

TRAFFIC OPERATIONS

This section provides a summary of the existing roadway facilities, as well as an analysis of the existing and future roadway capacity in the study area. Included is an analysis of potential vehicular impacts of the PUD and recommendations for improvements and mitigation measures.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the PUD on the study area roadways;
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips; and
- Evaluate the proposed roadway network to determine if adequate capacity is provided in the future.

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

- 2014 Existing Conditions;
- 2017 Background Conditions (without the PUD);
- 2017 Future Conditions (with the South Building); and
- 2019 Future Conditions (with the North Building).

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area. The capacity analysis also focuses on the Saturday afternoon peak hour due to the retail and entertainment uses of the existing and proposed site.

The following conclusions are reached within this chapter:

Existing Conditions

- The existing study area roadways generally operate under acceptable conditions during the morning, afternoon, and Saturday peak hours.
- Existing areas of concern for roadway capacity are primarily focused along the heavily trafficked commuter routes: New York Avenue NE and Florida Avenue NE.
- The existing configuration of 4th Street NE and 5th Street NE as one-way with one wide travel lane results in driver confusion as the roadway is wide enough to accommodate two lanes. Additionally, a lack of signage and striping along

these roadways, combined with heavy truck volumes, results in high vehicular speeds and elevated crash rates.

Background Conditions

- The addition of the trips generated by the background developments and inherent growth on the study area roadways has a negligible impact on the study area roadways.
- The background roadway improvements due to the *Florida Avenue Multimodal Study* are projected to have negligible impact on the roadway capacity in the study area.

Future Conditions

- The conversion of 4th and 5th Streets NE to two-way operation within the Market will provide a positive benefit, by providing more intuitive and redundant routing options for drivers. Traffic capacity analyses show no negative impacts to vehicular capacity will result from these changes.
- The addition of the trips generated by the South Building leads to poor levels of service for left turns onto 6th Street from Morse Street in the future traffic models. However, this TIS is not recommending improvements at this intersection because vehicles experiencing delay while waiting to turn left onto 6th Street NE will likely divert north on 5th Street NE and turn at the intersection of 6th Street NE with Penn Street NE/Brentwood Road NE.
- The addition of the trips generated by the North Building leads to unacceptable conditions at the intersection of Florida Avenue and 6th Street NE. However, this TIS does not recommend any improvements at this intersection beyond those recommended in the *Florida Avenue Multimodal Study*. Necessary improvements to vehicular capacity would have detrimental impacts to other modes. These considerations were reviewed in greater depth in the *Florida Avenue Multimodal Study* relative to this TIS.
- This TIS recommends two mitigation measures for the PUD. First, the intersection of 4th Street and Morse Street should be converted to an all-way stop controlled intersection. Second, the southbound approach of 4th Street with its intersection with Florida Avenue should operate with a right-turn only lane and a shared through/left lane during peak times (with associated changes to signal timing/phasing as appropriate to accommodate the change in lane striping).

ROADWAYS

As outlined previously, regionally the site is accessible from several Interstate and US highways, including I-395, I-695, I-295, US-50 (New York Avenue), US-1 (Rhode Island Avenue), and US-29 (Georgia Avenue/7th Street). These roadways also connect the site to the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs. All of these roadways bring vehicular traffic within a few miles of the site, at which point arterials and local roads can be used to access the site directly.

Within the Union Market district itself, the roadways take on a unique character within the District. Instead of following the traditional public space design of the rest of the District, the market roadways have a distinct industrial character, with a mixture of vehicle types, activities, and pedestrian/bicycle traffic.

The roadways within the markets—Penn Street NE, Neal Place NE, Morse Street NE, 4th Street NE, and 5th Street NE—have minimal lane markings or striping, wide vehicular travel areas that accommodate car and truck parking, and minimal dedicated pedestrian and bicycle facilities.

4th Street NE and 5th Street NE between Penn Street NE and Morse Street NE are designated as one-way streets; 4th Street NE is one-way southbound, and 5th Street NE is one-way northbound. However, observations, backed by the data collected for this TIS, show that many drivers ignore or are unaware of these designations due to the lack of existing signage and striping within the Market.

STUDY AREA, SCOPE, & METHODOLOGY

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

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

Capacity Analysis Scenarios

The vehicular analyses are performed to determine if the proposed development of the PUD will lead to adverse impacts

on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing two future scenarios: (1) without the proposed application (referred to as the Background conditions) and (2) with the application approved and constructed (referred to as the Future conditions).

Specifically, the roadway capacity analysis examined the following scenarios:

- 2014 Existing Conditions;
- 2017 Background Conditions (without the PUD);
- 2017 Future Conditions (with the South Building); and
- 2019 Future Conditions (with the North Building).

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area. The capacity analysis also focuses on the Saturday afternoon peak hour due to the retail and entertainment uses of the existing and proposed site.

Study Area

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

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

1. 4th Street/Penn Street NE & New York Avenue NE
2. Penn Street NE & 4th Street/Alley NE
3. Penn Street NE & 5th Street NE
4. Penn Street NE & 6th Street/Brentwood Road NE
5. Neal Place NE & 4th Street NE
6. Neal Place NE & 5th Street NE
7. Morse Street NE & 4th Street NE
8. Morse Street NE & 5th Street NE
9. Morse Street NE & 6th Street NE
10. Florida Avenue NE & 2nd Street/Driveway NE
11. Florida Avenue NE & 3rd Street/Driveway NE

12. Florida Avenue NE & 4th Street NE
13. Florida Avenue NE & 5th Street NE
14. Florida Avenue NE & 6th Street NE
15. Florida Avenue NE & N Street NE

Figure 7 shows a map of the study area intersections.

Traffic Volume Assumptions

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

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data. For this study, a mix of new counts and data on record were used to assemble existing traffic volumes. Traffic data from the Gateway Market PUD was used for most intersections along Florida Avenue, while new counts were collected for the intersections within the market in conjunction with the PUD. Saturday counts were also collected at the study area intersections.

The results of the traffic counts, including the peak hour traffic volumes, are shown in the Technical Attachments. Figure 7 shows a summary of the existing data collection for the weekday morning and afternoon peak periods, as well as for the Saturday afternoon peak period.

Background Traffic Volumes (without the PUD)

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

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

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

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

Based on these criteria, three developments are included in the Background scenario:

- **1270 4th Street PUD**
Located at 1270 4th Street NE, this mixed-use development consists of constructing an 11-story mixed-use building containing approximately 39,600 sf of ground-floor retail space and 420-520 apartments. A below-grade parking garage containing approximately 400 to 550 parking spaces would serve the site, accessed from an alley, which currently sits disused to the west of the site.
- **Gateway Market**
Located at 340 Florida Avenue NE, this mixed-use development includes approximately 188 residential units and 27,500 square feet of retail spaces. Approximately 215 parking spaces will be provided in a below-grade garage, accessed via a curb cut on Florida Avenue.
- **Washington Gateway (not generating significant traffic at the time of data collection).**
Located at 100 Florida Avenue NE, this mixed-use development includes approximately 400 residential units and 5,000 square feet of retail space in its first phase.

