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Mobility Issues and Residential Apartment Building Design: The Case of the Valor Project in Washington, DC

White Paper No. 2

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Note: This is a draft report from Energy for Development. The report will be edited as part of the Energy for Development White Paper Series. This draft is provided to the public in the interest of releasing the results of the research in a timely manner. Citations and quotation of this report are permitted.

Introduction

The District of Columbia is placing a great emphasis on mobility issues during the last 10 years. The downtown area is fully saturated with traffic and yet the city continues to experience a building boom with the inevitable consequences of increasing density. The main solution to increasing density is to promote alternative forms of transportation to cars and trucks. This includes walking, bicycling and mass transit. The city has an active mass transit system. The Metro subway system has been operational since 1976 and recently has been addressing maintenance after years of neglect. During the last 4 years the safety of pedestrians also has come to the front of the transportation agenda.

The DC government now has fully adopted policies that encourage alternative, multimodal forms of transportation. As part of this new emphasis, the District has embraced major bicycle and pedestrian programs, including Capital Bikeshare, Complete Streets. MoveDC (DDOT 2014) and Vision Zero DC (DDOT 2018; District of Columbia 2017). Capital Bikeshare has steadily grown since its inception in 2010, recently achieving over 2 million trips per year. The Council of the District of Columbia recently has just voted to extend the dockless bike and scooter rental programs. The District Department of Transportation (DDOT) has programs for the building of better walking and bicycle infrastructure, but many have criticized the slow pace of introducing these new mobility solutions to reduce vehicular traffic.

Vision Zero is a case in point. Vision Zaro is a program to reduce pedestrian and bicyclist fatalities and serious injuries to zero (DDOT 2018b). Highlighting this problem is a recent surge in pedestrian and bicycle accidents resulting in fatalities. Vision Zero plans to reduce such fatalities and injuries through four modalities: the effective use of data and evaluation studies, education, law enforcement and design and engineering of sidewalks, streets, and bicycle infrastructure. The idea is that once the local infrastructure becomes more pedestrian and bicycle friendly, then more and safer trips will be accomplished by riding, walking and taking mass transit. To put it more simply, no one dies or is seriously injured on city streets and trips of less than a mile are enjoyably achieved by non-vehicle travel (Funkhouser 2019).

This concept also has been recognized recently by the Institute of Transportation Engineers (ITE 2017). In its recent report stressing multimodal street design, they state, “Starting in the mid-20th century, major streets in North America were designed primarily to minimize vehicle travel delay and move motor vehicle traffic, neglecting the needs of other users. Well-designed multimodal thoroughfares, however, can support a range of safe, affordable, and sustainable mobility options including walking, riding a bike, and taking transit.” Their proposed context sensitive solutions approach has as a keystone community participation since no one knows a geographical region better than those that live in it. One way to achieve this is activating alleyways for use by pedestrians. This can create more walkable neighborhoods because they can provide shortcuts and better connections compared to conventional streets, along with quieter, safer, and more interesting routes (Fialko and Hampton 2011).

The proposed Valor/Mill Creek Ladybird project[1] has several initiatives that portend to improve mobility (Gorove/Slad 2017 2018). This includes new sidewalks, plans for a HAWK signal crossing Massachusetts Avenue at mid-block, and a bicycle storage facility inside the building. The developer also supports the installation of a Bikeshare station, but has not indicated where such a station could be built. Since 2016 a Capital Bikeshare station for Spring Valley has been in the *DC Capital Bikeshare Development Plans* (DDOT 2015), but there currently is no station slated for construction near the planned site location.

Despite these positive aspects of the project, the Valor/Mill Creek development falls short in its transportation plans in supporting pedestrians and mobility. The *Supplemental Transportation Memo* by Gorove/Slade (2018) indicates the alleyways surrounding the new building will host an increased number of cars and trucks due to a parking garage entrance and loading bays. The suggestion is that pedestrians should take the long way around to Spring Valley Shopping Center via 48th Street and Massachusetts Avenue. However, pedestrians tend to take the shortest distance and likely will use the same alley space as the cars and trucks.

The increased vehicular traffic in the alleys means that the new project will put pedestrians at risk, including those seeking to travel to the Spring Valley Shopping Center or to the restaurants and shops on the west side of Massachusetts Avenue in Spring Valley Village. According to the data in the *Comprehensive Traffic Review* by Gorove/Slade (2017; 2018), the future number of vehicles entering and exiting the alley intersections involves traffic volumes that are similar to those on the surrounding neighborhood streets today.

The Site and Building Configuration

The January 2018 version of the Valor/Mill Creek development included a mobility friendly pedestrian path through the building site called Windom Walk (yellow arrow in figure 1). The pedestrian pathway, unfortunately, was not well thought out because it emptied pedestrians into a parking entrance and loading dock area of an alley. The idea of Windom Walk was a good one, but the execution was poor. Instead of fixing the problems with Windom Walk, the pedestrian pathway through the site was eliminated in the new October 2018 design of the building. The alternative could have been to alter the pathway to so it would deliver pedestrians to the north-south alleyway rather than an active loading and parking entrance area. The result is that the development now has no walkways through the site and has mostly vertical walls with a few courtyards bounding the entire property, blocking any pathway for neighborhood pedestrian traffic. Pedestrians are relegated to the perimeter of the new building.

[1] The Valor project is before the DC Zoning Commission and is case number 16-23. This is a proposal for Design Review by Valor Development, LLC for Square 1499, Lots 802, 803, 806, 807.

Figure 1. Previous Rendering of Building Had Walkway Through Site.

Source: Google Maps 2018a and Valor Development/Torti Galas Urban 2018a. Map produced by Doug Barnes.

In the October 2018 new building design, Windom Walk is replaced with a small park that does not allow pedestrians to walk through the development site (figure 2). With this change, pedestrians have no other option than to circumnavigate the entire property. The developer has adequate plans to improve the pedestrian walkways on the streets, but they have not paid enough attention to the pedestrians who will use the alleyways. The purpose of this study is to examine the impact of the new building on the mix of pedestrian and vehicular traffic and on the overall pedestrian friendliness of the project design, including the alleyways.

