TECHNICAL MEMORANDUM

To: Aaron Zimmerman DDOT

From: Vinay Varadarajan, PE
Katie Wagner, PE, PTOE
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Date: March 19, 2020

Subject: 1900 Half Street, SW - Eagle Academy School Operations

Introduction

This memorandum presents a comparison of the traffic and operational impacts related to the conversion of previously approved retail space to a school use for Eagle Academy at 1900 Half Street, SW. Under Z.C. Order No. 16-06 dated July 7, 2016, as amended by Z.C. Order Nos. 16-06A through 16-06C, the subject site at 1900 Half Street was previously approved for the adaptive reuse of the existing building into a mixed-use apartment building with approximately 453 dwelling units and approximately 16,542 square feet of retail. Until recently the Property was improved with an existing and mostly vacant office building that was constructed for use by the General Services Administration (GSA). The building is currently under construction consistent with the Zoning Commission's prior approvals and is being developed as a mixed-use building. A site plan is provided in Figure 1.

The Applicant is proposing that the approved retail space be used for education use and to construct an additional 2,400 square feet in the building in a portion of the previously approved two-story retail space at the ground level. The residential use of the building will not change. The additional 2,400 square feet will also be devoted to the educational use, which will be occupied by Eagle Academy Public Charter School. The school use would be for pre-kindergarten through third grade students. Approximately 240-260 students and 35 teachers, faculty, and staff will be accommodated at full enrollment.

Based on a trip generation comparison of the approved residential and retail use, the proposed school would generate fewer trips in the afternoon peak hour but slightly more trips in the morning peak hour. Based on conversations with DDOT, a revised vehicular analysis was performed in the morning peak hour to study the effects of the school on nearby intersections. Based on the revised analysis, the following conclusions were made regarding the 1900 Half Street development:

- The revised development program will not have a detrimental impact on the surrounding roadway network.
- None of the study area intersections were found to have unacceptable delays and no additional mitigations are warranted.
- The proposed school is expected to generate a manageable number of trips which can be accommodated by the proposed parking garage for staff and a pick-up/drop-off lane on Water Street, SW for parents.
- The proposed pick-up/drop-off lane on Water Street will accommodate students who are driven to and from school within 20 minutes before and after? the arrival and dismissal periods.
- A rigorous Transportation Demand Management (TDM) plan has been proposed to incentivize parents of students, staff, and faculty of the school to further reduce the demand of single-occupancy vehicles on-site. The plan includes carpooling matching among parents and public transportation benefits for staff/faculty.

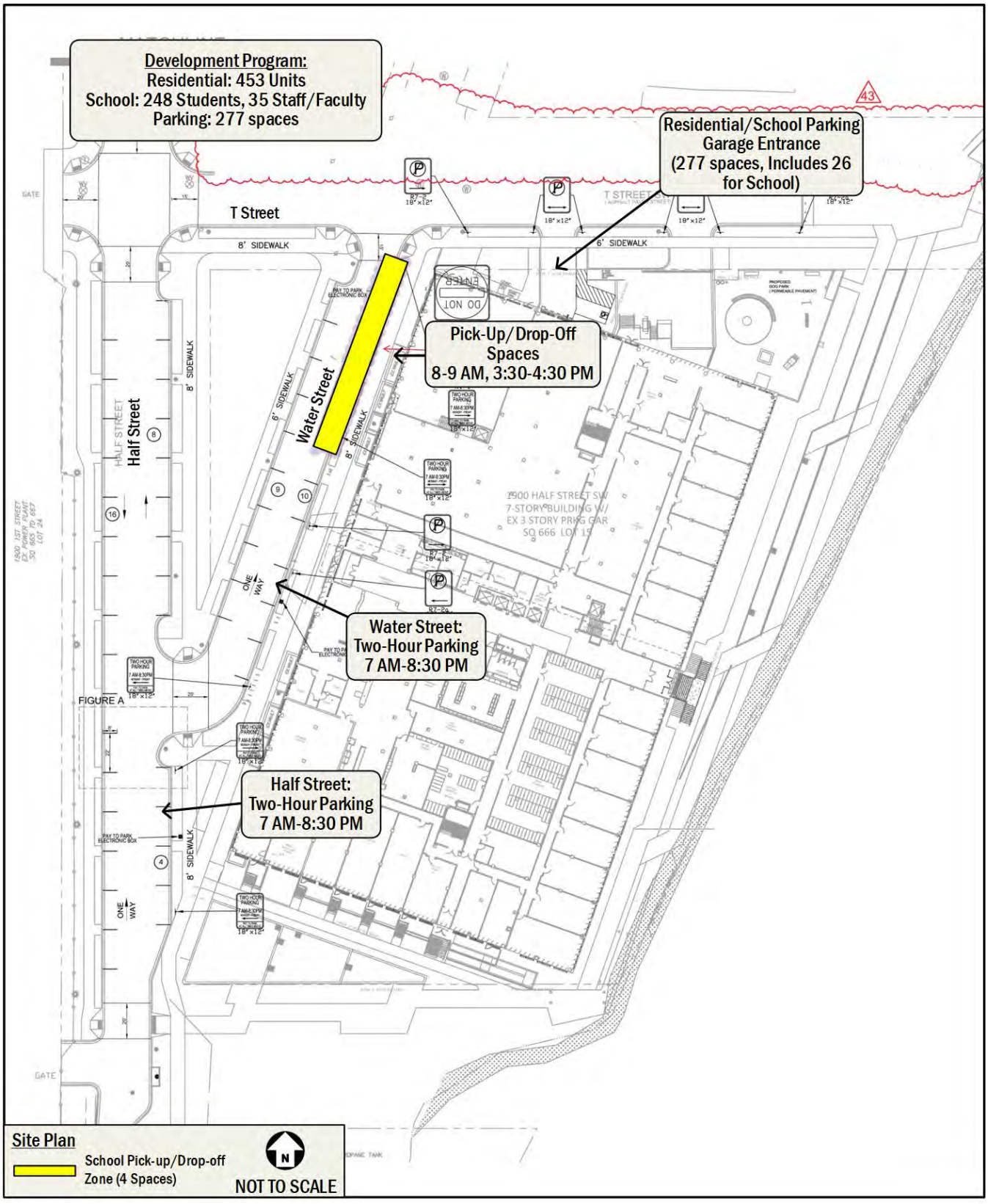

Figure 1: Site Plan – 1900 Half Street – Eagle Academy

Eagle Academy - School Operations

Eagle Academy currently operates at 1017 New Jersey Avenue SE, about a mile from the proposed site. Eagle Academy's current lease is being terminated in June 2020; therefore, Eagle Academy would open at the 1900 Half Street location in August 2020. This section summarizes the daily schedule and operations of Eagle Academy at 1900 Half Street.

Enrollment

The school will open in the 2020-21 academic year with 210 students. At full enrollment during the 2021-22 school year, approximately 248 students, 17 faculty, and 18 staff are expected to attend the school. Table 1 presents a breakdown of students by grade.

Table 1: Student Enrollment at Eagle Academy

Grade	Number of Students	
	At Opening (2020-21)	At Full Enrollment (2021-22)
Pre-K 3	32	32
Pre-K 4	38	38
Kindergarten	40	46
Grade 1	40	46
Grade 2	40	46
Grade 3	20	40
Total	**210**	**248**

Hours of Operations

Classes begin at 8:45 a.m. and dismissal will occur 3:45 p.m. for younger students and 4:00 p.m. for the older students. The school offers before- and after-school care which are described in detail below.