The traffic volumes generated by these three developments were assigned and distributed through the roadway network using the same methodologies as the TIS for the 1270 4th Street PUD.

While the background developments represent local traffic changes, regional traffic growth is typically accounted for using percentage growth rates. The growth rates used in this analysis are derived using the Metropolitan Washington Council of Government's (MWCOG) currently adopted regional transportation model. Growth rates were derived by comparing volume projections at two different time periods within the model.

This background growth rate was applied to thru movements at study area intersections, as summarized on Figure 8. The peak hour traffic volumes for the Background conditions are shown in the Technical Attachments.

2017 Future Traffic Volumes (with the South Building)

The 2017 Future traffic volumes consist of the Background volumes with the addition of the traffic volumes generated by Phase 1 of the proposed development (site-generated trips).

Thus, the Future traffic volumes include traffic generated by: the existing volumes, the inherent growth on the study area roadways, and the proposed South Building.

Existing traffic volumes and travel patterns in the study area were analyzed in order to determine the trip distribution for the site-generated trips. Based on this review and the existing site access locations, the site-generated trips were distributed through the study area intersections. Figure 9 shows a summary of the trip distribution and site-generated trips. The site-generated traffic volumes and the peak hour traffic volumes for the 2017 Future conditions are shown in the Technical Attachments.

2019 Future Traffic Volumes (with the North Building)

The 2019 Future traffic volumes consist of the 2017 Future volumes with the addition of the traffic volumes generated by Phase 2 of the proposed development (site-generated trips). Thus, the 2019 Future traffic volumes include traffic generated by: the existing volumes, the inherent growth on the study area roadways, the proposed South Building, and the proposed North Building.

Existing traffic volumes and travel patterns in the study area were analyzed in order to determine the trip distribution for the site-generated trips. Based on this review and the existing site access locations, the site-generated trips were distributed through the study area intersections. The background growth rate outlined previously was applied to thru movements at study area intersections, as summarized on Figure 10. Figure 11 shows a summary of the trip distribution and site-generated trips. The site-generated traffic volumes and the peak hour traffic volumes for the 2019 Future conditions are shown in the Technical Attachments.

Geometry and Operations Assumptions

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

Existing Geometry and Operations Assumptions

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

Level of Service (LOS)

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The HCM defines six levels of service, ranging from A to F. LOS A represents the “best” operating conditions from a traveler’s perspective (free-flowing conditions and little-to-no delay), and LOS F represents the “worst”. Detailed LOS descriptions are contained in the Technical Attachments.

For cost, feasibility, and environmental impact, roadways are not typically designed to provide LOS A conditions during peak periods. Instead, roadways are typically designed to reflect a balance between individual traveler’s desires, society’s desires, and financial resources. In suburban areas, roadways are typically designed to a peak hour threshold of LOS D. In urban areas, such as the District, LOS E is typically used as the acceptable peak hour LOS threshold. Nevertheless, during low-volume periods of the day, a roadway or intersection may operate at LOS A.

controls for the Existing conditions are shown in the Technical Attachments.

Of note, the 6th Street NE cycletrack was installed by DDOT at the end of October 2014. At the time of the data collection, the cycle track had not yet been installed. Therefore, the modification of the 6th Street NE cross-section is included as an improvement in the Background conditions.

Background Geometry and Operations Assumptions

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

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

Based on this criteria, the following improvements were included in the Background conditions due to the *Florida Avenue Safety Study*:

- Florida Avenue NE

- Five-lane cross-section between 2nd and 3rd Streets NE (two eastbound lanes, three westbound lanes);
- Five-lane cross-section between 3rd and 6th Streets NE (two lanes east- and westbound, with left-turn lanes); and
- Four-lane cross-section east of 6th Street NE.
- 6th Street NE
 - Two-lane cross-section with cycle-track on east side of roadway.

Of note, these future improvements are still under development as the *Florida Avenue Safety Study* has not yet been published. The cross-sections above were agreed to by Gorove/Slade and DDOT. The lane configurations and traffic controls for the Background conditions are shown in the Technical Attachments.

In addition to the improvements outlined in the *Florida Avenue Safety Study*, the conversion of 4th Street NE from one-way southbound to two-way was included in the Background Conditions following the construction of the 1270 4th Street PUD.

2017 Future Geometry and Operations Assumptions

The lane configurations for the 2017 Future conditions are based on the lane configurations for the Background conditions. However, as noted previously, the 2017 Future conditions include changing the existing one-way operation of 5th Street NE to a two-way configuration. The lane configurations and traffic controls for the 2017 Future conditions are shown in the Technical Attachments.

2019 Future Geometry and Operations Assumptions

The lane configurations for the 2019 Future conditions are based on the lane configurations for the 2017 Future conditions. The lane configurations and traffic controls for the 2019 Future conditions are shown in the Technical Attachments.

Analysis Methodology

Following DDOT guidelines, the capacity analyses were performed using *Highway Capacity Manual* (HCM) methodologies. For signalized and unsignalized intersections, the HCM calculates the delay experienced by drivers traveling through an intersection. This delay is associated with vehicles slowing in advance of an intersection, the time spent stopped at an intersection, the time spent as vehicles move up in the queue, and the time needed for vehicles to accelerate to the

speed limit. Traffic delay also results from the interaction of vehicles, primarily in a state where the traffic volumes exceed the available capacity.

The results of these delay calculations is a computed average delay (seconds per vehicle) for each approach and a Level of Service (LOS) grade. At signalized intersections, all approaches controlled by the traffic signal have a calculated average delay and associated LOS, and an overall average delay and LOS for the entire intersection are determined. At unsignalized intersections, the approaches controlled by a stop-sign have a calculated average delay and associated LOS. For all-way stop intersections, an overall average delay and LOS are also determined. For one- or two-way stop intersections, an average delay and LOS are also calculated for vehicles turning across a free-flowing approach, as the driver must yield to oncoming traffic. The major through movements and right-turns on free-flowing approaches at one- or two-way stop controlled intersections are assumed to operate with no delay.

For this report, the analysis was performed using the *Synchro, Version 7* software package, which is based on the HCM methodologies. As stated previously, the weekday morning and afternoon peak hours were analyzed in the Existing, Background, and Future conditions. The *Synchro* models were compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade.

Capacity Analysis Results

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. A summary of the LOS results is shown on Figure 12, Figure 13, and Figure 14. The detailed capacity analysis tables and worksheets are contained in the Technical Attachments.

