Abingdon Elementary School
School Transportation Report

May 2015

Prepared for Arlington Public Schools
by Toole Design Group, LLC

CONTENTS

EXECUTIVE SUMMARY

In conjunction with the planned renovation and expansion of Abingdon Elementary School, Arlington Public Schools (APS) contracted with Toole Design Group (TDG) to assess existing and future transportation conditions at the school site. This report summarizes the findings from the study and outlines existing transportation conditions, future conditions and recommendations. Data collection for this study was conducted in fall 2014 and included self-reported travel surveys, field observations, and traffic counts. A traffic analysis was conducting using SYNCHRO 8.0 and SimTraffic 8.0. Data from these sources was used to develop recommendations related to future parking demand, transportation infrastructure improvements, and program strategies to support safe walking, bicycling, carpooling and transit use amongst students and staff. This final report builds upon an existing conditions report that was delivered to APS in December 2014.

The following bullets provide an overview of key findings from the multimodal transportation study.

SELF-REPORTED TRAVEL MODES

Existing travel modes were estimated using self-reported survey data from staff, parents, students and visitors. The following are key takeaways from the surveys, which were completed by 57 percent of staff, 33 percent of parents, students in 88 percent of classrooms, and 27 visitors.

Students

- Using averages from the responses to the parent and student surveys, it is estimated that approximately 23 percent of children walk to/from school, 0.5 percent bicycle, 45 percent ride the bus, 31 percent ride in a family vehicle, 1 percent carpool and 0.2 percent take public transit.[1]
- Approximately 57 percent of the students who walk to school live within one mile of the school.
- Compared to similar data collected in 2013, there are only minor changes in reported student travel modes (e.g. small increases in busing and decreases in walking and family vehicle drop-off).

Staff and Visitors

- Most staff members (90 percent) reported that they usually drive alone to/from school.
- When compared from year to year (2013 to 2014), there was an increase in the percentage of staff survey respondents who drive alone to work (from 82 percent in 2013 to 89 percent in 2014) and a decrease in staff who reported taking public transportation to work (from 12 percent to 0 percent). These changes could reflect a data anomaly but should be evaluated over time to explore trends.
- Approximately 78 percent of staff report parking in the school parking lot, while 6 percent park in the lot on S Abingdon Street, 5 percent park on S Abingdon Street and 6 percent park on 30th

[1] Average response rates from the Parent and Student Travel Tallies, conducted in October 2014. Includes both trips to and from school.

Road. About 5 percent of respondents selected "other" to the question about where they park and indicated parking locations such as on 31st Street and the Community Center Parking Lot.

- Approximately 82 percent of visitors report traveling to the school by car and 11 percent report walking.
- About 40 percent of visitors report that they parked in the school parking lot. Others parked on S Abingdon Street (9 percent), in the parking lot on S Abingdon Street (9 percent) and in other un-specified locations (27 percent).

SCHOOL BUSING

Abingdon Elementary School is served by seven buses, two of which are designated for children with special needs.

- Buses arrive between approximately 7:30 AM and 7:50 AM and use the loop at the front of the school to access the school property.
- As buses arrive in the morning, 71 percent of them come from the north on S Abingdon Street, while 29 percent of them come from the south. This pattern is duplicated in the afternoon, with 71 percent of buses leaving heading north on S Abingdon and 29 percent heading south.
- Based on input from APS transportation staff and an evaluation of students per bus at all APS elementary schools, the future site plan was designed to accommodate ten full-sized school buses in the future. However, this number is likely a high-end estimate for Abingdon.

ARRIVAL AND DISMISSAL

School arrival and dismissal patterns were observed in four instances and counts were conducted on both a typical school day and an inclement weather day in Fall 2014. The number of students walking, bicycling, and riding in a personal vehicle (pick-ups and drop-offs) were counted. Observations did not include a count of students arriving or departing via school bus. Based on these observations:

- The majority of walkers arrived from (51 percent) and departed from (70 percent) the Fort Reynolds Path.
- One student was observed bicycling to and from school.
- The majority of morning vehicle pick-ups (61 percent) and afternoon drop-offs (39 percent) occurred in the drop-off loop in front of the main entrance. Other vehicle pick-up and drop-off areas include the Fairlington Village Community Center parking lot, 29th Street, S Abingdon Street and 31st Street.
- On inclement weather days, vehicle pick-ups/drop-offs increased and walking/biking decreased compared to the typical day. The decrease in walking was about 30 students, or 9 – 15 percent of those counted.
- The school has developed an efficient system for vehicle pick-up and drop-off that utilizes dashboard signs, teachers and student safety patrols. Although this system functions well given

existing space constraints, there is opportunity to further separate modes and reduce potential conflict points between buses, vehicles and pedestrians on-site.

- There are two crossing guards that serve the school during arrival and dismissal: one at a mid-block crossing location on S Abingdon Street near the tennis courts, and one at a mid-block crossing location on 31st Street, near the entrance to Fort Reynolds Park.

PARKING

The parking supply, or total number of spaces, was documented in the school lot, at the Fairlington Villages Community Center lot, and on-street within two blocks of the school. Occupied parking spaces were counted before and after school arrival and dismissal times on a typical school day and on an inclement weather day. Parking occupancy was also counted during Back-to-School Night.

- There are 78 existing parking spaces in the school lot, including 2 handicapped spaces and 3 reserved spaces for school administrators. There are currently no designated visitor or carpool priority parking spaces.
- The school parking lot was over 90 percent occupied during the school day.
- The Fairlington Villages Community Center lot was approximately 50 percent occupied at most times studied.
- During the school day, parking spaces on surrounding streets were typically no more than 75 percent occupied. Several streets were less than 50 percent occupied.
- During Back-to-School Night, the school lot, tennis court lot, and street spaces on S Abingdon Rd and adjacent street links were over 90 percent occupied.
- The future parking demand calculated for the site is 83 spaces, which is a reduction from the 116 spaces that would be required by zoning. The recommended reduction is based on 15 shared spaces in the Fairlington Villages Community Center lot, the use of 7 on-street spaces and a reduction of 11 spaces from Transportation Demand Management strategies. If the shared parking space arrangement does not go through with Fairlington Villages Community Center, than the on-site parking recommendation would be 98 spaces (83 plus 15).

VEHICLE VOLUMES AND SPEEDS

The vehicle volumes at surrounding intersections were counted and used to perform a vehicular capacity analysis at each intersection. Weeklong counts of vehicle volume, speed, and class were performed at three locations on surrounding roads. Based on this data:

- All study intersections currently function with minimal vehicular delay (LOS A or B).
- The future traffic analysis indicates that projected traffic demand, calculated for after the school expansion is complete, can be accommodated with the existing road/intersection infrastructure. All study intersections are anticipated to operate with minimal traffic delay (LOS B or better) during school arrival and dismissal peak hours, with the exception of 29th St S and S Abingdon St,

where the westbound approach is projected to operate with some delay (LOS C) during the school arrival peak hour.

- The 85th percentile speeds were approximately equal to or less than the 25 mile-per-hour speed limit on surrounding streets. During school arrival and dismissal hours, the speed limit is 20 mph in the school zone and the 85th percentile speed measured on S Abingdon Street was 24-26 mph.

INFRASTRUCTURE RECOMMENDATIONS

The priority infrastructure recommendations that are recommended on and near the site which would support more walking and biking include:

On Site

1. Install ADA compliant curb ramps and high visibility crosswalks in the parking/pick-up area to minimize conflicts between users and improve access for people walking and on bicycles.
2. Install one outdoor bicycle parking space for every 30 students, and one secure bicycle parking space for every 20 staff.[2] Installation of specialty racks designed for scooters or larger cargo bicycles should also be considered.
3. Add lighting in the back of the school to connect to the Fort Reynolds Park Trail.

Off Site

1. Install traffic calming at the mid-block crossing location on Abingdon Street, including a raised crosswalk and bulb-outs.
2. Reinstall a high visibility crosswalk on 29th Street to align with new driveway location, and ensure ADA compliant curb-ramps on both sides of the street.
3. Retrofit existing curb ramps at the intersection of 29th and Abingdon Street. All ramps should provide ADA access for users. A high-visibility crosswalk should be added to each leg/approach of the intersection.

[2] Based on future, potential bicycle parking mode share for students and staff. Figures exceed the Arlington County Bicycle Parking requirements for office locations and the LEED Building Standards.

INTRODUCTION

Abingdon Elementary School is located in South Arlington near the Fairlington and Shirlington neighborhoods. In 2014, Abingdon had 627 students and 136 staff (including part-time staff). In conjunction with the planned renovation and expansion of Abingdon, Arlington Public Schools (APS) contracted with Toole Design Group (TDG) to assess existing and future transportation conditions and to provide recommendations and input aimed at improving safety and connectivity for all transportation modes. This Multimodal Transportation Report summarizes work conducted during the 2014/15 school year that included the following activities:

- Collection of self-reported travel data from students, parents, staff members and visitors
- Assessment of arrival and dismissal travel patterns, mode counts and parking occupancy
- Assessment of special event travel patterns and parking occupancy
- Vehicular turning movement counts and automatic traffic recorder (ATR) counts
- Assessment and recommendations related to pedestrian and bicycle infrastructure along priority walk/bike routes
- Analysis of existing and future vehicular capacity at intersections
- Analysis of existing and future parking supply and demand
- Review and recommendations related to program strategies to support safe walking, bicycling, carpooling and transit use amongst students and staff.