Before- and After-School Care

Eagle Academy operates a before- and after-school care program for students. Approximately 60 students are expected to use the before-school program, which operates from 7:00 to 8:15 a.m. After-school care operates from the 3:45 p.m. dismissal to 6:00 p.m. Pick-up of students for the after-school care takes place from 5:00 p.m. to 6:00 p.m. It is expected that no more than 120 students will use after-school services. The operations of before- and after-school care will spread out vehicular trips across the commuter peak hours.

Pick-up/Drop-off Operations

Morning drop-off occurs between 8:15 a.m. and 9:00 a.m. and afternoon pick-up occurs between 3:45 p.m. and 4:15 p.m. Eagle Academy will continue to utilize its existing carpool system which organizes parents into groups of carpools to lessen single student occupancy vehicles. Parents register their car tag numbers at the beginning of the year. Each carpool family is assigned a number which corresponds to their car tag and is displayed on their dashboards with only authorized vehicles allowed to drop-off and pick-up students. The students are also given the same number on a lanyard to keep on their person at all times.

While the existing New Jersey Avenue facility does not have any reserved drop-off parking spaces, the proposed Half Street location will feature a curbside lane to facilitate drop-off and pick-up activity. The curbside lane will be composed of four (4) on-street spaces along northbound Water Street, adjacent to the school building. In coordination with the Safe Routes to School team, DDOT plans to designate the east side of Water Street adjacent to the school building as "No Parking" between 8:00 to 9:00 a.m. and 3:30 to 4:30 p.m. Peak arrival is expected to occur between 8:30 and 8:45 a.m. Traffic control personnel will be on site at the intersections of Water Street and Half Street and Water Street and T Street to regulate traffic flow and potential conflict areas, particularly between pedestrians and vehicles..

Morning Drop-Off

To drop students off, parents drive into the curbside lane on northbound Water Street adjacent to the school building. Up to four (4) school monitors will open the passenger-side doors and escort the students to the school. In order to ensure a quick and efficient drop-off process, parents will not be allowed to park or exit their vehicle. Once the student has departed the vehicle, the parents may drive out of the lane to keep the process moving. In general, the process takes a maximum of 15-20 minutes to accommodate all students who are driven to school. Peak arrival is expected to occur between 8:30 and 8:45 a.m. The proposed morning drop-off plan is presented in Figure 2.

Afternoon Pick-Up

Dismissal of students begin at 3:45 p.m. for younger grades, with older students dismissed at 4:00 p.m. During these time periods, parents with authorized tag numbers enter the curbside lane on Water Street. Students will be held in a waiting area close to the school entrance within the building and monitors will relay the vehicle tag number by short-range communication system to the student queue. The student(s) associated with the vehicle tag number are then escorted to the vehicle by the school monitor. As with the morning drop-off period, parents will be prohibited from parking or exiting their vehicles. Once the student(s) is safely in the vehicle, the parent may depart and pull out of the curbside lane. The four (4) school monitors will be opening car doors and helping children into vehicles. The proposed afternoon pick-up plan is presented in Figure 3.

Parking

A below-grade parking garage will serve the site, accessed from a curb cut along T Street. The garage will provide 277 parking spaces. Under 2016 Zoning Requirements, a public education facility is required to provide 0.25 spaces per every 1,000 square feet. For an education facility with 18,942 square feet of GFA, five (5) spaces are required. A total of 26 parking spaces within the building garage will be dedicated to teachers and staff, meeting and exceeding zoning requirements. This garage will also be shared with residents of the 1900 Half Street development. Parking for parents will be accommodated with on-street public parking along Half Street and Water Street. Parents are also allowed to park in the garage for school events longer than two (2) hours. The number of parking spaces reserved for the school will meet the practical needs of staff/faculty and parents of students.

Transportation Demand Management (TDM)

TDM is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM typically focuses on reducing the demand of single-occupancy, private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

The Applicant proposes the following TDM measures for the proposed school:

- **Student TDM Elements**
    - The School will offer a parent listserv which will allow parents to find carpool matches.
    - The School will organize carpooling and publicly recognize at annual ceremony any parent who regularly drives two (2) or more students to school.
    - The School will offer DC One Cards to all students to encourage the use of public transportation
    - The School will require all drop-off and pick-up activities to be within the designated area on Water Street, SW.
    - The School will coordinate bike safety/education courses for students.

- **Faculty/Staff TDM Elements**
  - The School will offer a transit benefit program in the form of SmartTrip cards to faculty and staff to encourage the use of public transportation.
  - The School will encourage carpooling and prioritize providing parking for any faculty or staff who regular drives two (2) additional faculty or staff members to school.
  - All faculty and staff who drive to school will be instructed to park within the parking garage in the designated spaces.
  - The School will offer secure long-term and short-term bicycle parking which meets 2016 Zoning Regulations. Under these requirements, three (3) long-term and 10 short-term spaces are required and will be provided. Short-term spaces will be provided in the form of a bicycle rack.
- **School-Wide TDM Elements**
  - The School will continue to work with the neighborhood through periodic public meetings to ensure any traffic concerns can be addressed in a timely manner.
  - The School will assign a staff member to serve as Transportation Management Coordinator (TMC) who will be responsible for oversight of the TDM plan, adherence to driving and parking regulations, and encourage and facilitate car-pooling.
  - The School will implement policies for deliveries to the campus to minimize the impact of this traffic on the neighborhood.
  - The School will install outdoor bicycle parking racks to promote additional bicycle activity on-campus.
  - The School will participate in the Safe Routes to School Program
  - Per the previous zoning approval for 1900 Half Street, the Applicant is finalizing an agreement to install a Capital Bikeshare station near the site.