The capacity analysis results are split into three categories:

1. Intersections that operate at acceptable conditions during all time periods and scenarios analyzed. This study defines acceptable conditions as meeting LOS grade D or better for the overall intersection and each intersection approach.
2. Intersections that operate at unacceptable conditions regardless of the development of the project. This is either because the unacceptable conditions occur today, or unacceptable conditions occur in the future regardless of construction of the project.
3. Intersections that operate at unacceptable conditions due to construction of the project.

As shown in Figure 12, Figure 13, and Figure 14, the majority of the study area intersections operate under acceptable conditions during the weekday morning, weekday afternoon, and Saturday peak hours. However, the following intersections operate under unacceptable conditions during one or more peak hour:

- **4th Street/Penn Street NE & New York Avenue NE**

During the morning and afternoon peak hours, the westbound approach of New York Avenue NE operates over acceptable thresholds of delay in Existing conditions (and all future conditions).

These conditions could be improved from shifting some green time from New York Avenue to 4th Street, although such a change would have to weigh the impacts to New York Avenue through traffic. These conditions occur regardless of the PUD and this this TIS is not recommending their implementation as part of the PUD.

- **Morse Street NE & 4th Street NE**

During the afternoon peak hour, the east- and westbound approaches are projected to operate over acceptable thresholds for delay in Future conditions, starting with 2017 Background.

These conditions could be improved through the conversion of the intersection from two-way stop controlled to all-way stop controlled. This improvement was recommended in the 1270 4th Street NE PUD as a mitigation measure.

- **Morse Street NE & 5th Street NE**

During the Saturday peak hour, the eastbound approach is projected to operate above acceptable thresholds for delay in the 2017 Future conditions.

Due to new parking facilities in the 2019 Future conditions, traffic is routed away from this intersection, resulting in an improved LOS at the eastbound approach. Because the total build-out results in an acceptable LOS at this intersection, this TIS is not recommending any mitigation measures for the interim period.

- **Morse Street NE & 6th Street NE**

During each peak hour, the left turn from Morse Street to 6th Street is projected to operate over acceptable

thresholds for delay in Future conditions, starting with 2017 Background.

No improvements are necessary at this intersection because they wouldn't be warranted. The amount of vehicles expected to experience these delays are relatively low, and they have the ability to travel north on 5th Street to reach the traffic signal at the intersection of Penn Street, 6th Street and Brentwood Parkway to turn north. Thus, this TIS is not recommending any improvements at this intersection.

- **Florida Avenue NE & 2nd Street NE**

During the Saturday peak hour, the westbound approach of Florida Avenue NE operates over acceptable thresholds of delay beginning in the 2017 Background conditions.

These conditions could be improved from shifting some green time from the eastbound left turn to the westbound approach. These conditions occur regardless of the PUD and this this TIS is not recommending their implementation as part of the PUD.

- **Florida Avenue NE & 4th Street NE**

During the morning peak hour, the eastbound Florida Avenue approach operates over acceptable thresholds starting in the 2017 Background conditions. With the additional trips generated by the North Building, the delays increase enough that the overall intersection operates over acceptable thresholds.

These conditions could be improved by restriping the southbound approach of 4th Street as a right-turn only lane and a shared left/through lane, with the appropriate changes in signal timing and phasing, including removing the split-phase. This improvement was recommended in the 1270 4th Street NE PUD as a mitigation measure.

- **Florida Avenue NE & 6th Street NE**

During the morning peak hour, the northbound approach of 6th Street NE operates over acceptable thresholds of delay in the Existing Conditions. In addition, during the evening peak hour the eastbound approach of Florida Avenue operates at unacceptable conditions starting with the addition of traffic generated by the South Building.

Although this intersection has significant improvements contained within the *Florida Avenue Multimodal Study*,

these vehicular delays are appearing in the traffic models even with the incorporation of these improvements. Traffic model results show that the addition of a northbound left turn lane, westbound right turn lane, eastbound left turn phase, a southbound left-turn phase, and signal retiming would lower vehicular delays to acceptable levels.

However, this TIS does not recommend any further improvements at this intersection beyond those recommended in the *Florida Avenue Multimodal Study*. The combination of all of these vehicular-based improvements would come at the detriment to pedestrian and bicycle modes. These considerations were reviewed in great depth during the *Florida Avenue Multimodal Study* relative. Because that report included extensive meetings with stakeholders, takes into account a wider study area, and has a wider depth of analysis, this TIS defers to the conclusions reached in that report.

Traffic model results incorporating the above improvements, even those not recommended by this report, are provided for reference in this report's Technical Attachments.

RECOMMENDED IMPROVEMENTS

Before this TIS can recommend any of the improvements outlined above in the vehicular capacity analysis as mitigation measures for the PUD, they need to be reviewed in context with District initiatives (such as the *Florida Avenue Multimodal Study*, and the Small Area Plan), and potential detrimental impacts to other modes. The only improvements recommended as mitigation measures accomplish improvements in vehicular delay without going against goals established within the *Florida Avenue Multimodal Study* or coming at a detriment to pedestrian facilities within streets internal to the market.

Thus, the following are this report's proposed mitigation measures that should become PUD commitments and implemented by completion of the first phase:

- *Morse Street NE & 4th Street NE*
This report recommends that this intersection be converted to all-way stop control. This report recommends that changing the intersection configuration be included in the streetscape improvements undertaken by the Applicant. (This improvement was also recommended in the 1270 4th Street NE PUD TIS.)

- *Florida Avenue NE & 4th Street NE*

This report recommends that the Applicant include optimizing the signal timings at this intersection, as well as formally striping the southbound approach of 4th Street as one right-turn only lane and one shared through/left-turn lane in the streetscape improvements. (This improvement was also recommended in the 1270 4th Street NE PUD TIS.)