This multimodal transportation assessment included consultation with and input from the Abingdon Safe Routes to School (SRTS) Team, as well as the community and other stakeholders on the APS Building Level Planning Committee (BLPC) and Arlington County Public Facilities Review Committee (PFRC).

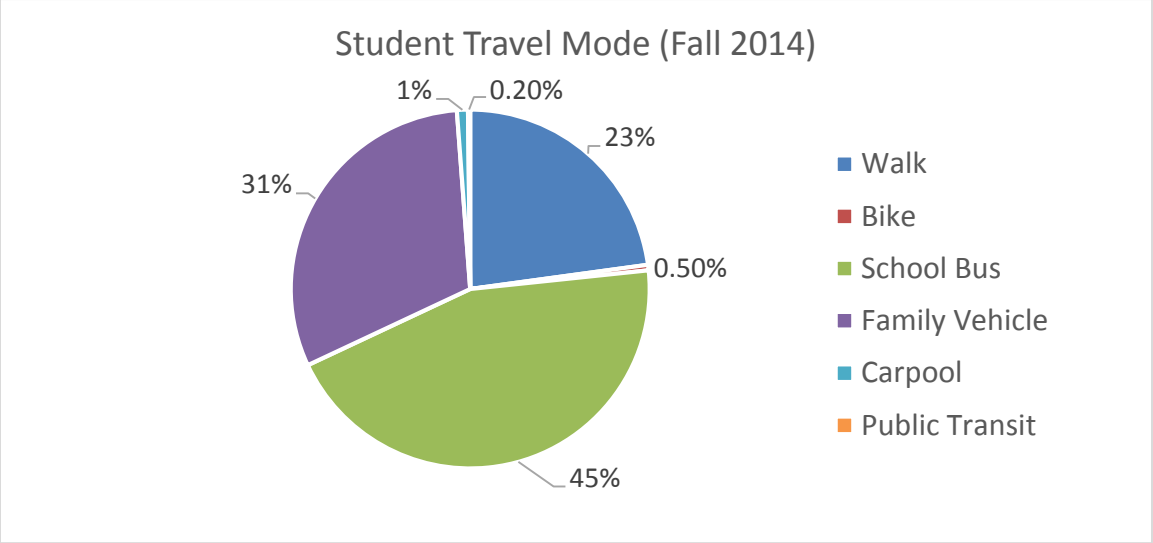
EXISTING CONDITIONS SUMMARY

The Existing Conditions Report, completed in early 2015, summarized work conducted by the Study Team in fall 2014. The existing conditions analysis used parent, staff, student and visitor surveys, as well as traffic/parking counts and observations, to evaluate baseline information related to multimodal transportation. The following are key findings from the study and more detail is available in the complete Existing Conditions Report (December 2014).

STUDENT TRAVEL MODES

Student travel data was collected using two surveys: a student travel tally (a show-of-hands survey used in the classroom) and parent surveys. Both surveys were conducted in October 2014 during weeks with mild weather conditions. The results of the two surveys were very similar regarding student travel

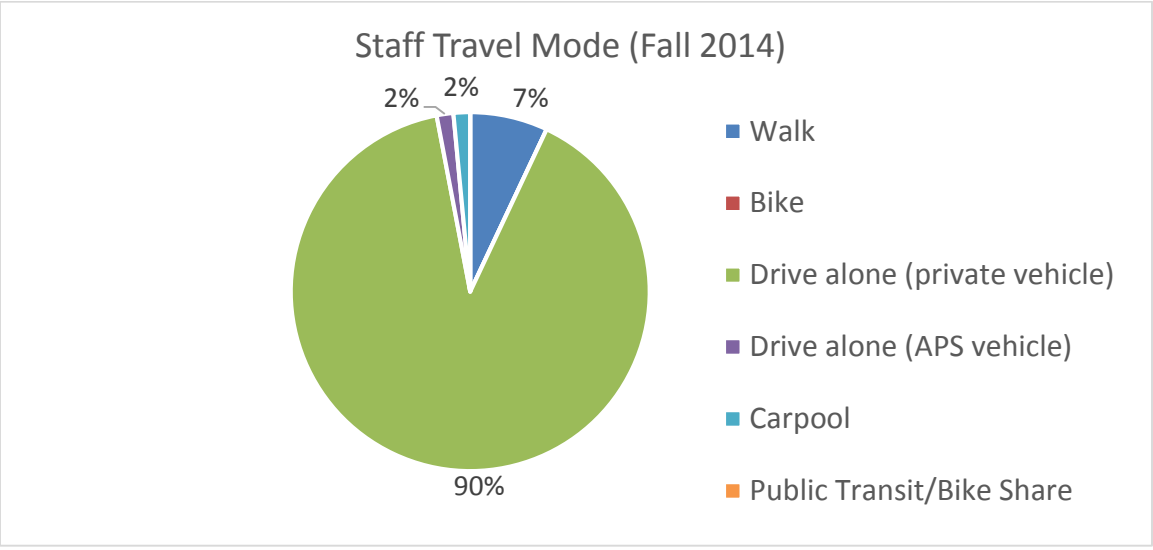
modes, and the averages were used to determine the following typical travel modes[3] for Abingdon Elementary School students:



More details on the Parent and Student Surveys are provided in the Existing Conditions report. Full survey results are provided in Appendices A (Student Travel Tallies) and B (Parent Survey).

STAFF TRAVEL MODES

Staff travel modes were analyzed through a survey, also conducted in October 2014. Typical staff travel modes at Abingdon Elementary School are:

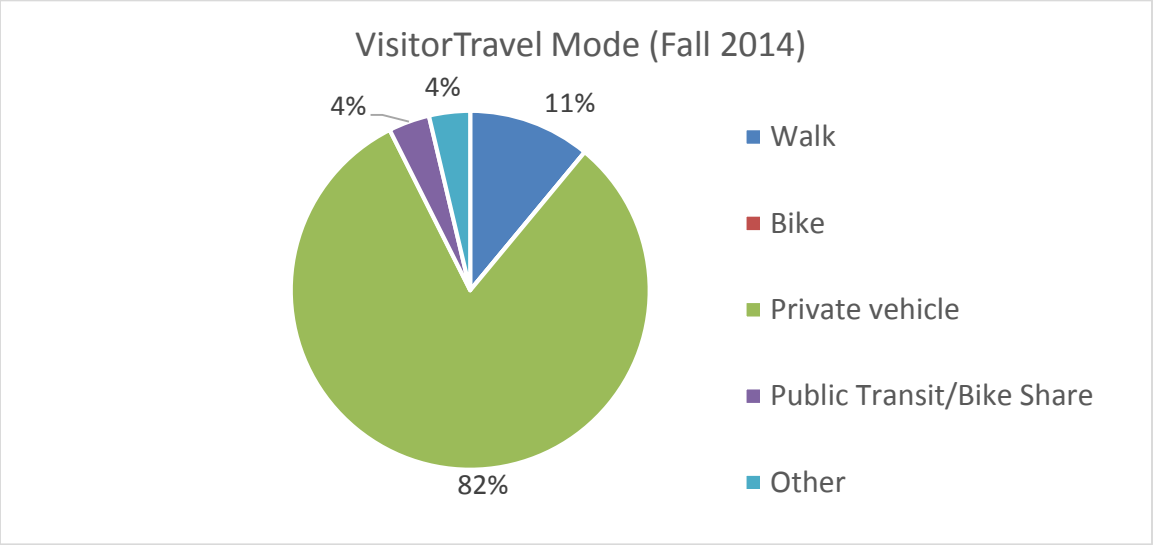


[3] Average response rates from the Parent and Student Travel Tallies, conducted in October 2014. Includes both trips to and from school.

More detail from the Staff Survey is provided in the Existing Conditions report and full survey results can be found in Appendices C.

VISITOR TRAVEL MODES

Abingdon Elementary School estimates that the school receives approximately 100 visitors each week. There are currently no designated visitor parking spaces in the school lot. A visitor survey was administered by Abingdon Elementary School staff over a three week period from in October 2014, and was completed by 27 respondents. The survey indicated the following as travel modes for school visitors, though the low survey response rate indicate that data may not provide a complete view of typical conditions:



More detail from the Visitor Survey is provided in the Existing Conditions report and full survey results can be found in Appendices D.

SCHOOL BUSING

Abingdon Elementary School is served by seven buses, two of which are designated for children with special needs. The buses arrive between approximately 7:30 AM and 7:50 AM and use the loop at the front of the school to access the school property.

STUDENT ARRIVAL AND DISMISSAL PATTERNS

Observations and counts were used to collect data about which routes students and staff were using to access the school during arrival and dismissal. These observations focused on students and staff who walk or bike to school, as well as students who are dropped off by a parent/guardian. The majority of students (51 percent) who walk and bicycle use the Fort Reynolds Park trail to access the school property. The second-most-common route for walkers and bicyclists (24 percent) was the sidewalk near the tennis courts that connects from S Abingdon Street to the school. Small numbers of pedestrians

were observed arriving on foot via 29th Street (6 percent), 30th street (6 percent) and Woodrow Street (1 percent).

The majority of students who arrive or depart school via a parent/guardian vehicle use the drop off loop on school property (81 percent); however some parents also use the Fairlington Villages parking lot (9 percent) or various on-street locations for pick up/drop off.

