.5	A
	Southbound	34.2	C	36.9	D	34.4	C	36.9	D	34.4	C	36.9	D
7. Potomac Avenue & Pennsylvania Avenue (Northeastern Node)	**Overall**	**5.8**	**A**	**1.7**	**A**	**6.0**	**A**	**1.7**	**A**	**5.9**	**A**	**1.7**	**A**
	Southbound	10.4	B	9.2	A	10.6	B	9.2	A	10.6	B	9.2	A
8. Potomac Avenue & Pennsylvania Avenue (Northern Node)	**Overall**	**43.9**	**D**	**45.8**	**D**	**44.6**	**D**	**45.9**	**D**	**44.6**	**D**	**45.9**	**D**
	Westbound	41.7	D	40.2	D	42.5	D	40.2	D	42.5	D	40.4	D
	Southbound	54.2	D	55.8	E	54.5	D	55.9	E	54.5	D	55.9	E

Intersection	Approach	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
9. Potomac Avenue & Pennsylvania Avenue (Northwestern Node - Northwestbound)	**Overall**	**9.7**	**A**	**13.9**	**B**	**9.9**	**A**	**13.5**	**B**	**10.1**	**B**	**13.6**	**B**
	Northwestbound	1.6	A	1.4	A	1.6	A	1.6	A	1.9	A	1.7	A
	Westbound	37.1	D	38.4	D	37.6	D	38.4	D	37.7	D	38.5	D
10. Potomac Avenue & Pennsylvania Avenue (Northwestern Node - Southeatbound)	**Overall**	**20.5**	**C**	**21.2**	**C**	**20.5**	**C**	**22.6**	**C**	**20.8**	**C**	**23.3**	**C**
	Southeastbound	40.7	D	22.9	C	40.9	D	24.4	C	41.2	D	25.2	C
	Southbound	3.2	A	11.0	B	3.2	A	11.1	B	3.2	A	11.0	B
12. Potomac Avenue & Pennsylvania Avenue (Southern Node)	**Overall**	**2.4**	**A**	**1.8**	**A**	**2.4**	**A**	**1.9**	**A**	**2.8**	**A**	**2.1**	**A**
	Northbound	9.5	A	10.6	B	9.5	A	10.8	B	9.6	A	11.0	B
13. Potomac Avenue & Pennsylvania Avenue (Southeastern Node - Southeastbound)	**Overall**	**53.6**	**D**	**13.7**	**B**	**54.4**	**D**	**15.6**	**B**	**65.6**	**E**	**16.9**	**B**
	Southeastbound	29.0	C	1.4	A	28.9	C	1.4	A	28.8	C	1.4	A
	Northbound	94.4	F	59.8	E	97.5	F	67.7	E	123.1	F	72.6	E
14. Potomac Avenue & Pennsylvania Avenue (Southeastern Node - Northwestbound)	**Overall**	**22.5**	**C**	**13.2**	**B**	**22.5**	**C**	**13.3**	**B**	**22.7**	**C**	**13.2**	**B**
	Northwestbound	19.4	B	24.8	C	19.5	B	24.9	C	19.5	B	25.0	C
	Northbound	40.3	D	3.6	A	39.7	D	3.6	A	39.7	D	3.5	A
15. 13th Street & Pennsylvania Avenue (Northern Node)	**Overall**	**13.8**	**B**	**12.6**	**B**	**14.0**	**B**	**12.7**	**B**	**14.0**	**B**	**12.8**	**B**
	Northwestbound	11.0	B	7.6	A	11.3	B	7.7	A	11.3	B	7.7	A
	Northbound	24.7	C	24.6	C	24.9	C	24.7	C	25.3	C	25.0	C
	Southbound	36.7	D	34.7	C	36.9	D	34.9	C	36.9	D	34.9	C
16. 13th Street & Pennsylvania Avenue (Southern Node) & G Street	**Overall**	**10.9**	**B**	**10.0**	**B**	**11.0**	**B**	**10.2**	**B**	**11.1**	**B**	**10.4**	**B**
	Southeastbound	6.6	A	9.0	A	6.6	A	9.3	A	6.6	A	9.3	A
	Northbound	30.0	C	47.4	D	30.6	C	46.8	D	31.1	C	48.0	D
	Southbound	14.6	B	10.0	A	14.7	B	9.7	A	14.7	B	9.7	A
17. 14th Street & K Street	**Overall**	**7.4**	**A**	**7.5**	**A**	**7.5**	**A**	**7.5**	**A**	**7.5**	**A**	**7.6**	**A**
	Eastbound	7.4	A	7.6	A	7.4	A	7.6	A	7.4	A	7.8	A
	Westbound	7.6	A	7.3	A	7.6	A	7.3	A	7.7	A	7.4	A
	Northbound	7.4	A	7.6	A	7.4	A	7.6	A	7.5	A	7.7	A
	Southbound	7.0	A	7.5	A	7.1	A	7.6	A	7.1	A	7.6	A

Table 9: Queuing Results

Intersection		Lane Group	Storage Length (ft)	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)			
				AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
				50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
1.	13th Street & Potomac Avenue & I Street	Eastbound LTR	460.0	30.0	59.0	56.0	103.0	31.0	61.0	58.0	109.0	32.0	64.0	63.0	118
		Westbound LT	190.0	9.0	m25	1.0	m3	9.0	m26	1.0	m3	9.0	m27	1.0	m4
		Westbound Right	190.0	186.0	278.0	16.0	m57	196.0	291.0	17.0	m58	198.0	293.0	19.0	m59
		Northbound LTR	225.0	61.0	101.0	34.0	68.0	64.0	105.0	37.0	71.0	71.0	113.0	48.0	86
		Southbound LTR	660.0	32.0	66.0	20.0	38.0	34.0	68.0	19.0	36.0	34.0	68.0	16.0	30
2.	Ives Place SE & Potomac Avenue SE	Westbound Left	365	--	5.0	--	2.5	--	5.0	--	2.5	--	5.0	--	2.5
3.	Ives Place & 14th Street	Eastbound	590	--	100.0	--	0.3	--	10.0	--	7.5	--	10.0	--	7.5
		Southbound Left	330	--	--	--	--	--	--	--	--	--	--	--	--
4.	Ives Place & 15th Street	Eastbound	465	--	5.0	--	5.0	--	5.0	--	5.0	--	5.0		5.0
5.	15th Street & Pennsylvania Avenue (Southern Node)	Eastbound Thru	420	27.0	24.0	36.0	63.0	27.0	25.0	37.0	64.0	27.0	25.0	37.0	65.0
		Eastbound Right	420	--	m0	--	--	--	m0	--	--	1.0	m0	--	--
		Northbound Right	60	--	0.0	--	--	--	--	--	--	--	--	--	--
		Southbound Left	135	--	4.0	1.0	7.0	--	2.0	--	8.0	--	2.0	--	8.0
		Southbound Thru	135	--	m0	--	m2	--	--	1.0	m3	--	--	1.0	m3
6.	15th Street & Pennsylvania Avenue (Northern Node)	Westbound Thru	560	101.0	119.0	29.0	38.0	106.0	123.0	30.0	40.0	106.0	124.0	31.0	40.0
		Southbound Thru	425	69.0	123.0	102.0	168.0	75.0	131.0	106.0	175.0	75.0	131.0	106.0	175.0
		Southbound Right	425	--	9.0	--	--	--	16.0	--	5.0	--	16.0		5.0
7.	Potomac Avenue & Pennsylvania Avenue (Northeastern Node)	Northbound Thru	75	--	--	--	--	--	--	--	--	--	--	--	--
		Northbound Right	75	--	--	--	--	--	--	--	--	--	--	--	--
		Southwestbound Right	355	--	43.0	--	9.2	--	47.0	--	14.0	--	47.0	--	15.0
8.	Potomac Avenue & Pennsylvania Avenue (Northern Node)	Westbound Thru	85	133.0	186.0	60.0	89.0	141.0	195.0	61.0	90.0	141.0	195.0	62.0	92.0
		Westbound Right	85	--	6.0	--	17.0	--	6.0	--	17.0	--	6.0	--	17.0
		Southbound Right	175	--	--	--	--	--	--	--	--	--	--	--	--