The east-west alleyway bordering the new building along its southern side will be heavily traveled due to the loading docks and the garage entrance. The east-west alley will contain the loading bays for trucks as large as 55 feet long and the entrance to a parking garage with 370 spaces (figure 2). In the previous design, the pedestrian walkway emptied into this area with significant traffic, but this walkway was removed without a replacement for a safe passage through the site. Pedestrians parked in the garage also will cross this alley to exit the site. American University employees, students and visitors using American University's reserved parking spaces will need to cross the alley to enter the American University building on the opposite side of the alleyway.

In certain locations along this alleyway, the developer will build a sidewalk that is 6 feet wide for pedestrians using the alleyway. However, the sidewalk will be interrupted by this study's estimated 85-foot gap for the entrances to the garage and loading bays along with another 55-foot gap for the cars accessing the townhomes. This curb cut areas (red lines in figure 2) with

traffic entering and exiting garages or loading docks will comprise over one-third of the linear space in the alley. The American University loading docks also are just opposite the curb cuts for the townhouses nearer to 48th Street.

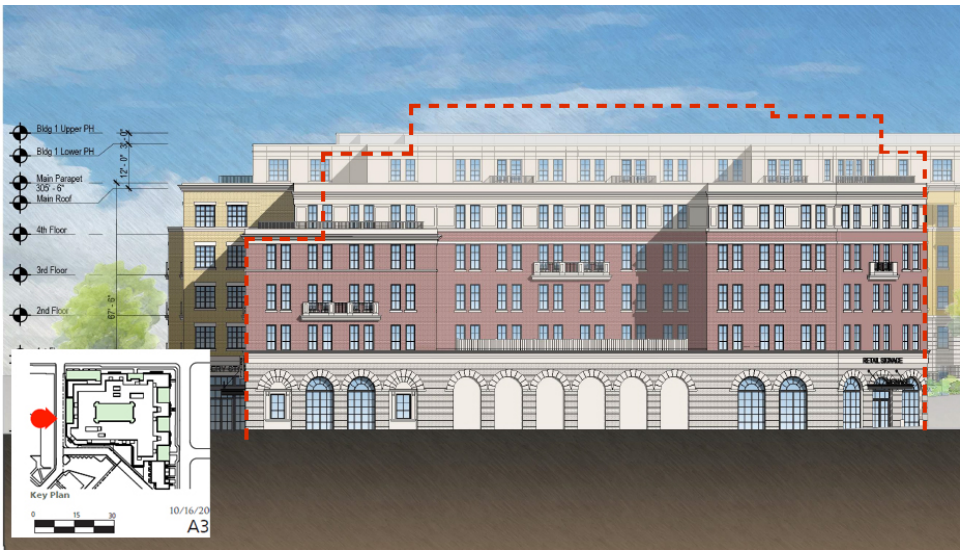
Figure 2. New Rendering of the Building with No Walkway Through Site

Source: Gorove/Slade 2018. Figure slightly altered by Doug Barnes.

The north-south alley bounds the building on its western side (figure 2). Although this alley will be widened from 15 to 20 feet, the distance between the walls of this building and the shopping center actually will become narrower. In many spots, the distance between the walls along this building today is as much as 60 feet. The developer is going to place a12 wide trash bins in the alley which is an improvement over current condition. Finally, a 3 feet wide sidewalk will abut the new building along the north-south alleyway. The face of the building will run along the alley entire property line (figure 3) with windows and false windows. Thus, the narrow sidewalk will be butted up directly against a vertical wall, making it impossible for two people to walk side by side and cause difficulties for those with disabilities. The developer does not anticipate a great number of pedestrians in this alleyway, but it is the shortest distance from the building

entrance to the Spring Valley Shopping Center that is next to the alley. It is likely to carry quite a bit of pedestrian traffic because of attractive retail amenities along both sides of Massachusetts Avenue.

Figure 3. The face of the Building along the north-south Alleyway.



Source: Gorove/Slade 2018

Vehicle Traffic in Alleyways

The number of vehicles in the alley will increase dramatically from 2016 levels due to a general increase in traffic and also because of the new building. The existing 2016 traffic levels were estimated through a survey conducted by Gorove/Slade, the traffic consultants for the project (Gorove/Slade 2017). The next step was to estimate the general background traffic that would increase without the project by the year 2021 (Box 1). Next, the traffic resulting from the new grocery store and residential building was estimated. Finally, the future 2021 levels of traffic including the background and the site generated traffic were estimated.

The before or existing 2016 results are from the traffic survey (Gorove/Slade 2017, pp. 33-34). The after or future volumes are for the year 2021 and include background growth and the impact of the new development site (Gorove/Slade 2017, pp. 42-43). The before values are very similar to the background volumes for 2021.

The alleys intersect city streets at three locations: 48th Street, Yuma Street and Massachusetts Avenue (see figure 2 and table 1). In this white paper, the traffic from conditions existing in 2016 will be compared to the traffic in 2021 that includes both the background growth of traffic and that from the new building. The vehicle traffic at the intersection of 48th street and the alley in 2016 carried about 23 vehicles an hour during the peak PM period during 2016. This figure is estimate to increase to 174 vehicles per hour during the PM peak period in 2021, for an increase of 151 vehicles per hour or 757% (figure 4).

Box 1. Table Definitions for Current and Estimated Traffic Volumes

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which was collected on Tuesday, October 18, 2016 and Thursday, October 20, 2016. The results of the traffic counts are included in the Technical Attachments. The existing peak hour traffic volumes are shown in Figure 15 and Figure 16. For all intersections, the individual morning and afternoon peak hours were used.

2021 Background Traffic Volumes

The traffic projections for the 2021 Background conditions without the project consist of the existing volumes with two additions: (1) Traffic generated by developments expected to be completed prior to the project (known as background developments); and (2) inherent growth on the roadway (representing regional traffic growth).