There is a very active Safety Patrol program at Abingdon Elementary School. Student Safety Patrol members, overseen by school staff, open vehicle doors and walk with students between the parking lot and the school. There are two crossing guards that serve the school during arrival and dismissal: one at a mid-block crossing location on S Abingdon Street near the tennis courts, and one at a mid-block crossing location on 31st Street, near the entrance to Fort Reynolds Park.

PARKING

Seventy-eight parking spaces are currently located in the Abingdon Elementary School parking lot, with two spaces reserved for handicapped parking and three spaces reserved for the school principal, vice principal, and secretary. On street parking near the school is generally permitted and not time-restricted. There are also 30 parking spaces nearby in a private lot at the Fairlington Villages Community Center.

The staff survey indicated that 78 percent of staff who drive report parking in the school lot, while the remainder park in the Fairlington Villages lot or on the street. The visitor survey indicated that about 46 percent of school visitors park in the school lot whereas 54 percent report parking on the street.

Parking counts indicate that the school parking lot is nearly fully occupied (98 percent) during the school day. There was typically a significant amount of available on-street parking near the school and the Fairlington Villages Community Center lot was typically about 50 percent occupied, as were many of the nearby streets with on-street spaces. Complete data on existing parking supply and demand is provided in Appendix J.

SPECIAL EVENTS

The parking supply at and near the school was documented during Back-to-School Night (September 2014), in order to assess parking demand during evening school events. Parking counts were taken in the school lot, the Fairlington Villages lot adjacent to the tennis courts, and on-street within two blocks of the school. During the special event observed (Back to School Night), the school parking lot was over capacity and many adjacent streets were at capacity.

TRANSIT

Abingdon Elementary School is served by the WMATA 7 bus line. Four different routes (7A, 7C, 7F, 7Y) provide frequent service to/from various bus stops located around the school. Roadways served include 31st Street, Abingdon Street, 29th Street, Walter Reed Drive and Arlington Mill Drive. The 7A and 7Y

routes provide the most frequent service (every 8 to 9 minutes) starting at 4:45 in the morning and extending until 11:20 at night. The additional two routes (7C and 7F) provide additional service during peak hours, providing service every 20 minutes connecting to the Pentagon Metro Station.

TRAFFIC AND VEHICLE SPEED SURROUNDING THE SCHOOL

The Automatic Traffic Recorder (ATR) counts, or "tube" counts, were collected for seven days in September 2014 while school was in session. The ATRs collected motor vehicle speed, volume, and class data for 24 hours a day at three locations in close proximity to the school site. Based on the overall traffic volumes at all intersections counted, the arrival peak hour was determined to be 7:05 AM to 8:05 AM and the dismissal peak hour was determined to be 2:35 PM to 3:35 PM. The peak hours were relatively consistent from intersection to intersection. (See Appendix F for the complete ATR count report.)

The traffic analysis included a calculation of baseline vehicle trips during the morning and afternoon peak hours. This baseline calculation is an important input for the future traffic analysis (see page 14 of this report). The analysis found that there are an estimated 384 vehicle trips during the peak arrival hour and 177 trips during the peak dismissal hour. These figures include both "in" and "out" trips (i.e. a parent dropping off a student counts from two trips) made by buses, visitors and parent/guardians. The dismissal figure is lower due to higher participation in the afternoon Extended Day program.

Intersection turning movement counts were also collected at six intersections near the school, in order to evaluate existing vehicle delay, or Levels of Service (LOS), near the school. The analysis indicated that the existing traffic demands can be accommodated with the existing infrastructure (all turning movements operate at LOS B or better during arrival and dismissal peak hours). The traffic analysis identified some speeding on S Abingdon Street near the Fairlington Villages Community Center when the school zone speed limit (20 MPH) was in effect. Other than this, there were no documented speeding issues (i.e. the 85th percentile speeds did not exceed the speed limit). Appendix E presents the intersection counts used for this study.

BICYCLE AND PEDESTRIAN INFRASTRUCTURE NEAR THE SCHOOL

The multimodal transportation study included an assessment of transportation infrastructure along priority walking and bicycling routes near Abingdon Elementary School. As part of the evaluation, the Project Team looked at all transportation infrastructure but focused on elements that impact pedestrian and bicycle safety, accessibility, and comfort. These elements include the condition of sidewalks, crosswalks, and curb ramps, the length of crossings, vehicle turning radii, signage, and vehicular speeds.

In general, the majority of the streets near the school have sidewalks on both sides of the street and marked crosswalks at intersections. A range of specific issues were noted for each priority route and informed the priority infrastructure recommendations presented in this report (see page 24). Key

infrastructure issues include the need for improved curb ramps and other ADA[4] features, improved lighting along the Fort Reynold Park trail, and traffic calming/improvements for students and staff crossing S Abingdon Street.

Regarding staff access to the site, it is important to note that the school is located less than one mile from the Four Mile Run Trail, a paved, multi-use trail that connects with the regional trail network. The shortest route that staff might use to bike between the trail and school includes a steep incline on 28th Road South. There are some existing, on-street bicycle facilities in the area, including bike lanes and shared-lane markings on S Abingdon street south of 29th Street.

COMMUNITY INPUT ON EXISTING CONDITIONS

This project involved extensive community engagement on transportation issues, conducted via:

- A community meeting, convened by APS, on October 30, 2014
- Multiple BLPC and PFRC meetings held August – April 2015
- An Abingdon SRTS Team, which was comprised of school staff and convened for this study

During the nine month planning process, a broad range of transportation issues and concerns were voiced by the community and project stakeholders. The future school site plan and recommendations in this report aim to address these concerns. The most common transportation-related topics raised by the Committees, public and other stakeholders included:

- Potholes and lighting in the school driveway and parking lot
- Insufficient on-site parking for staff and narrow parking spaces in school lot
- Insufficient lighting on the Fort Reynolds Park trail
- Limited bike parking on site and no secure parking for staff bicycles
- Concerns about vehicle speeds and congestion on S Abingdon Street
- Concerns about congestion on S 29th Street near the school driveway during arrival and dismissal
- Need for enhanced bicycle connection for staff to/from Four Mile Run Trail

Using this input as well as the data presented above, the project team conducted the future transportation analysis and developed the recommendations presented in the following sections.

[4] ADA: Americans with Disabilities Act, which outlines design requirements for providing mobility and access for people with disabilities. ADA Guidelines are available here: http://www.ada.gov/ada_req_ta.htm.

FUTURE PARKING ANALYSIS

In order to calculate the future parking demand for Abingdon Elementary School, APS provided an estimate of 146 future staff. The analysis began by calculating the zoning requirement for parking spaces,[5] which include 97 spaces for staff and 19 spaces for visitors (116 total spaces required by zoning). It is important to note that the spaces required by the zoning for visitors are not intended to all be designated, visitor-only spaces; this is simply the number of extra parking spaces required by zoning to accommodate visitors.

The County Zoning Ordinance allows modifications to the zoning requirements for parking based on:

- Attempts to reduce impervious surfaces, minimize grading and preserve trees
- Shared parking
- On-street parking
- Transportation demand management (TDM)

Because the preservation of green/recreation space was a significant priority for the school and community, the project team worked with the BLPC and PFRC to determine a reduced parking figure that would work for the site. The following calculations were used:

Shared Parking

A partnership is being explored with the Fairlington Community Center whereby an estimated 15 parking spaces may be leased to APS for use by Abingdon staff and visitors. Although this agreement is not finalized, a constructive dialogue was underway and an agreement appears likely. For this reason, the project team recommends a reduction of 15 spaces based on shared parking opportunities.

On-Street Parking

The zoning code allows for reductions based on available on-street parking located on streets adjoining the site. There are seven parking spaces on 29th Street adjoining the school property, and the on-street parking analysis showed that there is significant on-street parking availability near the school. For this reason, the project team recommends a reduction of 7 additional spaces based on the potential to utilize the existing on-street parking supply.

Transportation Demand Management (TDM)

Arlington Public Schools is embarking on a new program, *APSGo!*, which aims to promote sustainable transportation choices by students and staff. More details on the benefits of this program are provided later in this report (see page 24). Because of this effort and the associated incentives, APS anticipates that staff drive-alone rates will decline over the coming years. For this reason, the following calculation was used to estimate a potential reduction in parking due to transportation demand management:

[5] Arlington County Zoning Ordinance, Section 14.3.5.B

146	**x**	**93%**	**=**	**135.78**
Future Staff Estimate		Average staff drive rate at comparable APS elementary schools		Staff parking demand (on site and on street spaces)

146	**x**	**85%**	**=**	**124.10**
Future Staff Estimate		Future TDM scenario staff drive rate		TDM staff parking demand (on site and on street spaces)

135.78	**-**	**124.10**	**=**	**11.68 spaces**

The project team used this analysis to recommend an additional parking reduction of 11 spaces due to transportation demand management opportunities.

The follow equation summarizes the recommended parking reductions explained above:

116	**-**	**7**	**-**	**15**	**-**	**11**	**=**	**83**	
Spaces required by zoning		Adjoining on-street spaces		Shared spaces in Community Center lot		Spaces reduced through TDM		Recommended parking spaces on site	

If the shared parking space arrangement does not go through with Fairlington Villages Community Center, than the on-site parking recommendation would be 98 spaces (83 plus 15).