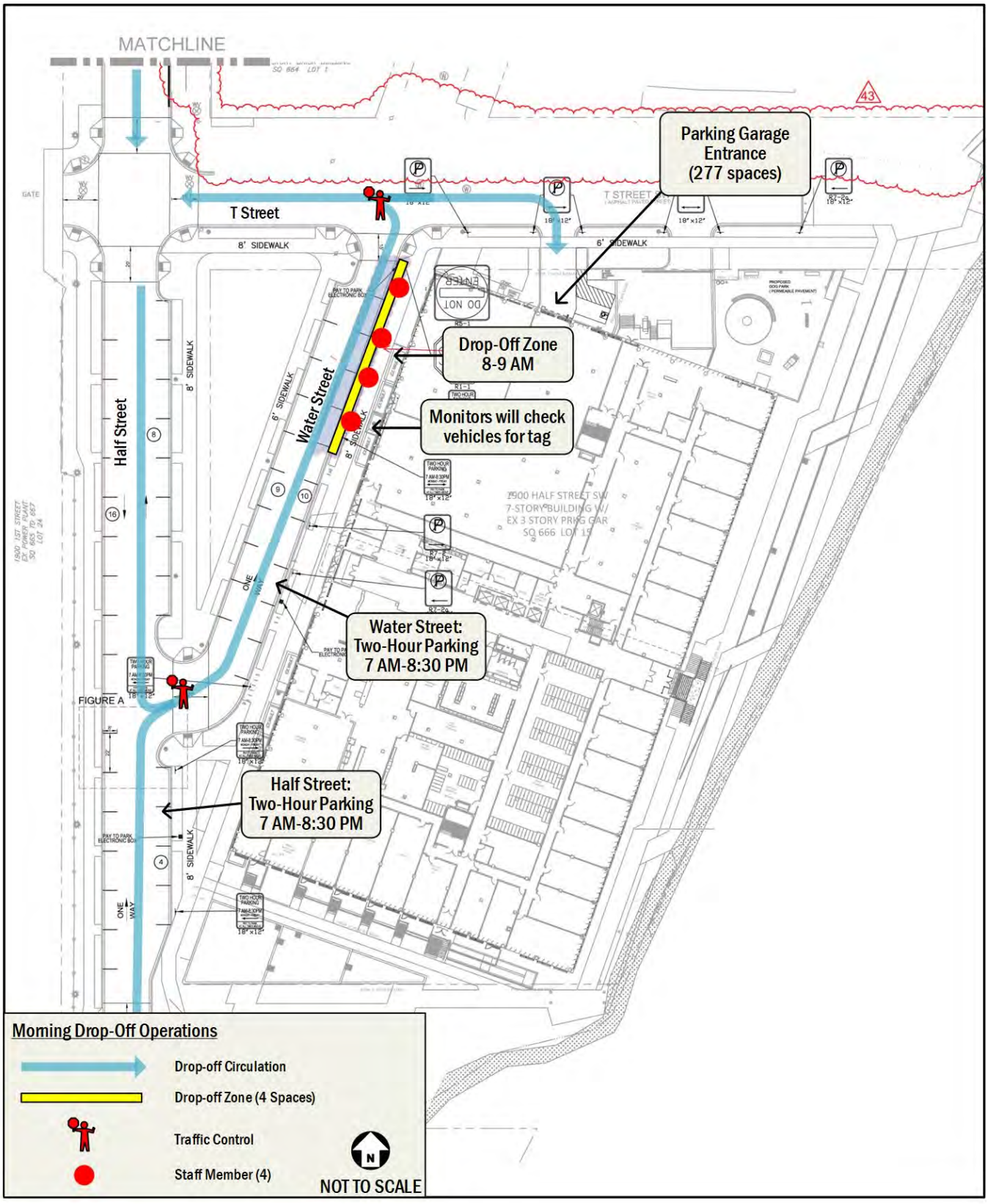

Figure 2: Proposed Morning Drop-Off Operations at Eagle Academy

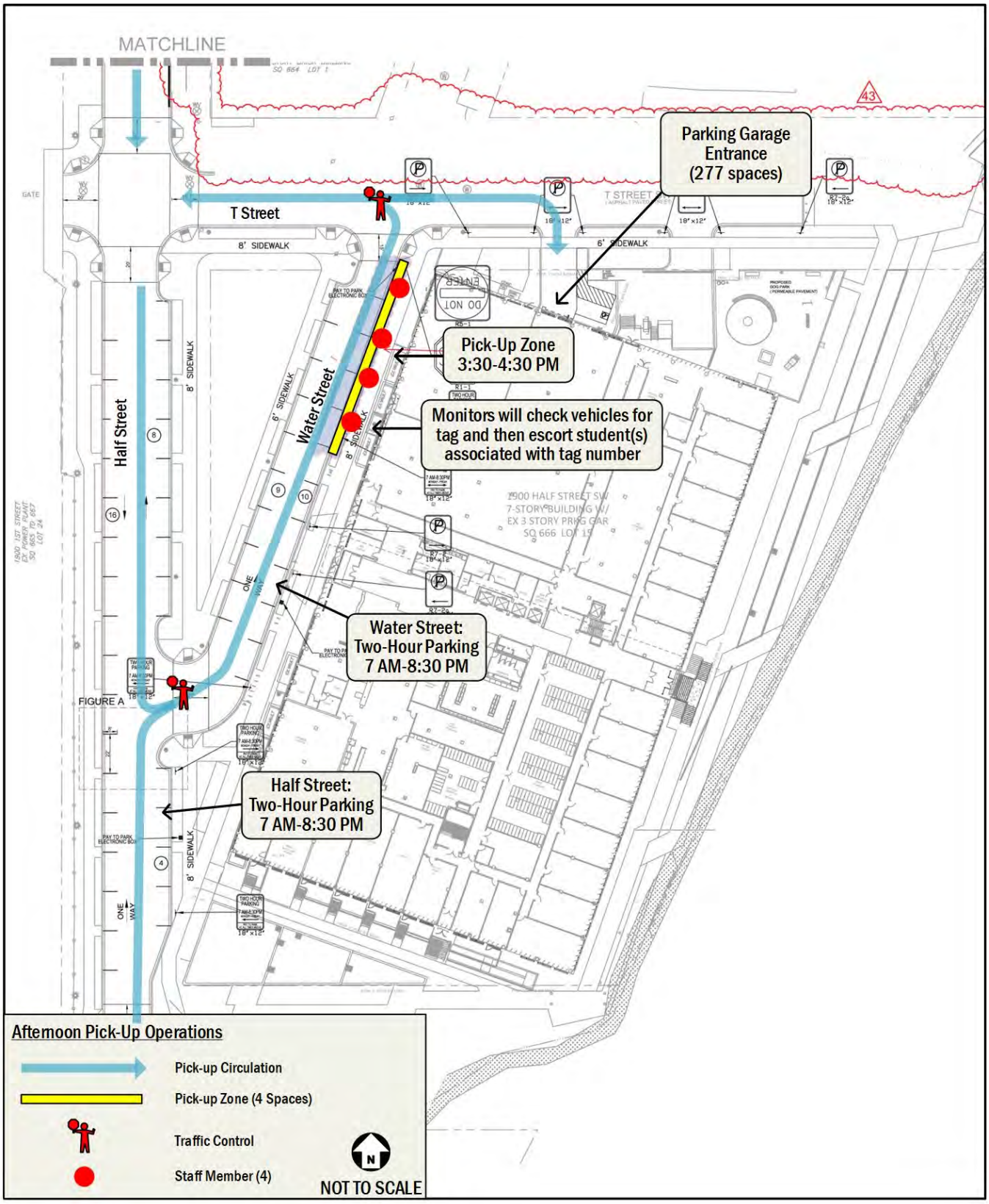

Figure 3: Proposed Afternoon Pick-Up Operations at Eagle Academy

Trip Generation Comparison

A trip generation comparison for the approved and previously analyzed development program and proposed school was prepared based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 9th and 10th Edition.

The original 2016 CTR prepared by Gorove Slade assumed 24,000 square feet of retail and 462 residential units. The trip generation presented in the 2016 study was calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 9th Edition. Trip generation rates for "Apartments (Land Use Code 220) and Retail (Land Use Code 820) were used for trip generation purposes. The mode splits from the 2016 study are shown on Table 2. These modal split assumptions were developed using other nearby CTRs as a basis.

Trip generation and modal splits for the proposed school was determined based on information provided by the school regarding projected student and employee mode splits and morning arrival and afternoon dismissal times. Additional details regarding the school's anticipated and existing operations are provided in the technical attachments. Based on the anticipated operations, the mode splits for the school were calculated and are provided on Table 3.

Trip generation for the built number of residential units was calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition. The same modal splits used for residential use in the 2016 study were applied to the built number of apartment units.

The trip generation summary for the previously approved 2016 development program and proposed school and built residential units are shown on Table 4. As seen in the table, there will be a net increase in the trips generated during the morning peak hour and a net decrease in the trips generated during the afternoon peak hour. Per agreement with DDOT, the vehicular analysis for the morning peak hour will be updated to account for the increase in trips as a result of the proposed school use.