9.	**Potomac Avenue & Pennsylvania Avenue (Northwestern Node - Northwestbound)**	Northwestbound LT	195	14.0	16.0	6.0	8.0	15.0	17.0	7.0	9.0	18.0	20.0	8.0	11.0
		Westbound TR	55	123.0	169.0	68.0	106.0	130.0	178.0	68.0	106.0	131.0	179.0	70.0	108.0
		Westbound Right	55	54.0	102.0	35.0	79.0	57.0	106.0	35.0	79.0	57.0	106.0	35.0	79.0
10.	**Potomac Avenue & Pennsylvania Avenue (Northwestern Node - Southeatbound)**	Southeastbound TR	630	114.0	141.0	387.0	457.0	118.0	145.0	409.0	481.0	120.0	147.0	417.0	#493
		Southbound LT	34	23.0	34.0	20.0	32.0	25.0	36.0	21.0	33.0	25.0	36.0	21.0	33.0
12.	**Potomac Avenue & Pennsylvania Avenue (Southern Node)**	Northbound	295	--	5.0	--	10.0	--	5.0	--	12.5	--	7.5	--	15.0
13.	**Potomac Avenue & Pennsylvania Avenue (Southeastern Node - Southeastbound)**	Southeastbound LT	210	71.0	93.0	14.0	23.0	74.0	96.0	15.0	24.0	75.0	97.0	15.0	24.0
		Northbound Thru	70	~124	#289	252.0	#426	~131	#290	272.0	#462	~167	#328	281.0	m#474
		Northbound Right	70	1.0	51.0	37.0	94.0	1.0	51.0	40.0	98.0	1.0	52.0	40.0	m98
14.	**Potomac Avenue & Pennsylvania Avenue (Southeastern Node - Northwestbound)**	Northwestbound T(R)	335	168.0	189.0	59.0	77.0	173.0	195.0	62.0	81.0	173.0	195.0	62.0	81.0
		Northwestbound Right	335	--	--	--	24.0	--	--	--	24.0	--	--	--	24.0
		Northbound LT	8	88.0	m98	44.0	m47	90.0	m100	47.0	m51	97.0	m98	45.0	m49
15.	**13th Street & Pennsylvania Avenue (Northern Node)**	Westbound LT	700	36.0	50.0	17.0	21.0	39.0	53.0	19.0	24.0	42.0	55.0	20.0	25.0
		Westbound Right	230	4.0	10.0	4.0	8.0	5.0	10.0	4.0	9.0	5.0	10.0	4.0	9.0
		Northbound LT	95	23.0	40.0	51.0	87.0	23.0	40.0	52.0	88.0	23.0	40.0	54.0	88.0
		Southbound TR	375	79.0	143.0	48.0	88.0	81.0	145.0	51.0	93.0	81.0	145.0	51.0	93.0
16.	**13th Street & Pennsylvania Avenue (Southern Node) & G Street**	Eastbound LT	540	43.0	53.0	192.0	227.0	44.0	55.0	203.0	239.0	45.0	56.0	206.0	244.0
		Eastbound Right	525	6.0	16.0	4.0	13.0	6.0	16.0	4.0	13.0	6.0	16.0	4.0	13.0
		Northbound TR	650	36.0	73.0	18.0	49.0	38.0	78.0	18.0	50.0	37.0	82.0	25.0	60.0
		Southbound LTR	85	26.0	39.0	16.0	25.0	26.0	40.0	16.0	25.0	26.0	40.0	16.0	25.0
17.	**14th Street & K Street**	Northbound	255	--	2.5	--	2.5	--	2.5	--	2.5	--	2.5	--	2.5
		Eastbound	720	--	2.5	--	10.0	--	2.5	--	10.0	--	5.0	--	10.0
		Westbound	460	--	5.0	--	7.5	--	12.5	--	7.5	--	12.5	--	10.0
		Southbound	170	--	2.5	--	2.5	--	2.5	--	2.5	--	5.0	--	2.5

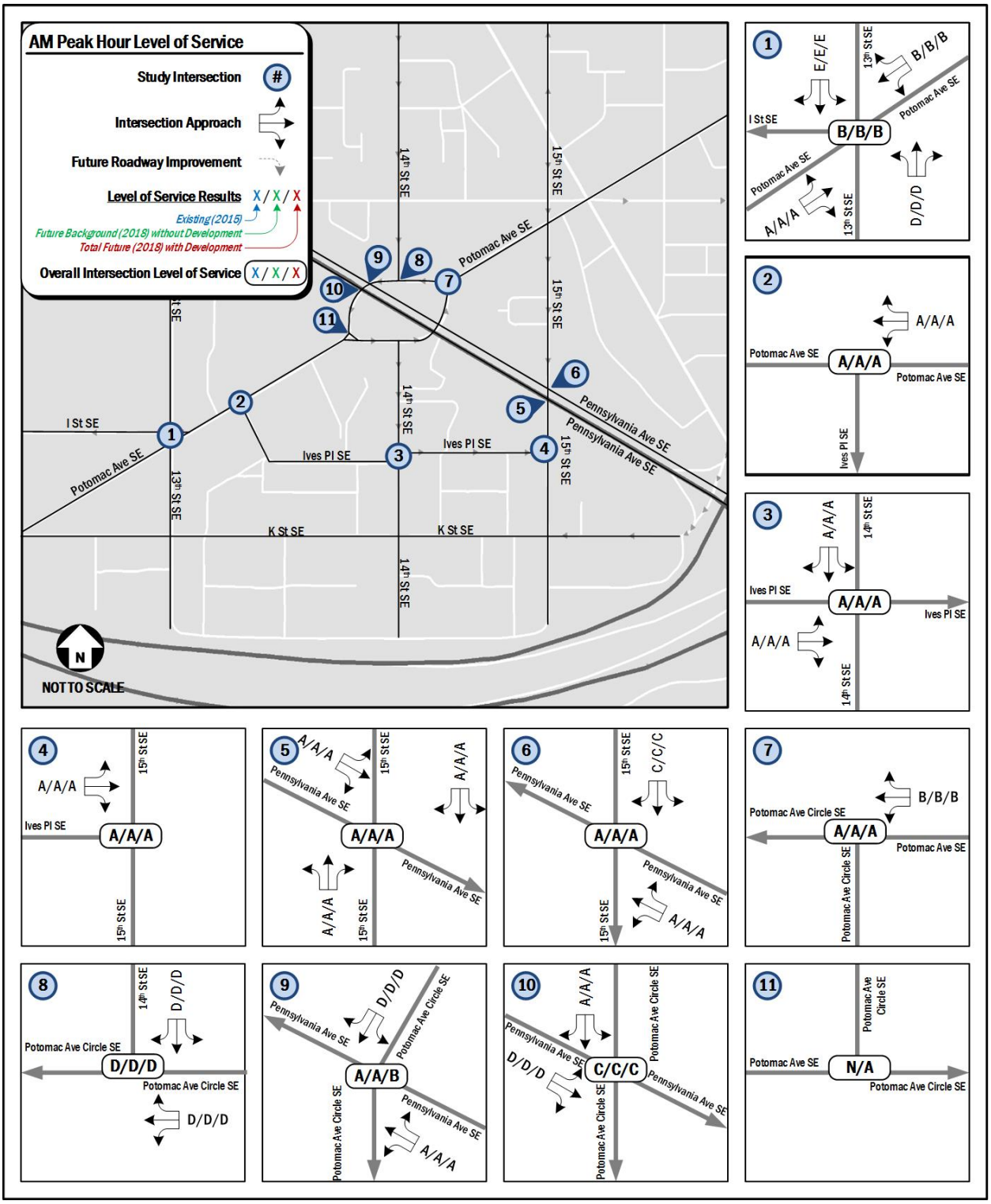

Figure 30: Morning Peak Hour Capacity Analysis Results (1)

