Transportation Impact Study

Wheeler Renaissance PUD

Washington, DC

April 8, 2014 (DRAFT)

GOROVE / SLADE

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EXECUTIVE SUMMARY

The following report is a Transportation Impact Study (TIS) for the Wheeler Renaissance PUD, Zoning Case 13-18. This report reviews the transportation aspects of the PUD (Planned Unit Development) application submitted on December 30, 2013, including the PUD plans and Statement of the Applicant. This report and evaluation are based on the December 30, 2013 and February 21, 2014 submittals and site plans.

The purpose of this study is to evaluate whether the PUD will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of two future conditions: one with the PUD constructed and one without. This report concludes that the PUD **will not have a detrimental impact** to the surrounding transportation network. These recommendations are summarized at the end of this executive summary and in detail in the body of the report.

The methodologies and analyses contained within are tailored to reach a conclusion on the impact of the PUD, and thus, this report is not a general neighborhood study that makes recommendations to solve all existing and predicted transportation concerns near the PUD. Although some discussions within this report do discuss non-PUD generated impacts.

Proposed PUD

The Wheeler Renaissance PUD is located along Wheeler Road in the Southeast quadrant of Washington, DC, in Ward 8. The proposed redevelopment is located in a primarily residential area of the District near the Maryland border with Prince George's County. The site is served by several arterials and collector roadways, as well as public transportation sources (primarily Metrobus). The PUD site area also features a robust pedestrian network and is served by the on- and off-street bicycle network.

The project site consists of Lots 0820 and 0821 in Square 5925. Lot 821 is currently improved with street-level retail, and Lot 820 is currently an unimproved vacant lot. The site includes approximately 32,104 square feet of land area and is located within the boundaries of Advisory Neighborhood Commission (ANC) 8E. The PUD and Zoning Map Amendment application proposes the development of a mixed-use project consisting of a six-story residential building with ground floor commercial retail facing Wheeler Road SE. The site is currently located in the C-1 Zone District. The Zoning Map amendment requests that the site be rezoned to the C-2-B District.

The PUD will include approximately 85 affordable residential units and 14,738 square feet of ground floor retail. The residential portion of the project will be 100 percent affordable housing, exceeding the District's Inclusionary Zoning requirements. The Applicant is requesting relief from the parking requirement to provide 25 on-site parking spaces and the loading requirement to provide a curbside loading zone. The proposed PUD includes a Transportation Demand Management Plan (TDM) plan that exceeds the DDOT expectations for TDM programs for projects of this size.

Impacts Review

The purpose of the impacts review is to determine if development of the site will lead to adverse impacts on the local transportation network by projecting future conditions with and without development of the site and performing analysis of intersection delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. The report describes what improvements to the transportation network are needed to mitigate adverse impacts.

Generally speaking, the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an unacceptable level of delay at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the future conditions without the proposed development. Based on the capacity analysis contained in this report, the PUD will not have a detrimental impact on the roadway capacity in the study area.

In addition to the roadway capacity, non-auto impacts were also examined. However, based on the availability of local bus service, the capacity of the sidewalks surrounding the site, and the quality of bicycle routes near the site, the PUD will not have a detrimental impact on the non-auto modes as well.

Although the PUD is requesting a parking variance to build only 25 spaces on-site, it is not anticipated to rely on on-street parking to serve its demand. Since there is a significant amount of available on-street parking, any on-street parking impacts would be limited, but may be concentrated on the blocks closest to the PUD.

1: INTRODUCTION

This report presents the findings of a Transportation Impact Study (TIS) performed for Wheeler Renaissance Planned Unit Development (PUD). The proposed PUD is located along Wheeler Road in Ward 8 of Southeast Washington, DC. The mixed-use development consists of a six-story residential building with ground-floor commercial retail, replacing the existing commercial retail uses located on-site.

The purpose of this report is to:

1. Review the transportation elements of the PUD, supplement the material provided in the site plans that accompanied the application, and demonstrate that the site conforms to the District Department of Transportation's (DDOT) general polices of promoting sustainability through the use of non-automobile modes of travel. The Design Review section of the report covers this topic.
2. Provide information on how the proposed redevelopment of the site may influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site on all major modes of travel and where these trips will be distributed on the network. The Impacts Review section of the report contains this analysis.
3. Determine if the proposed redevelopment of the site could lead to adverse impacts on the local transportation network. This is accomplished through using projections of future conditions with and without the proposed redevelopment of the site and performing analysis of pedestrian and vehicular delays. These delays are compared to the acceptable levels of delay set forth by DDOT standards to determine if the site will negatively impact the study area. The report describes what improvements to the transportation network are needed to mitigate any adverse impacts. The Impacts Review section of the report contains this analysis.

This report contains three sections as follows:

- *Introduction & Site Review*
  This section provides a summary of major transportation features near and adjacent to the Wheeler Renaissance PUD. This includes reviewing roadways, transit facilities, bicycle facilities, future developments, and District initiatives. This section contains information on the site to help establish a reference for the sections that follow.
- *Design Review*
  This section provides a summary of the internal transportation features of the PUD. This section is meant to supplement the details provided in the site plan package contained in the Master Plan application. This section reviews such items as the general parking strategy and the plan for accommodating bicycles throughout the site.
- *Impacts Review*
  This section provides a review of the possible impacts that redevelopment of the site could have to each mode within the transportation network. For each mode, and where necessary, a list of recommendations and mitigation measures are compiled.

1.1 Site Location and Major Transportation Features

The Wheeler Renaissance PUD is located along Wheeler Road in the Southeast quadrant of Washington, DC, in Ward 8. The proposed redevelopment is located in a primarily residential area of the District near the Maryland border with Prince George's County. The overall site area, as shown in Figure 1, is bounded by Wheeler Road SE on the east, Barnaby Street SE

on the south, and a private alley on the west and north. The site is served by several arterials, including Wheeler Road SE, Southern Avenue SE, Barnaby Street SE, and Atlantic Street SE. Major collector roadways include Mississippi Avenue SE, 6th Street SE, and 4th Street SE. The site is also served by public transportation sources, primarily Metrobus.

The PUD site area also features a pedestrian network consisting of sidewalks and crosswalks along the local streets surrounding the project site. In addition to pedestrian accommodations, the site is served by the on- and off-street bicycle network, which consists of signed bicycle routes along local roadways, as well as the Oxon Run Trail located north of the site.

1.2 Roadways

As stated previously, the site is accessible via arterial, collector, and local roadways. Figure 2 shows the roadway network hierarchy and Figure 3 shows the average annual daily traffic volumes for the roadways in the vicinity of the proposed redevelopment. The immediate study area of the proposed redevelopment has several key local access roads. These include the following:

- *Wheeler Road SE*
  Wheeler Road is a four-lane north-south secondary arterial that borders the eastern edge of the site. It has an average daily traffic volume of 13,700 vehicles per day.

- *Southern Avenue SE*
  Southern Avenue is a four-lane east-west secondary arterial located south of the site. It has an average daily traffic volume of 15,300 vehicles per day.

- *Barnaby Street SE*
  Barnaby Street is a two-lane east-west secondary arterial that borders the southern edge of the site. It has an average daily traffic volume of 2,800 vehicles per day.

- *Atlantic Street SE*
  Atlantic Street is a two-lane east-west secondary arterial located south of the site. It has an average daily traffic volume of 5,600 vehicles per day.

- *Mississippi Avenue SE*
  Mississippi Avenue is a four-lane east-west collector roadway located north of the site. It has an average daily traffic volume of 5,900 vehicles per day.

- *6th Street SE*
  Sixth Street is a two-lane north-south collector roadway located south of the site. It has an average daily traffic volume of 1,700 vehicles per day.

- *4th Street SE*
  Fourth Street is a two-lane north-south collector roadway located south of the site. No daily traffic information is available.

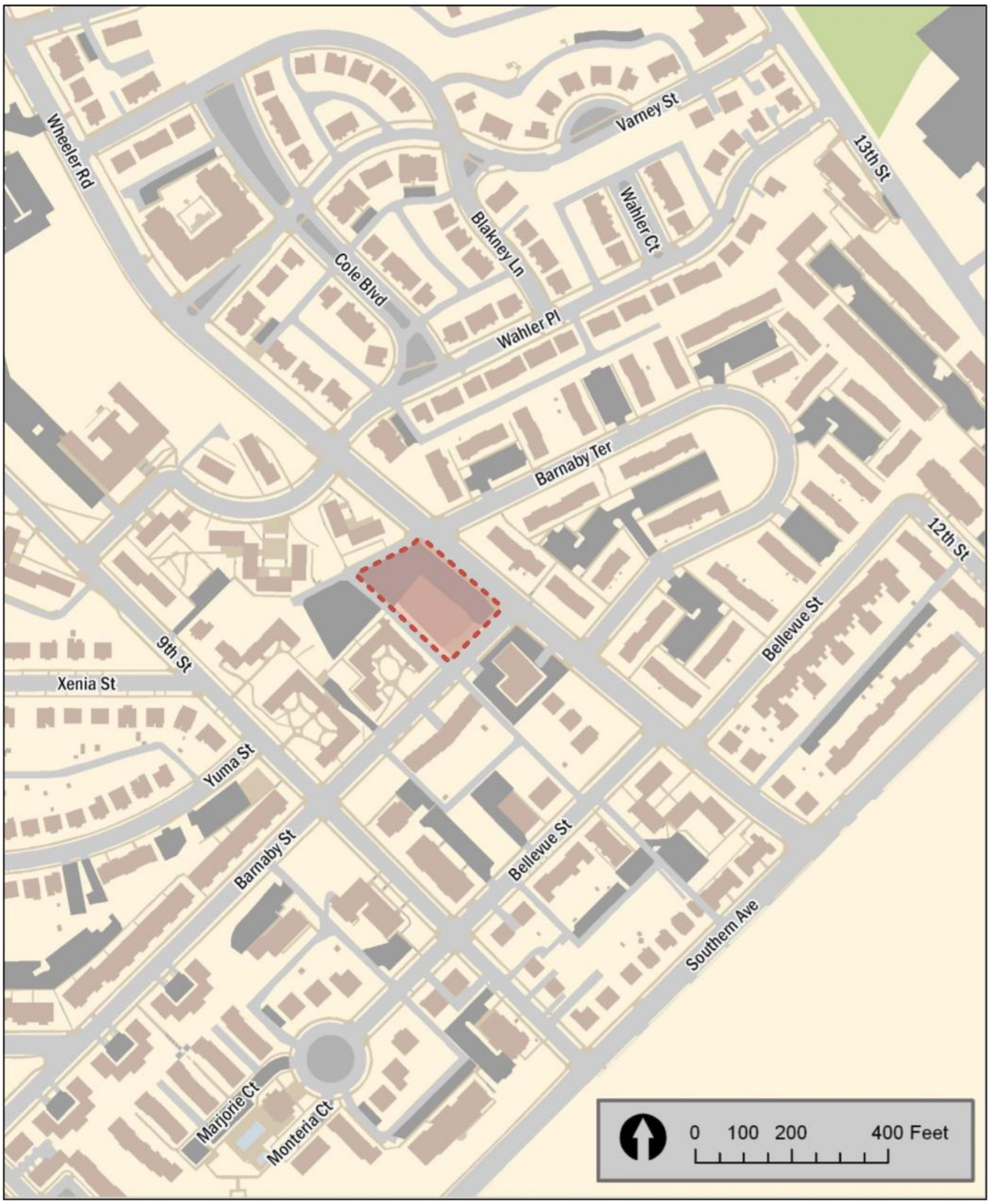

Figure 1: Site Location

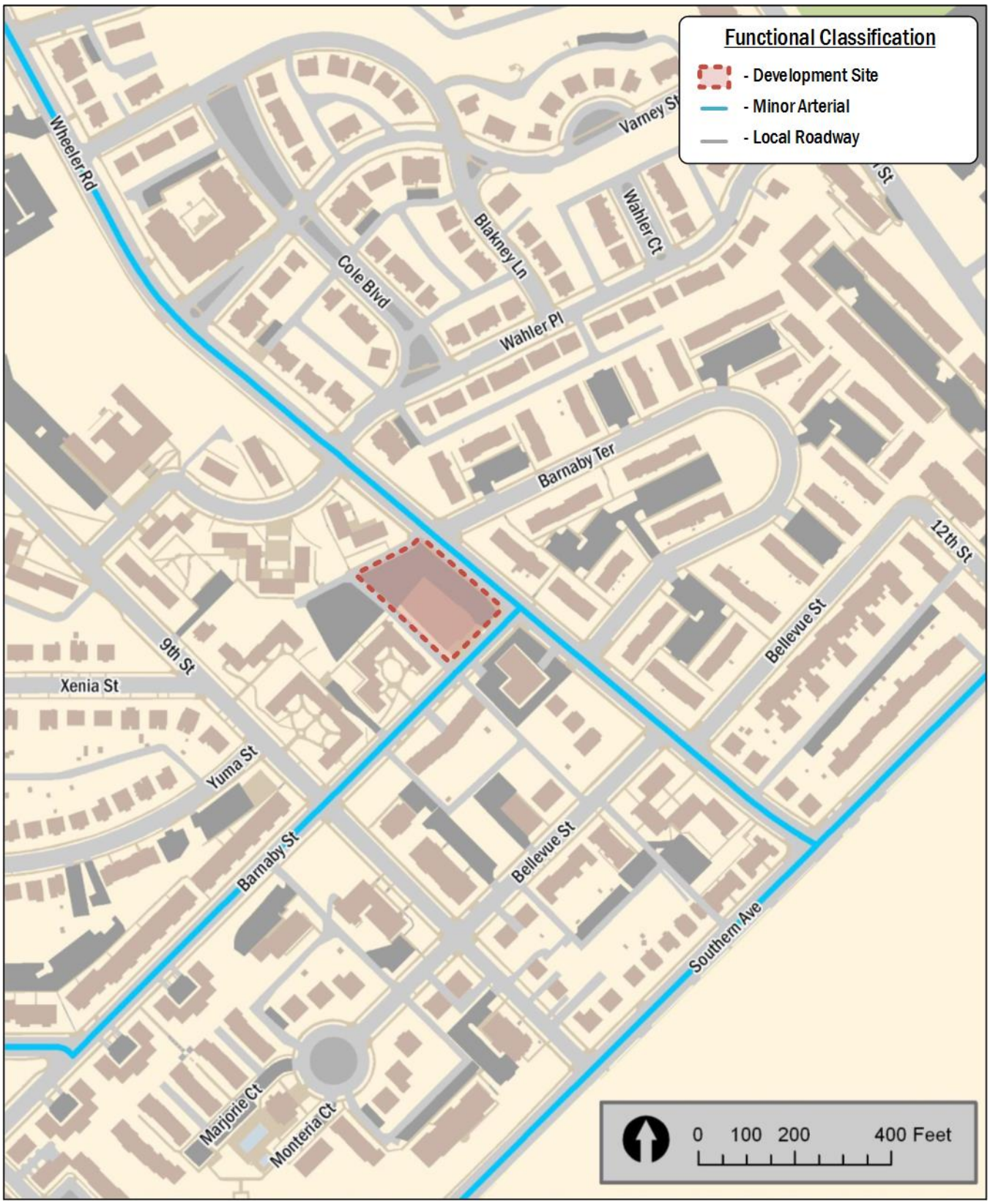

Figure 2: Roadway Network Hierarchy

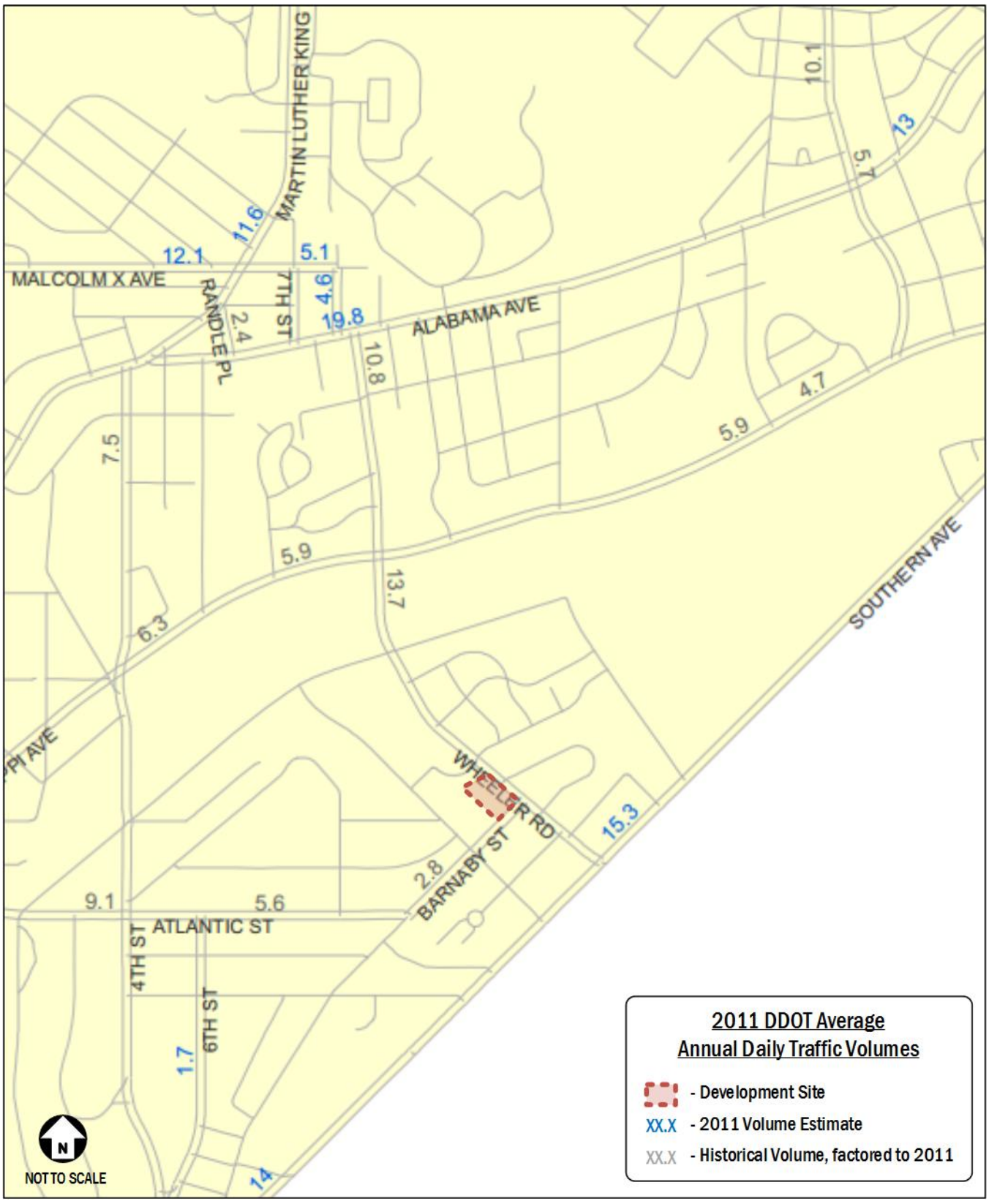

Figure 3: Average Annual Traffic Volumes

- *9th Street SE*
  Ninth Street is a two-lane north-south local roadway located west of the site. No daily traffic information is available.

- *Wahler Place SE*
  Wahler Place is a two-lane east-west local roadway located north of the site. No daily traffic information is available.

- *Varney Street SE*
  Fourth Street is a two-lane east-west local roadway located north of the site. No daily traffic information is available.