FUTURE TRAFFIC ANALYSIS

VEHICULAR LEVEL OF SERVICE METHODOLOGY

The performance of the study intersections for motor vehicles was analyzed in SYNCHRO 8.0 and SimTraffic 8.0. Performance was measured using Levels of Service (LOS), which is based on the process in the 2000 Highway Capacity Manual. Due to Synchro's inability to model pedestrian crossings at all-way stop locations, a SimTraffic simulation was performed to more accurately represent actual operating conditions. Each SimTraffic simulation lasted 60 minutes, with a 15-minute "seeding" period, or set-up period, in advance and the random simulations were performed five times to determine the average intersection performance.

Table 1 Relationship of LOS to control delay

Level of Service	Control Delay (seconds)
A	0 to 10
B	> 10 to 15
C	> 15 to 25
D	>25 to 35
E	> 35 to 50
F	> 50

Levels of Service (LOS) range from 'A' to 'F' where LOS 'A' represents optimal conditions with fewer than 10 seconds of delay, while 'F' represents failing conditions where delay exceeds 50 seconds at unsignalized intersections.

Levels of Service for stop-controlled intersections are based on delay as a function of capacity and motor-vehicle traffic-volume demands. At two-way stop-controlled intersections, capacity is determined for motorists entering from the minor road or turning left from the major road, movements in which motorists must use judgment to select an adequate gap in conflicting traffic. Table 1 illustrates the relationship between Level of Service and control delay for unsignalized intersections. Control delay is the delay resulting from a control device (i.e. a stop sign), measured as compared to an uncontrolled intersection.

The performance of the study intersections was also measured by 95th percentile queue length, which is the queue length in feet, with only a 5 percent probability of being exceeded during the time period.

EXISTING CONDITIONS LEVEL OF SERVICE ANALYSIS

Table 3 and Table 4 (see page 20) show the existing delay, Levels of Service, volume-to-capacity ratios, and the 95th percentile queues for each movement at the study area intersections during the arrival and dismissal peak hour, respectively. As shown, the existing traffic demands can be accommodated with the existing infrastructure. All movements operate at LOS B or better during arrival and dismissal peak hours. Summary Synchro outputs of the existing conditions are provided in Appendix G.

FUTURE TRAFFIC VOLUMES

BACKGROUND GROWTH

The background growth rate, or increase in vehicle traffic due to overall trends in the area, unrelated to the school, is assumed to be 0.5 percent annually. This background growth was determined by reviewing historic average annual daily traffic near the study area obtained from the Virginia Department of Transportation and confirmed with Arlington County staff during the study process. For the design year of 2022, six years after the start of construction and eight years after the existing conditions data collection, 0.5 percent growth is compounded annually for eight years for a total of 4 percent growth. This growth rate is applied on all movements not directly related to the school. Changes in traffic on movements directly related to the school are developed using trip generation and distribution, as described below.

POTENTIAL NEW TRAFFIC GENERATED BY SCHOOL EXPANSION

Trip generation and distribution estimates how many additional vehicle trips the proposed school expansion may add to the current volumes and the movements those vehicles will make within the adjacent road network.

TRIP GENERATION ESTIMATES AND ASSUMPTIONS

Trip generation described in this section is an estimate of the number of vehicular trips to and from the school during the peak hours of activity: School Arrival (7:05 AM to 8:05 AM) and School Dismissal (2:35 PM to 3:35 PM). The School Arrival trip generation includes vehicle traffic from before-care drop-off activity, bus arrival, staff arrival, student drop-off activity and volunteer arrival. The School Dismissal trip generation includes vehicle traffic from student pick-up activity, after-care pick-up activity, bus departure, staff departure, and volunteer departure.

A range of trip generation estimates were developed based on manual counts performed at Abingdon Elementary School and verified with several sources including national guidance (i.e., Institute of Transportation Engineers (ITE) Trip Generation Manual) and other data collected at Abingdon Elementary (i.e., parent surveys and student tallies).

Future trip generation was estimated based on the applying the rate of trips per existing student to the expanded student capacity to determine future trips. Two additional trip generation scenarios were estimated: (1) assuming Transportation Demand Management (TDM) measures described later in this report reduce total future trips by 10 percent and (2) assuming inclement weather shifts one third of all students who typically walk or bicycle to school to riding in a personal vehicle, which is a conservative estimate based on inclement weather day manual counts performed in fall 2014. Table 2 provides a summary of the existing and future trip generation estimates for Abingdon Elementary School during the School Arrival Peak Hour and School Dismissal Peak Hour. Details on existing and future trip generation can be found in Appendix H.

Table 2 Vehicular Arrival and Dismissal Peak Hour Trips

			School Arrival Peak Hour (7:05 AM to 8:05 AM)			School Dismissal Peak Hour (2:35 PM to 3:35 PM)		
			In	Out	**Total**	In	Out	**Total**
Current Trips[6]			227	157	**384**	56	121	**177**
Expanded ES Trips[7]	Typical Day	New	35	25	**60**	9	19	**28**
		Total	262	182	**444**	65	140	**205**
	Typical Day with TDM	New	9	6	**16**	2	5	**7**
		Total	236	163	**400**	58	126	**184**
	Inclement Weather Day	New	92	82	**174**	62	72	**134**
		Total	319	239	**558**	118	193	**311**

The travel mode splits for trip generation calculations were determined using averages from the fall 2014 arrival and dismissal mode counts combined with information from the turning-movement counts. Additional details can be found in Appendix G. As such, these trip generation estimates assume that during the School Arrival Peak Hour, 22 percent students walk or bike, 43 percent ride the bus, 8 percent carpool and 19 percent travel in a personal vehicle. During the School Dismissal Peak Hour, 18 percent students walk or bike, 34 percent ride the bus, 10 percent carpool and 9 percent travel in a personal vehicle. An additional 5 percent participate in morning Extended Day and 22 percent participate in afternoon Extended Day, arriving before and departing after the peak hours. (Note: These mode splits are based on the number of students traveling to and from Abingdon Elementary School. The vehicular trip generation discussed above considers only the number of vehicles, so the numbers are not directly comparable.)

TRIP DISTRIBUTION ASSUMPTIONS

The expected distribution of vehicle trips, or routes, to and from the expanded school site was based on the existing distribution of vehicles entering and exiting the school vicinity as determined by the turning-movement counts described previously. It was assumed that all new trips utilize the school driveway/loop for drop-off or pick-up. Distributions were assumed to be the same for the School Arrival and School Dismissal peak hours. Figure A illustrates trip distribution.