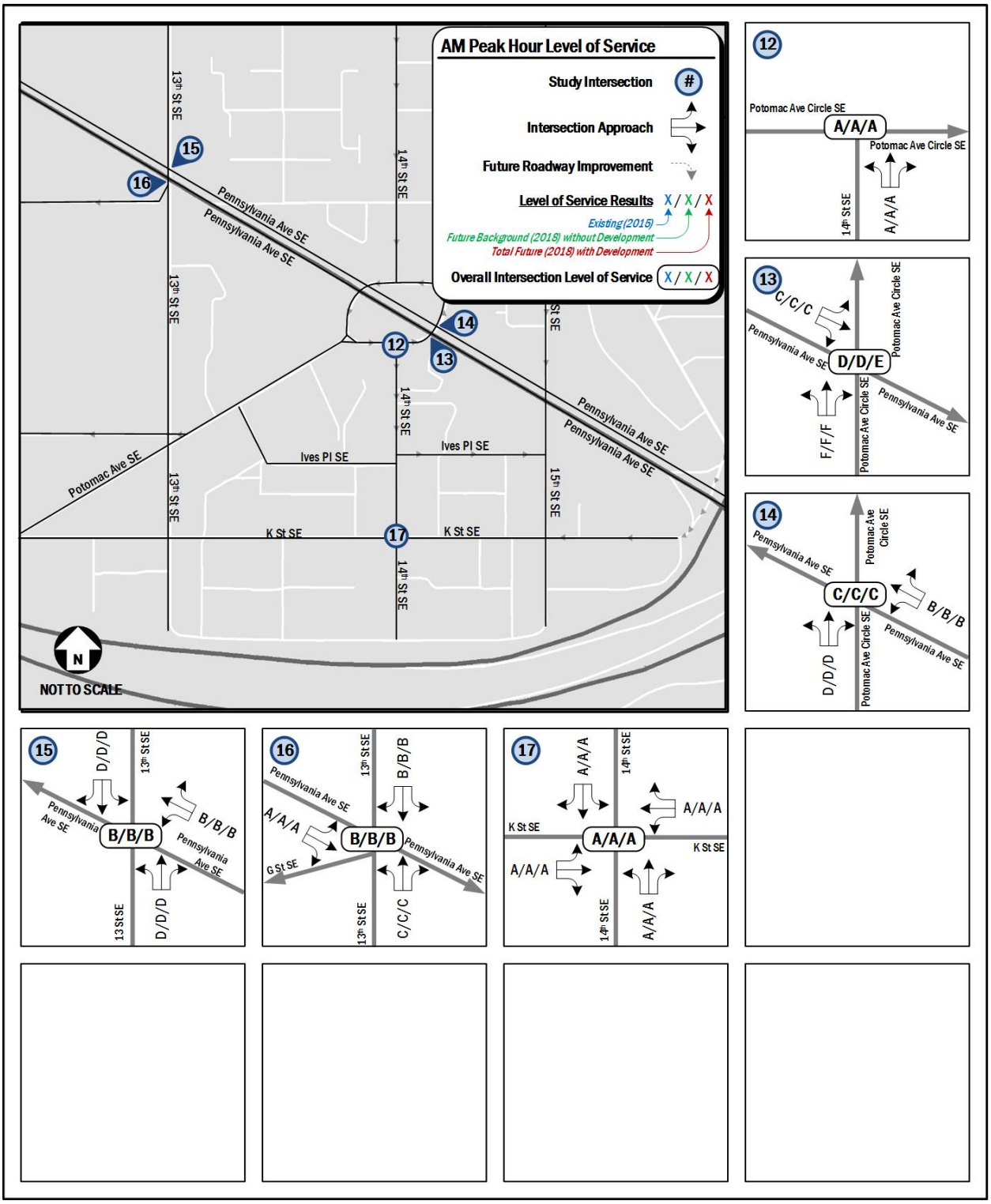

Figure 31: Morning Peak Hour Capacity Analysis Results (2)

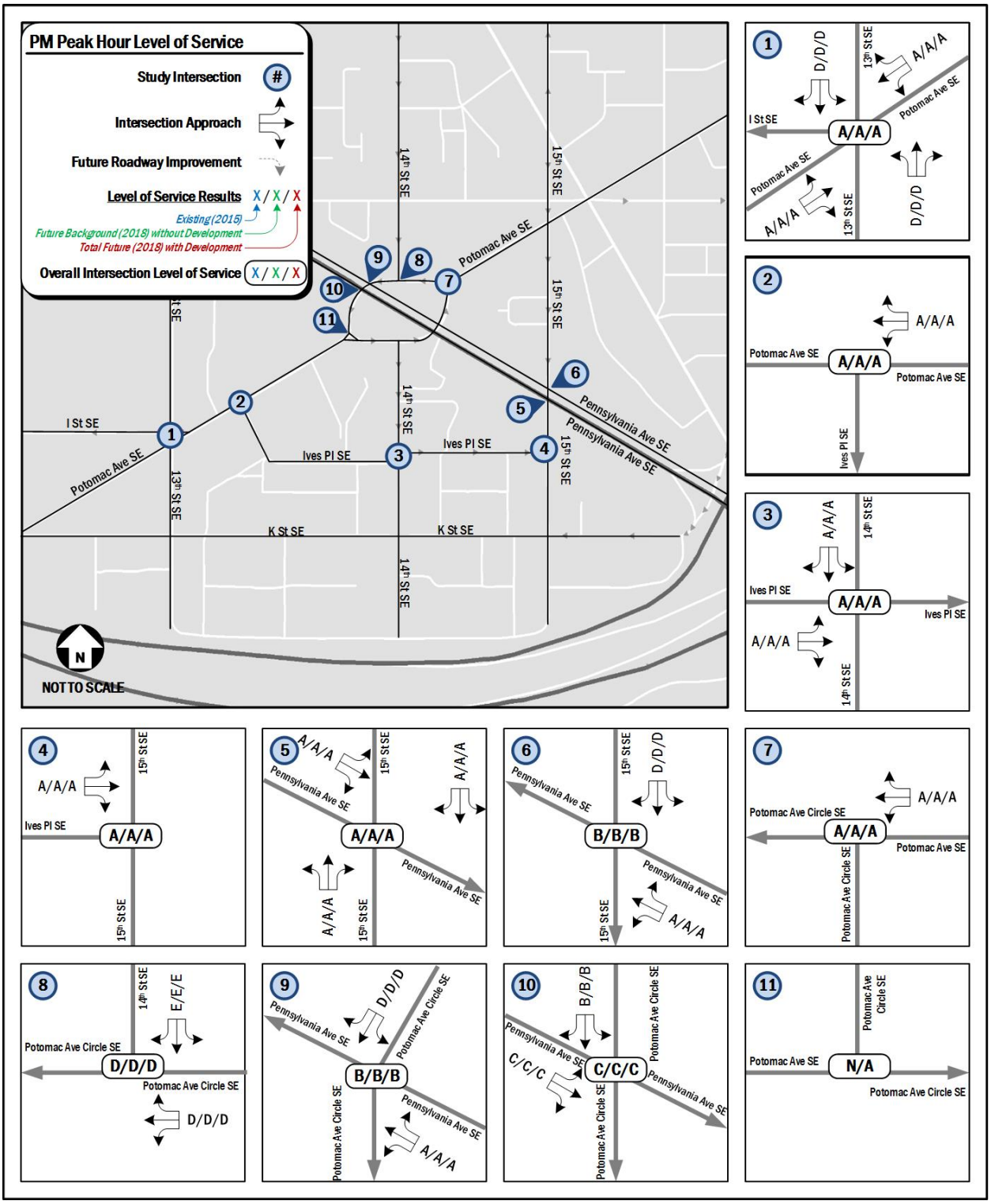

Figure 32: Afternoon Peak Hour Capacity Analysis Results (1)