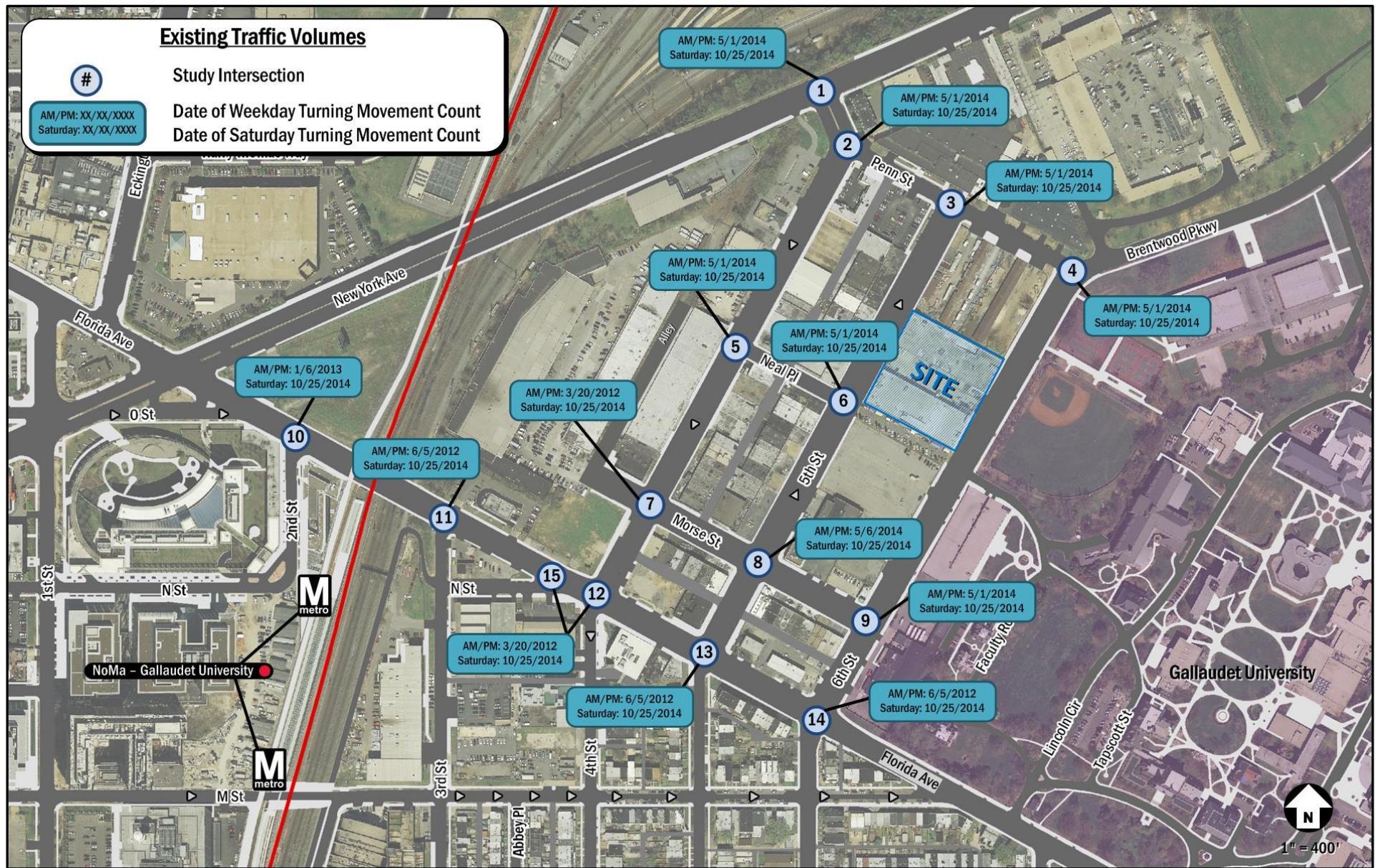


Figure 7: Study Intersections and Existing Volumes

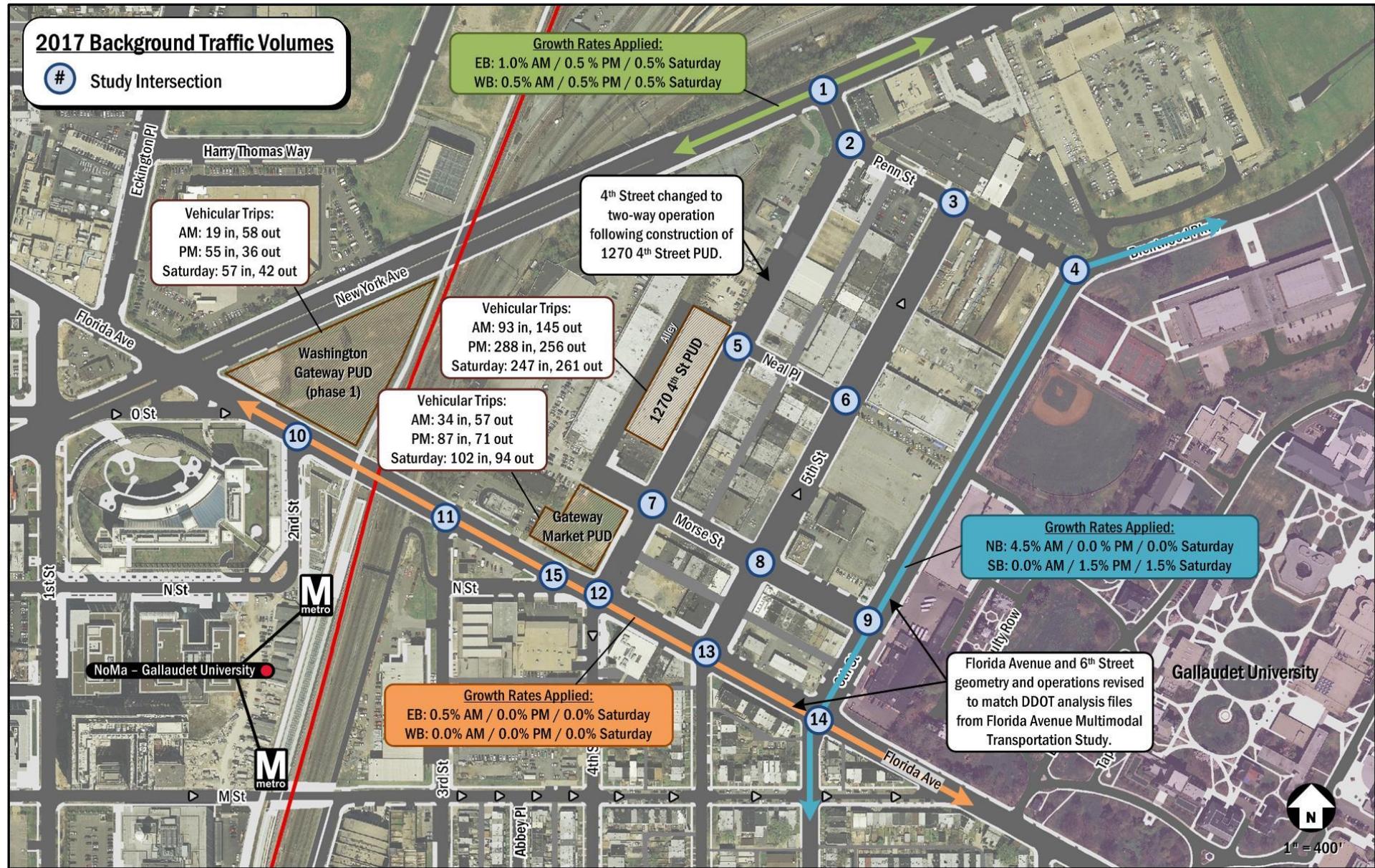


Figure 8: Background Peak Hour Volume Summary