[6] Assumes 627 students and 136 staff
[7] Assumes 725 students and 157 staff

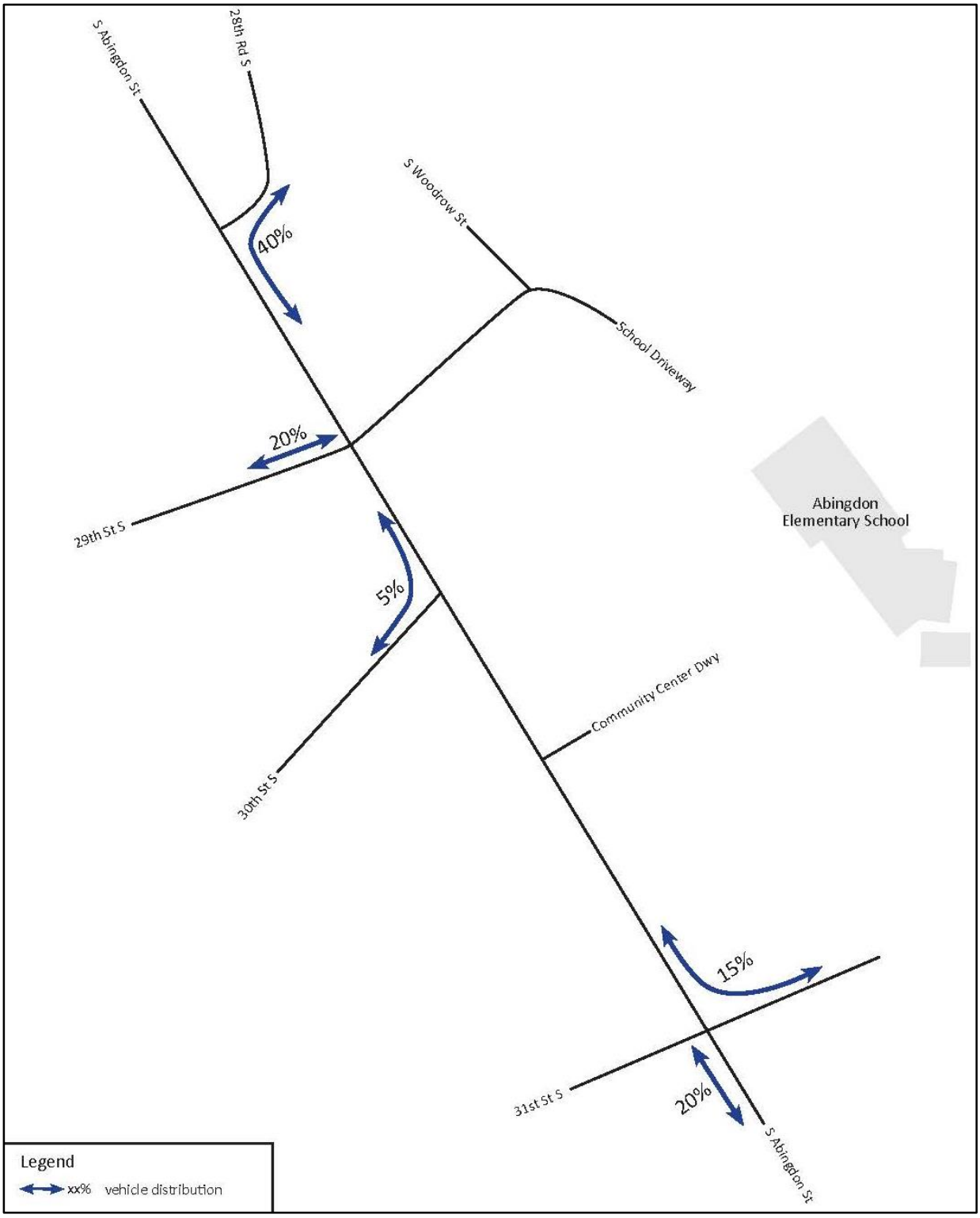


Figure A: Vehicle Trip Distribution for New Trips at Expanded Elementary School

Trip distribution and future traffic analysis assume the lesser-case driveway access condition for the purpose of traffic analysis, which is that all vehicles enter and exit the school driveway at the intersection of 29th Street and Woodrow Street. The alternative condition involves vehicles entering at a new driveway on 29th Street between Woodrow Street and Abingdon Street to access a new drop-off and pick-up loop and buses and staff would still enter at the driveway adjacent to Woodrow Street.

FUTURE CONDITIONS ANALYSIS

FUTURE LEVEL OF SERVICE

Table 3 and Table 4 show the existing and future delay, Level of Service (LOS), Volume-to-Capacity ratio (V/C) and the 95th percentile queues for each movement at the study intersections during the School Arrival and School Dismissal peak hours, respectively. As shown, the future traffic demands with the background growth and additional traffic from the school expansion can be accommodated with the existing infrastructure. All movements operate at LOS B or better during School Arrival and School Dismissal peak hours, with the exception of 29th St S and S Abingdon St, where the westbound approach operates at LOS C during the School Arrival peak hour in the future condition. Further, in the Inclement Weather Day Scenario, the intersection operates with an overall LOS C and westbound approach LOS D during the School Arrival peak hour. Summary SYNCHRO Analysis outputs of the future conditions are provided in Appendix I.

Table 3 Existing and Future Delay, Level of Service, and 95th Percentile Queues - Arrival

		Existing Weekday Arrival (7:05-8:05)				Future Typical Arrival (7:05-8:05)				Future with TDM Arrival (7:05-8:05)				Future Inclement Weather Day Arrival (7:05-8:05)			
1 - 28th Rd S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	28th St S WB LR	11.2	B	0.27	27	12.1	B	0.32	35	11.8	B	0.30	32	12.8	B	0.38	44
	S Abingdon Rd NB TR	-	-	0.16	-	-	-	0.17	-	-	-	0.17	-	-	-	0.19	-
	S Abingdon Rd SB LT	2.6	A	0.01	1	5.9	A	0.02	1	5.9	A	0.02	1	6.0	A	0.02	2
	Overall	**4.9**	**-**	**-**	**-**	**5.5**	**-**	**-**	**-**	**5.3**	**-**	**-**	**-**	**5.9**	**-**	**-**	**-**
2 - 29th Rd S & S Woodrow St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	29th St S EB LR	0.5	A	0.01	0	0.5	A	0.01	1	0.5	A	0.01	1	0.4	A	0.01	1
	School Driveway WB LT	-	-	0.14	-	-	-	0.17	-	-	-	0.15	-	-	-	0.22	-
	S Woodrow St SB TR	9.5	A	0.01	1	9.8	A	0.01	1	9.6	A	0.01	1	10.4	B	0.01	1
	Overall	**0.4**	**-**	**-**	**-**	**0.4**	**-**	**-**	**-**	**0.4**	**-**	**-**	**-**	**0.3**	**-**	**-**	**-**
3 - 29th St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	29th St S EB LTR	11.3	B	-	-	12.7	B	-	-	11.7	B	-	-	15.8	C	-	-
	29th St S WB LTR	12.7	B	-	-	15.3	C	-	-	13.3	B	-	-	26.8	D	-	-
	S Abingdon St NB LTR	12.7	B	-	-	14.8	B	-	-	13.4	B	-	-	20.8	C	-	-
	S Abingdon St SB LTR	12.6	B	-	-	14.6	B	-	-	13.2	B	-	-	20.3	C	-	-
	Overall	**12.4**	**B**	**-**	**-**	**14.5**	**B**	**-**	**-**	**13.0**	**B**	**-**	**-**	**21.7**	**C**	**-**	**-**
4 - 30th St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	30th St S EB LR	12.5	B	0.14	12	13.3	B	0.17	15	13.0	B	0.16	14	14.3	B	0.19	18
	S Abingdon Rd NB LT	0.3	A	0.01	0	0.2	A	0.01	0	0.2	A	0.01	0	0.2	A	0.01	0
	S Abingdon Rd SB TR	-	-	0.15	-	-	-	0.17	-	-	-	0.16	-	-	-	0.19	-
	Overall	**1.8**	**-**	**-**	**-**	**1.9**	**-**	**-**	**-**	**1.9**	**-**	**-**	**-**	**1.9**	**-**	**-**	**-**
5 - Community Center Dwy & S	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	Community Center Dwy WB LR	11.7	B	0.04	3	12.2	B	0.05	4	11.9	B	0.05	4	12.5	B	0.05	4
	S Abingdon Rd NB TR	-	-	0.15	-	-	-	0.16	-	-	-	0.15	-	-	-	0.18	-
	S Abingdon Rd SB LT	0.6	A	0.01	1	0.6	A	0.01	1	0.6	A	0.01	1	0.5	A	0.01	1
	Overall	**0.8**	**-**	**-**	**-**	**0.8**	**-**	**-**	**-**	**0.8**	**-**	**-**	**-**	**0.7**	**-**	**-**	**-**
6 - 31st St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	31st St S EB LTR	10.3	B	-	-	10.7	B	-	-	10.6	B	-	-	11.1	B	-	-
	31st St S WB LTR	10.2	B	-	-	10.8	B	-	-	10.6	B	-	-	11.3	B	-	-
	S Abingdon Rd NB LTR	11.1	B	-	-	11.9	B	-	-	11.6	B	-	-	12.7	B	-	-
	S Abingdon Rd SB LTR	12.3	B	-	-	13.4	B	-	-	12.9	B	-	-	15.0	B	-	-
	Overall	**11.2**	**B**	**-**	**-**	**12.0**	**B**	**-**	**-**	**11.7**	**B**	**-**	**-**	**13.0**	**B**	**-**	**-**

Table 4 Existing and Future Delay, Level of Service, and 95th Percentile Queues - Dismissal

		Existing Weekday Dismissal (2:35-3:35)				Future Typical Dismissal (2:35-3:35)				Future with TDM Dismissal (2:35-3:35)				Future Inclement Weather Dismissal (2:35-3:35)			
1 - 28th Rd S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	28th St S WB LR	9.8	A	0.14	12	9.9	A	0.16	14	9.9	A	0.15	13	10.2	B	0.19	17
	S Abingdon Rd NB TR	-	-	0.09	-	-	-	0.10	-	-	-	0.10	-	-	-	0.11	-
	S Abingdon Rd SB LT	4.7	A	0.00	0	1.6	A	0.00	0	1.6	A	0.00	0	1.6	A	0.00	0
	Overall	**4.4**	**-**	**-**	**-**	**4.3**	**-**	**-**	**-**	**4.3**	**-**	**-**	**-**	**4.6**	**-**	**-**	**-**
2 - 29th Rd S & S Woodrow St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	29th St S EB LR	2.2	A	0.01	1	1.8	A	0.01	1	2.0	A	0.01	1	1.0	A	0.01	1
	School Driveway WB LT	-	-	0.07	-	-	-	0.09	-	-	-	0.08	-	-	-	0.13	-
	S Woodrow St SB TR	9.1		0.01	1	9.2	A	0.01	1	9.1	A	0.01	1	9.7	A	0.01	1
	Overall	**1.1**	**-**	**-**	**-**	**0.9**	**-**	**-**	**-**	**1.0**	**-**	**-**	**-**	**0.6**	**-**	**-**	**-**
3 - 29th St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	29th St S EB LTR	8.1	A	-	-	8.3	A	-	-	8.2	A	-	-	9.0	A	-	-
	29th St S WB LTR	8.7	A	-	-	9.1	A	-	-	8.8	A	-	-	10.4	B	-	-
	S Abingdon St NB LTR	8.7	A	-	-	9.0	A	-	-	8.9	A	-	-	9.8	A	-	-
	S Abingdon St SB LTR	8.7	A	-	-	9.0	A	-	-	8.8	A	-	-	10.0	B	-	-
	Overall	**8.6**	**A**	**-**	**-**	**8.9**	**A**	**-**	**-**	**8.7**	**A**	**-**	**-**	**9.9**	**A**	**-**	**-**
4 - 30th St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	30th St S EB LR	10.4	B	0.06	4	10.6	B	0.06	5	10.5	B	0.06	5	11.0	B	0.07	6
	S Abingdon Rd NB LT	0.5	A	0.01	0	s	A	0.01	0	0.5	A	0.01	0	0.4	A	0.01	0
	S Abingdon Rd SB TR	-	-	0.10	-	-	-	0.11	-	-	-	0.10	-	-	-	0.13	-
	Overall	**1.4**	**-**	**-**	**-**	**1.4**	**-**	**-**	**-**	**1.4**	**-**	**-**	**-**	**1.3**	**-**	**-**	**-**
5 - Community Center Dwy & S	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	Community Center Dwy WB LR	10.0	B	0.04	3	10.2	B	0.04	3	10.1	B	0.04	3	10.4	B	0.04	3
	S Abingdon Rd NB TR	-	-	0.08	-	-	-	0.09	-	-	-	0.09	-	-	-	0.10	-
	S Abingdon Rd SB LT	0.4	A	0.01	0	0.4	A	0.01	0	0.4	A	0.01	0	0.4	A	0.01	0
	Overall	**1.2**	**-**	**-**	**-**	**1.1**	**-**	**-**	**-**	**1.1**	**-**	**-**	**-**	**1.0**	**-**	**-**	**-**
6 - 31st St S & S Abingdon St	**Movement**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**	**Delay (sec)**	**LOS**	**V/C**	**Queue (ft)**
	31st St S EB LTR	8.3	A	-	-	8.5	A	-	-	8.5	A	-	-	8.7	A	-	-
	31st St S WB LTR	8.8	A	-	-	9.0	A	-	-	8.9	A	-	-	9.2	A	-	-
	S Abingdon Rd NB LTR	8.7	A	-	-	8.9	A	-	-	8.8	A	-	-	9.1	A	-	-
	S Abingdon Rd SB LTR	9.4	A	-	-	9.8	A	-	-	9.7	A	-	-	10.2	B	-	-
	Overall	**8.9**	**A**	**-**	**-**	**9.2**	**A**	**-**	**-**	**9.1**	**A**	**-**	**-**	**9.5**	**A**	**-**	**-**