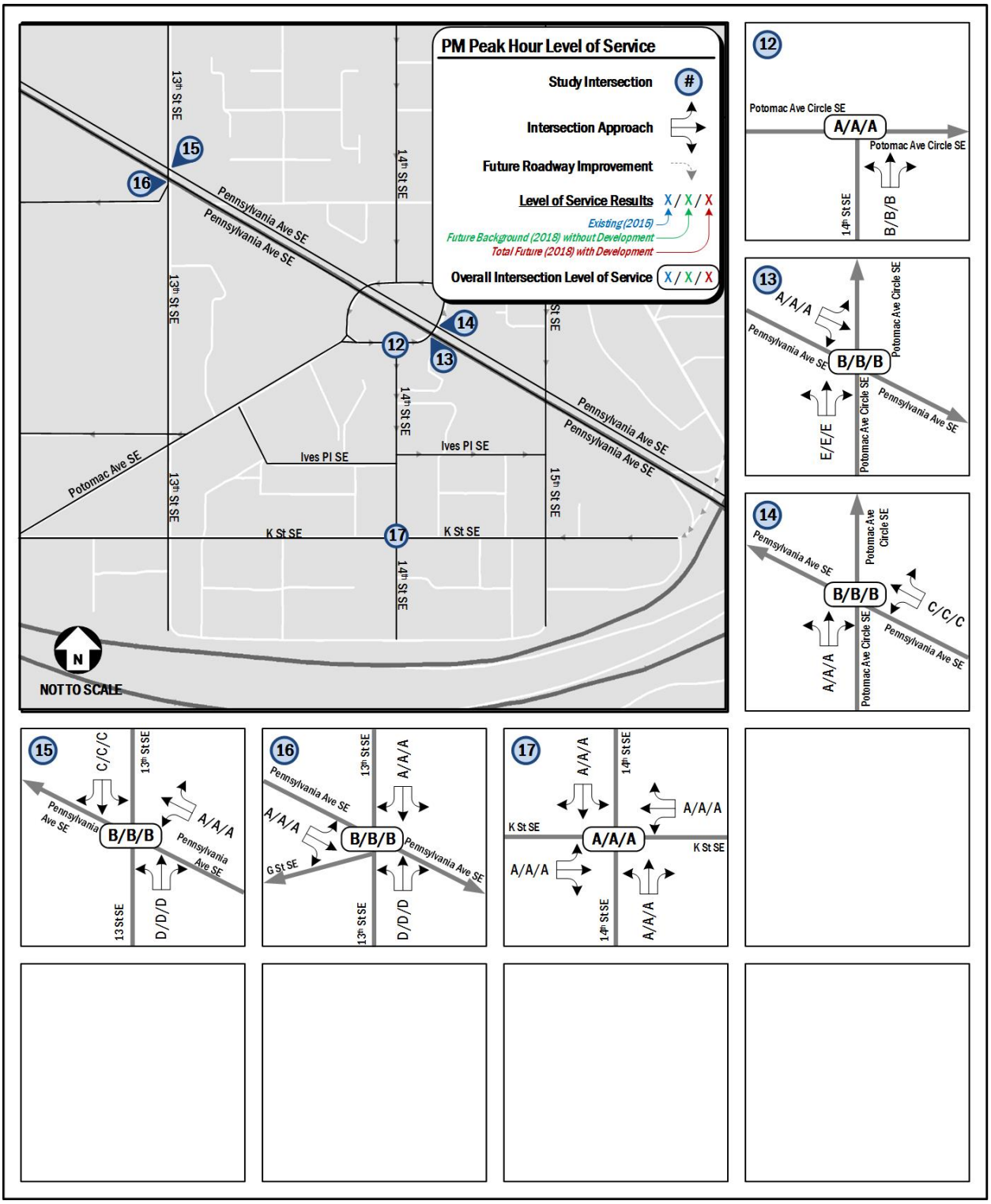

Figure 33: Afternoon Peak Hour Capacity Analysis Results (2)

TRANSIT

This section discusses the existing and proposed transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts due to the 1401 Pennsylvania Avenue SE project.

The following conclusions are reached within this chapter:

- The development has excellent access to transit
- The development site is surrounded by several Metrobus routes that travel along multiple primary corridors
- The site is expected to generate a manageable amount of transit trips, and the existing service is capable of handling these new trips

EXISTING TRANSIT SERVICE

The study area is well served by Metrobus, Circulator, and Metrorail. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 34 identifies the major transit routes, stations, and stops in the study area.

The Potomac Avenue Metrorail station is located 0.1 miles from the development site and is served by the Blue, Silver, and Orange lines which provide connections to areas in the District, Virginia, and Maryland. The Blue Line connects Largo Town Center with Franconia-Springfield while providing access to the District core. The Silver Line connects Largo Town Center with Whiele Reston East while providing access to the District core. The Orange Line connects New Carrollton with Vienna Fairfax-GMU while providing access to the District core. In addition, the Blue, Silver, and Orange Lines provide connections to all additional Metrorail lines allowing for access to much of the DC Metropolitan area. Silver and Orange Line trains run approximately every six minutes during the morning and afternoon peak hours and the Blue Line trains run approximately every 12 minutes. The Blue, Silver, and Orange Line run about every 12 minutes during weekday non-peak hours, every 20 minutes on weekday evenings after 9:30 pm and 12 to 20 minutes on the weekends.

The site is also serviced by Metrobus along multiple primary corridors. These bus lines connect the site to many areas of the District, Maryland and Virginia, including several Metrorail stations. Table 10 shows a summary of the bus route information for the routes that serve the site, including service hours, headway, and distance to the nearest bus stop.

PROPOSED TRANSIT SERVICE

Due to growth of population, jobs, and retail in several neighborhoods in the District and the potential for growth in other neighborhoods, the District's infrastructure is challenged with the need for transportation investments to support the recent growth and to further strengthen neighborhoods. In order to meet these challenges and capitalize on future opportunities, DDOT has developed a plan to identify transit challenges and opportunities and to recommend investments. This is outlined in DC's *Transit Future System Plan* report published by DDOT in April 2010, which includes the reestablishment of streetcar service in the District.

Pennsylvania Avenue was identified as a corridor in need of a Metro Express by the *Transit Future System Plan* report. In 2008 Metro Express Route 39 began running on Pennsylvania Avenue connecting the Downtown core with the neighborhoods east of the Anacostia River.

Additionally, WMATA and local transportation agencies in the District, Maryland, and Virginia have begun reviewing Metrobus lines and system wide facilities for service improvements since 2009. In direct relation to this development, routes 30N, 30S, 32, 34, 36, B2, M6, V1, and V4 were studied.

WMATA and DDOT published the *Metrobus 30s Line Study* in February 2008. At the time of the report (2008), the 30s line had the highest ridership of any Metrobus line at almost 20,000 daily riders. The report cites the need for improved customer experience, and improved reliability and travel times. As a possible solution, the report proposes enhanced service supervision, adding new routes, and modifying existing routes. In 2014 changes were made to routes 32, 34, and 36. Route 32 no longer provides crosstown service between Southern Avenue and Friendship Heights. Buses now operate between Southern Avenue and Foggy Bottom. Crosstown service to Friendship Heights was replaced by the new Route 30S. Route 36 no longer provides crosstown service between Naylor Road and Friendship Heights. Crosstown service to Friendship Heights is now replaced by the new Route 30N. These changes were designed to provide more reliable and frequent bus service to the majority of riders. In addition to the

30N, 30S, 32, 34, and 36, the M6 was studied in the same report, but no changes were recommended.

WMATA and DDOT published the *2010 Metrobus Evaluation Studies* in July 2011, which discusses recommendations for the B2 Metrobus route. The report cites the need for improved service and reliability as well as the need for improved bus stop amenities. As a possible solution, the report proposes segmenting the B2 route into three shorter variants of the existing route, with Stadium Armory acting as a transfer point. Since the length of the B2 route is causing delay and reliability issues, the segmenting of the route would improve reliability while maintaining exiting frequency of service, but may necessitate more transfers. As of this report, the recommendations outlined in the WMATA Metrobus study for the B2 route have not been enacted.