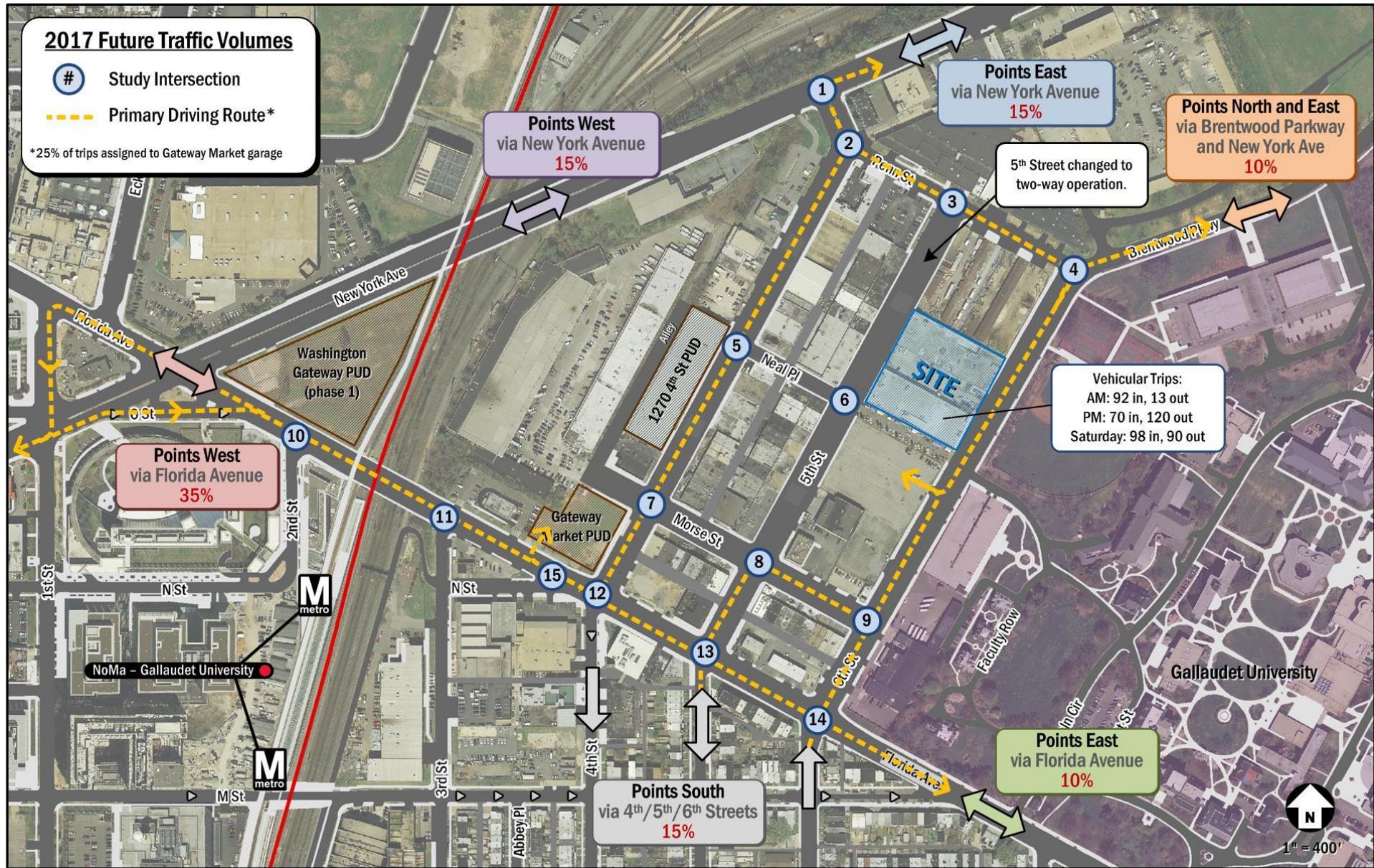


Figure 9: 2017 Peak Hour Volume Summary

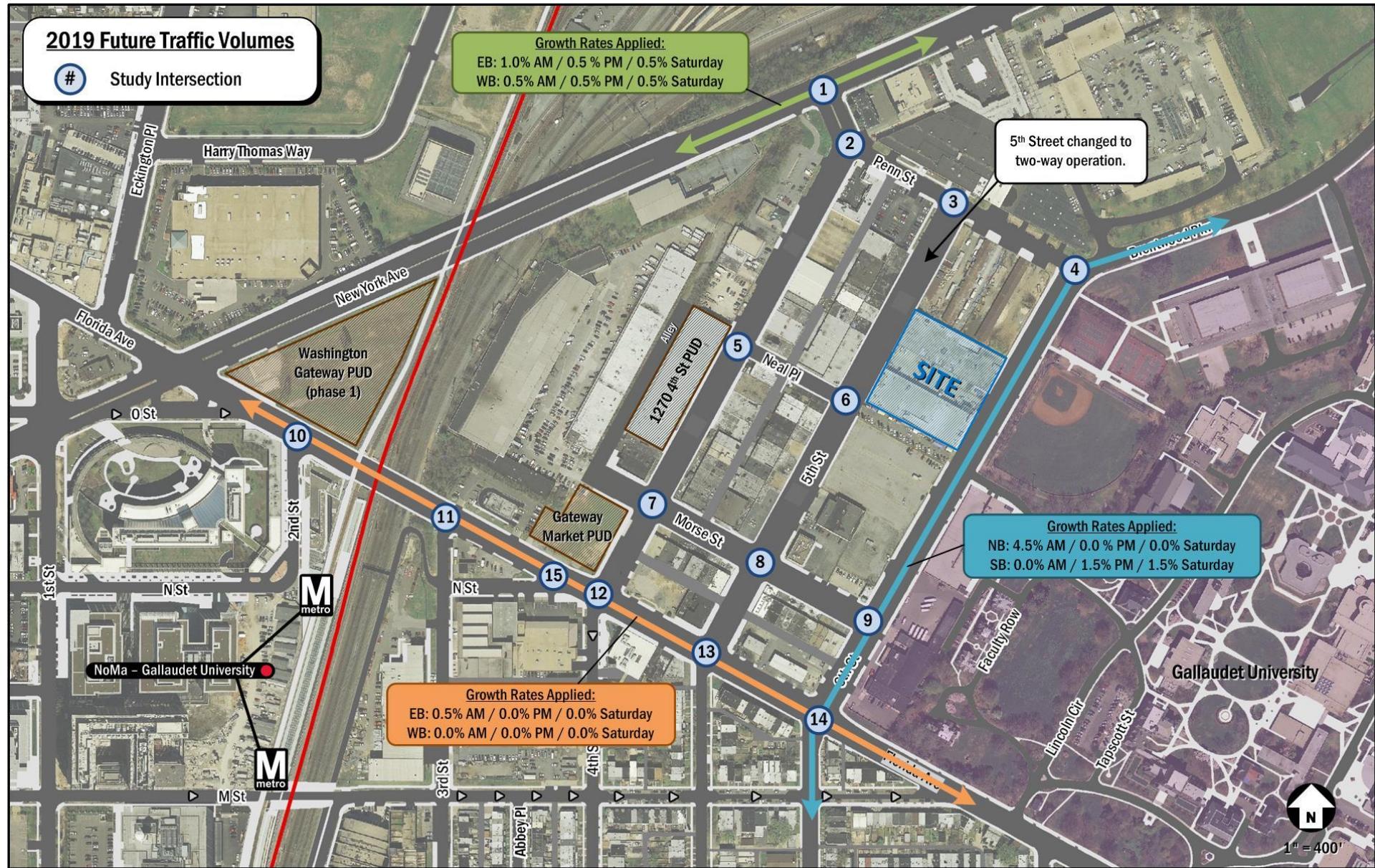


Figure 10: 2019 Peak Hour Volume Summary (1 of 2)