RECOMMENDATIONS TO ACCOMMODATE INCREASED VEHICULAR ACTIVITY

Based on the future conditions analysis, the existing facilities should accommodate the expected increase in vehicular activity at intersections surrounding the school, thus there are no recommendations changes at these intersections to increase vehicular capacity.

DROP-OFF QUEUE LENGTH ANALYSIS

Under current conditions, the peak, total sustained queue length observed during arrival was 30 vehicles, which extends to and sometimes slightly beyond the intersection of S Abingdon and S 29th Street. The average peak number of vehicles observed in this queue was 30 cars, though there are short periods on occasion where the line exceeds this number. The primary drop-off and pick-up location at the loop in front of the school is anticipated to experience a modest increase in number of vehicles during the arrival and dismissal peak hours. The future site plan was designed to accommodate as many as 32 vehicles queuing on-site, which should accommodate most of the future drop-off queue length. However, it is anticipated that some queuing will still occur on 29th Street in the future, typically for very short periods of time in the morning.

TRAFFIC CALMING AND SAFETY

TRAFFIC CALMING

Traffic calming in the study area was assessed based on speeds of vehicles on the study roadways including 29th St S and S Abingdon St, both of which have a speed limit of 25 mph. S Abingdon St has "School Speed Limit When Flashing" signs indicating a speed limit of 20 mph during school arrival and dismissal periods. There is no posted speed limit on 29th St S; however, in Arlington County the speed limit is 25 mph unless stated otherwise. There is a School Speed Limit sign on 29th St S indicating that the speed limit is 20 mph from 7:30 AM to 8:10 AM and from 2:30 PM to 3:10 PM.

Results of the speed analysis are shown in Figure B. At all count locations, the 85th percentile speed is at or below 26 mph, which does not indicate a speeding problem on either S Abingdon St or 29th St S. However, on S Abingdon St during both the arrival and dismissal peak hour, the 85th percentile speed is 25 mph between 30th Rd S and 31st St S, which indicates a potential speeding problem. There are no curb extensions or speed humps on S Abingdon St or 29th St S. East of S Abingdon St, there are curb extensions and speed humps on 31st St S, including one speed hump adjacent to the Fort Reynolds Park path. Possible traffic calming on 29th St S is discussed in the next section of the report (page 25).

SAFETY

During the three year period from 2011 to 2013, a total of eight crashes occurred within the study area, an average of fewer than three per year. Three crashes occurred within 500 feet of a study intersection and five at other locations. There was one crash that resulted in a minor injury and no other crashes reported injuries. One crash occurred during the school arrival peak hour and no crashes occurred during the school dismissal peak hour on a weekday. Half of the crashes involved drivers hitting one or more parked vehicles. There were two crashes at study intersections involving drivers that failed to obey stop sign protocol. A rear end crash occurred between two vehicle stopping behind a school bus at the intersection of 30th Rd S and S Abingdon Rd. There are no details provided for a crash that occurred in the parking lot at S Woodrow St and 31st St S. None of the crashes involved a pedestrian or bicyclist. Overall, there were very few crashes in the Abingdon Elementary School study area, and these crashes tended to be minor and without resulting injuries.

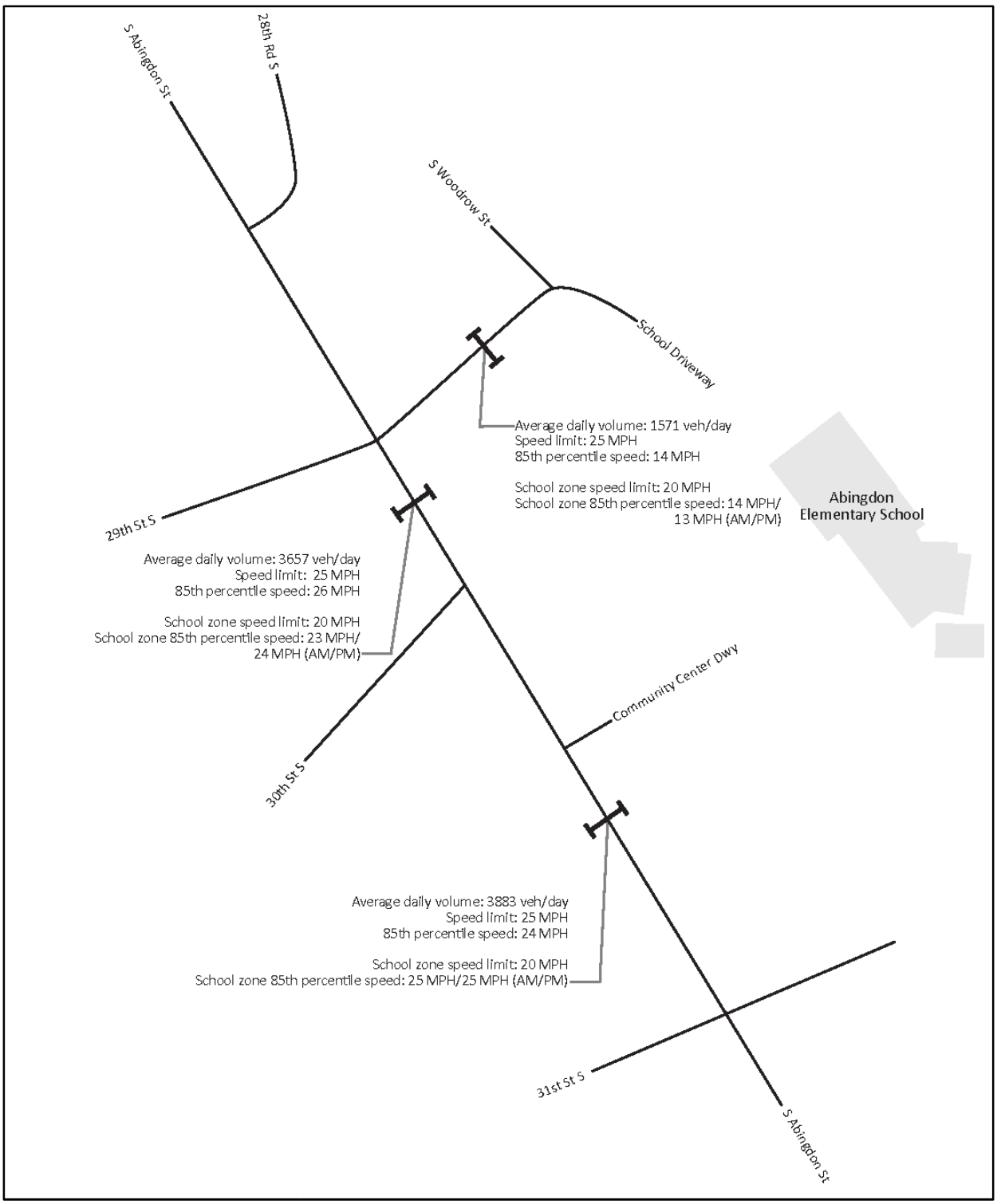


Figure B: Vehicle Volumes and Speeds

PEDESTRIAN AND BICYCLE INFRASTRUCTURE ASSESSMENT AND RECOMMENDATIONS

The Existing Conditions Report (December 2014) included an infrastructure assessment along priority walking and bicycling routes. Three priority walking and biking routes were identified:

- Along Abingdon Street from the South and East
- Along 31 street connecting Fort Reynolds Park
- Along 28 street connecting to Abingdon Street from the North and West.