Table 2: 1900 Half Street Development Program (From 2016 CTR)

Land Use	Mode			
	Drive	Transit	Bike	Walk
Retail	50%	30%	10%	10%
Residential	60%	30%	5%	5%

Table 3: 1900 Half Street Development Program (Eagle Academy)

Land Use	Time of Day	Mode			
		Drive	Transit	Bike	Walk
School	AM	82%	10%	1%	7%
School	School PM	70%	22%	1%	7%

Table 4: Trip Generation Comparison (Approved Program Analyzed in 2016 CTR and Current Eagle Academy Program)

Mode	Land Use	AM Peak Hour			PM School Peak			PM Peak Hour		
		In	*Out*	*Total*				*In*	*Out*	*Total*
Auto (Veh/hr)	Retail & Apartments	34	116	150		*Not analyzed*		128	79	207
	School & Updated Apartments	101	126	227	72	61	133	95	80	175
	Net	**67**	**10**	**77**	-	-	-	**-33**	**1**	**-32**
Transit (Ppl/hr)	Retail & Apartments	24	66	90		*Not analyzed*		83	56	139
	School & Updated Apartments	33	56	89	35	53	88	46	32	78
	Net	**9**	**-10**	**-1**	-	-	-	**-37**	**-24**	**-61**
Bike (Ppl/hr)	Retail & Apartments	6	11	17		*Not analyzed*		18	13	31
	School & Updated Apartments	5	9	14	2	6	8	8	6	14
	Total	**-1**	**-2**	**-3**	-	-	-	**-10**	**-7**	**-17**
Walk (Ppl/hr)	Retail & Apartments	6	11	17		*Not analyzed*		18	13	31
	School & Updated Apartments	16	19	35	9	14	23	8	6	14
	Total	**10**	**8**	**18**	-	-	-	**-10**	**-7**	**-17**

Revised Vehicular Analysis

Per agreement with DDOT, an update of the vehicular analysis presented in the 1900 Half Street CTR performed to determine the impacts of site-generated traffic from the proposed Eagle Academy during the morning peak hour. Consistent with the 2016 CTR study, the following study intersections were analyzed:

1. Half Street & T Street, SW
2. Water Street & T Street, SW
3. Half Street & S Street, SW
4. Half Street & Potomac Avenue, SW
5. 2nd Street & R Street, SW
6. 2nd Street & V Street, SW
7. 2nd Street & P Street, SW
8. Half Street & Water Street, SW

Figure 4 shows a map of the study area intersections.

Existing (2016) Conditions

The existing traffic volumes are comprised of the turning movement count data collected in 2016 from 6:30 to 9:30 AM and 4:00 to 7:00 PM. The geometry and operations assumed in the 2016 Existing Conditions match the conditions assumed in the 2016 CTR. Figure 5 shows the lane designations for the study intersections. The results of the traffic counts are included in the Technical Attachments. For all intersections, the intersection morning peak hour was used, with volumes balanced at Half Street and Water Street, SW. The existing intersection peak hour traffic volumes are shown on Figure 6.

Background (2021) Conditions

The traffic projections for the 2021 Background Conditions consist of the existing volumes with two (2) 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 industry, 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, one (1) development in the study area is expected to be completed prior to the project. The 1530-1550 First Street project is planned to be opened by 2021 and has incorporated into the Background Conditions analysis. In the 2016 CTR, there were no background developments included in the analysis for the 2018 buildout year. Trips associated with this project are provided in the Technical Attachments.

Regional traffic growth is typically accounted for using percentage growth rates. The growth rates used in this analysis are consistent with the rates derived and used in the 2016 CTR. Those rates were derived using the Annual Average Daily Travel (AADT) rates provided by DDOT. An examination of the AADT volumes within the study area noted that vehicular volumes on the study area roadways had not grown. As such, the 2016 CTR proposed a conservative 0.5% annual growth rate across all study area roadways. This growth rate was retained for the revised analysis and adjusted to account for the 2021 opening of the school.

The traffic growth along the network was added to the existing traffic volumes and background development volumes in order to establish the 2021 Background traffic volumes. These volumes are presented in Figure 7.

The following geometric changes to the roadway network were made between 2016 and the 2021 horizon year:

- Conversion of Half Street & S Street intersection from stop-controlled to signalized,
- Conversion of Half Street & Potomac Avenue intersection from stop-controlled to signalized, and;
- Conversion of Half Street and R Street intersection into all-way stop control.

These roadway network changes were not assumed in the original 2016 CTR due to the 2018 horizon year. Signal timing sheets for the intersections above were received from DDOT. These changes have been incorporated into the 2021 Background Conditions and are presented in Figure 8.

2021 Total Future Conditions

The 2021 Total Future traffic volumes consist of the 2021 Background volumes with the addition of the anticipated additional traffic volumes generated by the proposed residential and school development (site-generated trips). Thus, the 2021 Total Future traffic volumes include traffic generated by: the existing volumes, the inherent growth on the study area roadways, background developments, and the proposed project.

Trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting to and from the site's TAZ and adjusted based on traffic volume and patterns. The flow data for this updated analysis was derived from the 2016 CTR and changes to the roadway network in the intervening years. The origin of outbound and destination of inbound vehicular trips were the Water Street pick-up/drop-off area for parents of students and the garage located off T Street for residents and staff/faculty of Eagle Academy.

As detailed in the previous section, the morning peak hour will see a net increase in the number of vehicles as a result of the development program change. During the morning peak hour, the revised development program will generate 227 vehicles per hour (101 inbound, 126 outbound). Trips generated by the site are shown on Figure 9 and the traffic volumes for the 2021 Total Future conditions are shown on Figure 10.

The lane configurations and traffic control for the Total Future conditions are based on those for the Background conditions with the following changes:

- Reduction of travel lanes along northbound Water Street from two (2) lanes to one (1) lane adjacent to the site. The reduction of travel lanes will allow for the incorporation of a pick-up/drop-off lane.

The Total Future lane configurations and traffic control are presented on Figure 11.

Analysis Results

Intersection capacity analyses were performed for the three (3) scenarios outlined above at the intersections contained with the study area during the morning peak hour. *Synchro*, version 9.1 was used to analyze the study intersections based on the Highway Capacity Manual (HCM) 2000 Methodology. 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 E is typically used as the acceptable LOS threshold in the District, although LOS F is sometimes accepted in urbanized areas.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes outlined previously; (2) the lane use and traffic controls outlined previously; and (3) the HCM 2000 methodologies (using *Synchro 9.1* 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. Detailed LOS descriptions and the analysis worksheets are included in the Technical Attachments.

Table 5 shows the results of the capacity analyses, including LOS and average delay per vehicles (in seconds) for the Existing, Background, and Total Future scenarios. As shown in the capacity analysis results, all study intersections operate at an acceptable level of service in the Existing, Background, and Total Future conditions.

Based on DDOT standards, the proposed project is considered to have an impact at a study intersection if any of the following conditions are met:

- The capacity analyses show a LOS E or F at an intersection or along an approach where one does not exist in the Existing Conditions or Background Conditions; or
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than five (5) percent when compared to Background Conditions.

Following these guidelines, no mitigations are warranted and thus none are proposed.