No major infrastructure projects are located within the study area.

1.3 Car-Sharing

Four car-sharing companies provide service in the District: Zipcar, Hertz 24/7, Enterprise Carshare, and Car2Go. All four services are private companies that provide registered users access to a variety of automobiles. Currently there are no Zipcar, Hertz 24/7, or Enterprise Carshare vehicles located within a half mile radius of the site. However, car-sharing is also provided by Car2Go, which provides point-to-point car sharing. Unlike Zipcar, Enterprise, or Hertz, which require round trips, Car2Go can be used for one-way rentals. Car2Go currently has a fleet of vehicles located throughout the District. Car2Go vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit (RPP) location in any zone throughout the defined "Home Area". Members do not have to pay the meters or pay stations. Car2Go does not have permanent designated spaces for their vehicles; however availability is tracked through their website, which provides an additional option for car-sharing patrons.

1.4 Transit Service

The study area is served primarily by local bus service, although Metrorail service is also available near the site. These transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 4 identifies the major transit routes, stations, and stops in the study area.

1.4.1 Metrobus

Metrobus routes within a quarter-mile of the site include the A2/6/7/8/42/46/48 line, the D 12/13/14 line, the P12 line, the W15 line, the NH1/3 line, the M8/9 line, and the W2/3 line. Additional bus service is provided along Route 35 and along Route 33 by the Prince George's County TheBus. Bus stops with shelters provide rider amenities, such as protection from elements, benches, route maps, and schedules, while those without shelters are designated by a WMATA bus stop sign and do not have additional amenities. Bus stops are located along streets adjacent to the site, including Wheeler Road SE, Barnaby Street SE, and other streets within two or three blocks walking distance. Table 1 shows a summary of the bus route information for the lines that serve the site, including service hours, headways, and average weekday ridership.

Figure 4: Existing Transit Service

Table 1: Existing Bus Routes

Route Number	Route Name	Service Hours	Average Peak Hour Headway	Average Off-Peak Headway	Average Weekday Ridership^
*WMATA**					
A2, 6, 7, 8, 42, 46, 48	Anacostia-Congress Heights Line	24-hours	15 minutes	30 minutes	11,440
D12, 13, 14	Oxon Hill-Suitland Line	Weekday: 4:00 AM – 1:00 AM Saturday: 6:00 AM – 12:00 AM Sunday: 8:00 AM – 8:00 PM	20 minutes	60 minutes	Unknown
M8, 9[1]	Congress Heights Shuttle Line	Weekday clockwise route: 6:00 AM – 8:30 PM Weekday counterclockwise route: 6:00 AM – 9:00 AM, 4:00 PM – 7:30 PM	20 minutes:	25 minutes	863
NH1, 3	National Harbor Line	6:00 AM -1:00 AM	30 minutes	30 minutes	Unknown
P12	Eastover-Addison Road Line	Weekday: 5:00 AM – 1:00 AM Weekend: 6:00 AM – 12:00 AM	20 minutes	20-30 minutes	Unknown
W2, 3	United Medical Center-Anacostia Line	Weekday: 5:30 AM – 3:00 AM Saturday: 6:00 AM – 2:00 AM Sunday: 6:30 AM – 1:00 AM	10-20 minutes	30 minutes	2,529
W15	Camp Springs-Indian Head Highway Line	Weekday northbound: 5:30 AM – 9:30 AM Weekday southbound: 4:00 PM – 7:00 PM	20 minutes	N/A	Unknown
TheBus~					
33	Rogers Avenue Metro Station to Moravia	Weekday: 6:00 AM – 8:00 PM	40 minutes	40 minutes	Unknown
35	National Harbor/Southern Avenue Metrorail/National Harbor/Gaylord Hotel	Weekday: 6:00 AM – 7:30 AM, 3:30 PM – 5:00 PM	N/A	60 minutes	Unknown

** - WMATA route information obtained from: http://wmata.com/bus/timetables*

~ - TheBus route information obtained from: http://mdtrip.org/ProviderSchedulesMaps/User/17.aspx

^ - For WMATA routes, average weekday ridership obtained from: http://www.wmata.com/pdfs/planning/FY12_Bus_Ridership_By_Line.pdf

Approximately ten bus stops are located within a block of the site, as shown on Figure 5; these ten stops will be the most-likely used stops by residents, visitors, and retail customers of the PUD. Table 2 shows a summary of the design and amenities provided at each of these bus stops.

Table 2: Existing Bus Stop Evaluation

Bus Stop	Service Provided	Design and Amenities							
		Bus Sign	*Landing Area**	*Curb Ramps^*	*Shelter*	*Bench*	*Trash Can*	*Bus Map & Schedule*	*Wayfinding*
1	A6/7/46 M8	Yes	Yes	Missing curb ramp at northern crosswalk at Wheeler Rd & Barnaby St	No	No	Yes	Post-mounted	No
2	A6/7/46 M9	Yes	Only 7' deep		No	No	Yes	No	No
3	A2/42 M8	Yes	Yes	Missing curb ramp at northern crosswalk at Wheeler Rd & Barnaby St	No	No	Yes	No	No
4	A2/42 M9	Yes	Blocked by 4' grass buffer		No	No	Yes	No	No
5	A2/6/7/42/46	Yes	Yes	Yes	No	No	Yes	Post-mounted	No
6	A2/6/7/42/46	Yes	Yes		No	No	Yes	No	No

[1] As noted in a WMATA press release dated March 20, 2014, the M8/9 route will be eliminated and replaced by a new W1 route as of March 30, 2014. Route W1 will serve provide improved connections between Fort Drum, The Shops at Park Village (Giant Food), THEARC, Southeast Tennis and Learning Center, Congress Heights Station and Southern Avenue Station, partially replacing Route M8/9 service. Route W1 will operate weekdays between 5:45 A< and 8:15 PM. (http://www.wmata.com/about_metro/news/PressReleaseDetail.cfm?ReleaseID=5694)

Bus Stop	Service Provided	Design and Amenities							
		Bus Sign	*Landing Area**	*Curb Ramps^*	*Shelter*	*Bench*	*Trash Can*	*Bus Map & Schedule*	*Wayfinding*
7	A2/42 M8	Yes	Yes	Yes	No	No	Yes	No	No
8	A2/42 M9	Yes	Partially blocked by 4' brick buffer		No	No	Yes	Post-mounted	No
9	A6/7/46	Yes	Yes	Curb ramp on southeast side of intersection provides only 1 ramp for 2 crosswalks	No	No	Yes	Post-mounted	No
10	A6/7/46 M8/9	Yes	Yes		Yes	Yes	Yes	Yes	Yes

** - Minimum dimensions defined as at least 5' parallel to street and at least 8' perpendicular to the street, provided minimum dimensions to allow a customer in a wheelchair to board and alight per ADA standards*
^ Installed at corners or intersections adjacent to bus stop location and designed to conform to ADA standards

1.4.2 Metrorail

Two Metrorail stations are located near the proposed PUD: Congress Heights and Southern Avenue. Both stations are located approximately one mile from the site and provide access to the Green Line. The two stations connect the site to downtown DC, as well as the Suitland and Camp Springs neighborhoods of Prince George's County, Maryland. Trains at these two stations run approximately every 6 minutes during the morning and afternoon peak hours, every 12 minutes during the weekday mid-day and evening hours, and every 20 minutes on weekends.

The site is connected to the Congress Heights Metrorail Station, which has nine bus bays, primarily by the M8/9 bus line, as well as the W2/3 bus lines. On foot, the station is approximately a 20-minute walk from the site. The station provides 67 short-term metered parking spaces but no daily parking. Additionally, 10 bike racks and 12 bike lockers are located at the station, as well as three Zipcar vehicles.

The site is connected to the Southern Avenue Metrorail Station, which has 10 bus bays, primarily by the A2/42 bus line, as well as the D12/13/14, P12, and W2 WMATA lines and the Route 33 and 35 TheBus lines. On foot, the station is approximately a 20-minute walk from the site. The station provides 46 short-term metered parking spaces, 1,900 all-day parking spaces (from 10:30 AM to system closing, with reserved spaces available for an additional fee), and 200 12-hour parking spaces (from 5:00 AM to 2:00 AM). Additionally, 14 bike racks and 40 bike lockers are located at the station, as well as four Zipcar vehicles.

1.4.3 Future Transit Service

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

The streetcar system element of the plan, as shown on Figure 6, includes three routes that terminate at the Congress Heights Metrorail Station. As stated previously, the Congress Heights station is located approximately one mile from the PUD. The streetcar system will consist of modern low-floor vehicles that operate on surface tracks embedded in the roadways, which will mostly operate in travel lanes that are shared with automobiles. Stops will generally be located every ¼- to ½-mile along the routes. The future planned routes serving the study area will connect the site to several areas in the

District including Anacostia, Buzzard Point, Southwest Waterfront, Navy Yard, Barracks Row, H Street, and Downtown. These routes are included in Phase 2 and Phase 3 of the system plan.

The Metro Extra limited-stop bus service element of the plan, as shown on Figure 7, includes one new route that travels near the site along Martin Luther King Jr. Avenue and South Capitol Street SE. The new limited-stop bus service will consist of high-frequency buses using specially marked vehicles, operated by WMATA, which will supplement the four existing Metro Extra routes that operate along Georgia Avenue, 16th Street, Wisconsin Avenue, and Pennsylvania Avenue. Stops will generally be located every ¼- to ½-mile along the routes. The Metro Extra bus services will also include traffic signal priority and real-time Next Bus arrival displays. The future planned corridor near the site will connect to the new Department of Homeland Security headquarters camps and Historic Anacostia. .

1.5 Bicycle Facilities

1.5.1 Existing Bicycle Facilities

Within the study area, bicyclists primarily travel on local streets and sidewalks. The bicycle network generally provides fair conditions for local trips. The site is also served by the Oxon Run Trail, which connects Oxon Run Park north of the site to the Oxon Cove south of the site. Figure 8 illustrates the bicycle facilities in the study area and identifies street corridors with poor cycling conditions and the specific locations where there are barriers to cycling. No bicycle activity was observed in the study area during the periods of data collection on Tuesday, February 11, 2014.

There are a few major barriers in the study area that limit the mobility and accessibility of bicyclists in the study area. Notably, connections west of the site are limited due to the Potomac River, Bolling Air Force Base, and I-295. North of the site, grade changes and heavy traffic volumes along I-295 and Suitland Parkway reduce the attractiveness of cycling. As stated above, the site is served by the Oxon Run Trail. However, the trail provides limited connectivity in the study area as it is only partially constructed.

1.5.2 District Department of Transportation Bicycle Master Plan

The *District of Columbia Bicycle Master Plan* (*DC Bicycle Master Plan*) was completed in 2005 by DDOT with guidance and support provided by the District of Columbia Bicycle Advisory Council. The plan recognized that the use of bicycles for transportation and recreation is increasing within the District and that the high-density land use development patterns can support higher levels of bicycle transportation. The plan identified several barriers to increased cycling, including busy arterial roadways with high-speed traffic, no visible bike facilities on most roadways, complex intersections with vehicles turning in many directions, freeway ramp crossings, poor access to bridge sidewalks, and limited awareness of potential bicycle opportunities among residents and visitors.

Some of these issues are barriers to cycling in the study area. To improve facilities the plan recommended that DDOT improve and expand the bike route system, provide bike facilities on roadways, complete ongoing trail development and improvement projects, improve bridge access for bicyclists, provide bicycle parking in public space.

The *DC Bicycle Master Plan* from April 2005 calls for expanding bicycle infrastructure for the roadways in the vicinity of the proposed development. This includes improving the existing Oxon Run Trail, as well as constructing on-street bike lanes and additional multi-use trails in the study area. These proposed facilities will significantly improve bicycling conditions in the study area and may lead to higher rates of cycling. Figure 9 shows the proposed future bicycle conditions in the study area.