2021 Site Generate Traffic Volumes.

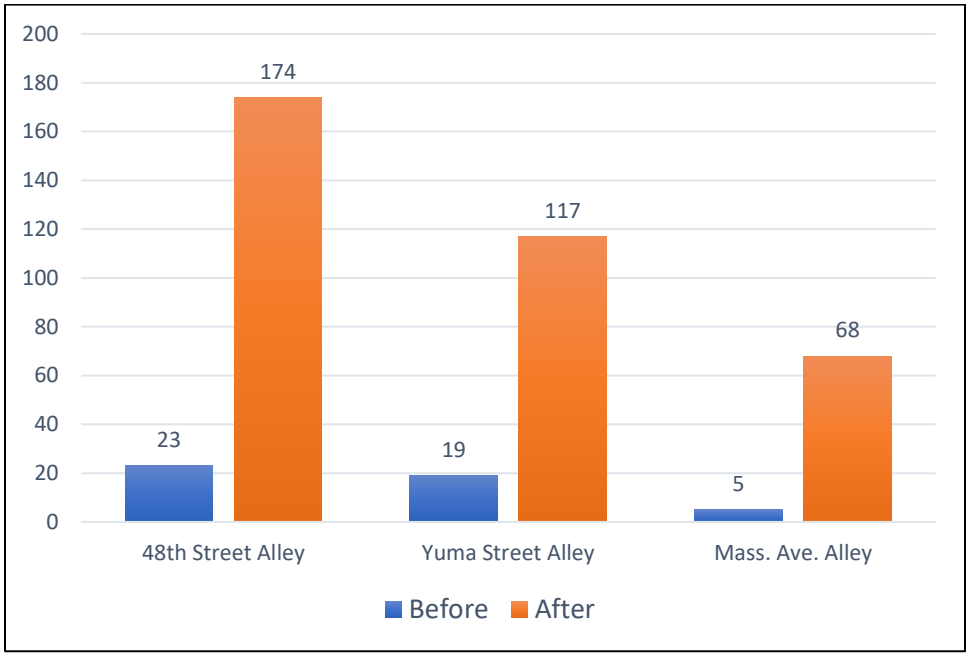
The site generated traffic volume is the number of entrances and exits generated by the new building, including the grocery store and the apartments.

2021 Total Future Traffic Volumes (2021 Site Generated plus Background Traffic)

The 2021 Total Future traffic volumes consist of the 2021 Background volumes with the addition of the traffic volumes generated by the proposed development (site-generated trips). The existing peak hour traffic volumes are shown on Figure 15 and Figure 16. For all intersections, the individual morning and afternoon peak hours were used. C42:C51.

Source: Gorove/Slade 2017

Figure 4. Vehicles Entering and Exiting Alleyways per Peak PM Hour Before & After Project



Source: Data from Gorove/Slade 2017

Note: Before are the 2016 levels and after are the levels after the completion of the project in 2021. See note to table 1

The traffic will increase at Yuma Street and Massachusetts Avenue by similar percentages (table 1). The traffic entering and exiting Yuma Street will increase by 616% and the figures for Massachusetts Avenue alley entrance involve an increase of 764%. The grand total of vehicles entering and exiting the alleyways will be 359 per hour at PM peak periods (table 1). The figures for morning peak hours not presented here are similar to those during evening peak hours, although they can be slightly lower depending on the location.

Table 1. 2016 and 2021 PM Peak Hour Vehicle Volumes Going into and out of Alleys Adjacent to the Site

Location	Peak Vehicles per PM Hour			
	Before	After		
48th Street Alley Intersection	2016	2021	Increase	% Increase
Exiting Alley	14	102	88	729%
Entering Alley	9	72	63	800%
Total Enters and Exits	23	174	151	757%
Yuma Street Alley Intersection				
Exiting Alley	12	53	41	442%
Entering Alley	7	64	57	914%
Total Enters and Exits	19	117	98	616%
Mass. Avenue Alley Intersection				
Exiting Alley	5	12	7	240%
Entering Alley	0	56	56	n.a.
Total Enters and Exits	5	68	63	1360%
Grand Total				
Enters & Exits	47	359	312	764%
Total Vehicle Enters and Exits per Min.	0.8	6.0	5.2	n.a.

Source: Gorove/Slade 2017.

Note: Existing 2016 are the results of the traffic survey. Gorove/Slade pp. 33-34. After is Future Volumes 2021, Gorove/Slade pp. 42-43; Before values are very similar to the background volumes 2021. The enters and exits do not correspond to car trips as a single vehicle may enter and exit alleyways at a different location. The Traffic Addendum produced by Gorove/Slade (2018) to update the 2017 study indicate that total additional trips are 322. As noted below, trips are not the same as enters and exits.

The number of enters and exits of traffic are significant, but it should be cautioned that the dramatic increases are due somewhat to the low volumes of traffic in the alleys in 2016. However, the increases involved attaining levels of traffic that are similar to levels on the streets in 2016 (table 2). The existing 2016 peak volumes of traffic per hour on Yuma Street that pass the alleyway are 207 vehicles. The volume of traffic passing 48th Street and Windom is lower at

86 vehicles per peak hour in the evening. Also, by comparison the traffic entering and exiting Fordham Street on the west side of Massachusetts Avenue is 133 vehicles per hour at PM peak periods. These are similar levels to the 117 and 174 vehicle per hours traffic volumes that will be entering and exiting the site alleyways in the 2021 future scenario.

Table 2. Existing PM Peak 2016 Traffic Volumes on Roadways Surrounding Site

	Vehicles per Hour at PM Peak (Existing 2016)		
Street Intersection	North or West	South or East	Total
Yuma Street and Alley	110	97	207
48th Street and Windom	17	69	86
Total	*128*	*167*	*295*
Massachusetts Avenue and Alley	1,114	847	1,961

Source: Gorove/Slade 2017.

Note: These is only the cross traffic. Additional traffic turned from Windom onto 48th Street and from Alley onto Yuma Street.