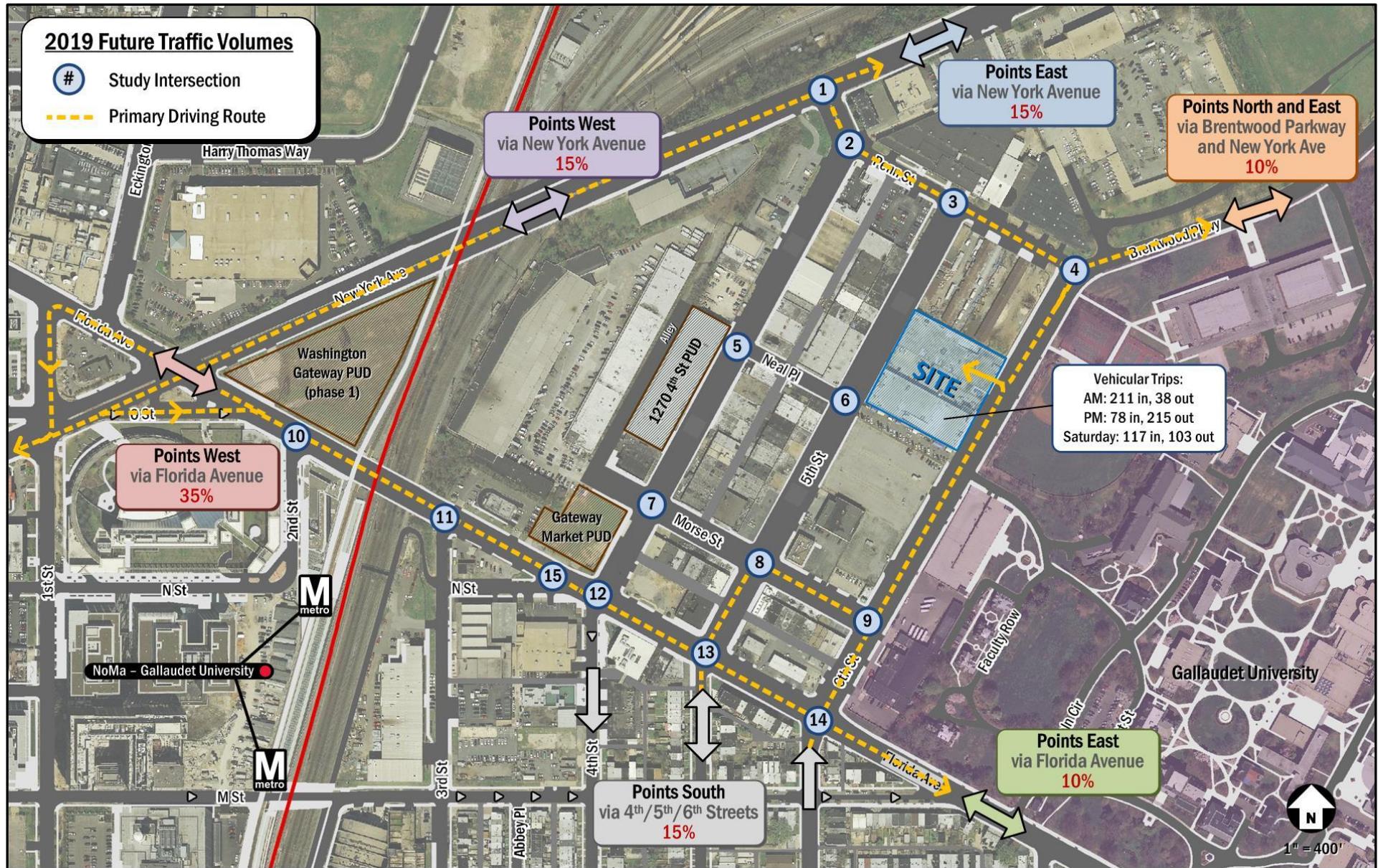


Figure 11: 2019 Peak Hour Volume Summary (2 of 2)

Morning Peak Hour Capacity Analysis Results

X/X/X/X

Overall LOS grade (or highest LOS approach grade for intersection without overall grades) during Existing/2017 Background/2017 Future/2019 Future conditions

X/X/X/X

Intersection operates at acceptable conditions in all scenarios

X/X/X/X

Intersection operates under unacceptable conditions regardless of construction of Angelika PUD

X/X/X/X

Intersection operates under unacceptable conditions due to construction of Angelika PUD