Figure 5: Existing Bus Stops near Site

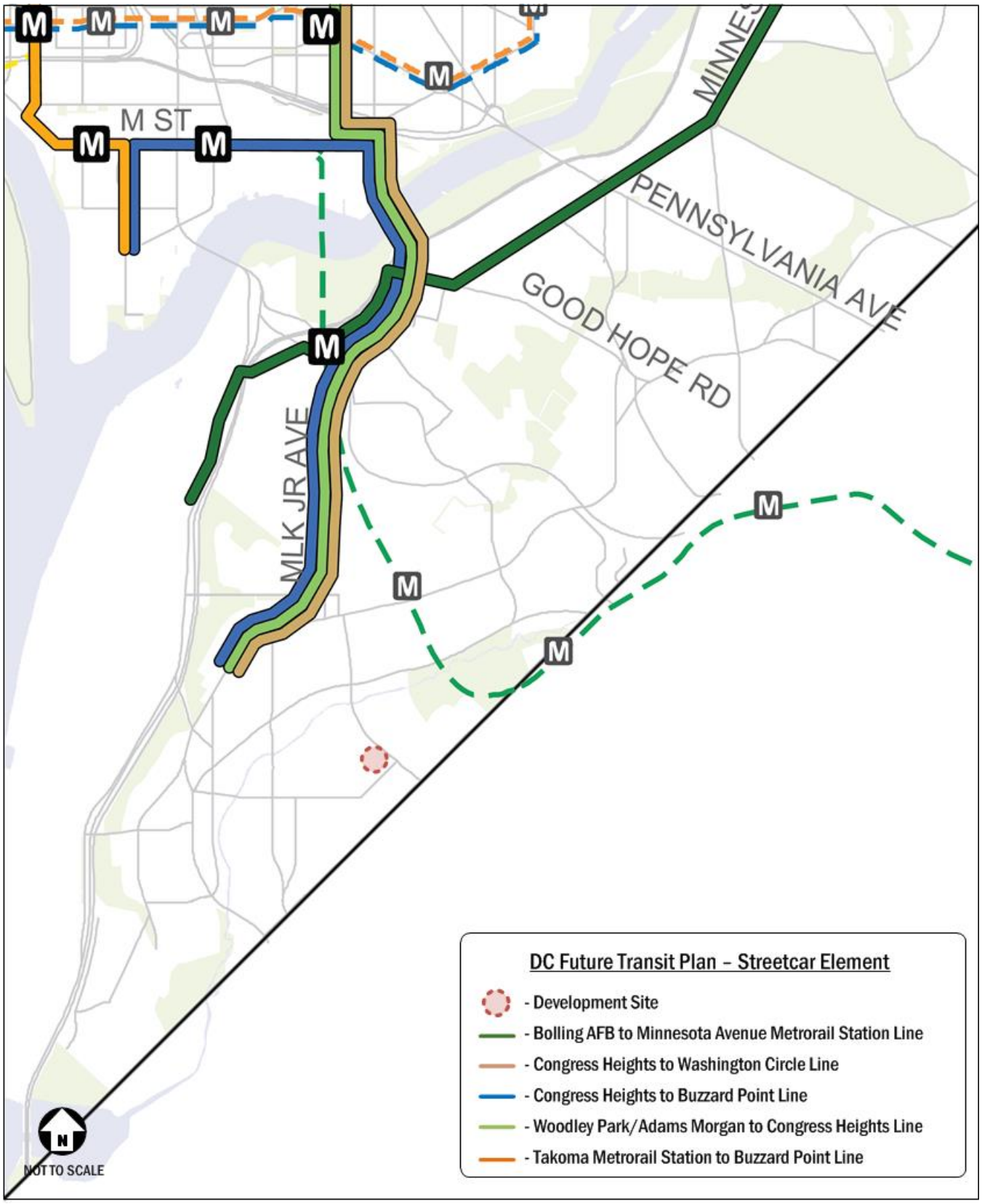

Figure 6: DC Transit Future System Plan – Streetcar System Element

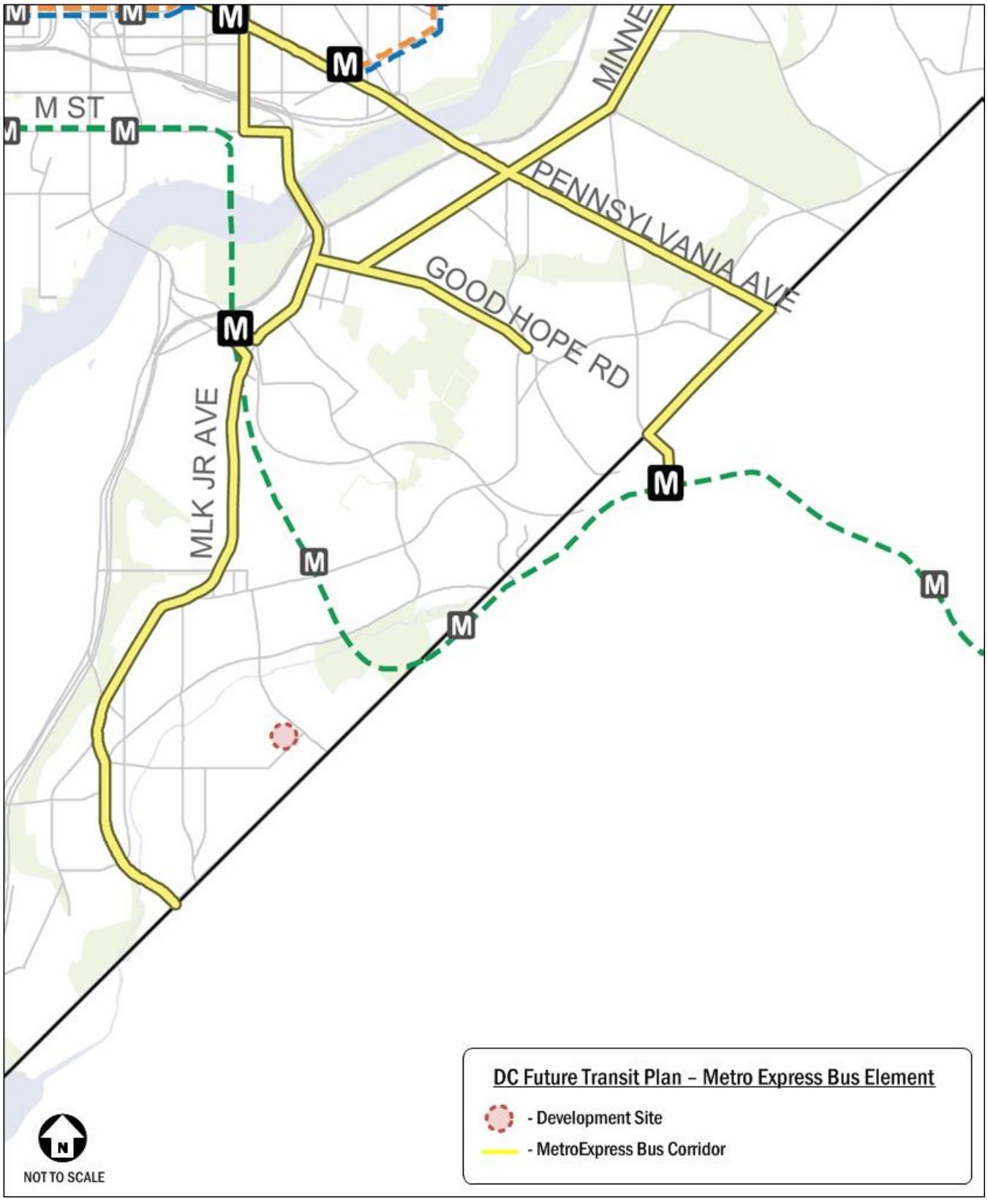

Figure 7: DC Transit Future System Plan – Metro Extra System Element

Figure 8: Existing Bicycle Facilities

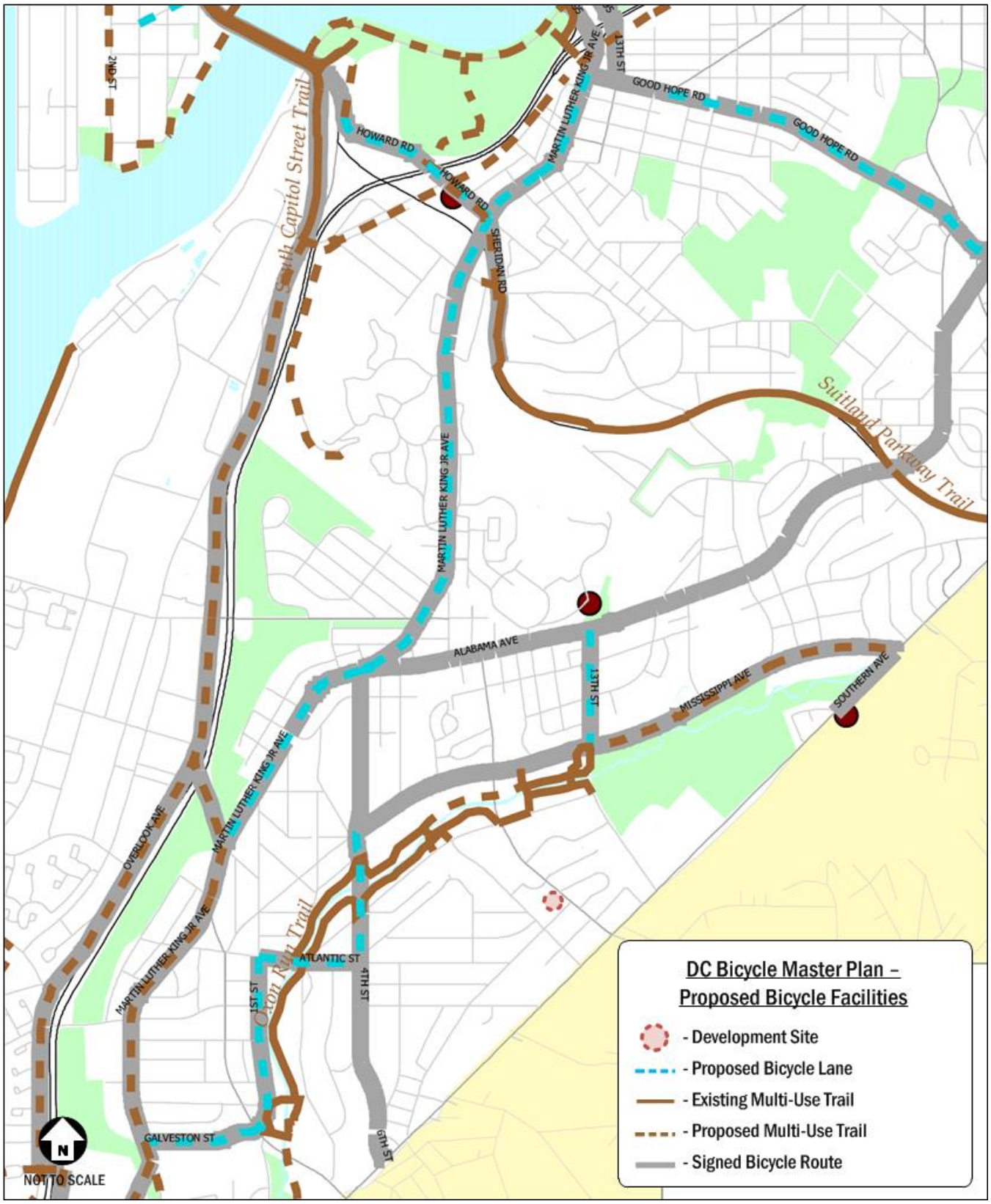

Figure 9: DC Bicycle Master Plan

1.5.3 Capital Bikeshare

Capital Bikeshare was launched in late September 2010 to replace the DC SmartBike program. This program has placed over 300 bicycle-share stations across Washington, DC; Arlington and Alexandria, VA; and Montgomery County, MD with over 2,500 bicycles provided. Currently, no Capital Bikeshare stations have been placed in the immediate study area. Two existing Bikeshare stations are located approximately one-mile from the site. However, the system is continually expanding so additional stations may be installed in the study are in the future.

1.6 Pedestrian Facilities

1.6.1 Existing Pedestrian Facilities

Overall, the pedestrian facilities within the study area provide a good walking environment, and pedestrian access to the site is provided along all adjacent streets. Most pedestrians accessing the site arrive from adjacent residential neighborhoods or from bus stops along Wheeler Road and Barnaby Street. Nearly all streets in the study area have adequate sidewalks, curb ramps, and planted buffers between sidewalks and the curb. Additionally, the local and neighborhood streets allow on-street parking, which provides an additional buffer between pedestrians and moving vehicles. Figure 10 shows the existing pedestrian facilities in the vicinity of PUD, and Figure 11 shows the weekday peak hour pedestrian volumes collected on Tuesday, February 11, 2014.

Along the site perimeter, most roadways have sidewalks on both sides of the street. Most other streets within the study area have sidewalks along both sides of the street, with some gaps. Routes between the site and the adjacent bus stops have good walking conditions with sidewalks provided along both sides of the street. Good walking conditions are also provided between the site and the nearby Metrorail stations (Congress Heights and Southern Avenue).

The Congress Heights and Southern Avenue stations are located almost equidistant from the PUD, at approximately one mile from the site. This measurement reflects the shortest walk distance along study area sidewalks. Based on the walking speed of 4 feet per second for a typical individual, this distance could be covered in approximately 22 minutes. However, daily commuters will likely cover this distance in a shorter time period. As a rule of thumb, ideal walking distance to a heavy rail station is typically less than one-half mile. This is based on the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) guidelines and rating system.

The bus stops located along Wheeler Road and Barnaby Street provide local service between the study area, the nearby Metrorail stations, and other destinations in the District and in Prince George's County, Maryland. Pedestrians access these bus stops along the local pedestrian network that borders the site and within the residential neighborhoods located adjacent to the site.

1.6.2 District Department of Transportation Pedestrian Master Plan

The *District of Columbia Pedestrian Master Plan* was completed in 2009 by DDOT with guidance and support provided by a Technical Advisory Committee. The Pedestrian Master Plan established two primary goals: 1) to reduce the number of pedestrians killed and injured in crashes with motor vehicles; and 2) to increase pedestrian activity by making walking a comfortable and accessible mode of travel.

A plan survey found that the most commonly cited reasons for walking were to access transit (Metro station or bus stop), go to work, and go shopping/run errands. The most common reasons cited for feeling unsafe or uncomfortable crossing

specific roadways were the need for traffic lights to stop cars so pedestrians can cross, not enough time to cross the street, no crosswalks, crossing distance that are too long, missing or poorly maintained sidewalks, traffic volumes, and traffic congestion. Some of these reasons cited in the Pedestrian Master Plan may impact pedestrian activity within the study area.

The Pedestrian Master Plan also stated that pedestrian safety is a major issue in the District. This document identified the intersections of Wheeler Road SE with Mississippi Avenue SE and of Chesapeake Street SE with Southern Avenue SE as high-accident locations that would require the future implementation of safety measures to address existing conditions. The plan established three objectives for increasing walking and improving safety:

- Objective 1: Provide accessible, safe, and well-maintained pedestrian facilities along and across all streets.
- Objective 2: Institute policies and practices to ensure that every street in the District meets the needs of pedestrians of all abilities.
- Objective 3: Establish education, enforcement, and encouragement programs that support pedestrian travel.

In the study area, applying these objectives would consist of installing missing sidewalks, improving the condition of poor sidewalks, providing adequate crossings facilities at all intersections, promoting walking among residents and commuters, and enforcing traffic regulations that reduce pedestrian comfort and safety, such as speeding.

Figure 10: Existing Pedestrian Facilities

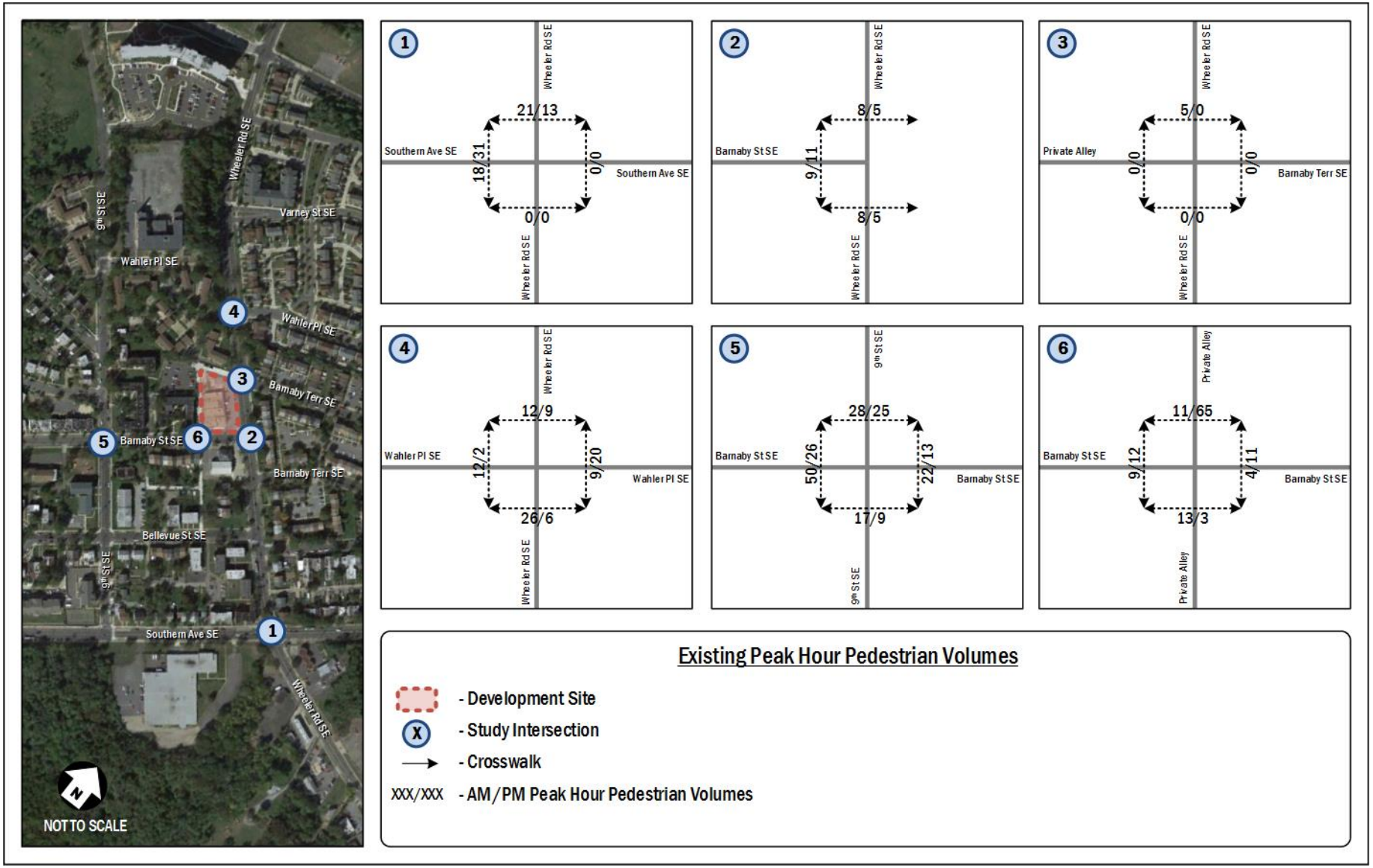

Figure 11: Existing Pedestrian Volumes

2: DESIGN REVIEW

This report section provides an overview of the on-site transportation features of the proposed Wheeler Renaissance PUD. It supplements the information provided in the site plans package that accompanied the Zoning Application, which includes several illustrations of site circulation and layout.

2.1 Site Development Program

2.1.1 Existing Site Plan

The project site consists of Lots 0820 and 0821 in Square 5925. Lot 821 is currently improved with a barber shop, sandwich shop, convenience store, liquor store, and cell phone retailer along Wheeler Road, SE. Lot 820 is currently an unimproved vacant lot. The site includes approximately 32,104 square feet of land area and is located within the boundaries of Advisory Neighborhood Commission (ANC) 8E.

The existing commercial use currently has two curb cuts along the site boundary: one along Wheeler Road SE and one along Barnaby Street SE. No on-street parking is provided along the border of the site, although on-street parking is available in the surrounding neighborhoods. Figure 12 identifies the existing curb cuts and on-street parking surrounding the site

2.1.2 Proposed PUD

The PUD and Zoning Map Amendment application proposes the development of a mixed-use project consisting of a six-story residential building with ground floor commercial retail facing Wheeler Road SE. The site is currently located in the C-1 Zone District. The Zoning Map amendment requests that the site be rezoned to the C-2-B District.

Construction of the site will occur in two phases. Phase I, which will consist of constructing three commercial bays on what is currently the vacant lot, is intended to begin construction in 2014 and will house the commercial tenants currently occupying the site. Phase II of development will consist of demolition of the existing commercial structure, once existing tenants are relocated into the newly constructed Phase I portion of the project, and construction of the residential building and first floor retail. Phase II of the development is estimated to take approximately 18 to 24 months and is projected to be completed in late 2016.

The PUD will include approximately 85 affordable residential units and 14,279 square feet of ground floor retail. The residential portion of the project will be 100 percent affordable housing, exceeding the District's Inclusionary Zoning requirements. Figure 13 provides an overview of the project's development program, and Figure 14 shows the site access plan. Table 3 shows a summary of the development plan and compares the design of the PUD to the matter of right and PUD guidelines for a project built in a C-2-B District.

Table 3: Summary and Comparison of Development Plan

Requirement	C-2-B Matter of Right	C-2-B PUD Guidelines	Wheeler Renaissance PUD Provided
FAR	3.5 (1.5 Commercial)	6.0 (2.0 Commercial)	3.46 (0.4 Commercial)
GFA	112,364 SF Total (48,256 SF Commercial)	194,406 SF Total (64,208 SF Commercial)	111,079 SF Total (14,279 SF Commercial)
Building Height	65 feet	90 feet	68 feet
Lot Occupancy	100% (80% Residential)	100% (90% Residential)	67.5 % Commercial (Floor 1) 59% Residential (Floors 2-6)
Rear Yard	15 feet	15 feet	20 feet

Requirement	C-2-B Matter of Right	C-2-B PUD Guidelines	Wheeler Renaissance PUD Provided
Side Yard	3 in/1 ft of height but not less than 8 feet	3 in/1 ft of height but not less than 8 feet	15 feet
Parking	85 spaces	85 spaces	25 spaces
Retail Loading			
Berth:	1 @ 30 feet deep	1 @ 30 feet deep	--
Platform:	1 @ 100 SF	1 @ 100 SF	--
Delivery:	None	None	--
Residential Loading			
Berth:	1 @ 55 feet deep	1 @ 55 feet deep	--
Platform:	1 @ 200 SF	1 @ 200 SF	--
Delivery:	1 @ 20 feet deep	1 @ 20 feet deep	--

2.2 Parking

2.2.1 Parking Supply

As shown in Table 3, the parking requirement for the proposed PUD totals 85 spaces. Based on the zoning requirements, 43 spaces are required for the residential portion (one space per every two units) of the development, and 42 spaces are required for the retail portion (one space per every 300 square feet over 3,000). However, the PUD proposes building only 25 parking spaces and is requesting relief from the parking requirement.

As noted in the PUD package, the Applicant analyzed the feasibility of constructing a single level of below-grade parking and determined that this was not a viable options. Due to the desire to provide 100 perfect affordable housing units at a size and cost desired by the District, no underground parking is included. The PUD maximizes the parking at the rear of the site, along the public alley, and will provide 30 secure bicycle spaces and external racks for 24 bicycles, exceeding the number of spaces required for a project of this size. This is greater than the 5 spaces that is required by zoning regulations.

Given the limited supply and low-income orientation of the housing that is being constructed with this project, the 25 parking spaces are being planned to accommodate primarily the retail uses of the site. The on-site parking will be signed for short-term (one-hour) parking from 8:00 am to 6:00 pm and will revert to permit parking for residents during the overnight hours from 6:00 pm to 8:00 am. Approximately five parking spaces may be designated during daytime hours for permit parking for retail tenants and/or property management. Management and enforcement will be provided via signage and agreements between property management and a towing contractor.

2.2.2 Parking Demand

In order to determine the peak parking demand, estimates were obtained from the Institute of Transportation Engineers' (ITE) *Parking Generation*, 4th Edition for the residential and retail land uses. These rates were then adjusted to account for the use of alternative modes. Many people going to and from the proposed PUD will choose not to drive, as is commonplace in the study area and throughout the District.

Table 4 provides a summary of the parking demand ratios assumed in this report. For the residential uses, Parking Generation gives an average suburban parking ratio of 1.20 vehicles per dwelling unit. However, based on the size of the PUD, the peak parking demand based on the regression equation is calculated as 0.88 vehicles per dwelling unit. With a mode split of 20% vehicular trips (explained in more detail later in this report), the parking demand ratio for the proposed development is conservatively calculated at approximately 0.17 vehicles per dwelling unit for residential land uses.