WMATA and DDOT published the service recommendations section of the *Metrobus Service Evaluation Study: U-V Lines* in March 2015, which discusses route changes and improvements to Metrobus Routes U2, U4, U5/6, U8 and V7, 8, 9. Issues regarding reliability and crowding were cited as potential areas of concern. In June 2015 changes to the U and V lines were made, which were designed to improve service and better match the travel needs of riders. These changes included the elimination of routes U2, V7, V8, shortening U8, extending V9, and the establishment of new routes U7, V1, V2, and V4.

Site-Generated Transit Impacts

The proposed development is projected to generate 63 transit trips (18 inbound, 45 outbound) during the morning peak hour and 111 transit trips (64 inbound, 47 outbound) during the afternoon peak hour.

US Census data was used to determine the distribution of those taking Metrorail and those taking Metrobus. The site lies in TAZ 20299 which shows that approximately 78 percent of transit riders used Metrorail and the remainder use Metrobus. That said, approximately 49 people will use Metrorail and 14 will use Metrobus during the morning peak hour; approximately 87 people will use Metrorail and 24 will use Metrobus during the afternoon peak hour.

WMATA studied capacity of Metrorail stations in its *Station Access & Capacity Study (2008).* The study analyzed the capacity of Metrorail stations for their vertical transportation, for example the capacity of the station at elevators, stairs, and escalators to shuttle patrons between the street, mezzanine, and platforms. The study also analyzed stations capacity to process riders at fare card gates. For both analyses, vertical

Table 10: Metrobus Route Information

Route Number	Route Name	Service Hours	Headway	Walking Distance to Nearest Bus Stop
30N,30S	Friendship Heights-Southeast Line	Weekdays: Eastbound 4:00AM-2:30AM Westbound 4:22AM-2:46AM Weekend: 4:30 AM-2:30AM	15-30 min	0.1 miles, 1 minutes
32,34,36	Pennsylvania Avenue Line	Weekdays: Eastbound 5:12AM-12:05AM Westbound 4:30AM-12:29AM	10-30min	0.1 miles, 1 minutes
39	Pennylvania Avenue Limited Line	Weekdays: Eastbound 3:30PM-6:39PM Westbound 6:00AM-9:04AM	15 min	0.1 miles, 1 minutes
B2	Bladensburg Road - Anacostia Line	Weekdays: Northbound 4:45AM-3:14AM Southbound 4:25AM-2:32AM Weekend: 4:27 AM-1:20AM	10-30 min	0.1 miles, 1 minutes
M6	Fairfax Village Line	Weekdays: Eastbound 5:21AM-1:08AM Westbound 5:00AM-1:17AM Weekend: 4:30 AM-2:30AM	30 min	0.1 miles, 1 minutes
V1	Bennin Heights-M Street Line	Weekdays: Eastbound 2:55PM-7:45PM Westbound 5:04AM-9:37AM	20-30 min	0.1 miles, 1 minutes
V4	Capitol Heights-Minnesota Avenue Line	Weekdays: Eastbound 3:09AM-2:56AM Westbound 4:10AM-2:19AM Weekend: 5:30 AM-1:17AM	15-30 min	0.1 miles, 1 minutes
Circulator	Potomac Avenue Metro - Skyland	Winter: 6:00AM-3:07PM Summer: 6:45AM-8:06PM Saturdays: 7:00AM-9:00PM	10 min	0.1 miles, 3 minutes

transportation and fare card gates, volume-to-capacity ratios were calculated for existing data (from 2005) and projections for the year 2030. According to the study, the Potomac Ave station can currently accommodate future growth at all access points.

WMATA studied capacity along Metrobus routes. DC's *Transit Future System Plan* (2010) lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). A load factor is considered unacceptable if it is over 1.2 during peak periods or over 1.0 during off-peak or weekend periods. According to this study Metrobus routes that travel near the site operate at an acceptable load factor during all periods of the day. Based on this information and the extensive Metrobus and Metorail service surrounding the site, site-generated transit trips will not cause detrimental impacts to Metrobus or Metrorail service.

Figure 34: Existing Transit Service

PEDESTRIAN FACILITIES

This section summarizes the existing and future pedestrian access to the site and reviews walking routes to and from the site.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the site provides a good walking environment. There are some gaps in the system, but there are sidewalks along all primary routes to pedestrian destinations.
- The site is not expected to generate a significant amount of pedestrian trips; however, the pedestrian trips generated by walking to and from transit will be more substantial, particularly along Pennsylvania Avenue.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the site were evaluated as well as routes to nearby transit facilities and prominent retail and neighborhood destinations. The site is easily accessible to transit options such as bus stops along Pennsylvania Avenue and the Potomac Avenue Metro Station. There are some barriers and areas of concern within the study area that negatively impact the quality of and attractiveness of the walking environment. This includes roadway conditions that reduce the quality of walking conditions, narrow or nonexistent sidewalks, incomplete or insufficient crossings at busy intersections, and Interstate 295 that limits connectivity to the south. Figure 35 shows suggested pedestrian pathways, walking time and distances, and barriers and areas of concern.

PEDESTRIAN INFRASTRUCTURE

This section outlines the existing and proposed pedestrian infrastructure within the pedestrian study area.

Existing Conditions

A review of pedestrian facilities surrounding the proposed development shows that most facilities meet DDOT standards and provide a quality walking environment. Figure 36 shows a detailed inventory of the existing pedestrian infrastructure surrounding the site. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by DDOT's *Public Realm Design Manual* in addition to ADA standards. Sidewalk widths and requirements for the District are shown below in Table 11.

Within the area shown, most roadways are considered residential with a low to moderate density. Meanwhile some areas along Pennsylvania Avenue are considered retail and commercial and thus require wider sidewalks. Most of the sidewalks surrounding the site comply with DDOT standards; however there are some areas which have inadequate sidewalks or no sidewalks at all that are located directly south of the site. All primary pedestrian destinations are accessible via routes with sidewalks, most of which met DDOT standards.

ADA standards require that all curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks is not desired. As shown in the figure, under existing conditions there are some issues with crosswalks and curb ramps near the site.

SITE IMPACTS

This section summarizes the impacts of the development on the overall pedestrian operations in the vicinity of the site.

Pedestrian Trip Generation

The 1401 Pennsylvania Avenue SE development is expected to generate 26 walking trips (11 inbound, 15 outbound) during the morning peak hour and 69 walking trips (36 inbound, 33 outbound) during the afternoon peak hour. The origins and destinations of these trips are likely to be:

- Employment opportunities where residents can walk to work;
- Retail locations outside of the site; and

Table 11: Sidewalk Requirements

Street Type	Minimum Sidewalk Width	Minimum Buffer Width
Residential (Low to Moderate Density)	6 ft	4 ft (6 ft preferred for tree space)
Residential (High Density)	8 ft	4 ft (6 ft preferred for tree space)
Commercial (Non-downtown)	10 ft	4 ft
Downtown	16 ft	6 ft

- Neighborhood destinations such as schools, libraries, and parks in the vicinity of the site.

In addition to these trips, the transit trips generated by the site will also generate pedestrian demand between the site and nearby transit stops.

Currently the existing pedestrian network has the capacity to absorb the newly generated trips from the site. The planned sidewalk and pedestrian landscape improvements on Pennsylvania Avenue and 14th Street will further improve and expand the pedestrian network in the vicinity of the site.