Figure 4: Study Area Intersections

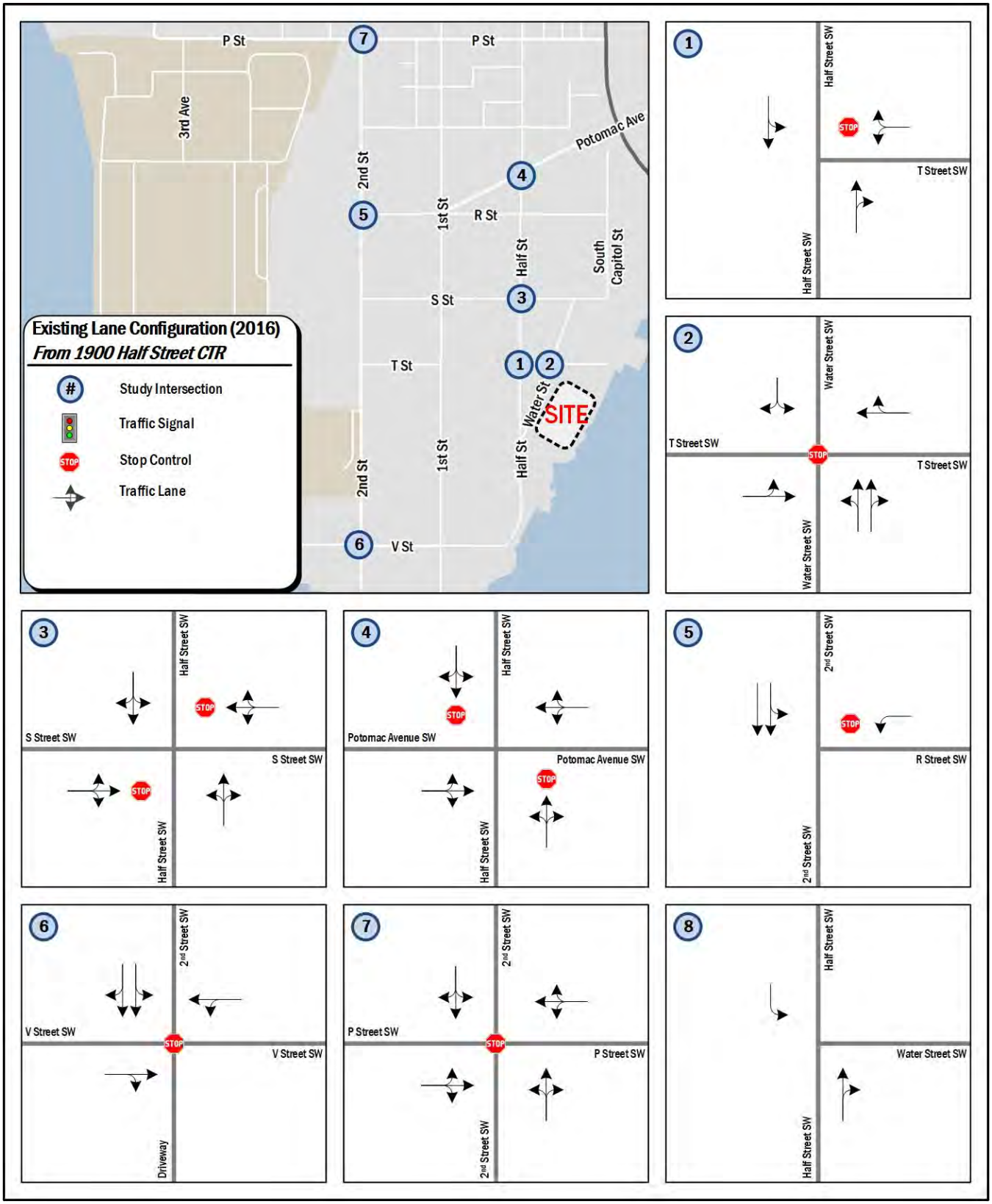

Figure 5: Existing (2016) Lane Configuration and Traffic Control (from 2016 CTR)

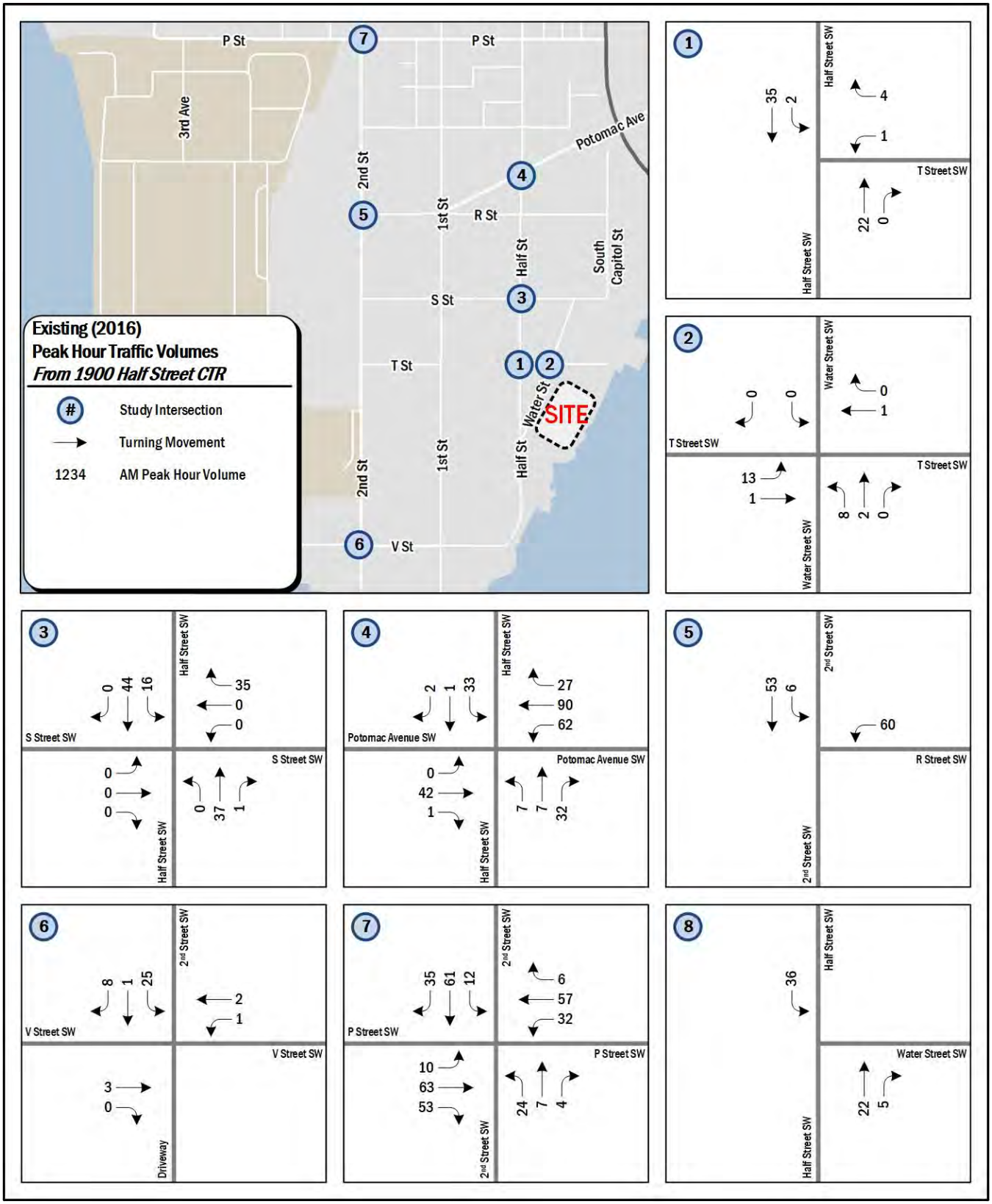

Figure 6: Existing (2016) Peak Hour Traffic Volumes (From 2016 CTR)