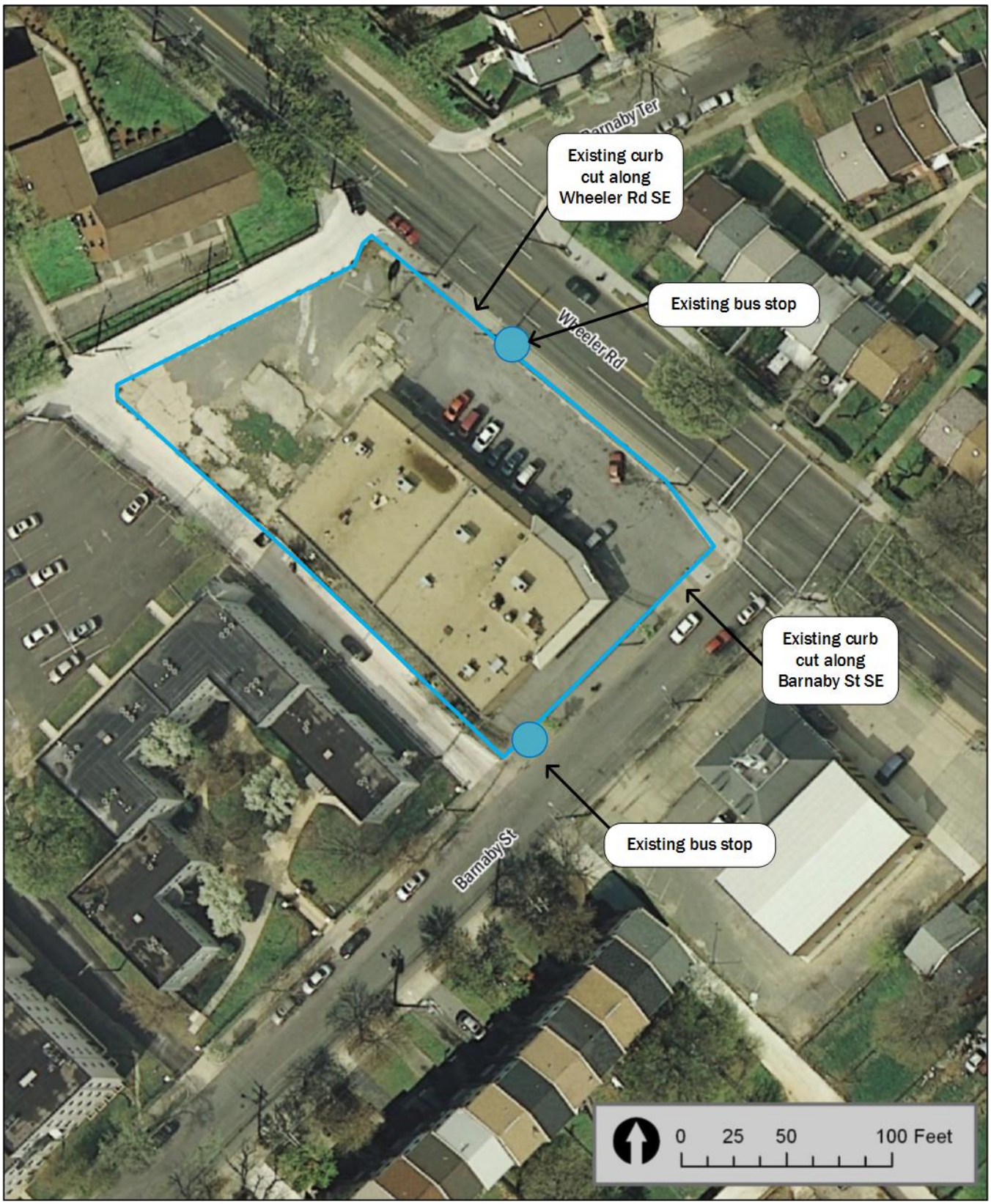

Figure 12: Existing Site

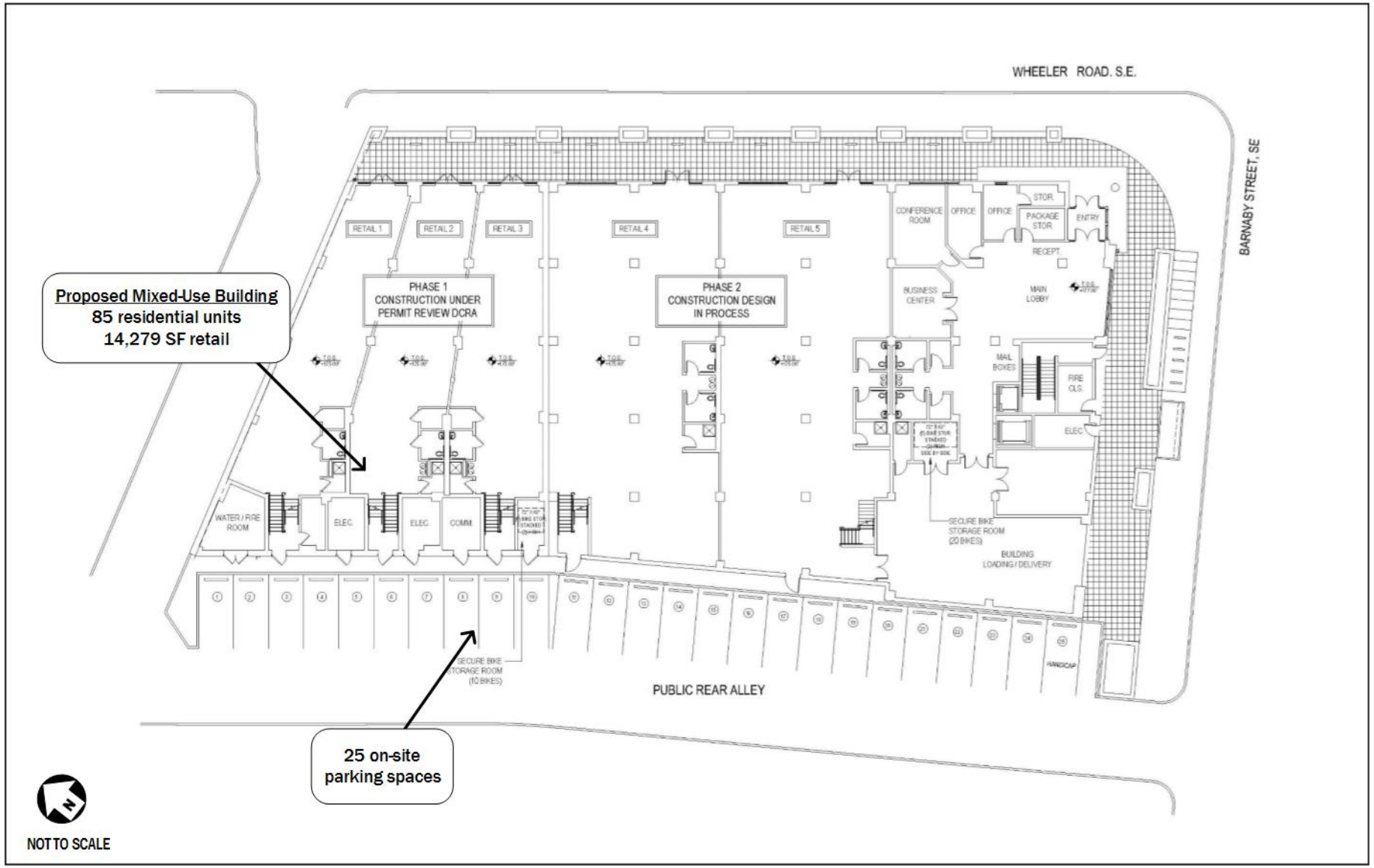

Figure 13: Development Program

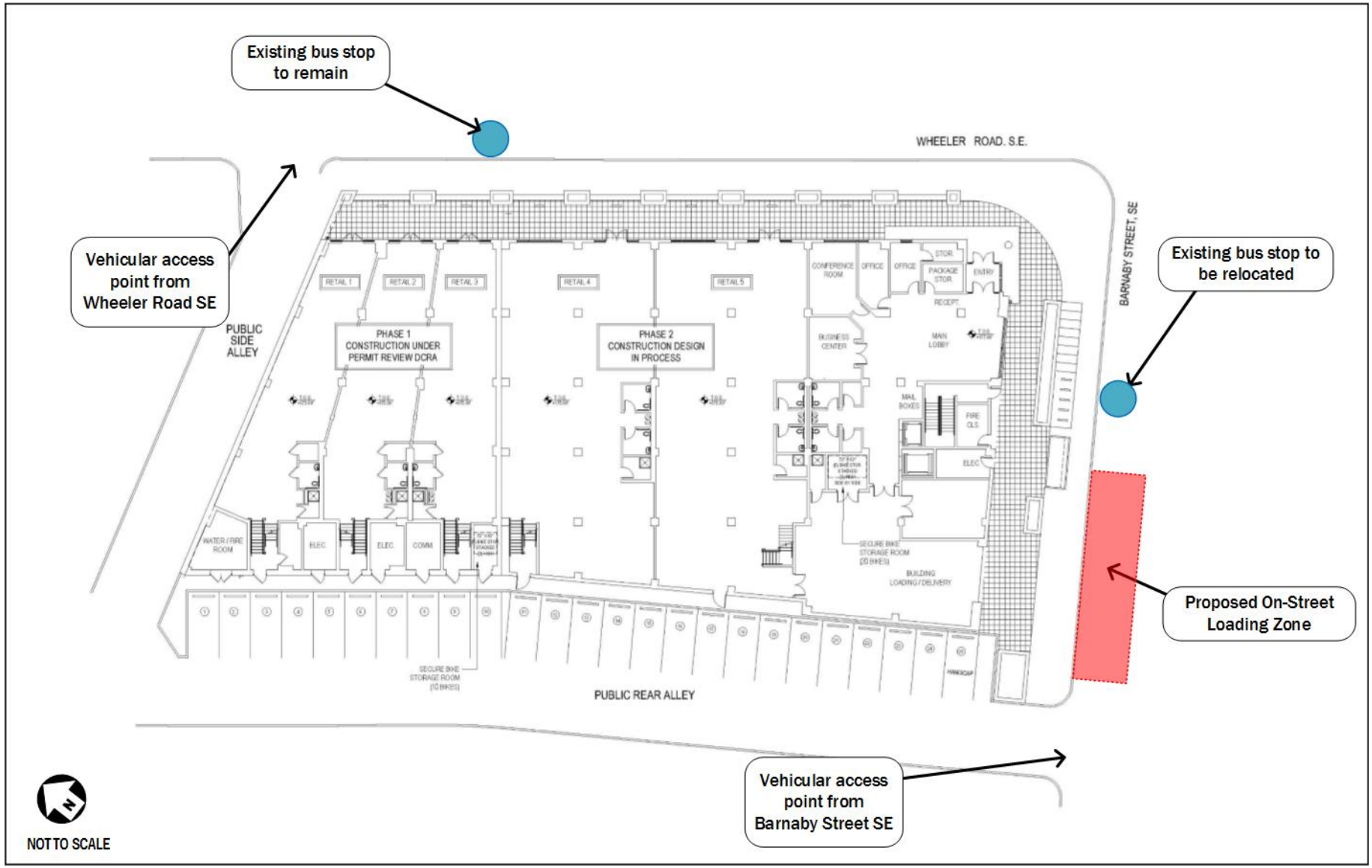

Figure 14: Site Access Plan

Parking Generation gives a suburban parking ratio of 2.55 vehicles per 1,000 square feet for retail land uses. With a mode split of 36% vehicular trips (explained in more detail later in this report) and an internal synergy of 13% for the mixed-use development, the parking demand ratio for the PUD is calculated at approximately 0.80 vehicles per 1,000 square feet for retail land uses.

Table 4: Peak Parking Demand Ratios

Land Use	Suburban Parking Demand Ratio	*Vehicular Mode Split of PUD*	PUD Parking Demand Ratio
Residential	0.88 spaces/dwelling unit	*20%*	0.17 spaces/dwelling unit
Retail	2.55 spaces/1,000 SF	*36% plus internal synergy of 13%*	0.80 spaces/1,000 SF

Table 5: Peak Parking Demand

Land Use	PUD Parking Demand Ratio	Size	PUD Parking Demand
Residential (Overnight Peak)	0.17 spaces/dwelling unit	85 dwelling units	14 spaces
Retail (Daytime Peak)	0.92 spaces/1,000 SF	14,738 SF	12 spaces
Total (Maximum Peak)	--	--	**26 spaces***

Based on the calculations shown in Table 5, the parking demand for the Wheeler Renaissance PUD will peak at approximately 26 parking spaces. This should be taken as a maximum number, however, since residential and retail parking demands tend to peak at different times (residential overnight and retail during the day). As such, it can be expected that up to 12 spaces are likely to be occupied by retail patrons during the day and up to 14 spaces are likely to be occupied by residents overnight. As stated in the parking supply section, the Applicant is seeking relief from the parking requirement due to the type of development—100 percent affordable housing units. As such, the parking supply provided for this development will be adequate for the needs of the site.

2.3 Site Access and Internal Circulation

2.3.1 Vehicular Access

All vehicular access to the Wheeler Renaissance PUD will be provided from the existing 20-foot wide public alleys that border the site. The existing alleys provide vehicular access to a parking lot for the adjacent residential development that sits west of the site along Barnaby Street. Additionally, refuse bins for the existing site and for an adjacent residential development north of the site are located within the alley. The alleys are accessed via Wheeler Road, north of the site, and via Barnaby Street, west of the site. The existing curb cuts that serve the site will be closed and abandoned.

Vehicular access is provided from the alley due to the design of the site. As explained previously, the site is designed based on the desire to provide 100 percent affordable housing units at a size and cost desired by the District; thus, no underground parking is included in the development. The 25 parking spaces provided on-site are located along the west side of the building and will be accessed via the existing alley.

Pick-up and drop-off activity will likely occur along Wheeler Road and Barnaby Street. The primary pedestrian access points for the retail are located along Wheeler Road, and the residential lobby is accessed at the corner of Wheeler Road and Barnaby Street.

2.3.2 Loading

Section 2201.1 of the Zoning Regulations requires the Applicant to provide one 30-foot deep berth and one 100-square-foot loading platform for the retail portion of the PUD. For the residential component, the Zoning Regulations require one 55-

foot deep berth, one 20-foot deep service/delivery space, and one 200-square-foot loading platform. A summary of the loading facilities is included in Table 3 and shown on Figure 14.

Loading cannot be accommodated on-site given the compact nature of the site. Therefore, it will be necessary for on-street loading to serve the needs of the site. This also eliminates the need for an additional curb cut to serve the loading functions of the site. The number of truck trips generated by a project of this scale is relatively low. Based on previous studies, it is expected that the new project would not generate more than three to four (3-4) truck trips per day. These are likely to be primarily delivery trucks such as FedEx and UPS, with some additional residential move-in/move-out activity as well.

Based on the compiled information, it appears that most move-in and move-outs will utilize vehicles 24 feet in length and smaller. Occasionally, vehicles up to 30 feet in length are used. The applicant has committed to encourage the residents and retail establishments to utilize vehicles 24 feet or smaller while also managing the loading operations taking place along the on-street loading areas.

At this time it is expected that the loading area will be located along Barnaby Street adjacent to the trash room, residential service elevators, and back-of-house staging area for the retail units. Trash collection bins will be moved curbside to the loading area when they are scheduled to be picked up. The loading area is planned to occupy the curb space currently used as a Metrobus stop. It is anticipated that the existing Metrobus stop would be relocated approximately 50 feet toward Wheeler Road closer to where the existing curb cut that is planned to be abandoned is located, as shown in Figure 14.

In addition, the Transportation Management Coordinator (TMC) designated for the site will be responsible for ensuring that deliveries to the site utilize the loading space and do not impede travel lanes or pedestrians along Barnaby Street or Wheeler Road. A Loading Management Plan will be in place for coordination between the TMC, building tenants, and delivery personnel. It will contain the following elements:

- Residential Building Management and Retail Management will provide the contact information for designated loading area personnel responsible for the coordination of deliveries per schedule.
- All tenant deliveries will be coordinated and scheduled through Residential Building Management and oversaw by designated building personnel.
- All deliveries will be scheduled in such a way that no more than one delivery will occur at a time, conflicts will be resolved by scheduling second delivery a future time and requested to return at that time.
- The loading area operations will be limited to only scheduled deliveries; with time frame being (7) seven days a week from 9am – 5pm. Designated personnel with provide oversight during deliveries to ensure no traffic conflicts on Barnaby Street, Wheeler Road, and the public alleys.
- All deliveries, delivery personnel will abide by all District guidelines for commercial vehicle operation including but not limited to: DCMR 20 – Chapter 9, Section 900 (Engine Idling), DDOT's Freight Management and Commercial Vehicle Operations document, primary access routes listed in the DDOT Truck / Bus Route System, as shown on Figure 15, and all other applicable DC / Federal regulations.
- Designated building operations personnel will clearly post all regulations; strictly enforce the regulations by notifying both the driver and company of noted violations. An onsite record will be kept for all violations.

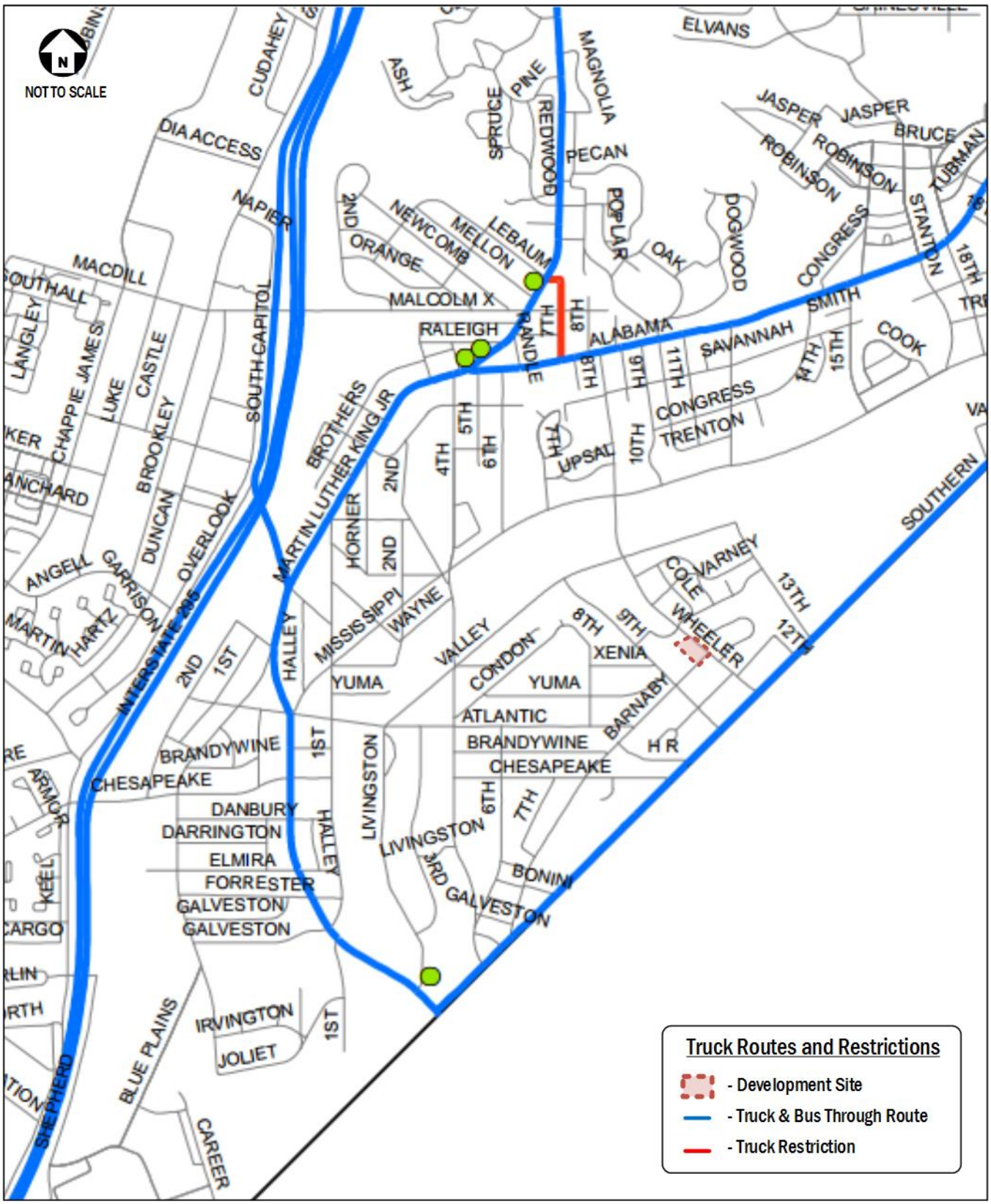

Figure 15: DDOT Truck Routes and Restrictions

2.3.3 Bus Stops

In conjunction with the proposed curbside loading area, it is proposed that the existing bus stop adjacent to the site along Barnaby Street be relocated, as shown in Figure 14. As discussed above, the bus stop is planned to be relocated approximately 50 feet toward Wheeler Road to accommodate the loading area. Given the location of the existing curb cut (which is planned to be abandoned and closed), the current Metrobus stop is located approximately 125 feet away from the Wheeler Road intersection. The applicant plans to relocate this bus stop to a location closer to the intersection which would better serve residents and retail patrons of the site and would be in a more visible location for pedestrians who may be walking to the bus stop from Wheeler Road.