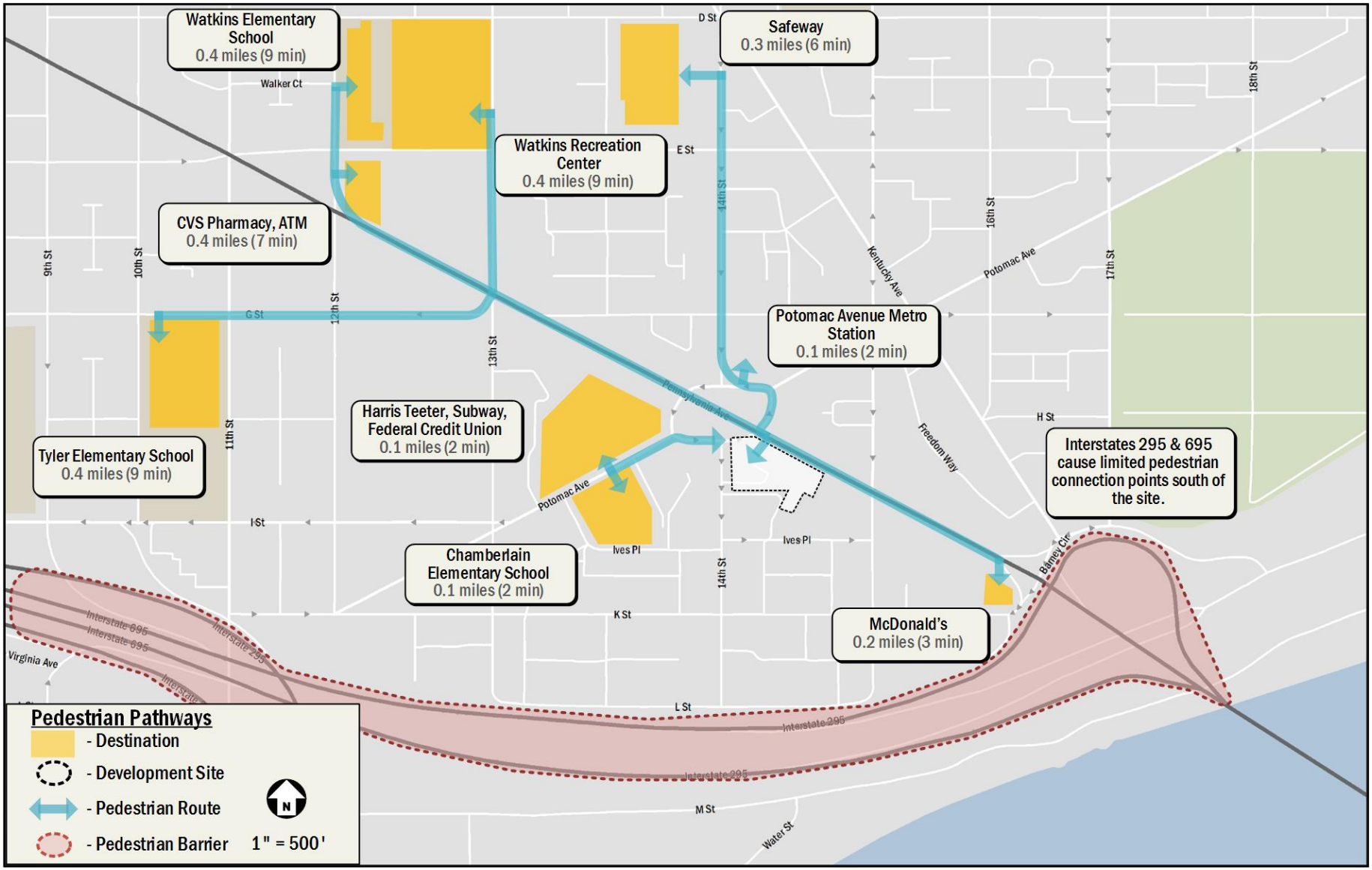

Figure 35: Pedestrian Pathways

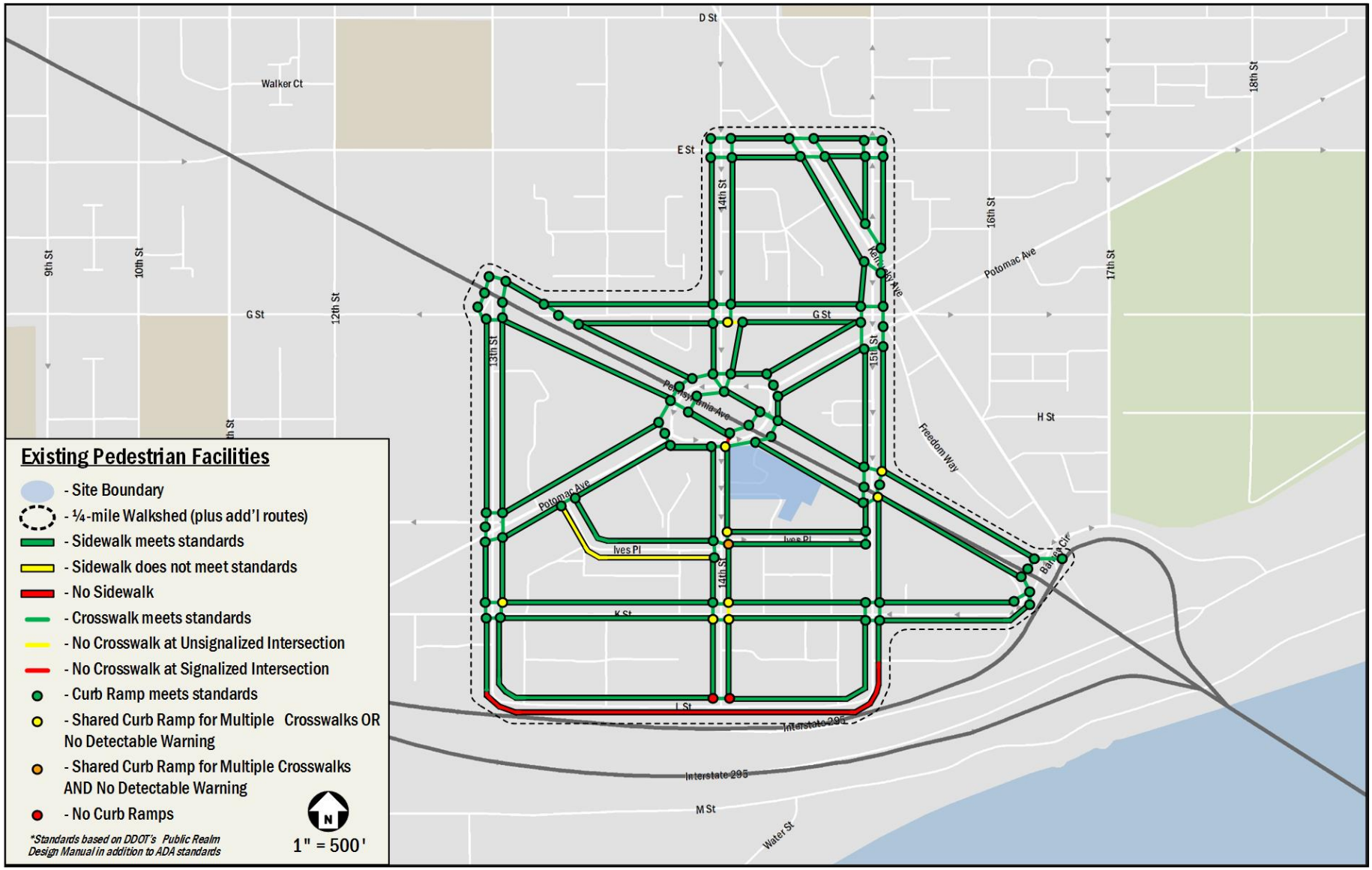

Figure 36: Existing Pedestrian Infrastructure

BICYCLE FACILITIES

This section summarizes existing and future bicycle access, reviews the quality of cycling routes to and from the site, and presents recommendations.

The following conclusions are reached within this chapter:

- The site has access to one bike trail located to the southeast of the site, as well as bike lane to the east and west.
- The site is not expected to generate a significant amount of bicycle trips, therefore all site-generated bike trips can be accommodated on existing infrastructure.
- The development will include secure bicycle parking on site, and short-term bicycle racks along the perimeter of the site.

EXISTING BICYCLE FACILITIES

The site is adequately connected to existing on- and off-street bicycle facilities. East connectivity is provided along the Anacostia River Trail. There are bicycle lanes located to the east of the site along 15th Street and to the west of the site along 11th Street that provide connectivity to the north. Figure 37 illustrates the existing bicycle facilities in the area.