Thus, according to the figures produced by Gorove Slade (2017; 2018), the projected 2021 traffic in the alleyways would come close to current levels of traffic in the two main streets adjacent to the project site. The north-south alleyway is already highly congested with cars and trucks (figure 5), and even with the alleyway improvements this situation is likely to get much worse once the development is completed.

Figure 5. Current Traffic in the North South Alleyway

Source: Photo by Doug Barnes December, 2018.

Pedestrian Trips Caused by Development

The trips caused by the development are different than the entry and exits of the alleyways. For instance, one trip can cause two entries or exits from the site depending on the time of entry or exit. Because of the approximately 400 new people living in the structure and visits to the grocery store, the new building will create additional vehicle, walking and bicycling trips. The new trips that are modeled for the new building and grocery store total 378 during a peak PM hour (table 5 and figure 6). About 85% of these trips are attributed to vehicles by the traffic modeling completed by Gorove/Slade.

Table 5. Site Development Caused Trips per Hour during Peak Hours (4-6 PM)

	Vehicles or People per PM Peak Hour					
	Vehicle AM	Vehicle PM	Walk PM	Transit PM	Bike PM	Total PM
Grocery	55	197	32	0	8	237
Residential	100	125	5	8	3	141
Total	155	322	37	8	11	378
% of Total	n.a.	85%	10%	2%	3%	100%

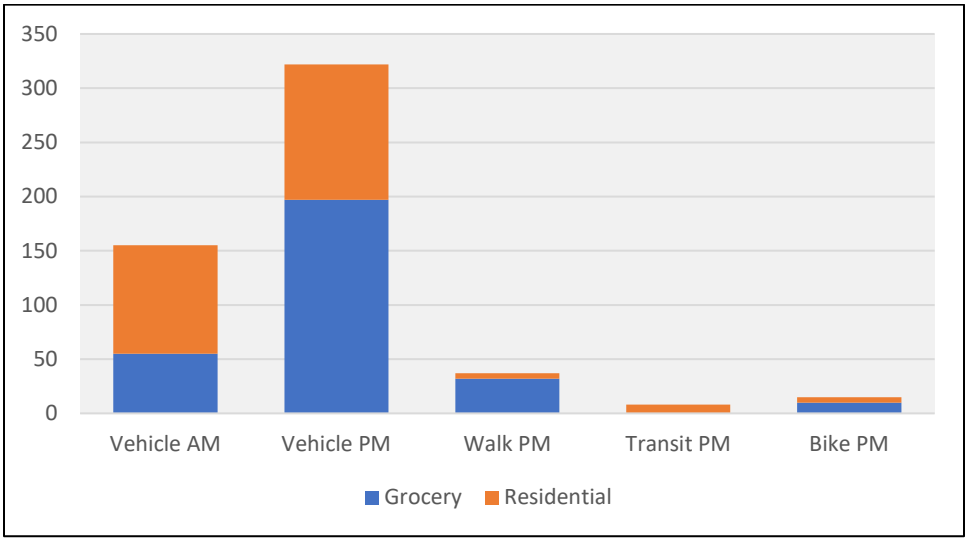
Source: Gorove/Slade 2018, pp. 15-16.

Note: These are updated figures produced by Gorove/Slade in November, 2018.

The number of pedestrian trips at only 5 per hour for the residential building during the period of 4-6 PM would appear to be underestimated. People walking to the nearby shopping centers on both sides of Massachusetts Avenue will generate significant pedestrian traffic from the new building. The stores in these shopping centers are attractive destinations. They include a CVS, Wagshal's Delicatessen (grocery, restaurant and butcher shop), Pan Quotidien Restaurant, Paradiso Pizzeria, Millie's restaurant, Compass Coffee and Crate and Barrel. Paradiso Pizzeria and Compass Coffee have been added since the transportation survey was conducted in 2016, and it is unlikely that they have been adequately included in the analysis. Millie's opened after the initial traffic survey was completed and it was acknowledged by Gorove/Slade that the background traffic from this restaurant was not accounted for in their 2016 survey. One low volume restaurant in Spring Valley Shopping Center has closed since the study was initiated and it will eventually be replaced by a new one that probably draws more foot traffic from the new building. Finally, the American University building was almost empty due to renovations at the time of the 2016 traffic survey.

The grocery store is rightly identified as a major source of trips for the new building (figure 6). Most of the trips to and from the grocery store are estimated to be completed by vehicle during both AM and PM peak hours. People generally will use cars to shop in the grocery store because of the difficulty in carrying medium or high volume of groceries any distance by foot or by bike. Nevertheless, some people will bike and walk to the new grocery store.

Figure 6 Additional Grocery and Residential Trips due to Project over 4 AM and PM Peak Midweek Hours



Source: Gorove/Slade 2018

With more than 400 residents in the new building, only 5 walking trips during a peak PM hour for new residents of the apartments seems quite low. There are some well know problems in estimating general trips that include vehicles and applying a percentage of those trips to pedestrians (ITE 2017; FHWA 2013) The nearby restaurants and stores are quite attractive destinations and the distances to them are quite walkable. The likely pedestrian pathways to the local retail restaurants and stores are explored in the next section.