2.3.4 Bicycle Facilities

As stated previously, the PUD will include 30 secure bicycle spaces, greater than the 5 bicycle spaces required by zoning regulations. The secure bicycle storage will be split between the retail and residential portions of the development. As shown in Figure 14, a bicycle storage area, which accommodates 10 bicycles, is located along west side of the building, adjacent to the public alley and parking area. An additional bicycle storage area, which accommodates 20 bicycles, is located adjacent to the residential lobby, within the loading area on the southwest corner of the site.

In addition to the secure bicycle spaces, the PUD has designated space for a Capital Bikeshare station, which would accommodate approximately 8 bicycles. Inverted U-racks are also placed next to the Bikeshare station and surrounding the site, which will provide short-term parking for 24 additional bicycles.

2.3.5 Pedestrian Access

As stated previously, the primary pedestrian access points for the retail portion of the PUD are located along Wheeler Road. For the residential portion of the development, the residential lobby is accessed at the corner of Wheeler Road and Barnaby Street. The majority of pedestrians travelling to and from the site will be transit riders going to and from the bus stops along Wheeler Road and Barnaby Street or travelling along the sidewalk from adjacent neighborhoods. Retail patrons walking between the front of the site and the parking area will travel through the existing alley. Residents who park on-site will be able to either walk to the residential lobby or access the internal stairway on the back-side of the building.

As outlined previously, the intersections surrounding the site provide pedestrian facilities including crosswalks, curb ramps, and pedestrian signals at signalized intersections in order to accommodate pedestrians. Additionally, the PUD is designed to provide pedestrian-friendly walkways along Wheeler Road and Barnaby Street, including wide sidewalks, landscaped brick pavers, grass and tree boxes, and improved lighting. The existing alley will also be repaved and proper lighting will be installed to enhance the pedestrian environment.

2.4 Transportation Demand Management

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

TDM's importance within the District is highlighted within section T-3.1 of the DC Comprehensive Plan, where it has its own dedicated section including TDM policies and actions. As stated in the Plan, the Washington DC, metropolitan region is a leader in developing and implementing TDM strategies. Typical TDM programs include:

- Carpooling/vanpooling, employee shuttles, and improvements that encourage bicycling and walking
- Financial incentives, such as preferential parking for ride-sharers and transit subsidies
- Congestion avoidance strategies, such as compressed work weeks, flexible work schedules and telecommuting

2.4.1 DDOT TDM Expectations for District Development Proposals

The District of Columbia is quickly growing and attracting new residential, commercial, and retail development and redevelopment, which are generating significant additional vehicular traffic to, from, and within the District. In order to meet the District's goals of reducing automobile trips and accommodation travel through the complete transportation network, DDOT is developing a systematic approach and process for integrating TDM in to the development and redevelopment permit process.

This report recommends that detailed TDM plans be submitted at the time of their application submissions. It is highly likely that DDOT TDM expectations and requirements, as well as changes in transportation options (for example, the growth of Capital Bikeshare and the DC Circulator in recent years); will change the landscape of TDM planning.

The trip generation for the Wheeler Renaissance PUD places it within the "Proposal requires a variance (or is a PUD) and project generates less than 100 peak hour auto trips." category of the TDM Recommendations Matrix from the DDOT TDM requirements.

2.2.2 Proposed TDM Plan

The Transportation Demand Management (TDM) plan for the Wheeler Renaissance PUD is based on the DDOT expectations for TDM programs. The Applicant proposes the following TDM measures:

- During construction, maintain or coordinate relocation of any existing bus stops at the developer's expense.
- The development is planned to include 30 secure bicycle parking spaces and 24 spaces in bicycle racks external to the building. This is greater than the 5 bicycle spaces as required by zoning regulations.
- Identify a project's TDM Leader (for planning, construction, and operations). Provide DDOT/Zoning Enforcement with annual TDM Leader contact updates.
- A TransitScreen will be installed in the lobby of the apartment buildings to keep residents and visitors informed on all available transportation choices and provide real-time transportation updates. In addition, the TDM Leader will make printed materials related to local transportation alternatives available to residents and employees upon request and at move-in for new tenants.
- Provide an on-site business center to residents with access to copier, fax, and internet services.
- Provide location for Bikeshare Program Station.
- An enhanced bus shelter will be provided at the existing bus stop on the project's site on Barnaby Street.

3: IMPACTS REVIEW

This section of the report focuses on the influence and impact site generated traffic will have on the local transportation network, with the following purpose:

- To provide information to the District Department of Transportation (DDOT) and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site on all major modes of travel and where these trips are expected to travel to and from.
- To determine if development of the site will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analysis of intersection delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. The report describes what improvements to the transportation network are needed to mitigate adverse impacts.

3.1 Site Transportation Demand

3.1.1 Base Trip Generation

Traditionally, trip generation for a proposed development is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 8th Edition. For this report, the methodology was supplemented to account for the urban nature of the site (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes. The following summarizes the methodology that was used in this study.

First, ITE *Trip Generation* was used to develop base vehicular-trip rates, not accounting for reductions due to mode split. The *Trip Generation Handbook*, 2nd Edition was also consulted for guidelines for estimating trip generation. Trip generation will be projected for the morning and afternoon weekday peak hours of the adjacent street traffic (typically one hour between 7:00 and 9:00 AM and between 4:00 and 6:00 PM). The following summarizes the trip generation projections:

- The Residential trips were projected based on Land Use (LU) 220 for Apartments, which are "rental dwelling units located in buildings with at least three other dwelling units". The total weekday trips, as well as the morning and afternoon peak hour trips, were generated using the regression equations provided based on average vehicle trip ends per dwelling unit. The regression equations were chosen for the Residential projections, due to the high (over 0.75) coefficient of determinations (R^2) for each time period. For the residential uses, the morning and afternoon peak hours correspond to the peak hours of the adjacent roadway network – one hour between 7:00 and 9:00 AM and between 4:00 and 6:00 PM, respectively – instead of the peak hours of the Generator due to the peak hours analyzed in this study.
- For the Retail trips, LU 820 for Shopping Center was applied in lieu of individual trip rates, such as bank, pharmacy, and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store). The Shopping Center trip rate accounts for these uses and interactions. Unlike the residential land use, the total weekday trips, as well as the morning and afternoon peak hour trips, were generated based on the average rates provided based on average vehicle trip ends per 1,000 square feet of gross leasable area. According to the *Trip Generation Handbook*, the weighted average rate should be used to estimate trip rates for land uses with low value independent values. This is due to the y-intercept of the regression equation, which can yield an illogical trip projection. Although the coefficient of determination (R^2) for

the regression equations provided is high (above 0.75), the average rates were used due to the low square footage of retail provided (under 50,000 SF).

Table 6 shows the base number of trips generated by the proposed development.

Table 6: Base Vehicular-Trip Generation

Land Use	Size		Base Vehicular Trip Generation						
			AM Peak Hour			PM Peak Hour			Weekday Total
			In	*Out*	*Total*	*In*	*Out*	*Total*	
Residential	85	Dwelling Units	9	36	45	42	22	64	640
Retail	14,279	Square Feet	9	6	15	27	28	55	634
Total Base Vehicle-Trips			**18**	**42**	**60**	**69**	**50**	**119**	**1,274**

3.1.2 Average Vehicle Occupancy and Person-Trips

The average vehicular occupancy (AVO) rates are based on the rates published in the *2009 NHTS* by the FHWA. Based on the information contained in the report, Table 7 shows the AVO assumed for each land use[2] contained in the proposed development. The AVO for the residential and office uses is based on the "To or From Work" trip purpose, as this applies to the majority of the trips generated by these uses. The AVO for the recreation uses is based on the "Social and Recreational" trip purpose. The AVO for the medical office and grocery uses is based on the "Other Family/Personal Errands" trip purpose since this category includes personal business and medical/dental. The AVO for the ground-floor retail use is based on the "Shopping" trip purpose.

Table 7: Average Vehicle Occupancy

Land Use	Average Vehicle Occupancy
Residential	1.13 persons/vehicle
Retail	1.78 persons/vehicle

The total weekday peak hour person-trips were generated for the proposed PUD based on (1) the base vehicular trips shown previously in Table 6; and (2) the average vehicular occupancy rates shown previously in Table 7. In order to calculate the person-trips, the vehicular trips are multiplied by the average vehicular occupancy. Table 8 shows the base person-trips generated by the proposed Wheeler Renaissance PUD.

Table 8: Base Person-Trip Generation

Land Use	AVO		Base Person-Trip Generation						
			AM Peak Hour			PM Peak Hour			Weekday Total
			In	*Out*	*Total*	*In*	*Out*	*Total*	
Residential	1.13	Persons/Vehicle	10	41	51	47	25	72	723
Retail	1.78	Persons/Vehicle	16	11	27	43	44	87	1,129
Total Base Person-Trips			**26**	**52**	**78**	**90**	**69**	**159**	**1,852**

[2] *2009 National Household Transportation Survey*. "Table 16: Average Vehicle Occupancy for Selected Trip Purpose 1977, 1983, 1990, and 1995 NPTS, and 2001 and 2009 NHTS (Person Miles per Vehicle Mile" for 2009 data, Page 33. Federal Highway Administration (FHWA), 2010.

3.1.3 Mode Split

Following the base trip generation, the trips were split into each mode: transit (consisting of both Metrorail and Metrobus/DC Circulator), walking, biking, and vehicle. Each land use was analyzed by mode separately in order to account for varying mode splits. The mode split estimates for the Wheeler Renaissance PUD were developed using survey information contained in several sources: WMATA's *2005 Development-Related Ridership Survey*, results from the 2000 U.S. Census, and files from Gorove/Slade's library. The following describes in detail how the mode split assumptions were assembled based on information from these sources.

Residential Uses

Several sources provide mode split information that can be used to develop mode split estimates for future residents of the PUD, including results from the 2000 Census, WMATA's Ridership Survey of residential sites within the District, and the State of the Commute report that contains the average mode split of commuters that live in the District. The mode splits from these three sources are shown in Table 9.

Table 9: Mode Split Information for Residential Uses

Information Source	Mode			
	Train	*Metrobus & Other Transit*	*Auto*	*Walk & Other*
2000 Census[3]	13.5%	43.6%	36.9%	6.0%
State of the Commute[4]	27%	14%	48%	11%
WMATA Ridership Survey[5]	43%	6%	39%	14%

Of these three sources of information, the one that most closely contains the transportation characteristics of the PUD would be the census information from the tracts where it is located. The sites that comprise the *Ridership Survey's* average mode splits do not compare well based on location and distance from the Metrorail station, and the *State of the Commute* is an average for the entire District.

Thus, this report uses the census information as a starting point for assembling residential mode split assumptions. However, an auto mode share of close to 40% will greatly overestimate the number of vehicular trips generated by the project due to the 100% affordable housing that all units will ascribe to, low number of parking spaces provided (25), and the number of secure bicycle spaces provided (30). Based on the District's draft zoning ordinance rewrites, publicly assisted housing requires approximately half the amount of parking as that required for market rate housing.

Thus, the assumptions for residential mode split at the Wheeler Renaissance PUD are as follows:

- Vehicle: 20%
- Transit: 60%
- Walk: 10%
- Bike: 10%

[3] Census Tract 98.01
[4] Survey respondents that live within the District
[5] Table 10: Residential Mode Share for All Trips by Concentric Location Typology

Retail Uses

The main source of mode split information for retail sites is WMATA's *Ridership Survey*. Contained within the report are summaries of mode splits for five retail sites within the Metropolitan area, and one within the District. Table 10 summarizes the mode split information for all of the retail sites surveyed.

Table 10: WMATA *Ridership Survey* Mode Split for Retail Sites

Retail Location	Mode			
	Metrorail	*Metrobus & Other Transit*	*Auto*	*Walk & Other*
All sites surveyed	29%	8%	36%	27%

As none of the sites surveyed resemble the proposed PUD exactly, this report uses the average mode split of all sites surveyed. Thus, the assumptions for retail mode split at the Wheeler Renaissance PUD are as follows:

- Vehicle: 36%
- Transit: 37%
- Walk: 20%
- Bike: 7%

In addition, based on data derived from ITE, internal synergy due to the presence of residential above the retail was determined to be approximately 13% during the afternoon peak period and, as such, was deducted from the retail trip generation prior to the application of the mode splits.

Summary

Table 11 summarizes the mode split assumptions.

Table 11: Mode Split Assumptions

Land Use	Mode Split			
	Vehicle	*Transit*	*Walk*	*Bike*
Residential	20%	60%	10%	10%
Retail	36%	37%	20%	7%

3.1.3 Multi-Modal Trip Generation

Based on the trip generation calculations and the mode split assumptions shown previously (and summarized in Table 11), Table 12 shows the resulting calculations by mode. The proposed development will generate approximately 15 vehicular trips, 41 transit trips, 10 walking trips, and 7 bicycle trips during the morning peak hour; 31 vehicular trips, 75 transit trips, 24 walking trips, and 13 bicycle trips during the afternoon peak hour; and 356 vehicular trips, 852 transit trips, 298 walking trips, and 151 bicycle trips during a typical weekday.

Table 12: Trip Generation for Proposed Development by Mode

Land-Use/Mode	Trip Generation by Mode						
	AM Peak Hour			PM Peak Hour			Daily
	In	*Out*	*Total*	*In*	*Out*	*Total*	**Total**
Vehicle Trips							
Residential	2	7	9	8	5	13	128
Retail	3	3	6	8	10	18	228
Total New Vehicle Trips	*5*	*10*	*15*	*16*	*15*	*31*	*356*
Transit Person-Trips							
Residential	6	25	31	28	15	43	434
Retail	6	4	10	16	16	32	418
Total New Transit Person-Trips	*12*	*29*	*41*	*44*	*31*	*75*	*852*
Walking Person-Trips							
Residential	1	4	5	5	2	7	72
Retail	3	2	5	9	8	17	226
Total New Walking Person-Trips	*4*	*6*	*10*	*14*	*10*	*24*	*298*
Bicycling Person-Trips							
Residential	1	4	3	5	2	7	72
Retail	1	1	2	3	3	6	79
Total New Bicycling Person-Trips	*2*	*5*	*7*	*8*	*5*	*13*	*151*
Total Trips*	**23**	**50**	**73**	**82**	**61**	**143**	**1,657**

** - Combination of person-trips and vehicle-trips*

3.2 Roadway Capacity and Operations

This section defines the analysis assumptions, analyses the vehicular impacts of the proposed development, and makes recommendations for improvements where needed.

3.2.1 Scope of Analysis

The purpose of the vehicular capacity analysis is to determine the existing conditions of the intersections located in the immediate vicinity of the proposed development. The following intersections were selected, as shown in Figure 16:

1. Wheeler Road SE & Southern Avenue SE
2. Wheeler Road SE & Barnaby Street SE
3. Wheeler Road SE & Barnaby Terrace SE/Alley Driveway
4. Wheeler Road SE & Wahler Place SE
5. 9th Street SE & Barnaby Street SE
6. Barnaby Street SE & Alley Driveway

Intersection capacity analyses were performed for the existing conditions at each intersection within the study area during the morning and afternoon peak hours, as well as for future conditions with and without the proposed development. The study scenarios are as follows:

- 2014 Existing Conditions

- 2017 Future Conditions without Development (2017 Background)
- 2017 Future Conditions with Development (2017 Future)

The *Synchro, Version 7.0* software package was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The *Synchro* model was compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade. The following sections review the assumptions made for the technical analyses, as summarized in Table 14.

3.2.2 Traffic Volume Assumptions

The following section reviews the traffic volume assumptions made and methodologies used in the roadway capacity analyses, summarized in Table 14.

2014 Existing Conditions

The overall purpose of this study is to show what effect the proposed development will have on the transportation system in the study area. The existing conditions in and around the site are characterized in order to provide a foundation for assessing the transportation implications of the proposed development. This is determined by examining the peak traffic hours, which are directly associated with the peaking characteristics of the site and the adjacent transportation system. These peaking characteristics are found through analysis of existing count data.

DDOT and National standards require that traffic counts be conducted on a weekday, not including Monday or Friday, when traffic conditions can be described as "typical". This includes the consideration for adjacent uses, such as retail, special events, and recreation facilities and for major traffic generators, such as the area public school system or any large public or private institutions. Weekend and other off-peak periods are also often reviewed if the study area includes other uses that may be relatively inactive during the "typical" weekday.

The traffic counts conducted on "typical" day are used to determine the morning and afternoon "peak hour" of traffic within the study area. According to the Highway Capacity Manual (HCM) methodologies, a one-hour analysis period is preferred. Analysis periods that exceed one hour are not usually used because traffic conditions are typically not steady for long time periods and because the adverse impact of short peaks in traffic demand may not be detected in a long time period. The "peak hour" represents the worst-case scenario, when the system traffic volumes are the highest. The use of a "typical" weekday morning and afternoon peak hours are used to ensure that conclusions regarding adverse impacts and their respective mitigation measures would apply to the vast majority of time roadways are used in the study area. Although there may be times when volume flows exceed these conditions, such as during special events, holiday weekends, or other times depending on the study area and site location, it is the industry standard to design transportation infrastructure for the peak times during "typical" weekdays.

In order to ensure that the data collected contains the peak hour, traffic counts are taken for a period of several hours during the morning and afternoon peak periods. From these peak periods, a peak hour is derived for both the morning and the afternoon time periods. According to the Transportation Impact Analyses for Site Development Manual published by the Institute of Transportation Engineers (ITE), data is generally collected during the weekday morning (7:00 to 9:00 AM) and afternoon (4:00 to 6:00 PM) peak hours. Although this is the standard, Gorove/Slade usually collects data for a three-hour (or longer) period to ensure that the peak hour is contained within the data collection timeframe.

The peak period counts are analyzed to determine the one hour during the morning and afternoon periods that contains the highest cumulative directional traffic demands. From each peak period count, the morning and afternoon "peak hours"

are determined by summing up the four fifteen-minute consecutive time periods in the study area that experience the highest cumulative traffic volumes. These morning and afternoon "peak hours" are analyzed for the system of intersections investigated, choosing the "peak hour" of the entire system instead of each individual intersection.

Following the above guidelines, traffic counts, including vehicular and pedestrian volumes, were conducted by Gorove/Slade at the key study intersections between the hours of 6:30 and 9:30 AM and between 4:00 and 7:00 PM on Tuesday, February 11, 2014. These count dates represent "typical" weekdays when the DC public school systems were in session, as well as the surrounding counties in Maryland and Virginia. These "typical" weekdays also represent time periods that include normal operation for other major traffic generators in the study area. The results of the traffic counts are included in the Technical Appendix. The morning and afternoon peak hours for the system of intersections being studied occurred between 7:15 – 8:15 AM and 5:30 – 6:30 PM, respectively. The existing peak hour traffic volumes are shown on Figure 17.

2017 Future Conditions without Development (2017 Background)

The Wheeler Renaissance PUD is anticipated to be complete in 2016. Therefore, the future analysis year is 2017 (anticipated completion year plus one). The traffic projections for the 2017 future condition without the development consist of the traffic generated by background developments with planned completion by 2016, as well as inherent growth on the study area roadways.

In the study area, the only known background development is the Highland Dwellings, which is located to the west of the proposed PUD. The Highland Dwellings site is bounded by Atlantic Street SE on the south, Yuma Street SE on the north, 8th Street on the east, and Condon Terrace SE on the west. The site is currently undergoing renovation and is not occupied. The existing 142 units will be replaced 1-for-1, and construction is anticipated to be completed by 2016. Table 13 shows the projected trip generation for the Highland Dwellings development. These trips were then distributed and assigned to the network based on the trip distribution for the Wheeler Renaissance PUD (as outlined later in the report).