PROPOSED BICYCLE FACILITIES

The MoveDC plan outlines several bicycle improvements in the vicinity of the site. These improvements are broken up into four tiers that rank the priority for implementation. The four tiers are broken down as follows:

- *Tier 1*
  Investments should be considered as part of DDOT's 6-year TIP and annual work program development, if they are not already included. Some projects may be able to move directly into construction, while others become high priorities for advancement through the Project Development Process.

  There are no tier 1 improvements planned in the vicinity of the site.

- *Tier 2*
  Investments within this tier are not high priorities in the early years of MoveDC implementation. They could begin moving through the Project Development Process if there are compelling reasons for their advancement.

  There are a couple tier 2 additions that will positively affect bicycle connectivity to and from the site. A bike lane extending from Barney Circle SE to 2nd Street SE along Pennsylvania Avenue, and a bike lane from Potomac Avenue SE to D Street SE along 14th Street are planned. These facilities will greatly improve the bicycle connectivity near the site.

- *Tier 3*
  Investments within this tier are not priorities for DDOT-led advancement in the early years of MoveDC's implementation. They could move forward earlier under circumstances such as real estate development initiatives and non-DDOT partnerships providing the opportunity for non-District-led completion of specific funding.

- *Tier 4*
  Generally, investments within this tier are not priorities for DDOT-led advancement and are lower priority for project development in the early years of implementation.

Due to the timeline of the proposed development, this report will focus on the Tier 1 and Tier 2 recommendations within the vicinity of the site.

Although these projects are discussed in the MoveDC plan, they are not currently funded or included in DDOT's Transportation Implementation Plan thus they will not be assumed as complete for this analysis.

SITE IMPACTS

This section summarizes the impacts of the development on the overall bicycle operations surrounding the site and develops recommendations for connectivity improvements.

Bicycle Trip Generation

The 1401 Pennsylvania Avenue SE development is expected to generate 7 bicycle trip (2 inbound, 5 outbound) during the morning peak hour and 14 bicycle trips (8 inbound, 6 outbound) during the afternoon peak hour. Although bicycling is an important mode for getting to and from the site, with significant facilities located on site, and existing and planned routes to and from the site, the project is well positioned to take full advantage of the future expansion of bicycle infrastructure in the area. In the meantime, the surrounding

low volume neighborhood streets provide suitable interim connectivity for bicycles.

On-Site Bicycle Elements

The project will provide amenities that cater to cyclists including short-term bicycle racks around the perimeter of the site, on-site secure long-term bicycle parking as well as a bike service area and a shower/changing area, which will increase the attractiveness of cycling to the site.

The development will provide 218 secure bicycle parking spaces within its parking garage. Twenty (20) exterior bicycle parking spaces will be provided by the applicant in the public space. Each inverted "U" shaped bicycle rack will comply with DDOT's *Bicycle Rack Design and Placement Guidelines*. The Applicant is working in conjunction with DDOT to determine the exact locations of bicycle racks within public space.

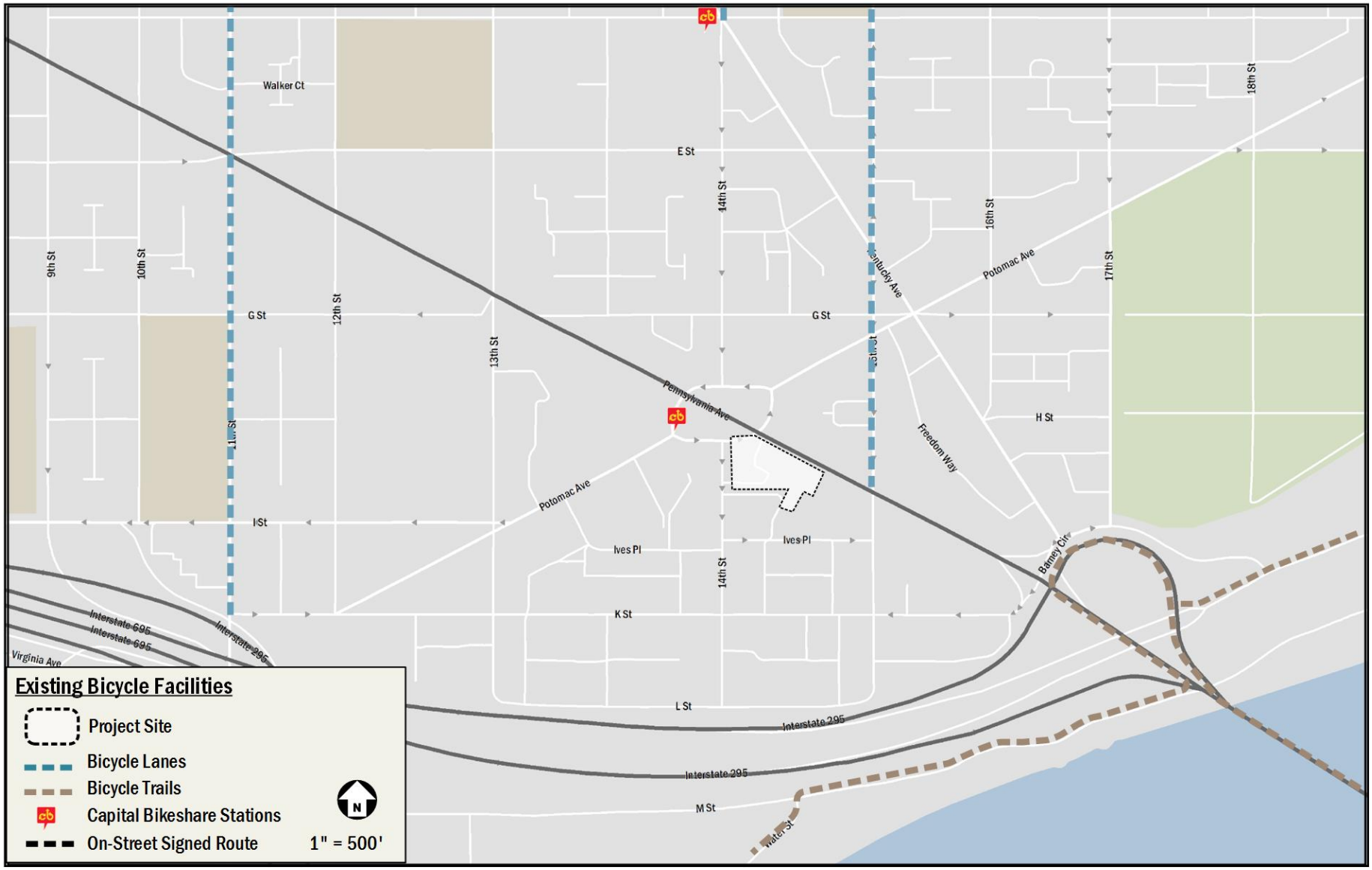

Figure 37: Existing Bicycle Facilities

CRASH DATA ANALYSIS

This section of the report reviews available crash data within the study area, reviews potential impacts of proposed development on crash rates, and makes recommendations for mitigation measures where needed.

SUMMARY OF AVAILABLE CRASH DATA

A crash analysis was performed to determine if there was an abnormally high crash rate at any study area intersection. DDOT provided the last three years of intersection crash data, from 2012 to 2015 for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections, the crash rate is measure in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 12.

According to the Institute of Transportation Engineer's *Transportation Impact Analysis for Site Development*, a crash rate of 1.0 or higher is an indication that further study is required. Five intersections in this study area meet this criterion (as shown in red in Table 12 and detailed in Table 13). The 1401 Pennsylvania Avenue SE development should be developed in a manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other issues. Additionally, the crash data does not provide detailed location information. In some cases, the crashes were located near the intersections and not necessarily within the intersection.

For these three intersections, the crash type information from the DDOT crash data was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate some possible causes. Table 13 contains a breakdown of crash types reported for the seven intersections with a crash rate over 1.0 per MEV.