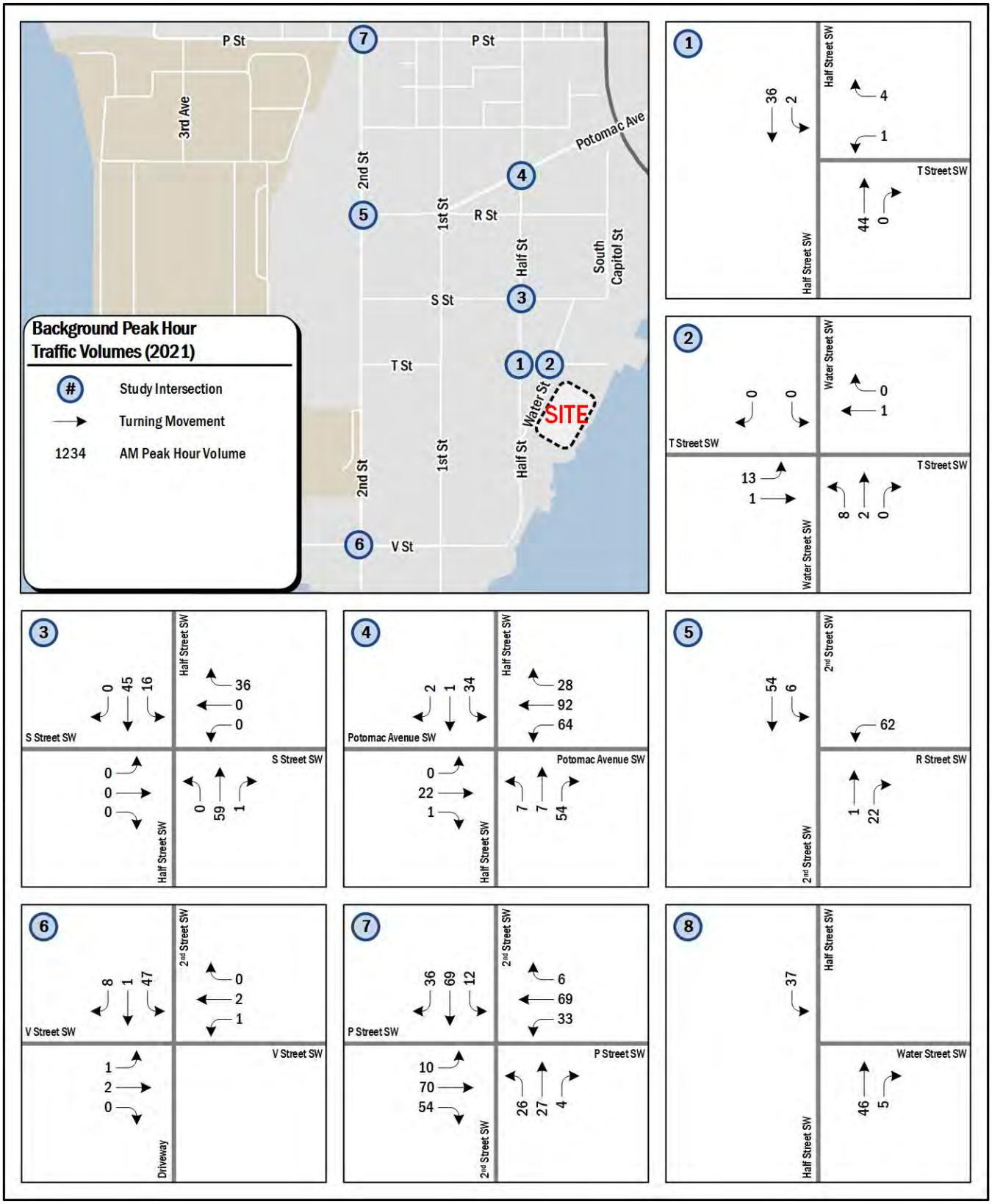

Figure 7: Background (2021) Peak Hour Traffic Volumes (AM Only)