Table 13: Background Development-Trip Generation

Land Use	Size		Trip Generation						
			AM Peak Hour			PM Peak Hour			Weekday Total
			In	*Out*	*Total*	*In*	*Out*	*Total*	
Residential	142	Dwelling Units	15	58	73	62	34	96	986
Non-Auto Reduction	50	%	(8)	(29)	(37)	(31)	(17)	(48)	(493)
Total Background Trips			**7**	**29**	**36**	**31**	**17**	**48**	**493**

In addition to the Highland Dwellings background development, other traffic increased due to inherent growth on the study area roadways were accounted for with a 1% per year growth rate compounded annually over the study period (2014-2017). This rate was estimated based on a comparison between existing and past average annual weekday traffic volumes obtained from DDOT for 2006-2009. This growth rate was applied to all through movements along Wheeler Road and Southern Avenue.

The traffic volumes generated by the background development and the inherent growth were added to the existing (2014) traffic volumes in order to establish the future (2017) traffic volumes without the proposed development. The traffic volumes for the future conditions without the development are shown on Figure 18.

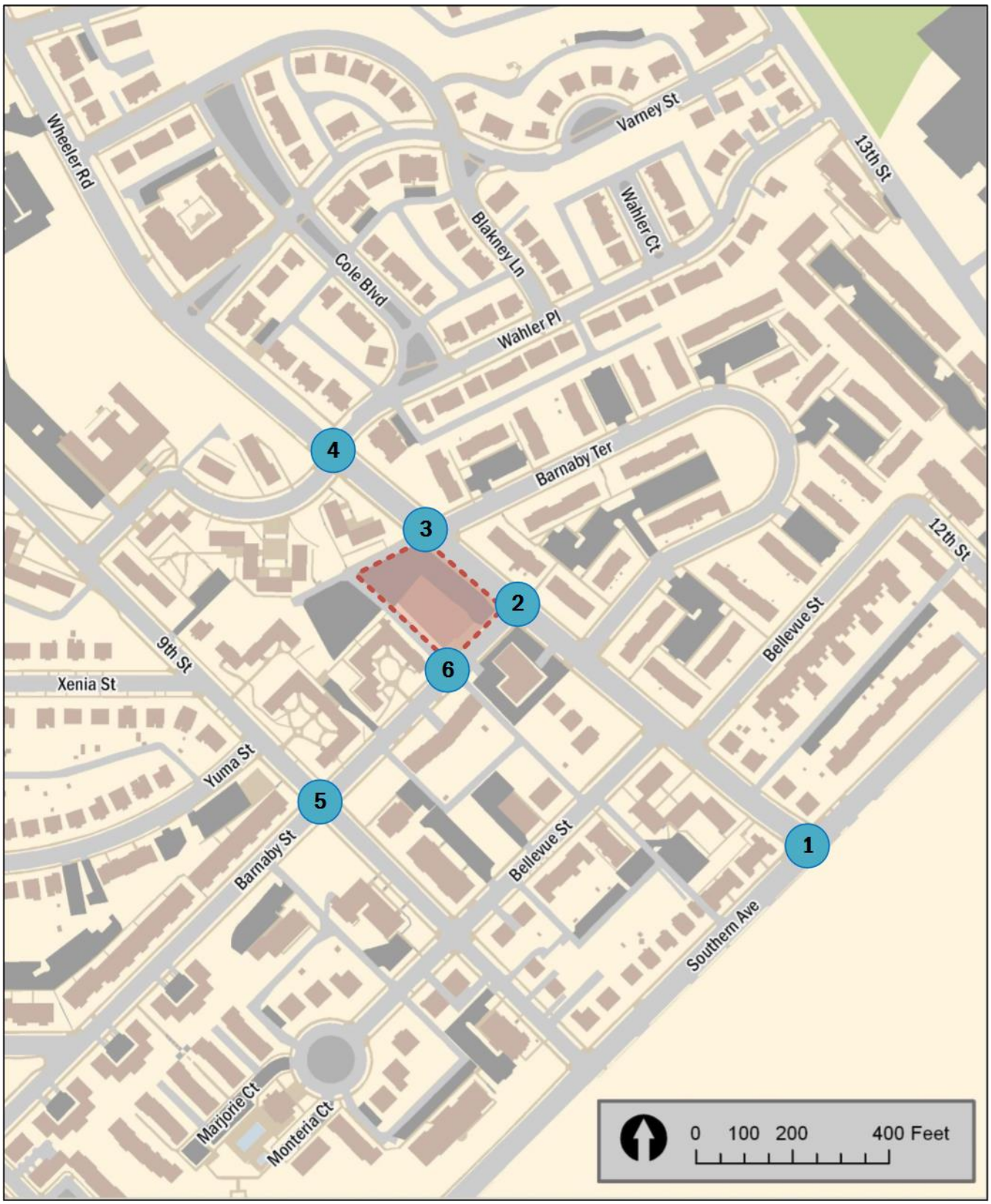

Figure 16: Study Area Intersections

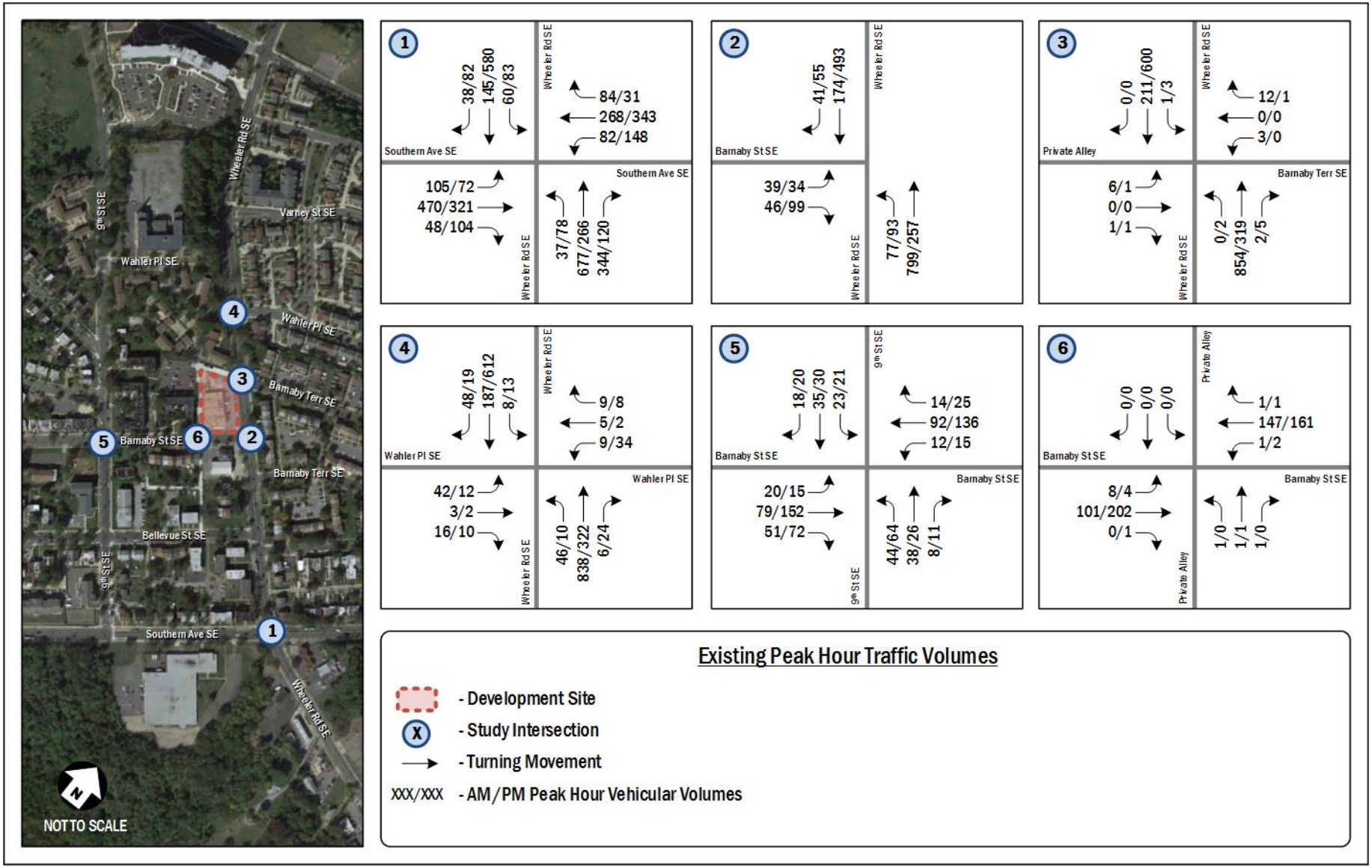

Figure 17: 2014 Existing Peak Hour Traffic Volumes

Figure 18: 2017 Background Peak Hour Traffic Volumes

2015 Future Conditions with Development (2015 Future)

Existing traffic volumes and travel patterns in the study area were analyzed in order to determine the trip distribution for the trips added by the proposed PUD, as shown in Figure 19. Based on this review of the existing traffic volumes and the proposed site access locations shown previously on Figure 14, the site-generated vehicular trips shown in Table 12 were distributed through the study area intersections, as shown on Figure 20.

The traffic volumes for the future (2017) conditions with the proposed development were calculated by adding the development-generated traffic volumes to the future (2017) without the proposed development traffic volumes. Thus, the future condition with the proposed development scenario includes traffic generated by existing volumes, the growth percentage, background development, and the proposed Wheeler Renaissance PUD. The future (2017) traffic volumes with the proposed development are shown on Figure 21.

3.2.3 Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses, summarized in Table 14.

2014 Existing Conditions

Gorove/Slade conducted field reconnaissance to confirm the existing lane configurations and traffic controls at the intersections within the study area, shown on Figure 22. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

2017 Future Conditions without Development (2017 Background)

The lane configurations for the 2017 future conditions without the proposed development are based on the existing lane configurations. No roadway infrastructure changes were assumed for the future conditions without development for 2017. The lane configurations and traffic controls for the 2017 background conditions are shown on Figure 22.

2017 Future Conditions with Development (2017 Future)

The lane configurations for the 2017 future conditions with the proposed PUD are based on the lane configurations for the 2017 conditions without the proposed development. No roadway infrastructure changes were assumed for the future conditions with development for 2017. The lane configurations and traffic controls for the 2017 future conditions are shown on Figure 22.

3.2.4 Vehicular Analysis Results

Intersection capacity analyses were performed for the three scenarios outlined in Section 3.2.1 at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro, Version 7.0* was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS E is typically used as the acceptable LOS threshold in the District; although LOS F is sometimes accepted in urbanized areas. For the purpose of this analysis, LOS E was defined as unacceptable.