POTENTIAL IMPACTS

This section reviews the five locations with existing crash rates over 1.0 MEV and reviews potential impacts of the proposed development.

- *Ives Place & 14th Street*

  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.48 crashes per MEV over the course of the 3-year study period. All the crashes at this intersection were side swipes. A common cause for such crashes is narrow drive lanes, especially when there are parked vehicles on both sides of the travel lane, as is the case on Ives Place. The elevated crash rate is more likely affected by the low volumes at the intersection.

  This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety.

- *15th Street & Pennsylvania Avenue*

  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.37 crashes per MEV. The majority crashes at this intersection were side swiped vehicles. Sideswipe crashes can often occur when a parked

Table 12: Intersection Crash Rates

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
1. 13th Street and Potomac Ave SE	9	0	0	0.87
2. Ives Pl and Potomac Ave SE	9	0	0	0.96
3. Ives Pl and 14th St SE	3	0	0	**1.48**
5. 15th Street and Pennsylvania Ave SE	44	1	1	**1.37**
7. Pennsylvania Ave and Potomac Ave SE	71	4	0	**1.77**
15. 13th Street and G St SE	37	1	0	**1.09**
17. 14th Street and K St SE	6	0	0	**2.17**

** - Million Entering Vehicles; Volumes estimated based on turning movement count data*

vehicle attempts to merge into the travel lane. Overall, the distribution of crash types at the intersection does not lead to a likely safety issue at the intersection.

This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety.

- *Pennsylvania Avenue & Potomac Avenue*
  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of 1.77 crashes per MEV. The majority of crashes at this intersection side swipes. The geometry of the intersection, with its multiple nodes and turning movements could be a significant contributing factor to the high number of side swipe crashes.

  This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety. Furthermore, the Pennsylvania and Potomac Avenues SE Intersection Improvement Project is expected to address many of the safety concerns that currently exist at this intersection.

- *13th Street & G Street & Pennsylvania Avenue*
  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.09 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were side swipes. A common cause for such crashes is when a parked vehicle attempts to merge into the travel lane. The unique geometry of the intersection could be a significant contributing factor to the elevated number of side swipes at the intersection.

  This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety.

- *14th Street & K Street*
  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 2.17 crashes per MEV. No specific crash type shows prevalence at this intersection, with the elevated crash rate more likely affected by the low volumes at the intersection than any other contributing factor.

  This report does not recommend mitigation measures at this intersection as the proposed development is not projected to make changes to the commuting patterns, operations, or geometry of this intersection that could negatively influence safety.

Table 13: Crash Type Breakdown

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Non-Collision	Under/Over Ride	Unspecified	Total
3. Ives Pl and 14th St SE	**1.48**	0	0	0	0	3	0	0	0	0	0	0	0	0	0	**3**
		0%	*0%*	*0%*	*0%*	*100%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	
5. 15th Street and Pennsylvania Ave SE	**1.37**	6	0	0	7	20	0	0	2	1	1	2	0	0	5	**44**
		14%	*0%*	*0%*	*16%*	*45%*	*0%*	*0%*	*5%*	*2%*	*2%*	*5%*	*0%*	*0%*	*11%*	
7. Pennsylvania Ave and Potomac Ave SE	**1.77**	5	2	2	11	34	0	3	4	1	5	1	0	0	3	**71**
		7%	*3%*	*3%*	*15%*	*48%*	*0%*	*4%*	*6%*	*1%*	*7%*	*1%*	*0%*	*0%*	*4%*	
15. 13th Street and G St SE	**1.09**	1	0	0	5	27	1	1	0	0	1	1	0	0	0	**37**
		3%	*0%*	*0%*	*14%*	*73%*	*3%*	*3%*	*0%*	*0%*	*3%*	*3%*	*0%*	*0%*	*0%*	
17. 14th Street and K St SE	**2.17**	1	1	0	0	2	0	1	0	0	0	1	0	0	0	**6**
		17%	*17%*	*0%*	*0%*	*33%*	*0%*	*17%*	*0%*	*0%*	*0%*	*17%*	*0%*	*0%*	*0%*	

SUMMARY AND CONCLUSIONS

This report presents the findings of a Transportation Impact Study (TIS) for the 1401 Pennsylvania Avenue SE development. The purpose of this study is to evaluate whether the project will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, three background conditions, and four future conditions. This report concludes that **the project will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements are implemented.

Proposed Project

The 1401 Pennsylvania Avenue SE site is currently occupied by a pizzeria, a parking lot, four vacant parcels, and a single two story multi-unit residential building. The site is generally bound by Pennsylvania Avenue to the north, residential row houses to the east, an alley to the south, and 14th Street to the west.

The application plans to develop the site into a mixed-use development including residential and retail uses. The project will be one structure containing 174 dwelling units with 58 below-grade parking spaces and 23,502 square feet of ground-floor retail.

Parking and loading will be accessed through an expanded existing alley that links 14th Street to the west of the site with Ives Place to the south of the site.

Pedestrian facilities along the perimeter of the site will be improved to include sidewalk and buffer widths that meet or exceed DDOT requirements. The residential garage will supply 218 secure bicycle parking spaces as well as a bike service area and a shower/changing area which exceeds the current zoning requirements. Furthermore, 20 short-term bicycle parking spaces will be provided around the perimeter of the site.

The parking and loading provided by the development will adequately serve the demands set forth by the development program.

Multi-Modal Impacts and Recommendations

Transit

The site is served by regional and local transit services such as Metrorail, Circulator, and Metrobus. The site is 0.1 miles from the Potomac Avenue Metrorail Station portal at Pennsylvania Avenue SE and 14th Street SE, and many Metrobus stops are located within a block of the site along Pennsylvania Avenue SE.

Although the development will be generating new transit trips, existing facilities have enough capacity to handle the new trips.

Pedestrian

The site is surrounded by a well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and acceptable crosswalks and curb ramps, particularly along the primary walking routes. There are some pedestrian barriers surrounding the site such as limited connectivity due to the Interstate to the south.

As a result of the development, pedestrian facilities along the perimeter of the site will be improved, for example by removing three curb cuts, two on Pennsylvania Avenue, and one on 14th Street. The development will improve sidewalks adjacent to the site such that they meet or exceed DDOT requirements and provide an improved pedestrian environment.

Bicycle

Although not directly adjacent to any bike facilities, the site is just blocks away from trails and bike lanes, such as the Anacostia River Trail to the east and bike routes along 11th Street and 15th Street to the east and west of the site.

On site, the development will provide short-term bicycle parking along the perimeter of the site and on-site secure long-term bicycle parking for residents.

Vehicular

The site is well-connected to regional roadways such as I-295 and I-695, primary and minor arterials such as Pennsylvania Avenue and 17th Street, and an existing network of collector and local roadways.

In order to determine if the proposed development will have a negative impact on this transportation network, this report projects future conditions with and without the development of the site and performs analyses of intersection delays. These

delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. Minor impacts were found at one intersection. Operational improvements to mitigate the impacts are discussed in the report.

The analyses concluded that the planned development will not have adverse impacts on the surrounding transportation network.

Summary and Recommendations

This report concludes that the proposed development will not have a detrimental impact to the surrounding transportation network assuming that all planned site design elements are implemented.

The PUD has several positive elements contained within its design that minimize potential transportation impacts, including:

- The site's close proximity to Metrorail
- The inclusion of secure long-term bicycle parking spaces on-site that greatly exceed zoning requirements, as well as a bike service area and a shower/changing area.
- The expansion of the public alley to accommodate access to the site

The PUD has several positive elements contained within its design that are publicly accessible improvements, including:

- The pedestrian facilities adjacent and within the site will be greatly improved. This includes enhancing the sidewalks along 14th Street and Pennsylvania Avenue adjacent to the PUD, as well as the removal of two curb cuts on Pennsylvania Avenue and one curb cut on 14th Street.
- Exceeding the required amount of short-term on-street bicycle racks as set forth by zoning.