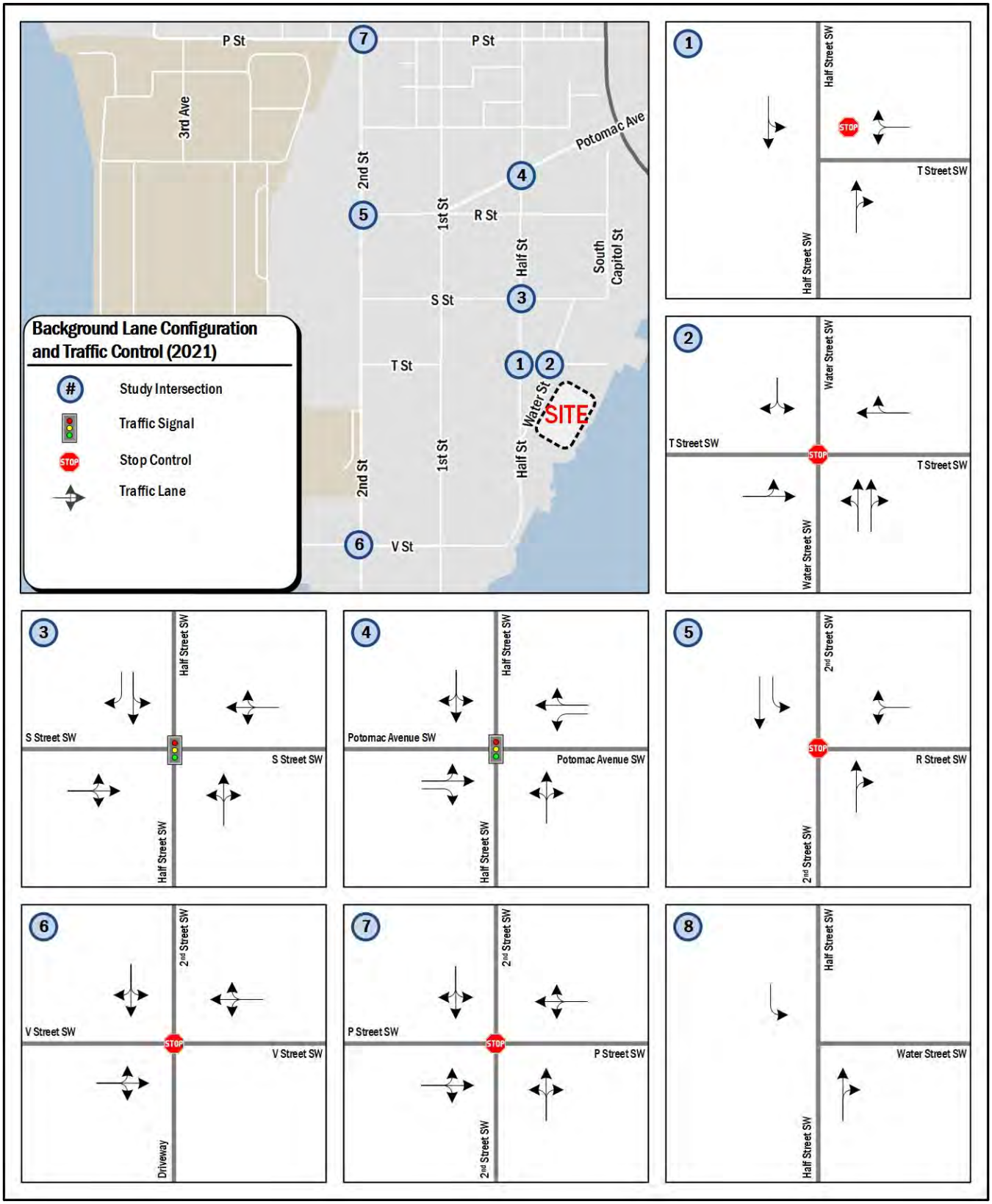

Figure 8: Background (2021) Lane Configuration and Traffic Control

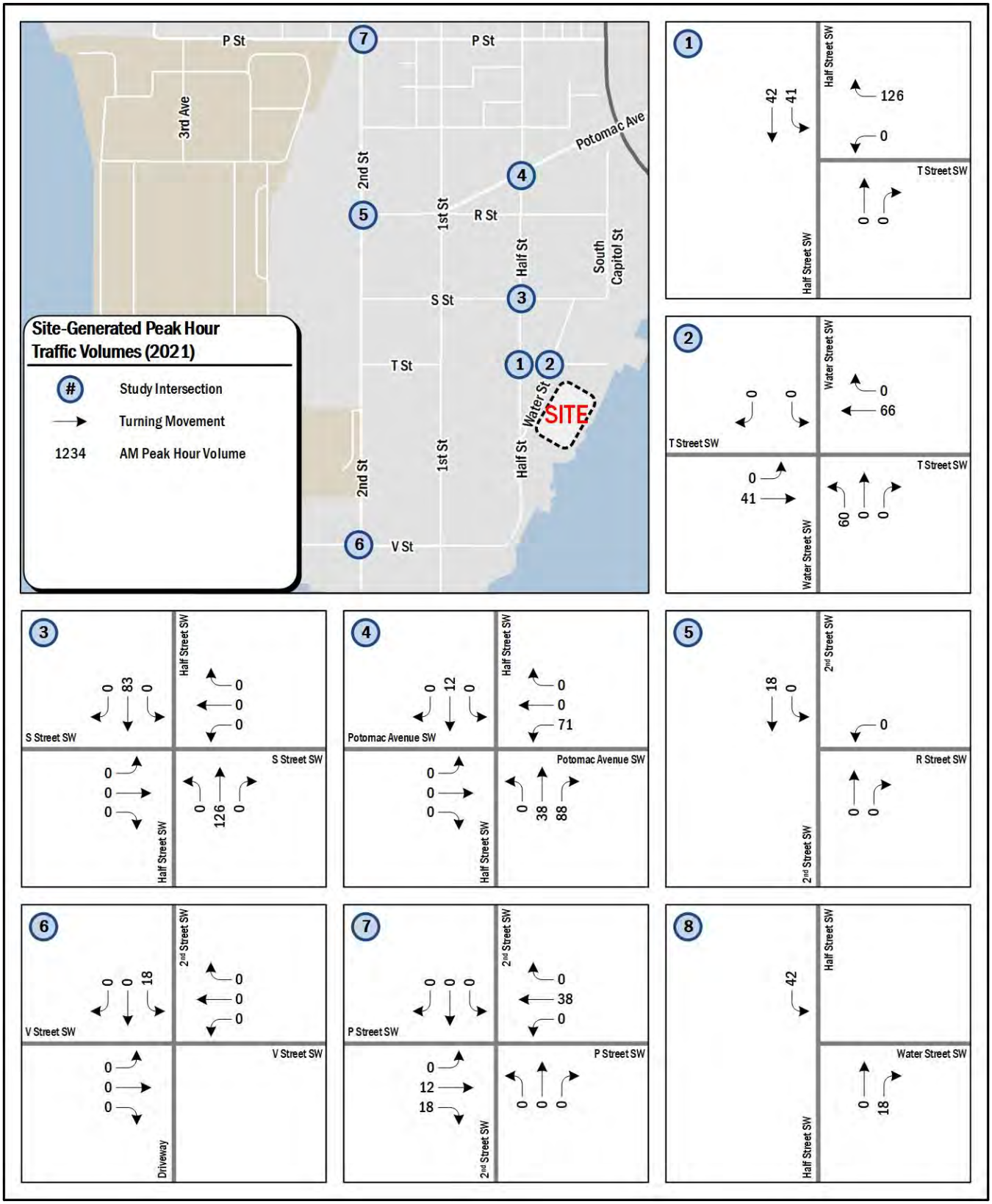

Figure 9: Site-Generated Peak Hour Traffic Volumes (AM Only)

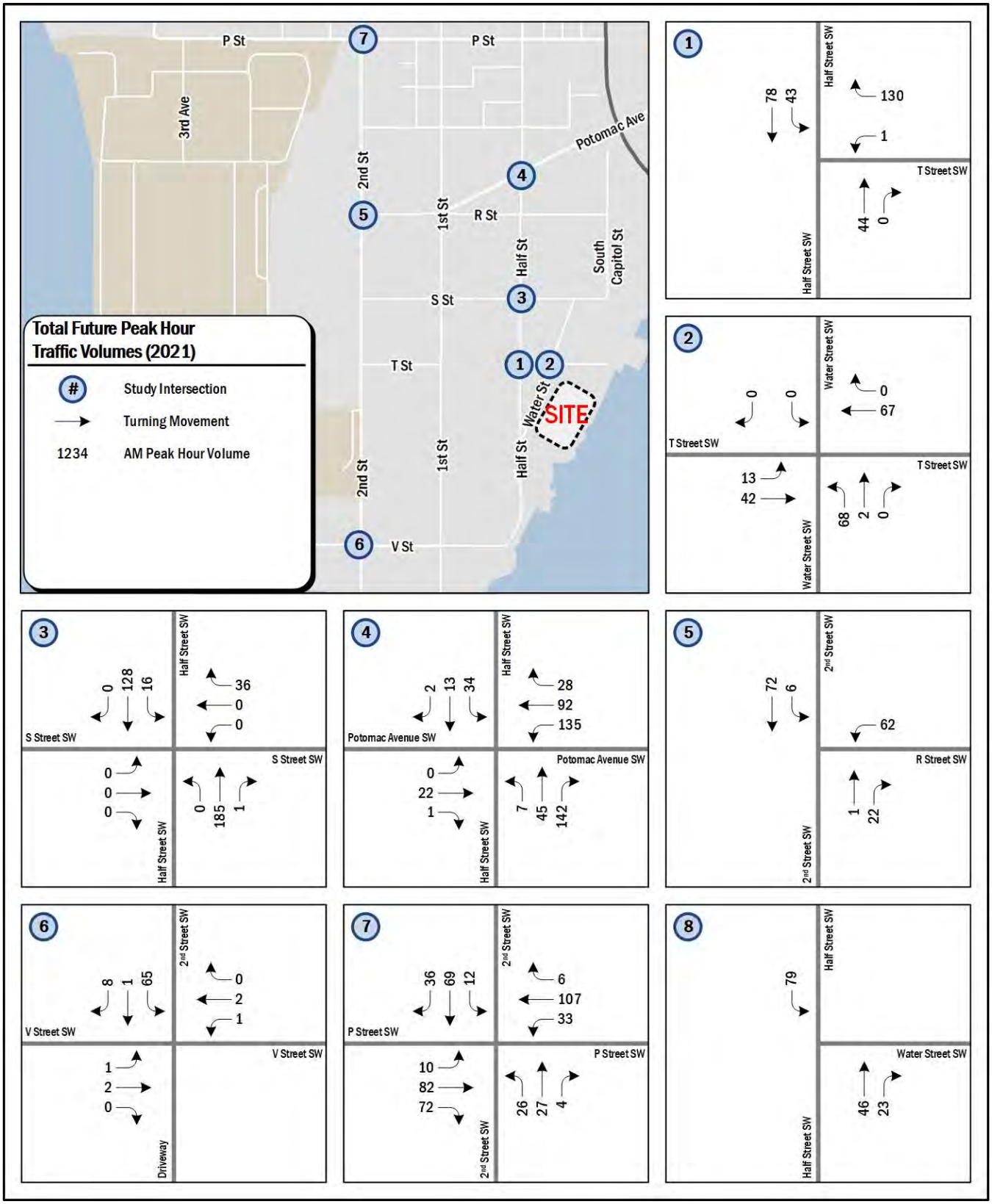

Figure 10: Total Future (2021) Peak Hour Traffic Volumes (AM Only)