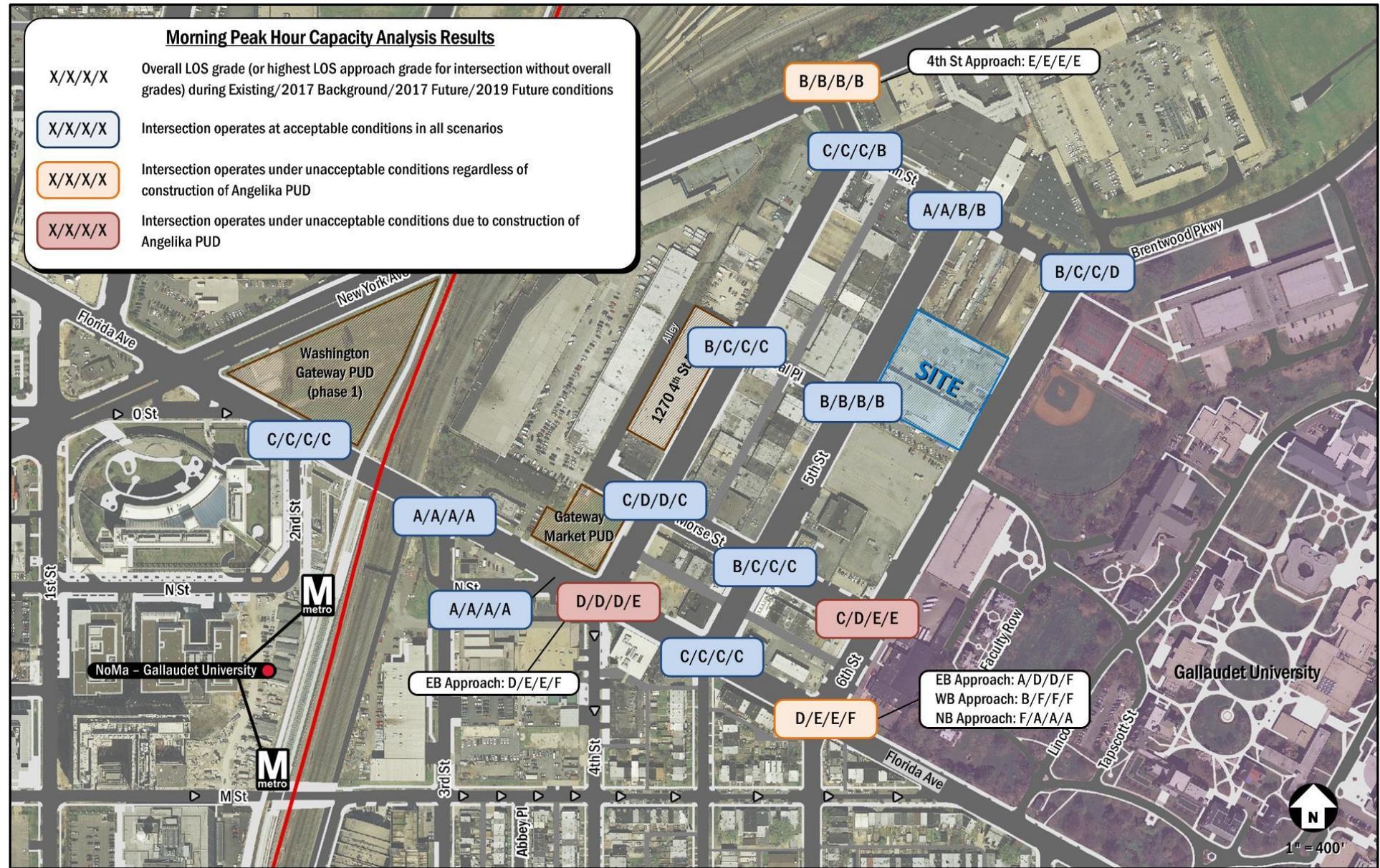


Figure 12: Weekday Morning Capacity Analysis Summary

Afternoon Peak Hour Capacity Analysis Results

X/X/X/X

Overall LOS grade (or highest LOS approach grade for intersection without overall grades) during Existing/2017 Background/2017 Future/2019 Future conditions

X/X/X/X

Intersection operates at acceptable conditions in all scenarios

X/X/X/X

Intersection operates under unacceptable conditions regardless of construction of Angelika PUD

X/X/X/X

Intersection operates under unacceptable conditions due to construction of Angelika PUD