Pedestrians Pathways to Spring Valley Shopping Center

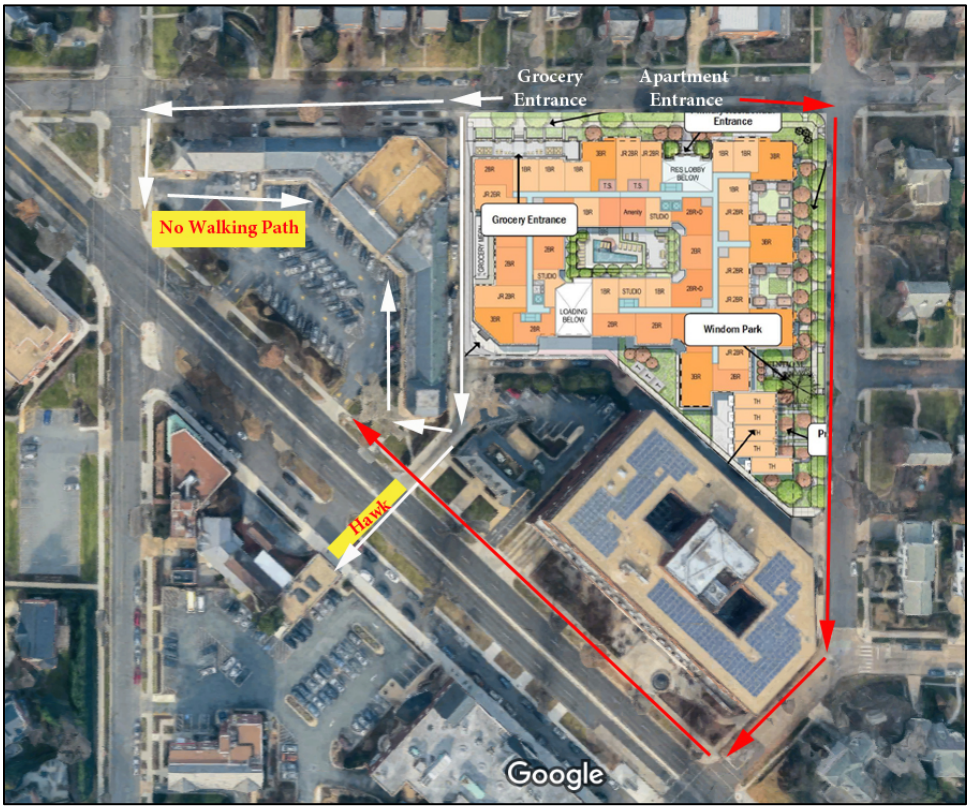
The main pathways to Spring Valley Shopping Center and the stores across Massachusetts Avenue will have significant interaction with vehicle traffic. Spring Valley Shopping Center and the stores across Massachusetts are desirable destinations for people in the new building and the neighborhood. The Spring Valley Shopping Center on the east side of Massachusetts Avenue contains a CVS Pharmacy, Wagshal's Market and other stores. Just adjacent to the shopping center is a PNC Bank. As indicated, the shopping area on the west side of Massachusetts Avenue has several restaurants including Pain Quotidien, Millies, Paradiso Pizza and Compas Coffee. The shopping area also has a Capital One Bank, a Bank of American and a Crate and Barrel.

Pedestrians from the new building and grocery store will have 3 main pathways to get to the store and shops in Spring Valley Shopping Center. The shortest pedestrian pathways to these desirable sites are fraught with traffic. Those leaving the main residential and grocery store entrance have three choices. One is a long circuitous path along 48th Street to Massachusetts Avenue (see red line in figure 7). This is the safest and least convenient route.

The two most convenient routes to the stores in the Spring Valley shopping center and across Massachusetts Avenue will be for pedestrians from the new building to turn left in the north-south alley or to continue on towards 49th street and turn left at that location to enter the shopping center (see white lines in figure 7). Both of these routes have their drawbacks. There may be additional somewhat circuitous paths that are through the garage or a small egress location in the building's southwest corner, bit these is not well document in the project documents.

According to Gorove/Slade (2018), pedestrians will encounter 117 vehicles per hour entering and exiting the alley on Yuma Street between the hours of 4 PM and 6 PM. They also will encounter 68 vehicles entering and exiting the alley intersection at Massachusetts Avenue. There is a possibility of a HAWK traffic light for pedestrians at the Massachusetts Avenue-alleyway intersection, making walking through the north-south alley even more attractive for pedestrians from the neighborhood, the residential building and the grocery store.

Figure 7. Building Pedestrian Pathways to Restaurants and Stores



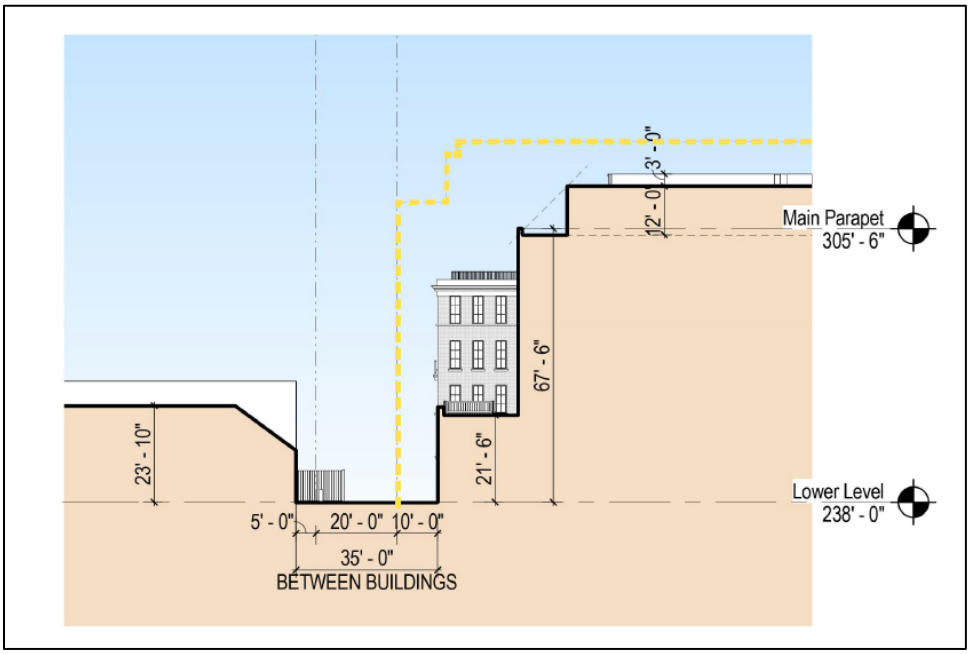
Source: Google Maps, 2018 and this paper.

Note: The red line will increase the walking distance by over 3 times compared to white routes. The HAWK signal will increase pedestrian use of the alley. See figure 9 for item labeled "no walking path" at the entrance of the Spring Valley Shopping Center near 49th street.