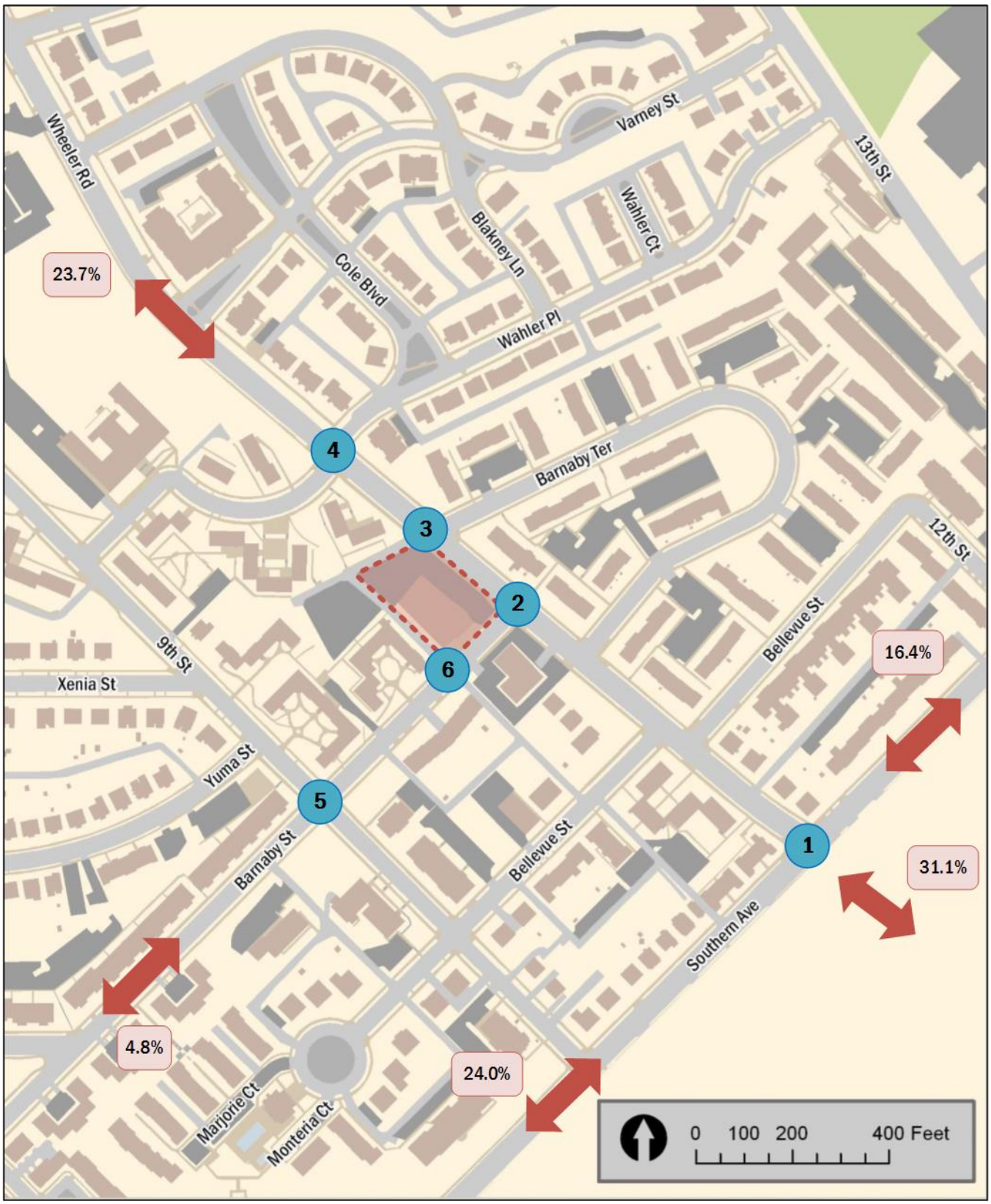

Figure 19: Trip Distribution for Site-Generated Trips

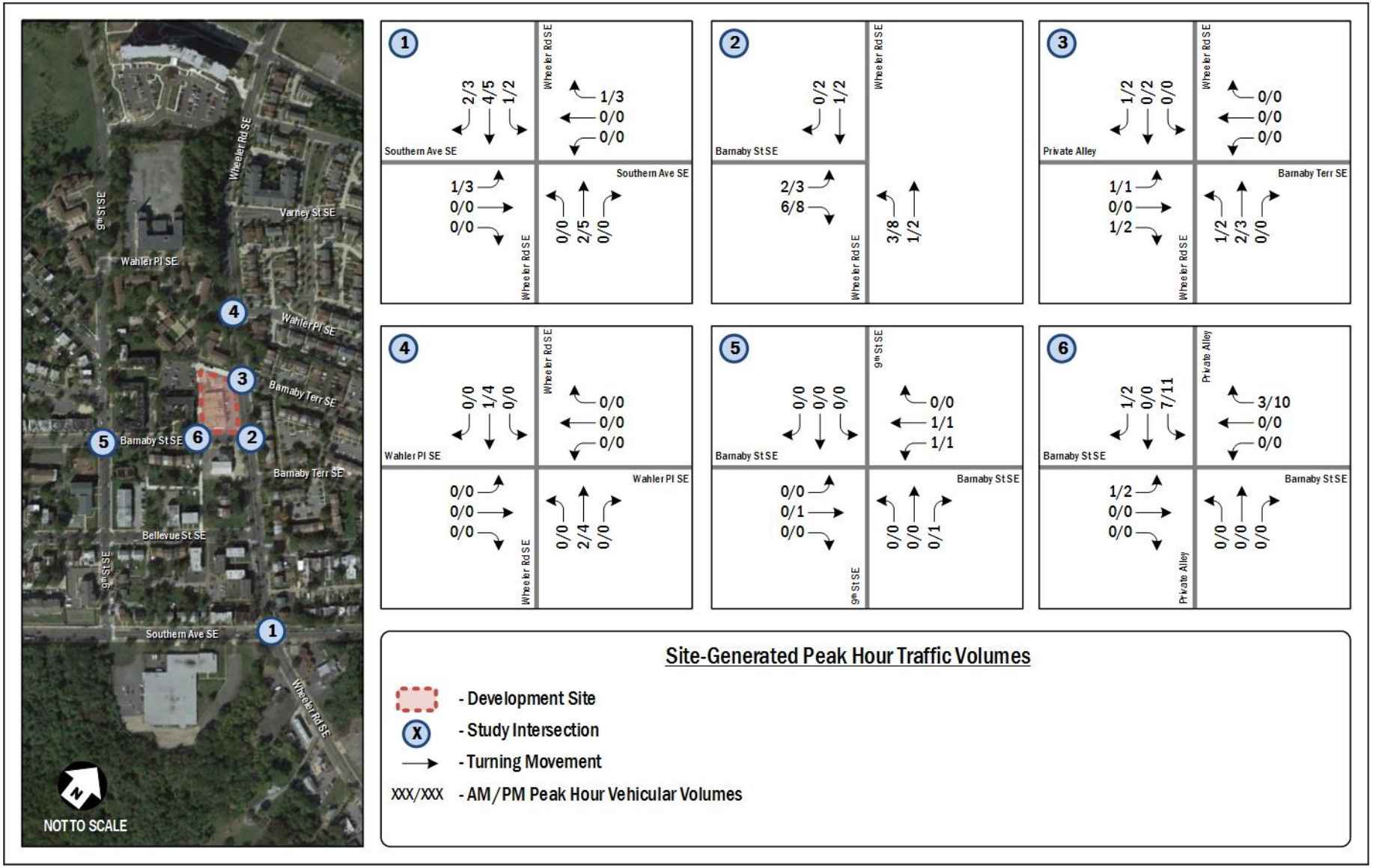

Figure 20: Site-Generated Traffic Volumes

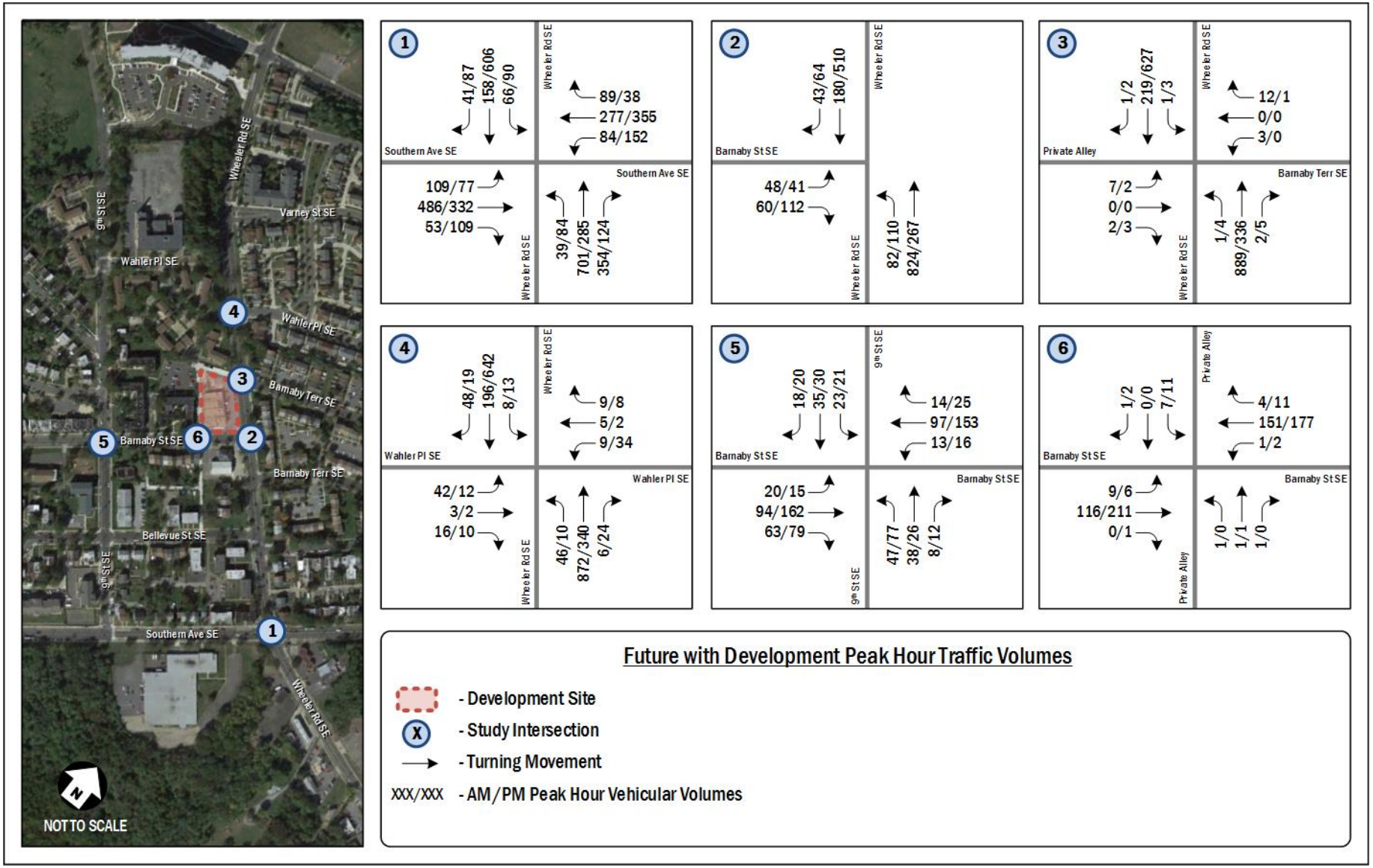

Figure 21: 2017 Future Peak Hour Traffic Volumes

Figure 22: 2014 Existing and 2017 Background/Future Lane Configurations and Traffic Controls

Table 14: Summary of Vehicular Capacity Analysis Assumptions

2014 Existing Conditions

• Date of data collection:
  o Tuesday, February 11, 2014
  o Counts taken from 6:30 – 9:30 AM and 4:00 – 7:00 PM
  o Count sheets in Technical Appendix
• System Peak: 7:15 – 8:15 AM, 5:30 – 6:30 PM
• Geometries and lane configurations based on existing conditions
• Signal timings/phasings/offsets provided by DDOT

2017 Future Conditions without Development (2017 Background)
• Background development included Highland Dwellings, located west of PUD. Trip generation, mode split, and trip assignment detailed in Section 3.2.2 • Assumed background growth percentage of 1%/year, compounded annually, added to through volumes along Wheeler Road SE and Southern Avenue SE • No roadway infrastructure or signal timing improvements assumed
2017 Future Conditions with Development (2017 Future)
• Site trip generation and mode split assumptions are detailed in Section 3.1 • Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area • No external roadway infrastructure or signal timing changes assumed

The LOS capacity analyses were based on: (1) the peak hour traffic volumes outlined in Section 3.2.2; (2) the lane use and traffic controls outlined in Section 3.2.3; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro 7* software). The average delay of each approach and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Appendix.

In addition to the capacity analyses presented above, a queuing analysis was performed at the study intersections. The queuing analysis was performed using the *Synchro 7.0* software. The 50th percentile and 95th percentile maximum queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile maximum queue is the maximum back of queue on a typical cycle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. For unsignalized intersection, the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM calculations. The HCM does not give guidelines for calculating queues for an all-way stop-controlled intersection, so this information is not reported.

Table 15 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2014 Existing and 2017 Background and Future scenarios. The capacity analysis results for the morning peak hour are shown on Figure 23 and for the afternoon peak hour are shown on Figure 24. Queuing results for the study intersection are shown in Table 16.

The majority of study intersections operate at acceptable conditions during the morning and afternoon peak hours for the 2014 Existing, 2017 Background, and 2017 Future scenarios. However, the northbound approach of Wheeler Road SE at Southern Avenue SE is projected to operate under unacceptable conditions during the morning peak period in the 2017 Background and Future scenarios.

Table 15: Peak Hour Capacity Analysis Results

Intersection	Approach	Existing Conditions (2014)				Future Background Conditions (2017)				Total Future Conditions (2017)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southern Avenue SE & Wheeler Road SE	**Overall**	**37.3**	**D**	**28.1**	**C**	**41.4**	**D**	**29.1**	**C**	**41.6**	**D**	**29.5**	**C**
	Eastbound	24.8	C	29.6	C	25.6	C	30.3	C	25.6	C	30.6	C
	Westbound	21.7	C	32.3	C	22.1	C	33.3	C	22.2	C	33.5	C
	Northbound	54.9	D	21.6	C	63.6	E	22.5	C	64.3	E	22.7	C
	Southbound	22.5	C	28.3	C	22.5	C	29.6	C	22.7	C	30.1	C
Barnaby Street SE & Wheeler Road SE	**Overall**	**4.9**	**A**	**9.7**	**A**	**5.5**	**A**	**9.8**	**A**	**5.7**	**A**	**10.2**	**B**
	Eastbound	45.9	D	43.6	D	44.0	D	43.6	D	43.9	D	43.7	D
	Northbound	1.7	A	6.1	A	2.0	A	6.2	A	2.0	A	6.3	A
	Southbound	1.9	A	2.7	A	2.3	A	2.9	A	2.3	A	2.9	A
Site Alley & Wheeler Road SE	Eastbound	8.7	A	8.5	A	8.7	A	8.5	A	8.7	A	8.5	A
	Westbound	8.5	A	8.3	A	8.5	A	8.4	A	8.5	A	8.4	A
	Northbound Left	0.0	A	7.2	A	0.0	A	3.6	A	1.3	A	3.9	A
	Southbound Left	7.2	A	7.2	A	3.6	A	3.4	A	3.6	A	2.9	A
Wahler Place SE & Wheeler Road SE	**Overall**	**7.7**	**A**	**6.6**	**A**	**7.6**	**A**	**6.5**	**A**	**7.6**	**A**	**6.4**	**A**
	Eastbound	50.9	D	44.1	D	50.9	D	44.1	D	50.9	D	44.1	D
	Westbound	40.8	D	46.2	D	40.8	D	46.2	D	40.8	D	46.2	D
	Northbound	3.9	A	2.3	A	3.9	A	2.3	A	3.9	A	2.3	A
	Southbound	2.7	A	2.7	A	2.7	A	2.8	A	2.7	A	2.8	A
Barnaby Street SE & 9th Street SE	**Overall**	**8.7**	**A**	**9.5**	**A**	**8.8**	**A**	**9.9**	**A**	**8.9**	**A**	**9.9**	**A**
	Eastbound	8.6	A	9.9	A	8.9	A	10.4	B	8.9	A	10.4	B
	Westbound	8.7	A	9.3	A	8.8	A	9.7	A	8.8	A	9.7	A
	Northbound	8.8	A	9.3	A	8.9	A	9.7	A	8.9	A	9.7	A
	Southbound	8.5	A	8.8	A	8.7	A	8.9	A	8.7	A	9.0	A
Barby Street SE & Site Alley	Eastbound Left	6.0	A	0.2	A	0.5	A	0.2	A	0.6	A	0.3	A
	Westbound Left	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A	0.1	A
	Northbound	10.6	B	13.3	B	10.8	B	13.7	B	10.8	B	13.9	B
	Southbound	0.0	A	0.0	A	0.0	A	0.0	A	11.2	B	14.0	B

Table 16: Peak Hour Queuing Analysis Results

Intersection	Approach	Existing Conditions (2014)				Future Background Conditions (2017)				Total Future Conditions (2017)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Southern Avenue SE & Wheeler Road SE	Eastbound	138	185	120	166	145	193	125	172	146	194	126	174
	Westbound	81	116	137	185	85	121	143	193	85	121	144	195
	Northbound	~305	#444	85	121	~322	#471	91	128	~325	#474	93	131
	Southbound	45	62	181	243	48	65	190	256	49	66	192	260
Barnaby Street SE & Wheeler Road SE	Eastbound	27	73	27	61	32	81	30	64	33	84	32	66
	Northbound	41	m54	71	97	44	m55	77	104	45	m56	80	107
	Southbound	15	23	35	72	16	25	38	76	16	26	40	80
Site Alley & Wheeler Road SE	Eastbound	--	1	--	0	--	1	--	0	--	1	--	1
	Westbound	--	1	--	0	--	1	--	0	--	1	--	0
	Northbound Left	--	0	--	0	--	0	--	0	--	0	--	0
	Southbound Left	--	0	--	0	--	0	--	0	--	0	--	0
Wahler Place SE & Wheeler Road SE	Eastbound	49	64	18	20	49	64	18	20	49	64	18	20
	Westbound	10	30	31	54	10	30	31	54	10	30	31	54
	Northbound	82	143	23	43	85	150	24	44	86	150	23	44
	Southbound	15	30	46	82	16	31	48	85	16	31	48	86
Barnaby Street SE & 9th Street SE	Eastbound	--	--	--	--	--	--	--	--	--	--	--	--
	Westbound	--	--	--	--	--	--	--	--	--	--	--	--
	Northbound	--	--	--	--	--	--	--	--	--	--	--	--
	Southbound	--	--	--	--	--	--	--	--	--	--	--	--
Barby Street SE & Site Alley	Eastbound Left	--	1	--	0	--	1	--	0	--	1	--	0
	Westbound Left	--	0	--	0	--	0	--	0	--	0	--	0
	Northbound	--	1	--	1	--	1	--	1	--	1	--	1
	Southbound	--	0	--	0	--	0	--	0	--	1	--	3

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

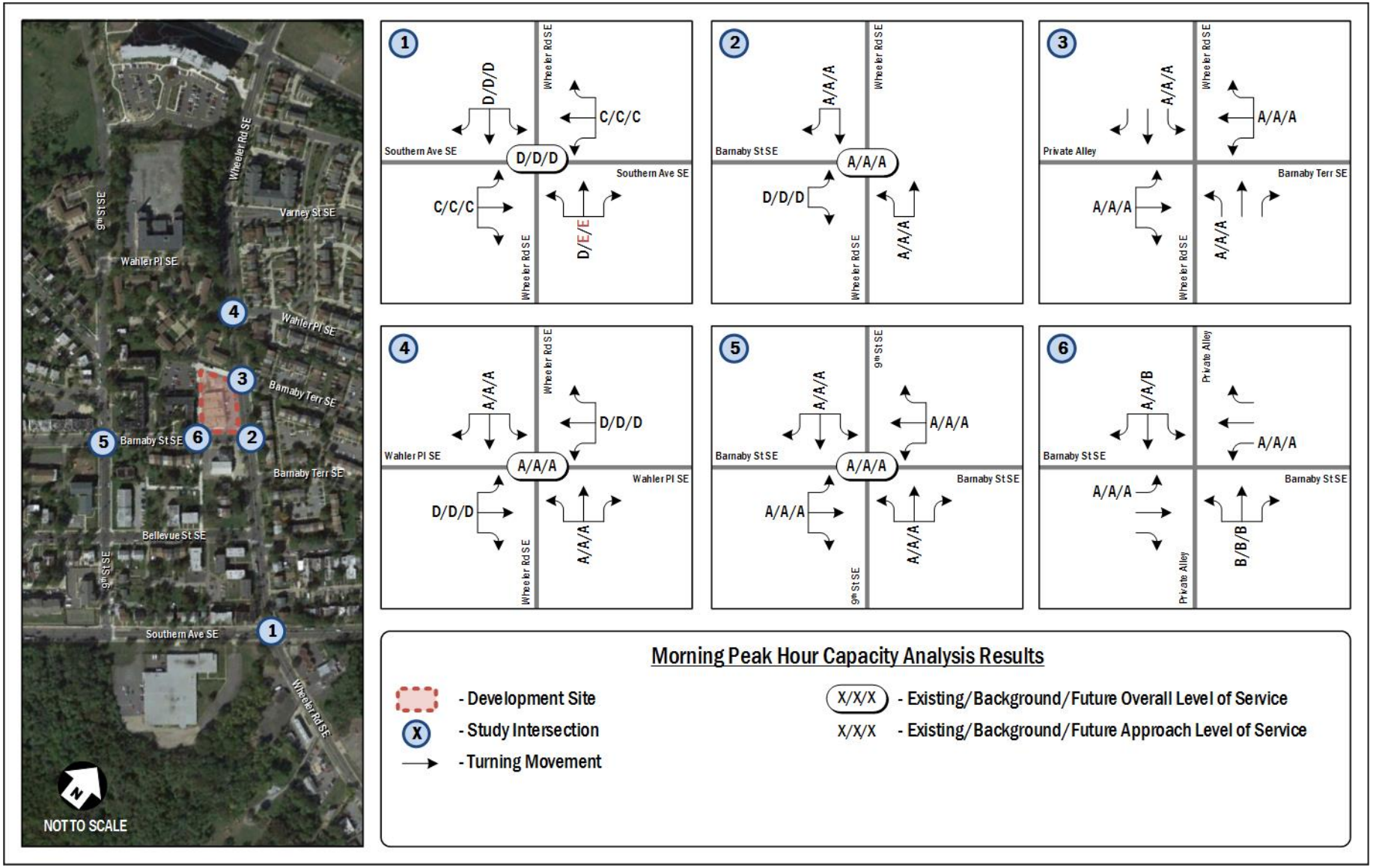

Figure 23: Morning Peak Hour Capacity Analysis Results

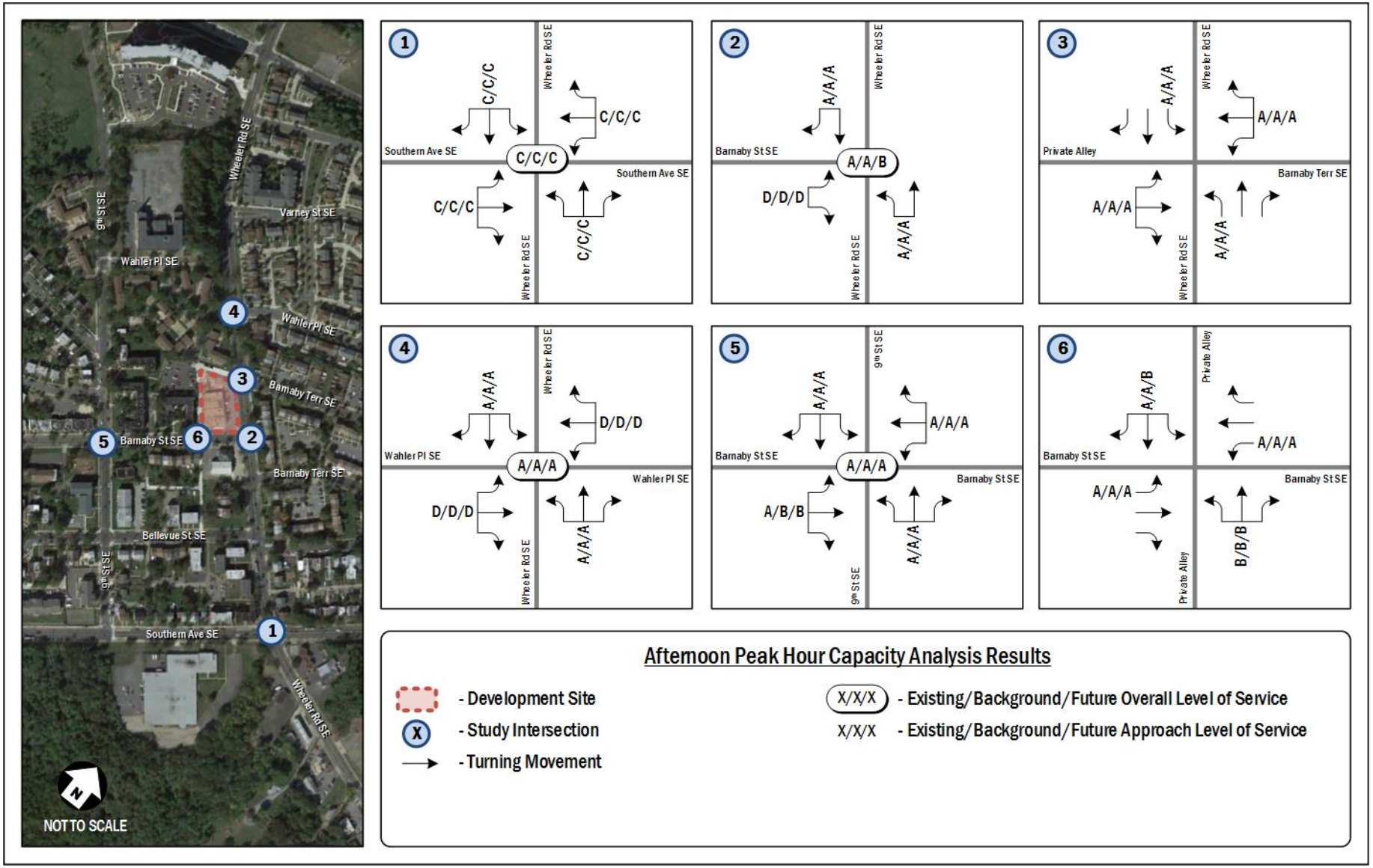

Figure 24: Afternoon Peak Hour Capacity Analysis Results

Generally speaking, the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an LOS E or F at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the future conditions without the proposed development. As shown in Table 15, the only approach projected to operate under unacceptable conditions occurs in both the 2017 Background and Future scenarios. Retiming the intersection during the morning peak period could allow it to operate under acceptable conditions during all scenarios, as shown in Table 17. Table 18 shows the queuing results following the recommended retiming.

3.3 Non-Auto Impacts

3.3.1 Transit

The trip generation estimates for the Wheeler Renaissance PUD show that a significant amount of new transit riders will be generated. The proposed development is projected to generate approximately 850 transit trips on a weekday.

As stated in Section 1, there is a significant amount of transit service nearby, including several bus routes that connect to the Metrorail Green Line. The majority of the bus routes in the study area serve the site during peak hours, as well as off-peak and on weekends. The bus service in the area near the PUD is of high enough quality that census data shows significantly more bus commuters than rail and slightly more than by automobile.

The PUD will likely generate more transit ridership bus than rail, similar to the existing census data. As referenced previously, *DC's Transit Future System Plan*[6], lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). One of the Metrobus routes that travels near the PUD is cited for having unacceptable load factors: the A2/6/7/8 line. However, several other bus routes also serve the study area, including a new bus route that will connect the site to the nearby Metrorail stations. Thus, the local bus service will be able to accommodate the future riders generated by the PUD.