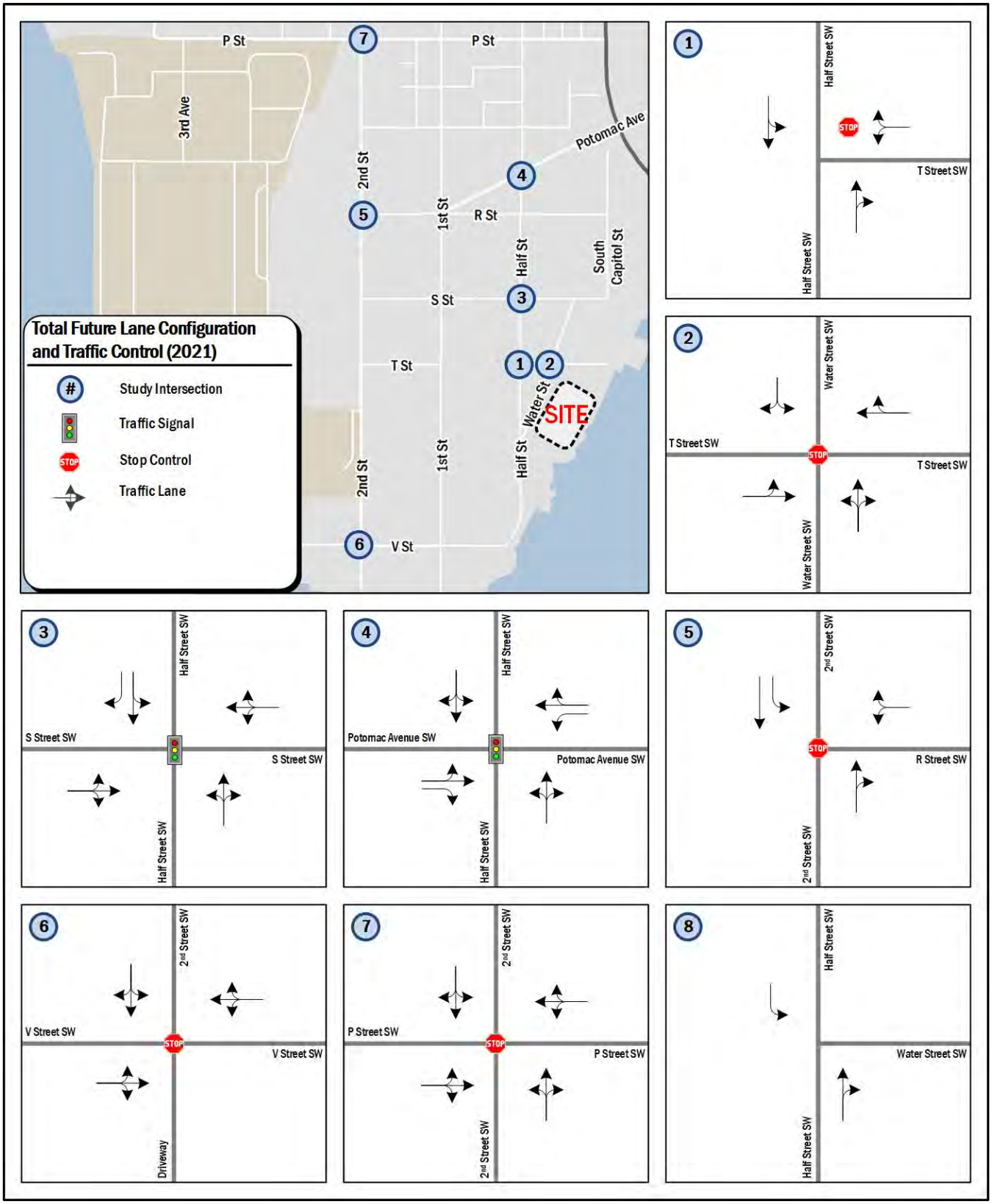

Figure 11: Total Future (2021) Lane Configuration and Traffic Control

Table 5: Vehicle Capacity Analysis Results

Intersection		Approach	Existing Conditions (2016)		Background Conditions (2021)		Future Conditions (2021)	
			AM Peak Hour		*AM Peak Hour*		*AM Peak Hour*	
			Delay	LOS	Delay	LOS	Delay	LOS
1.	**Half Street/T Street, SW**	**Overall**	**0.9**	**A**	**0.7**	**A**	**5.2**	**A**
		Westbound	8.5	A	8.6	A	9.2	A
		Northbound	0.0	A	0.0	A	0.0	A
		Southbound	0.3	A	0.3	A	2.8	A
2.	**Water Street/T Street, SW**	**Overall**	**7.1**	**A**	**7.1**	**A**	**7.7**	**A**
		Eastbound	7.2	A	7.2	A	7.6	A
		Westbound	7.0	A	7.0	A	7.6	A
		Northbound	6.8	A	6.8	A	7.9	A
		Southbound	0.0	A	0.0	A	0.0	A
3.	**Half Street/S Street, SW**	**Overall**	**3.1**	**A**	**8.0**	**A**	**4.3**	**A**
		Eastbound	0.0	A	0.0	A	0.0	A
		Westbound	8.7	A	31.7	C	31.7	C
		Northbound	0.0	A	1.5	A	1.7	A
		Southbound	2.0	A	0.9	A	1.1	A
4.	**Half Street/Potomac Avenue, SW**	**Overall**	**4.5**	**A**	**21.5**	**C**	**18.9**	**B**
		Eastbound	0.0	A	33.6	C	33.6	C
		Westbound	2.8	A	28.9	C	29.2	C
		Northbound	9.6	A	5.7	A	6.7	A
		Southbound	12.0	B	6.1	A	6.5	A
5.	**2nd Street/R Street, SW**	**Overall**	**5.0**	**A**	**7.5**	**A**	**7.6**	**A**
		Westbound Left	9.1	A	--	--	--	--
		Westbound	--	--	7.8	A	7.8	A
		Northbound	--	--	6.7	A	6.7	A
		Southbound	0.7	A	7.5	A	7.6	A
6.	**2nd Street/V Street, SW**	**Overall**	**6.8**	**A**	**7.3**	**A**	**7.5**	**A**
		Eastbound	7.1	A	7.2	A	7.2	A
		Westbound	7.1	A	7.2	A	7.2	A
		Southbound	6.7	A	7.3	A	7.5	A
7.	**2nd Street/P Street, SW**	**Overall**	**8.1**	**A**	**8.3**	**A**	**8.7**	**A**
		Eastbound	8.0	A	8.2	A	8.5	A
		Westbound	8.2	A	8.5	A	8.9	A
		Northbound	8.0	A	8.2	A	8.4	A
		Southbound	8.1	A	8.3	A	8.6	A
8.	**Half Street/Water Street, SW**	**Overall**	**4.2**	**A**	**3.1**	**A**	**4.0**	**A**
		Northbound	0.0	A	0.0	A	0.0	A
		Southbound Left	7.3	A	7.4	A	7.5	A