This north-south Alley will have a new 3 feet wide sidewalk, which is quite narrow, especially for those with handicaps. According to G/S (2018) "The 35 feet of the alley will include a 12-foot trash enclosure, a 20-foot drive-aisle, and a 3 foot delineated pedestrian path." The alley will have a vertical wall right along the sidewalk without much, if any, buffer (figure 8). There aren't many design manuals that address sidewalk design for alleys, but for streets a design course by FHWA (2013) makes the following points:

> A border area should be provided along streets for the safety of motorists and pedestrians as well as for aesthetic reasons. The border area between the roadway and the right-of-way line should be wide enough to serve several purposes, including provision of a buffer space between pedestrians and vehicular traffic, sidewalk space, snow storage, an area for placement of underground utilities, and an area for maintainable esthetic features such as grass or other landscaping… Sidewalks require a minimum width of 5.0 feet if set back from the curb or 6.0 feet if at the curb face. Any width less than this does not meet the minimum requirements for people with disabilities. (FHWA 2013).

Figure 8. Vertical configuration of the north-south alleyway in Valor renderings



Source: Valor Development/TortiGallas Urban 2018b. p. A31.

The widening of this alleyway also will mean greater car and truck speeds. The combination of higher speeds and a vertical wall hemming in pedestrians is an unsafe arrangement. In addition, this location will have many trucks due to the location of the trash facilities in the alleyway. Along the alley there will be no buffers or plantings to soften the effect of the vertical wall with faux windows. A better option than widening the alleyway might be to widen the sidewalk and

buffer zones by 7 feet. This would give pedestrians at least 10 feet to maneuver in case of a problem.

The pathway from the building's Yuma Street entrance to 49th Street will have better sidewalks. The sidewalks along 49th street are about 6 feet wide and they have a buffer on both sides. This is a tree-lined street. The problem with this path is that once pedestrians reach the Spring Valley Shopping Center, the intersection is quite congested with cars entering and exiting the commercial area at all times of the day. This has been a known intersection for car accidents. In addition, there are no pedestrian walkways into the shopping center from 49th Street (figure 9). The gas station has many parked vehicles along the face of the building waiting to enter the repair bays. They also back out of the garage creating a danger for people walking from 49th Street into the shopping center. At the gas station garage, pedestrians are forced into the path of the shopping center traffic.

The safest route to the shopping center unfortunately is one that will not be used very often by pedestrians. This is the route west along 48th Street towards Massachusetts Avenue. This route is about 3 times longer for reaching the shopping center than the other two pedestrian pathways. Even this route will traverse the busy alley entrance at 48th Street, which is the main vehicle entrance to the new building. The entrance to the residential garage, the grocery store and the townhouses are all located along this alleyway. The estimated number of vehicles entering and exiting the 48th Street Alley entrance is 174 or over 3 per minute. Thus, very few pedestrians will be tempted to walk west on 48th Street to reach the Spring Valley Shopping Center.

Figure 9. Walking Area into Spring Valley Shopping Center from 49th Street

Source: Photo by Doug Barnes

Note: Pedestrians have to mix with traffic coming from shopping center parking and deal with cars backing out of the gas station repair bays.

The design of the new building will add more than 400 new residents to the neighborhood along with more than 155 vehicle trips per hour for people using the grocery store during 4-6 PM.

Both of these populations along with people from the local neighborhoods will want to use the north-south Alley to reach the Spring Valley Shopping Center and the shops of the west side of Massachusetts Avenue. The new pedestrians using this alleyway are likely to encounter many cars and trucks. This will create conflicts and possible danger due increased traffic in the alleyways leading the shopping center.

Accidents in North-South Alleyway

The main areas around the site that have been subject to a significant number of accidents are the north-south alley and Yuma Street (table 6). The alleyway is somewhat narrow and is the location for loading and unloading trucks for Spring Valley Shopping Center and other nearby stores.

In the north-south alleyway there were 6 reported accidents between 2008 and 2014 and one of the accidents involved a major injury to a driver. This is a high number of incidents for an alleyway compared to the surrounding blocks, which mostly have no or at most 1 accident during a similar time period. This is probably caused by the cramped conditions in the alley and the number of trucks that enter and exit this back road. Yuma Street is quite busy, so it is not surprising that it is the location of 5 accidents between 2008 and 2016. By contrast, 48th Street carries less traffic and only witnessed 1 accident during the same period.

The high number of accidents in the alleyway will likely increase due to the increased traffic volumes in the alleyway caused by the development. In the Gorove/Slade Comprehensive Transportation Review(2017), the report indicates that trucks that now deliver along Yuma Street are going to be directed to enter the north-south alley for making their deliveries. This will make matters worse. Despite the widening of the alleyway, the narrowing of the space between the walls of the Spring Valley Shopping Center and the new building to 35 feet will make this area more cramped. As indicated previously, the widening of the alley also will increase the speed of vehicles, making accidents more likely. Into this mix of trucks and cars will come a greater number of pedestrians from the neighborhood, the grocery store and the residential building. They will be competing for space with cars and trucks.

The solution to the structural problem of having high levels of trucks, cars and pedestrians sharing the same alley space could be resolved in several different ways. The lowering of the density of the residential apartment would mean that there are fewer pedestrians and cars in the alleyway, which in turn reduces conflicts. The grocery store also will generate quite a bit of vehicle traffic in the alleyway. The grocery store could perhaps be replaced with less intensive retail stores or restaurants, making it an even more attractive walkway for pedestrians. Also, the alleyway could be kept at 15 feet. This would slow down traffic in the alley and make it safer for pedestrians.

Table 6. Accidents along the Perimeter of the Valor/Mill Creek Development Site, AU Park.