3.3.2 Bicycle

Of all of the modes analyzed in this report, the trip generations estimates for cycling are the lowest. The projected trips are around 150 per weekday. Although bicycling will be an important mode for getting to and from the site, with significant bicycle facilities located on site, the impacts from bicycling will be relatively less than impacts to other modes.

The cyclists traveling to and from the site area expected to take advantage of the existing and planned mixed-use trails in the study area, as well as the low-volume local roadways adjacent to the site. Based on the trip generation estimates for bicycling, and the quality of the routes near the site, the PUD will not have a negative impact to bicycle facilities in the study area.

3.3.3 Pedestrian

The PUD is located in a walkable area, with connections to adjacent residential neighborhoods and transit service. The trip generation estimates project approximately 300 walking trips per weekday for the PUD.

The origins and destinations of these trips are likely to be:

- Residential neighborhoods and buildings adjacent to the PUD that will generate trips to and from the retail portions of the site;

[6] *DC's Transit Future System Plan Final Report*, April 2010, District of Columbia Department of Transportation

Table 17: Peak Hour Capacity Analysis Results with Recommended Improvements

Intersection	Approach	Existing Conditions (2014)				Future Background Conditions (2017)				Total Future Conditions (2017)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southern Avenue SE & Wheeler Road SE	**Overall**	**37.3**	**D**	**28.1**	**C**	**41.4**	**D**	**29.1**	**C**	**41.6**	**D**	**29.5**	**C**
	Eastbound	24.8	C	29.6	C	25.6	C	30.3	C	25.6	C	30.6	C
	Westbound	21.7	C	32.3	C	22.1	C	33.3	C	22.2	C	33.5	C
	Northbound	54.9	D	21.6	C	63.6	E	22.5	C	64.3	E	22.7	C
	Southbound	22.5	C	28.3	C	22.5	C	29.6	C	22.7	C	30.1	C
Improvements:	***Overall***	**--**	**--**	**--**	**--**	***31.4***	***C***	**--**	**--**	***31.5***	***C***	**--**	**--**
Retime intersection	*Eastbound*	--	--	--	--	*39.4*	*D*	--	--	*39.6*	*D*	--	--
Adjust offset	*Westbound*	--	--	--	--	*31.9*	*C*	--	--	*31.9*	*C*	--	--
	Northbound	--	--	--	--	*30.2*	*C*	--	--	*30.3*	*C*	--	--
	Southbound	--	--	--	--	*16.5*	*B*	--	--	*16.6*	*B*	--	--

Table 18: Peak Hour Queuing Results with Recommended Improvements

Intersection	Approach	Existing Conditions (2014)				Future Background Conditions (2017)				Total Future Conditions (2017)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Southern Avenue SE & Wheeler Road SE	Eastbound	138	185	120	166	145	193	125	172	146	194	126	174
	Westbound	81	116	137	185	85	121	143	193	85	121	144	195
	Northbound	~305	#444	85	121	~322	#471	91	128	~325	#474	93	131
	Southbound	45	62	181	243	48	65	190	256	49	66	192	260
Improvements:	*Eastbound*	--	--	--	--	*173*	*#246*	--	--	*173*	*#248*	--	--
Retime intersection	*Westbound*	--	--	--	--	*102*	*145*	--	--	*102*	*145*	--	--
Adjust offset	*Northbound*	--	--	--	--	*260*	*340*	--	--	*261*	*341*	--	--
	Southbound	--	--	--	--	*38*	*48*	--	--	*40*	*56*	--	--

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

- Employment opportunities where residents can walk to work, such at St. Elizabeth's Hospital and other adjacent employers; and
- Recreational parks where residents can walk.

In addition to these trips, the transit trips generated by the PUD will also generate pedestrian demand between the site and nearby transit stops. The vast majority of these transit riders will not leave the block the site is located on, as they will use the adjacent bus stops.

Most of the sidewalks surrounding the site are of acceptable quality, as summarized in Section 1.6.1. The sidewalks closest to the PUD, such as those along Wheeler Road and Barnaby Street are of high quality.

The capacity of sidewalks to handle the projected number of pedestrians will not be negatively impacted by this project. DDOT requires that all sidewalks are a minimum of 6 feet wide, with sidewalks on arterial streets 8 to 10 feet wide depending on the location. The proposed widths of the sidewalks adjacent to the site property meet the District standard. The *Highway Capacity Manual* (HCM) outlines methodologies for calculating capacity of sidewalks based on the sidewalk widths. According to methodologies contained in the HCM, the LOS grade on a 6 foot wide sidewalk does not reach LOS D until the sidewalk volumes reach 2,000 pedestrians per hour. Similarly, LOS E is not reached until volumes reach 3,000 pedestrians per hour. The existing pedestrian counts adjacent to the site combined with the projected pedestrian trips associated with the site will not approach these thresholds. Thus, the sidewalk capacity will not be exceeded, and there will be no detrimental impacts.

Based on the trip generation estimates for walking and the quality of the routes near the project's location, the Wheeler Renaissance PUD will not have a negative impact to pedestrian facilities in the study area.

3.4 On-Street Parking

Due to the small amount of on-site parking and requested parking variance for the Wheeler Renaissance PUD, DDOT expressed concerns over parking demand spilling onto adjacent streets and leading to negative impacts to the surrounding neighborhood. Thus, this section presents the findings of an on-street parking study, including a full inventory of available parking spaces and a parking occupancy count within a 10-minute walk of the site. The purpose of these counts was to determine the amount of parking supply and demand on streets within walking distance of the site and to identify any trends or patterns associated with parking demand.

3.4.1 Parking Inventory and Occupancy Counts

The on-street parking study was conducted across an area considered to be within walking distance, defined as within a 5-minute walk, of the PUD. A map showing the 5-minute walkshed and the location of the 18 block faces is included in the Technical Appendix.

An inventory of available on-street parking facilities was conducted on February 20, 2014 that included tabulating the number of parking spaces by block face and identifying any relevant parking restrictions. A total of approximately 243 parking spaces were inventoried within the 5-minute walkshed previously described. Nearly all of the on-street parking within the study area is unrestricted throughout the entire day. However, a few block faces are restricted due to their location adjacent to a school or a commercial site, such as the existing PUD site.

Parking occupancy data was collected for the morning period (6:00 AM–10:00 AM) and the evening period (4:00-10:00 PM) on February 20, 2014. Table 19 gives a summary of the inventory and occupancy results. Figure 25 and Figure 26 show a summary of the peak parking utilization during the morning and evening periods, respectively.

While the majority of the block faces in the study showed a low parking utilization rate, a few areas of high parking utilization are worth noting. Generally, the neighborhood blocks adjacent to residential development with little to no parking provided experiences the highest parking utilization. The block of Barnaby Street SE adjacent to the site and of 9th Street north of Barnaby Street experienced an evening occupancy higher than the available number of spaces due to illegally parked vehicles.

Table 19: On-Street Parking Occupancy Results

	On-Street Parking	
Time Period	Occupancy	Utilization
Morning (6:00 AM – 10:00 AM)	86	35%
Evening (4:00 PM – 10:00 PM)	79	33%

3.4.2 Potential Impacts

Although the PUD is requesting a parking variance to build only 25 spaces on-site, it is not anticipated to rely on on-street parking to serve its demand. However, because of the significant amount of unrestricted and available parking within the study area, there is a potential for on-stret parking to occur. The significant amount of available parking means that this impact will be limited, but it may be concentrated on the blocks closest to the PUD, some of which already experience a high parking utilization.

Curbside regulations can be used in order to limit on-street parking from the PUD, which could include installing meters to limit the amount of cars parked all day and to increase turnover and designating some blocks as Residential Permit Parking (RPP) in order to reserve those spaces for existing residents. Any changes to curbside management and regulations would likely come through a joint agreement between the surrounding community and DDOT. Since the parking demand for the PUD is expected to be served off-street, the Applicant does not have a preference for what on-street parking regulations are employed and is willing to support any agreement that the community and DDOT come to regarding curbside management.

3.5 Crash Analysis

A safety analysis was performed to determine if there was an abnormally high accident rate at any study area intersection. The District Department of Transportation (DDOT) provided the last three years of intersection accident data; from 2011 to 2011. This data set included all intersections adjacent to the site, with the exception of Barnaby Road SE and the alley. This data was reviewed and analyzed to determine the accident rate at each location. For intersections, the accident rate is measured in accidents per million-entering vehicles (MEV). The accident rates per intersection are shown in Table 20.

According to the Institute of Transportation Engineer's *Transportation Impact Analysis for Site Development*, an accident rate of 1.0 or higher is an indication that further study is required. Three intersections in the study area meet this criterion (as shown in red in Table 20 and detailed in Table 21). The proposed site needs to be developed in a manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

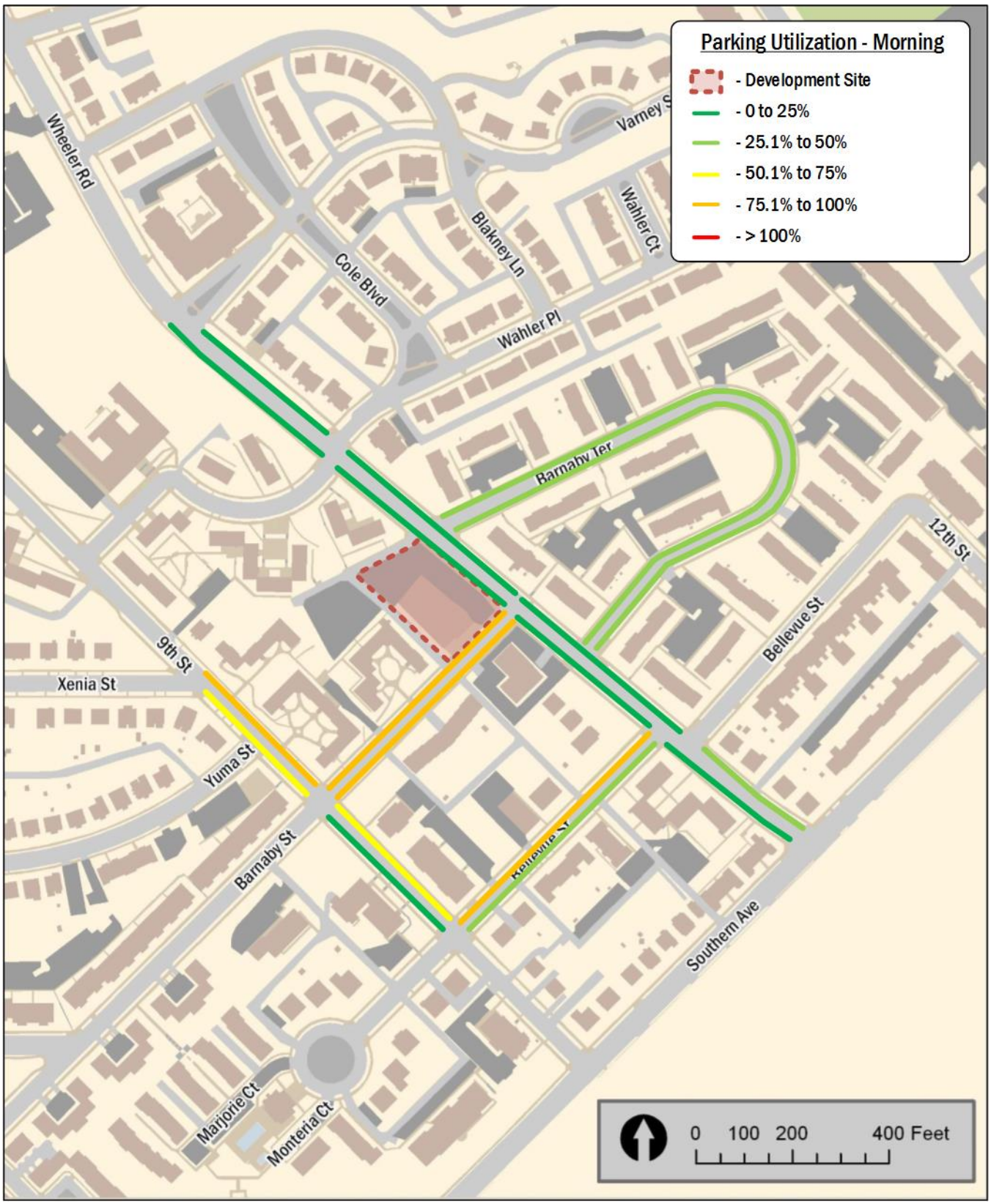

Figure 25: Morning (6:00 AM – 10:00 AM) Peak Parking Utilization

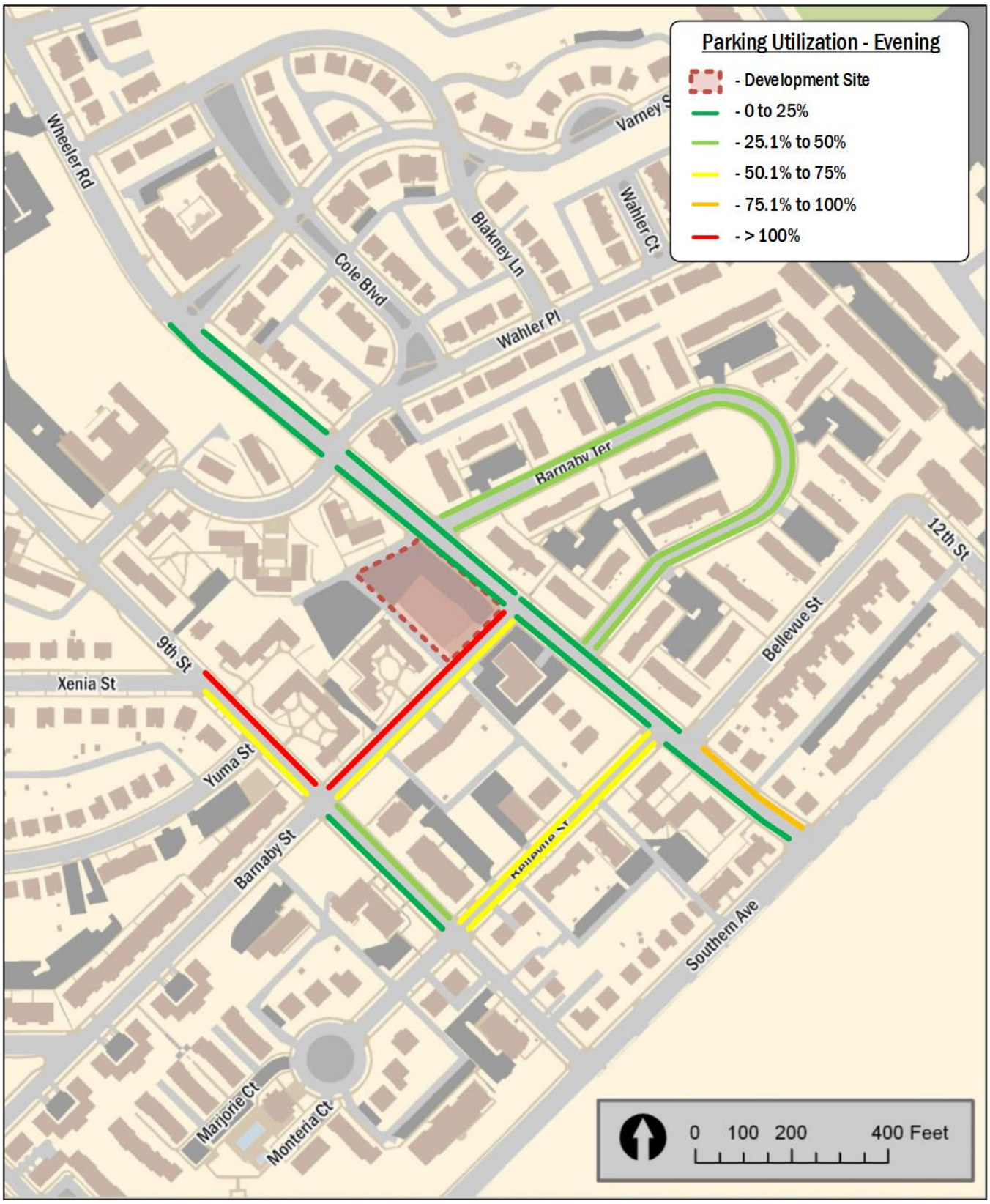

Figure 26: Evening (4:00 PM – 10:00 PM) Peak Parking Utilization

Table 20: Intersection Crash Rates

Intersection	Total Crashes	Pedestrian Crashes	Bike Crashes	Rate per MEV*
Southern Avenue SE & Wheeler Road SE	59	3	0	**2.35**
Barnaby Street SE & Wheeler Road SE	7	3	0	0.58
Site Alley & Wheeler Road SE	8	3	0	0.72
Wahler Place SE & Wheeler Road SE	3	0	0	0.24
Barnaby Street SE & 9th Street SE	2	0	0	0.36

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

The crash summary data in Table 20 shows only one intersection with a crash rate over 1.0 crashes per million entering vehicles–the rate which is considered a threshold for further analysis. A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other issues.

For this intersection, the crash type information from the DDOT crash data was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate some possible causes. Table 21 contains a breakdown of crash types reported for the intersection with a crash rate over 1.0 per MEV.

Table 21: High Crash Rate Intersections by Crash Type

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Unspecified	Total
Southern Avenue SE & Wheeler Road SE	**2.35**	4	11	3	12	13	1	3	3	0	2	0	0	**59**
		7%	*19%*	*5%*	*20%*	*22%*	*2%*	*5%*	*5%*	*0%*	*3%*	*0%*	*0%*	

As shown in Table 21, the intersection of Southern Avenue SE and Wheeler Road SE was shown to have a significantly high crash rate, with 2.35 crashes per MEV over the course of the 3-year study period. The majority of the crashes at this intersection were side-swiped vehicles, rear-end crashes, and left-turn crashes, each accounting for approximately 20% of the crashes at the intersection. Sideswipe crashes can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane, as is the case in this location since this intersection does not have any left-turn lanes. Elevated rear-end collision rates are typical at intersections controlled by a traffic signal. Left-turn crashes can occur when a vehicle executes a left-turn without an adequate gap in traffic or when a driver runs a red-light during an opposing approach's left-turn phase.

As the proposed development is not projected to make significant changes to the commuting patterns, operations, or geometry of this intersection, no mitigation measures are proposed. However, due to the few pedestrian involved crashes, leading pedestrian intervals (LPIs) should be investigated at the intersection. LPIs are a signal-timing-based pedestrian safety measure. Intersections with pedestrian and car traffic often experience conflict between these two groups, with potentially dangerous consequences for the pedestrians. The term LPI refers to when the 'Walk' signal appears approximately three or four seconds before the green traffic signal for vehicles. The 'Walk' signal then remains active for

the duration of the green signal. This brief timing adjustment allows pedestrians more time to cross the street and increases their visibility to drivers, especially those making turns[7].

3.6 Summary and Conclusions

This TIS for the Wheeler Renaissance PUD, Zoning Case 13-18, reviewed the transportation aspects of PUD application. Following a detailed review of the study area, project design, transportation demand, impacts by mode, crash data, and proposed TDM plan, this report concluded that the PUD **will not have a detrimental impact** to the surrounding transportation network.

[7] http://www.walkinginfo.org/engineering/crossings-signals.cfm