The infrastructure assessment focused on elements that impact pedestrian and bicycle safety, accessibility, and comfort. These elements include the condition of sidewalks, crosswalks, and curb ramps, the length of crossings, vehicle turning radii, signage, and adjacent vehicular speeds. A summary of key challenges along these routes is presented below.

On-Site Challenges

- On-campus curb ramps such as those in the bus loop do not meet current ADA guidelines.
- Existing crosswalks do not conform to best practices for schools. They should be wider and painted using high-visibility paint.
- There is limited separation of modes (e.g. the bus loading and parent pick-up/drop-off areas) and the design creates conflict-points between vehicles and pedestrians.

Off-Site Challenges

- Low intensity lighting and tall light poles (~24 feet) provide limited light during early morning and later afternoon times at Fort Reynolds Park Trail.
- At the intersection of Abingdon and 31st Street:
  - Existing curb ramps on southeast and southwest corners of the intersection are not ADA compliant.
  - Sidewalk on northern side of S Abingdon Street, from of 31st Street S to 31st Road S is an indirect route set back from the road and includes stairs, so it is not ADA compliant Pedestrians were observed walking along the bike lane on northern side of S Abingdon Street.
  - Existing curb ramps at 31st Road S are not ADA compliant.
- At the intersection of Abingdon Street, 30th Street and 29th Street:
  - Curb ramps at intersection are not ADA compliant.
  - Existing curb ramp on S Abingdon Street and 30th Street does not connect to any crosswalk.
  - No clearly marked crosswalk on driveway at 29th Street S and 30th Street S.
  - The stop sign on intersection of 30th Street S and S Abingdon Street is further north than crosswalk and does not include a stop bar.
  - No sidewalk exists along the island between S Abingdon Street and private parking lot on S Abingdon Street.
- At the intersection of 28th Street S and S Abingdon Street:

- Due to slopes, there are potential issues with sight lines for westbound motorists on 28th Street S, which could lead to limited visibility of pedestrians in crosswalk. A recently installed stop sign at this location may address this issue.
- Existing curb ramps at 28th Street S are not ADA compliant.
- The quality of the sidewalk varies along S Abingdon Street.

RECOMMENDED IMPROVEMENTS

Utilizing the information gathered through the existing conditions phase of the project, as mentioned above, a set of recommendations was developed to help mitigate the current challenges faced by students, parents and teachers walking and biking to and from Abingdon Elementary School.

Because addressing many transportation challenges not located directly within Abingdon site required dialogue and partnership with Arlington County and the surrounding community, the Project Team and APS staff met with representatives from Arlington County Transportation, Parks and Recreation and Planning Departments to review the proposed recommendations and assess the proposed prioritization for each recommendation. This working group also conducted a site "walkabout" to further understand and assess the proposed infrastructure recommendations based on the existing conditions.

The locations of the proposed infrastructure improvements can be seen in **Figure C** and **Figure** and further explained in the section below.

On-site Recommendations

On-site infrastructure recommendations were focused on making the walking and biking experience more comfortable in the immediate Abingdon Elementary site. These recommendations are anticipated to be accomplished as part of the school expansion/renovation project. On-site recommendations include:

1. Installing ADA compliant curb ramps and high visibility crosswalks in the parking/pick-up area to minimize conflicts between users and improve access for people walking and on bicycles.
2. Installing one outdoor bicycle parking space for every 30 students, and one secure bicycle parking space for every 20 staff.[8] Installation of specialty racks designed for scooters or larger cargo bicycles should also be considered.

Please refer to **Figure C** for more details on the location of the proposed on-site recommendations.

[8] Based on future, potential bicycle parking mode share for students and staff. Figures exceed the Arlington County Bicycle Parking requirements for office locations and the LEED Building Standards.

Figure C - On-site Recommendations

Off-site Recommendations

Off-site infrastructure recommendations were developed to help provide safer and more comfortable access routes for students, parents, teachers and visitors. **Figure** notes the location of all proposed improvements. The proposed recommendations were sorted into two groups based on their proximity to the school site, the frequency of use by students and staff based on field observations, and feedback received by members of the community, school representatives and BLPC members during the public input portion of this study. "Priority Access Improvements" are denoted by blue dots and are recommended for implementation in affiliation with the school expansion project, using the Community Amenity Fund and in partnership with Arlington County. Yellow dots in the map denote recommended "Future County Projects," which will require additional County review and could be constructed as part of other countywide improvements. **Addressing any transportation issues *not* located on the Abingdon site would require dialogue and partnership with Arlington County and the surrounding community. In particular, projects shown as "Future County Projects" have not been selected/approved for implementation by County staff and will not be completed as part of the school renovation project.**

The following is a full list of off-site infrastructure recommendations:

1. Install traffic calming devices on Abingdon Street. Such traffic calming devices may include a raised crosswalk and bulb-outs at the existing midblock crosswalk location to increase visibility, prioritize pedestrian use, and reduce the distance a pedestrian has to cross. A speed feedback sign should be considered at this location. This recommendation is recommended as Priority Access Improvement.
2. Replace the existing high visibility crosswalk on 29th Street to align with new driveway location. Because of its close proximity to the school site, this recommendation is recommended as Priority Access Improvement.
3. Retrofit existing curb ramps at the intersection of 29th and Abingdon Street. All ramps should provide ADA access for users.[9] A high-visibility crosswalk should be added to each leg/approach of the intersection. Because of the volume of pedestrians in this intersection, this recommendation is recommended as Priority Access Improvement.

4A. Provide sufficient lighting on school property to connect to Fort Reynolds Park trail. Because of the number of children walking to and from school and its close proximity to the school site, this recommendation is recommended as Priority Access Improvement.

The following are recommended for consideration as "future county projects" and will not be implemented as part of the school project.

4B. Improve existing lighting in Fort Reynolds Park to increase comfort for pedestrians during early morning and evening times. An additional one to two light posts needed near trail entrance and existing lights are dim.

[9] Proposed retrofit should include installation of truncated domes, landing area of at least 4 feet by 4 feet, and a maximum ramp slope of 2 percent.

5. Retrofit existing curb ramps to be ADA compliant at the two east side corners of the intersection of 28th Road S and S Abingdon Street.[10]
6. Retrofit existing curb ramps to be ADA compliant at two west-side corners of the intersection of 31st Street S and S Abingdon Street.[11]
7. Construct new sidewalk and ADA compliant curb ramps along planted island on Abingdon Street between 29th and 30th Street. As part of this project, a lane diet should also be considered on Abingdon Street at this location. Add a connecting crosswalk on 30th Street and relocate existing stop sign closer to the corner of Abingdon Street to properly communicate to motor vehicles where to stop. Finally, a curb extension on the southern corner of 30th and Abingdon Street should be considered.
8. Install new sidewalk on Abingdon Street between 31st Street and 31st Road. Currently the pathway involves walking up and down the stairs which are rarely used by pedestrians.
9. Add sharrows on Abingdon Street between 29th and 28th Street to let motorists know to "share the road" with bicyclists.
10. To provide a more comfortable environment for bicyclists heading south on 28th Street, a climbing lane should be added (i.e., bike lane on the uphill and sharrow on the downhill). This will require removal of parking on one side of the street and therefore needs further study.

[10] Ibid.

[11] Proposed retrofit should include installation of truncated domes, landing area of at least 4 feet by 4 feet, and a maximum ramp slope of 2 percent. Americans with Disabilities Act (ADA) Guidelines are available here: http://www.ada.gov/ada_req_ta.htm