Date	Closest Building to Location	Injuries	Vehicles
North-South Alley between Mass. Ave. and Yuma Street			
May 25, 2012	4822 Yuma St NW	Major-Driver	2 Vehicles
September 1, 2008	4849 Massachusetts Ave NW	None	1 Vehicle
November 13, 2017	4851 Massachusetts Avenue NW	None	2 Vehicles
August 24, 2009	4845 Massachusetts Ave NW	None	1 Vehicle
December 30, 2014	4835 Massachusetts Avenue NW	None	1 Vehicle
January 17, 2012	4841 Massachusetts Avenue NW	None	2 Vehicles
Yuma Street Between 48th And 49th Street			
July 29, 2016	Yuma Street NW & 49th Street NW	None	1 Veh. 1 Bike
September 28, 2011	4861 Massachusetts Ave NW	Major-Driver	2 Vehicles
April 16, 2013	4855 Massachusetts Ave NW	Major-Driver	2 Vehicles
July 3, 2008	4820 Yuma Street, NW	None	1 Vehicle
November 7, 2011	4801 Yuma Street NW	Major-Drive	2 Vehicles
48th Street Between Yuma Street and AU Alleyway			
May 23, 2011	4300 Block 48th Street NW	None	2 Vehicles

Source: DDOT 2018a.

Note: This crash data These crash data are derived from the Metropolitan Police Department's (MPD) crash data management system (COBALT) and represent DDOT's attempt to summarize some of the most requested elements of the crash data. Thus, these figures are only for accidents reported to the police. There were no accidents reported in the east-west alleyway.

One way to activate the alleyway for pedestrians might be to combine a narrow alley with a row of retail stores and restaurants as replacements for the grocery store. The trucks and cars entering the alley also might be considered as guests, with clear markings that pedestrians have the right of way when using this alley space. Most of the truck and car traffic could be directed to the east-west alley, which is the entrance to the loading facilities and the parking garage.

A final option, could be widening the space by moving the building back about another 10 feet. This would enable the separation of pedestrians from the cars by means of a 7-foot-wide sidewalk with buffers on both sides to protect walkers from traffic. An arrangement similar, but of course not identical, was implemented at Whole Foods on Wisconsin Avenue (figure 10). Since 2008, there have been 3 accidents in this busy alleyway, with none involving pedestrians in the alley itself. In 2015, there was one accident on the sidewalk crossing the busy alleyway, and it involved major injuries to two pedestrians. By contrast, there were 6 accidents in the narrower alleyway directly adjacent to the Whole Foods and its parking lot.

In an alleyway behind 4600 Wisconsin Avenue that contains rear parking to a residential building and retail stores, a pedestrian was injured and there were 5 car accidents between 2010 and 2017. This alley contains much less traffic than the levels estimated at the Valor

development site. The safety of alleys that contain high traffic volumes combined with pedestrian activity is not an issue that should be ignored.

Figure 10. Whole Food Alley with 7 Feet Wide Sidewalk at Wisconsin Avenue.

Source: Photos by Doug Barnes December, 2018.

Note: The sidewalk is 7 feet wide with a railing separating pedestrians from traffic. The traffic markings keep cars back from pedestrians walking along sidewalks at Wisconsin Avenue and also provide a buffer for the sidewall and the railings on both sides of the alley.

Conclusion

Greater consideration should be given to pedestrians traffic in the design of the new building designed by Valor/Mill Creek for the SuperFresh site in American University Park. The developers actually started on the right track with a pedestrian walkway through the building site. Unfortunately, this option was discarded in the most recent version of the project renderings. Rather than eliminating the walkway completely, a better option would have been to enhance its design. This could be done by having the sidewalk end in a safer part of the alleyways surrounding the site. In addition, the development can be made more mobility friendly by improving the alleyway for pedestrians and/or decreasing amount of traffic generated by the site by reducing its size and density.

The proposed building design by Valor/Mill Creek does have several mobility assets, but the new building also has major liabilities. The assets include the bicycle storage and support for a Capital Bikeshare location. Bicycles will not have a difficult time navigating their way out of the alleys and into the streets. The investments in new sidewalks along the streets and intersection crossings will be pedestrian friendly. Finally, the HAWK signal if approved by DDOT, will assure safe crossing over Massachusetts Avenue. However, it should be noted that there are no pedestrian deaths or accidents along Massachusetts Avenue between Spring Valley Shopping Center and the shops in Spring Valley Village. Most pedestrians cross Massachusetts Avenue at the intersections of Fordham Avenue and 49th Street, both of which could be improved. In 2017 a pedestrian was injured at the intersection of Fordham and Massachusetts Avenue, which is an intersection with a relatively high number of accidents.

At present, the Valor/Mill Creek development does not have any plans to offer a shuttle service from the residential building to the Tenleytown Metro. The distance is approximately 1 mile, and some, but not many people, will walk or bicycle to get to the Metro Station. Buses do run along the Massachusetts Avenue corridor, and they provide a mass transit connection to downtown Washington, DC or Georgetown. There is no bus service to the Metro stop at Tenleytown. A bus does connect Massachusetts Avenue with Friendship Heights Metro. Still, the lack of easy access to the Metro subway will no doubt mean an increase in reliance on cars.

The major drawback in the design of the new building from a mobility point of view is that increased traffic along the alley perimeter of the building will be adverse for pedestrians. Due to the new project, the alleys will carry an increased volume of cars and trucks that is equal to the current "without project" traffic that is present along Yuma and 48th Street. Pedestrians will use the north-south alley to walk to the Spring Valley Shopping Center. If a new HAWK signal is installed, pedestrians will use the same north-south alley to get to the shops and restaurants in Spring Valley Village across Massachusetts Avenue. The 3 feet sidewalk along the north-south alley in the new design bumps up against a vertical wall and is inadequate for alleviating the pedestrian problems in this alleyway. The recommended minimum size of sidewalks by FHWA is 6 feet for those abutting buildings and at least 5 feet for those with a buffer between the sidewalk, the building and the street.

The increase population density due to the new building also will result in an increase in the car and truck traffic in the surrounding alleyways. This increase is due to the grocery store, the residential building and the locations of the entryways to the building. American University employees, students and visitors parking in American University reserved spots also will exit into the east-west alleyway in order to get to the American University Building. Because of the mixing of pedestrians, cars and trucks, the inevitable consequence will be both a decrease in their safety and even worse an avoidance of walking due to the pedestrian unfriendliness of the alleyways.