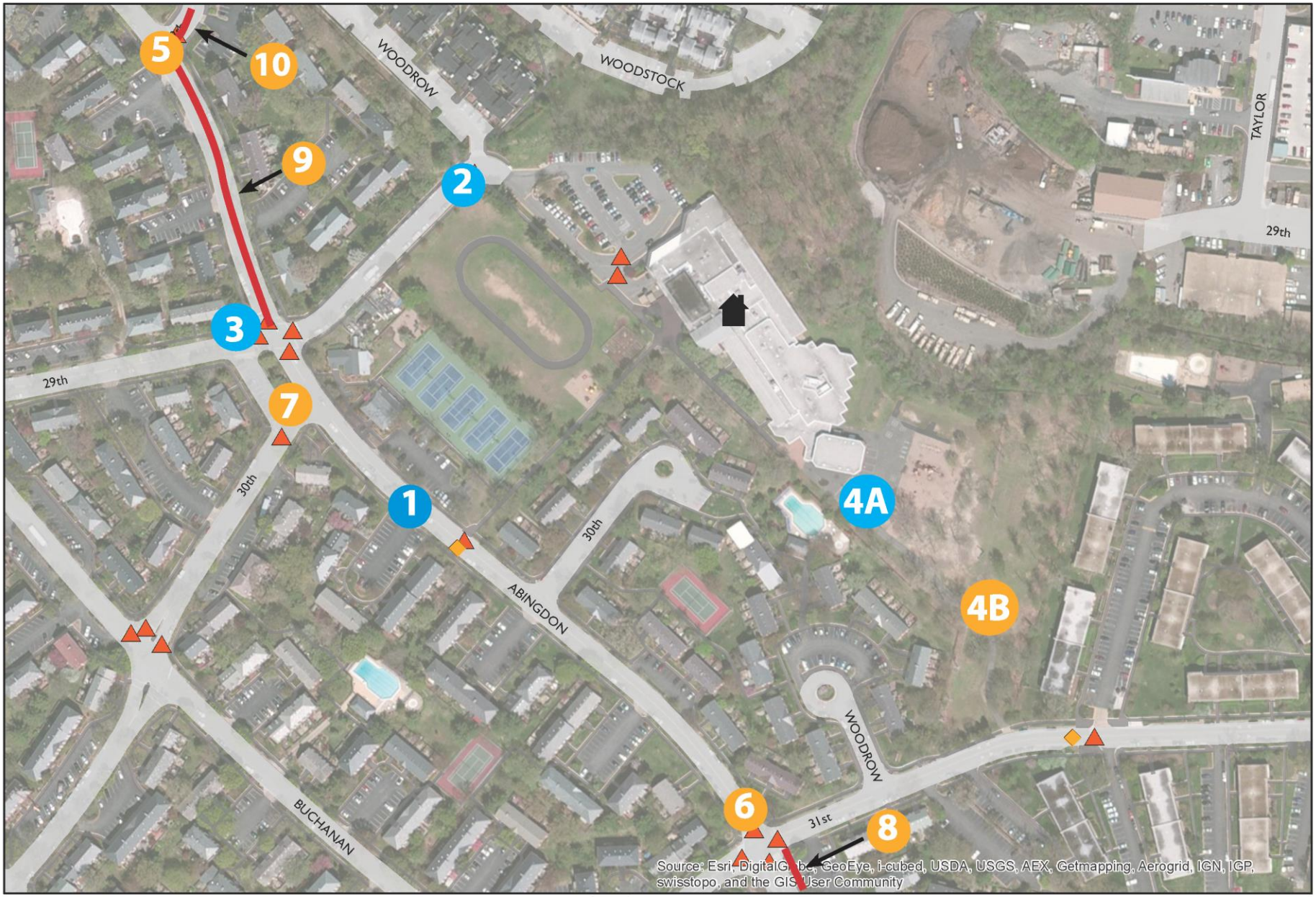


Figure D - Off-site Recommendations

NON-INFRASTRUCTURE RECOMMENDATIONS

This section provides recommendations related to programs, policies and other non-infrastructure strategies that can support safe, efficient and active transportation for students, staff and visitors at Abingdon Elementary School. The recommendations presented below are consistent with APS's division-wide transportation demand management program entitled *APSGo!*. *APSGo!* is a series of programs and resources designed to support greater use of sustainable travel modes by students and staff. More information can be found at http://www.apsva.us/Page/24244.

Table 5 below suggests ways Abingdon Elementary School can encourage and enable students to walk, bicycle, take the bus and carpool more often to school. The subsequent table (Table 6) presents strategies that target staff and visitor travel.

Table 5 Program Strategies to Support Safe, Efficient and Active Transportation for STUDENTS, Abingdon Elementary School

STUDENT TRAVEL	
Strategy	**Benefits**
Apply for a QuickStart Mini-grant from the Virginia SRTS program. QuickStart Mini-grants are worth up to $1,000 and can be used for activities to encourage and enable walking and biking to school.	• Can provide funding to implement many of the activities listed below
Continue participation in Walk to School Day and Bike to School Day. Walk to School Day and Bike to School Day are national, one-day events that celebrate walking and biking to school. Generally, Walk to School Day is held the first full week of October, and Bike to School Day is held in May.	• Generates enthusiasm for walking and biking • Way to raise community awareness about safety issues • Can be simple or elaborate – just a few kids and parents meeting to walk to school or a parade • Can be folded into studies of international cultures as it is an international event • Can be used to test or to promote other strategies to encourage students to walk and bike safely to school, e.g., walking school buses
Consider establishing a regular (i.e., weekly or monthly) walk and bike to school day. Track and reward students who walk and bicycle to school.	• Provides positive reinforcement for walking and bicycling • Can include all students if a remote drop-off location is established (e.g., the intersection of Ohio Street and 12th Street, which is currently as a meet up location for Walk to School Day) • Can include walking and bicycling beyond the trip to school
Continue Student Safety Patrol. Abingdon has a very strong safety patrol program that builds leadership skills and helps with safety during arrival and dismissal. In addition to their current duties, Student Safety Patrol members might help record walk and bike trips as part of a frequent walker/biker/bus rider program or offer educational literature on traffic safety issues.	• Excellent way to educate parents and students and encourage appropriate behaviors while supporting the school's SRTS program • Teaches students valuable leadership skills

STUDENT TRAVEL	
Strategy	**Benefits**
Teach pedestrian safety. Pedestrian safety education is particularly important in advance of activities that encourage walking to school, such as Walk to School Day. The National Traffic Highway Safety Administration's (NHTSA) Child Pedestrian Safety Curriculum is a recommended resource.	• Parents may feel better about their child's skills. • Students can practice pedestrian safety skills in controlled environments with adult supervision. • The NHTSA curriculum addresses national standards of learning. • The NHTSA curriculum can be downloaded for free from the NHTSA website and includes a series of five lessons for three age levels—K-1, 2-3, 4-5.
Start a walking school bus program. Walking school buses and bicycle trains are adult supervised groups of students walking and/or bicycling to school.	• Provides adult supervision on the walk to school • Can be loosely structured or highly organized • Can include a meeting point in a parking lot so children and parents who must drive can participate • Can be expanded to include supervision to bus stops • Adults can rotate who will lead each time • Note: Some school districts have trained bus drivers to be walking school bus leaders when their routes were cut due to funding constraints
Start a frequent walker, biker, and bus rider program. Frequent walker, biker, and bus rider programs encourage students to walk, bike, or take the school bus by offering incentives to students who use these modes frequently or by establishing a competition between classes. A simple record keep system must be created to track student walking, biking, and school bus ridership.	• Provides positive reinforcement for walking, biking, and taking the school bus
Continue providing pedestrian and bicycle route maps. Pedestrian and bicycle route maps show the locations of crosswalks, crossing guards, sidewalks, and shared use paths. These maps are available on each APS school's website and should be distributed to all parents at the beginning of each school year.	• Provides parents with a tool to plan a safe route to school with their children
Encourage and facilitate carpooling. Often school families don't realize that simple coordination with their friends and neighbors can cut down on car trips to school (and take one to-do off of their list). "School Pool" programs allow parents to sign up, indicate their location and availability and identify potential car pool partners.	• Reduces the number of cars on the roads around the school during drop off and pick up

Table 6 Program Strategies to Support Safe, Efficient and Active Transportation for STAFF and VISITORS, Abingdon Elementary School

STAFF and VISITOR TRAVEL	
Strategy	**Benefits**
Make all staff at Abingdon Elementary eligible for APS transportation incentive program. APS offers staff at some schools a direct financial incentive for biking, walking, taking transit and carpooling to their school location. APS plans to open eligibility for this program to all staff at Abingdon Elementary school when the school expansion is complete.	• Strongly encourages mode shift and helps off-set the cost of commuting for those using sustainable transportation modes.
Encourage and facilitate carpooling. Carpooling may offer the greatest potential opportunity to reduce the staff drive-alone rate. Work with Arlington Transportation Partners to promote staff registration in the regional RideMatching program and to increase awareness about Guaranteed Ride Home services. **https://tdm.commuterconnections.org/mwcog/**	• Reduces the number of cars on the roads around the school and the parking demand at the site
Provide secure bike parking and shower/changing rooms for staff. Staff may be more inclined to bike to work if they can park their bikes in a private, secure location. Also, staff who bike or walk/jog to work may need a changing area or shower room.	• Provides support and increased comfort for staff who bike or walk/jog to work
Designate priority parking spaces for carpoolers. Having a reserved parking space close to the front of the school lot could create a strong incentive for staff to carpool. It also sends an important signal to others that the school encourages and rewards sustainable transportation choices.	• Provides an incentive and reward for staff who carpool, potentially increasing the carpool rate
Provide transportation information and "commute coaching" for staff. Work with Arlington Transportation Partners to place an information kiosk in the school with transit maps, school walk/bike maps, RidMatching program brochures and other relevant information. Invite staff from Arlington Transportation Partners to attend a staff meeting at the beginning of each year to provide commute coaching services for anyone who needs help determining a transit route, enrolling in RideMatching, etc.	• Increases staff and visitor awareness about their transportation choices

STAFF and VISITOR TRAVEL	
Strategy	**Benefits**
Distribute transportation information to regular school visitors/volunteers. The Abingdon Elementary School website should include a "Getting to the School" page that includes transit information, popular bike/walk routes and bike parking locations. Similarly, staff who work with regular school volunteers could add information about transportation options at the bottom of their emails (i.e. "*Help keep us green! Click here to learn how to reach our school on transit, foot or bike!*")	• Distributes information to volunteers and also serves as a "prompt," encouraging them to consider sustainable travel modes.
Participate in regional events including Spare the Air Day and Bike to Work day. There are a number of annual events sponsored by the Metropolitan Washington Council of Governments and Arlington Commuter Partners that support and encourage active/sustainable transportation.	• Increases awareness of the benefits of biking, walking, transit use and carpooling. • Allows people to "test" their commute using alternative modes – may demonstrate the ease/personal benefits of making the change.

To implement these recommendations, Abingdon Elementary School should work closely with the APS Safe Routes to School coordinator (Tom Norton, tom.norton@apsva.us) whose position is dedicated to supporting safe walking and bicycling to schools at APS. Also, Arlington Transportation Partners are an important resource – they are a countywide organization that helps employers and commuters increase their usage of "green" transportation options (http://www.arlingtontransportationpartners.com/).