The plans to increase the size of alleys sounds like a good way to make the alleyway safer, but in reality, it will lead to an increase traffic speeds and put pedestrians at risk. This north-south alley already has proved to have be a problem area for accidents. With the increased car and truck traffic, the situation probably will become worse. Ways to slow down traffic might be the placement of barriers that vehicles need to negotiate, keeping the alleyway at its current narrow width or widening sidewalks and buffer zones. Another approach might be to make vehicles as guests in the alleyway with pedestrians having right of way. A review of ways to reduce pedestrian-motorists crashes concludes that slowing down vehicles, separation of pedestrians and modifications in signaling at intersections all have a significant impact on reducing pedestrian-vehicle accidents (Rett et al. 2003).

At 3 feet wide, the size of sidewalks in the north-south alley do not meet minimum standards of AASHTO or FHWA for city streets. Because this is an alleyway, these guidelines would not be mandatory. However, after the building is constructed the alleyways will carry traffic levels similar to the surrounding streets. This makes the alleys more like roadways, and for the greater

safety of pedestrians it would be good to follow the example of the Whole Foods at Tenley and widen the sidewalks to 7 feet.

Greater consideration should be given in the new building design to the pedestrians who will inevitably use the alleys to get to the shops and stores on both sides of Massachusetts Avenue. The alleys of Washington, DC vary widely in their use and function. Besides servicing buildings and homes, they also are used for walking by residents, for exercising dogs, for avoiding traffic on streets and for getting to and from commercial areas.

As mobility issues have become more important because of programs like Vision Zero and Complete Streets, greater attention needs to be paid to pedestrian issues in both project design and evaluation (Hess et al. 1999). Studies of the impact of new buildings on traffic are standard features for most projects that increase the density of those living or working in the new location. Comprehensive Traffic Review documents are produced by engineering firms which assess new trips surrounding the new building. The reviews often do a very good job for vehicular traffic, but for a variety of reasons they sometimes fall short in estimating trips by pedestrians (FHWA 2016). In order to achieve the lofty goals of the new mobility programs, greater attention needs to be paid to make projects such as the Valor SuperFresh development attractive to pedestrians, bicyclists and those using mass transit.

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Annex

Table A.1. Peak Hours and Minutes for Vehicle Volumes Going into and Out of Alleys

	Vehicles per Hour		Increase
48th Street Alley Intersection	Existing 2016	Future 2021	2016-21
From Alley Turning North	2	15	13
From Alley Turning South	12	87	75
Into Alley from North	4	18	14
Into Alley from South	5	54	49
Total	23	174	151
Total Vehicles per Minute	0.4	2.9	2.5
Yuma Street Alley Intersection			
From Alley Turning West	5	33	28
From Alley Turning East	7	20	13
Into Alley from West	3	19	16
Into Alley from East	4	45	41
Total	19	117	98
Total Vehicles per Minute	0.3	2.0	1.6
Mass. Avenue Alley Intersection			
From Alley Turning North	5	12	7
Into Alley from South	0	56	56
Total	5	68	63
Grand Total	47	359	312
Total Vehicle Enter and Exits per Min.	0.8	6.0	5.2

Source: Govove and Slade 2017.

Note: Existing 2016 are the results of the traffic survey. Gorove/Slade pp. 33-34. After is Future Volumes 2021, Gorove/Slade pp. 42-43; Before values are very similar to the background volumes 2021.

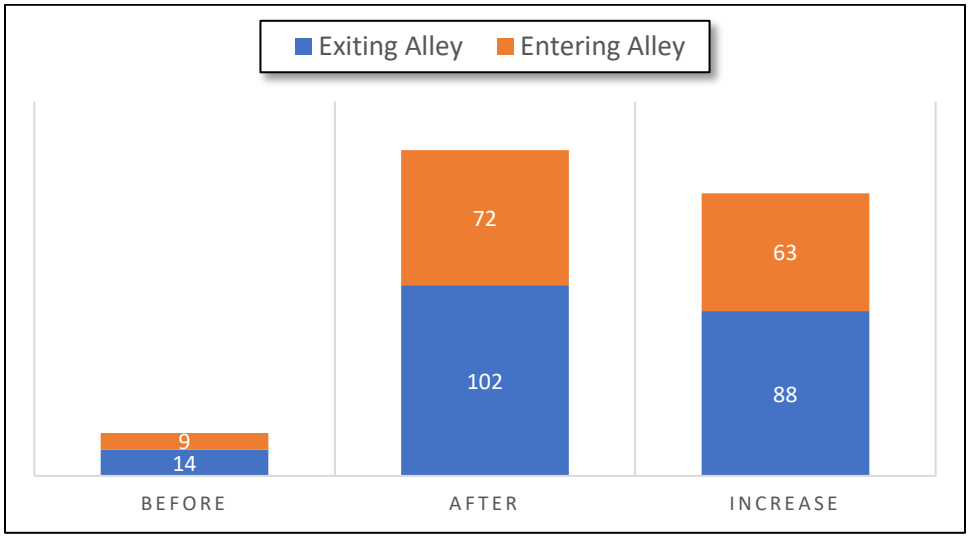
Table A.2. Vehicles and Others Trips Originating due to New Building for 2021

	Trips per PM Peak Hour	
Vehicles or People per PM hour	Gross Trips including Walking, Transit and Biking	Vehicle Trips
Apartment vehicle trips	135	122
Townhome vehicle trips	3	3
Grocery vehicle trips	219	197
Total	357	322

Source: Gorove/Slade 2018

Note: These are not the same as entrances and exits. They are actual vehicles trips. The values are similar, but not the same.

Figure A.1. The Vehicles per Hour Entering and Exiting 48th Street Alleyway due to Project, Peak PM



Source: Gorove/Slade 2017 and this paper

Note: Before is existing 2016 are the results of the traffic survey (Gorove/Slade 2017, pp. 33-34). After is Future Volumes 2021, (Gorove/Slade 2018, pp. 42-43; Before values are very similar to the background volumes 2021.