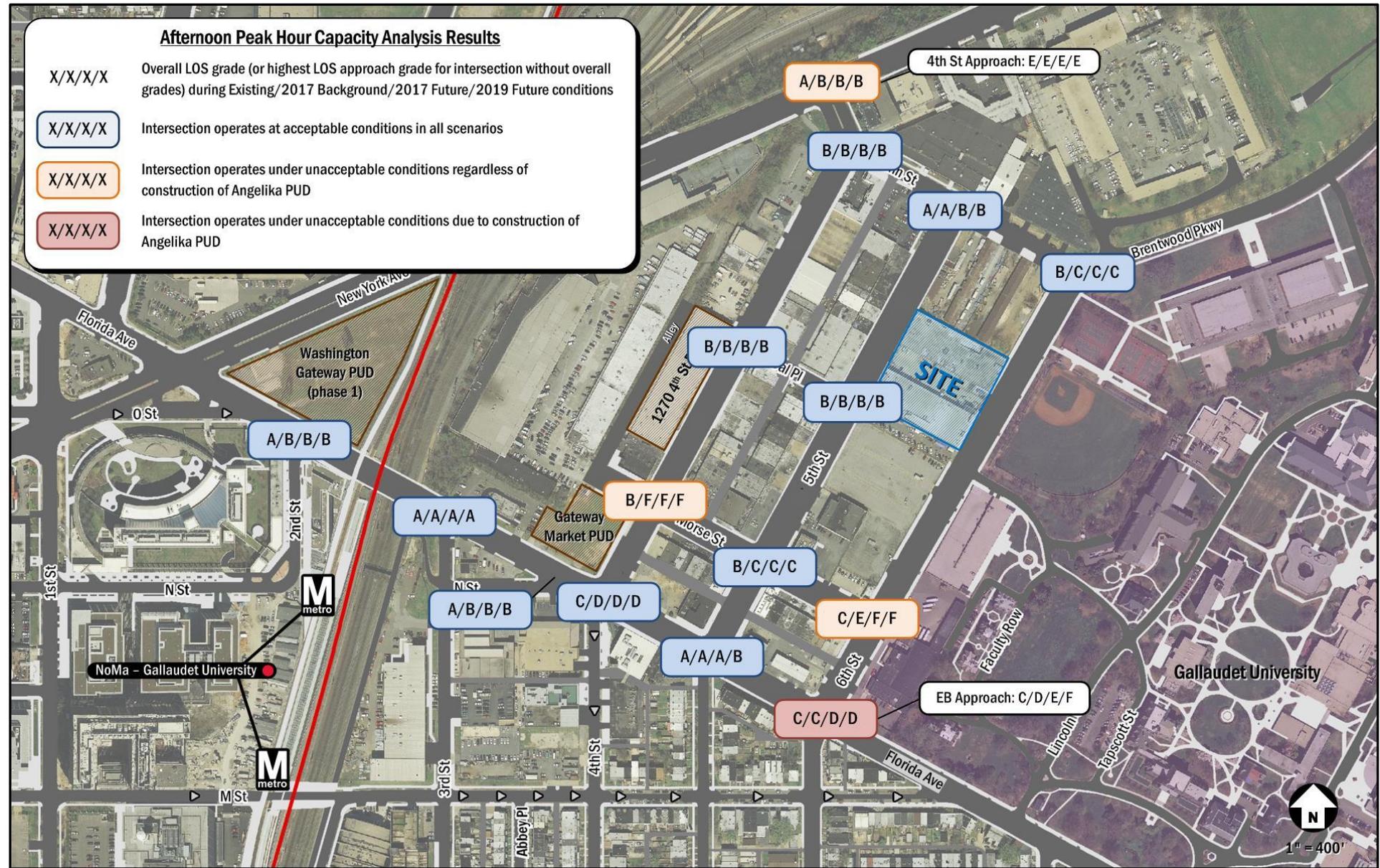


Figure 13: Weekday Afternoon Capacity Analysis Summary

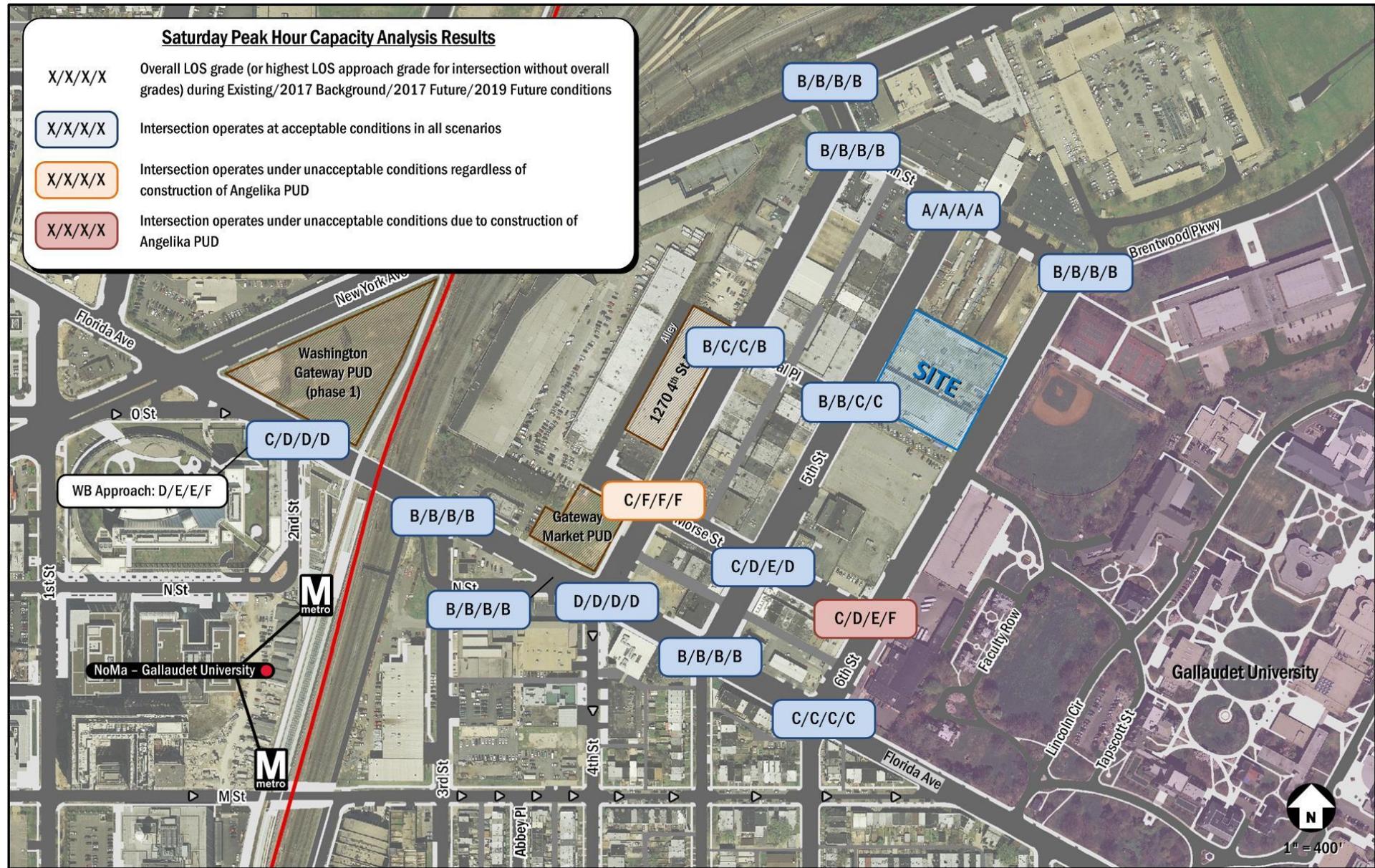


Figure 14: Saturday Peak Hour Capacity Analysis Summary

TRANSIT

This section discusses the existing and proposed transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts due to the development.

The following conclusions are reached within this chapter:

- The site is served by the Metrorail Red Line via the NoMa Station and two Metrobus routes that travel along Florida Avenue.
- The Metrobus routes along Florida Avenue have been studied with proposed recommendations for improved service including a Metro Express route with limited-stop service.
- Transit-trips generated by the site are not expected to have a detrimental impact on the surrounding transit system.

EXISTING TRANSIT SERVICE

The study area is well served by Metrorail and Metrobus. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 15 identifies the major transit routes, stations, and stops in the study area.

The NoMa-Gallaudet U Metrorail station is located approximately one-third of a mile from the development site and is served by the Red Line. The Red Line travels south from Shady Grove, travels through downtown DC, and continues north to Glenmont. Trains run approximately every three minutes during the morning and afternoon peak hours. They run about every 5 to 6 minutes during weekday non-peak hours, every 10 to 15 minutes on weekday evenings after 7:00 pm and 6 to 15 minutes on the weekends.

The site is also serviced by Metrobus along Florida Avenue. The routes serving this area connect the site to many stations in the Metrorail system and with various locations throughout all quadrants of the District. Table 4 shows a summary of the bus route information for the routes that serve the site, including service hours, headway, and distance to the nearest bus stop.

The nearest westbound bus stops are located on Florida Avenue at 3rd Street NE and Florida at 5th Street NE. Both are about equidistant to the site; however, the bus stop at 5th Street offers a bus shelter. The nearest eastbound stops are located on Florida Avenue between 3rd and 4th Street NE and Florida Avenue at 5th Street NE. Neither of these bus stops provides a shelter.

PROPOSED TRANSIT SERVICE

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

Construction of the initial Streetcar Line, which runs along H Street and Benning Road, is complete and service is expected to start within the next few months. This line will be extended to the west in the future and connect with the Georgetown neighborhood. The nearest streetcar stop is located just over half a mile from the site at H Street and 3rd Street.

In addition to the added Streetcar service, a report was completed in 2011 that examined the U Street-Garfield

Table 4: Metrobus Route Information

Route Number	Route Name	Service Hours	Headway	Distance to Nearest Stop
90, 92, 93	U Street-Garfield Line	24 hour service	Peak: 7-15 min Non-Peak: 7-30 min Weekend: 10-20 min	0.2 miles (4 minutes)
X3	Benning Road Line	Weekdays: WB 6:00 am - 8:40 am EB 3:40 pm - 6:10 pm	AM Peak Hour: 7-15 min PM Peak Hour: 20-30 min	0.2 miles (4 minutes)

Metrobus Line. This study recommends improvements

including a new Metro Express Route (99) with limited-stop service. In its initial implementation it would run bi-directionally with 15-minute headways during peak periods only. However, based on demand, service would have the potential of including weekday midday service, weekday evening service, and weekend service in the future.

SITE-GENERATED TRANSIT IMPACTS

The trip generation estimates for the development show that a substantial amount of new transit riders will be generated. The proposed development is projected to generate 207 transit trips (180 inbound, 27 outbound) during the morning peak hour, 216 transit trips (49 inbound, 167 outbound) during the afternoon peak hour, and 72 (38 inbound, 34 outbound) during the Saturday peak hour.

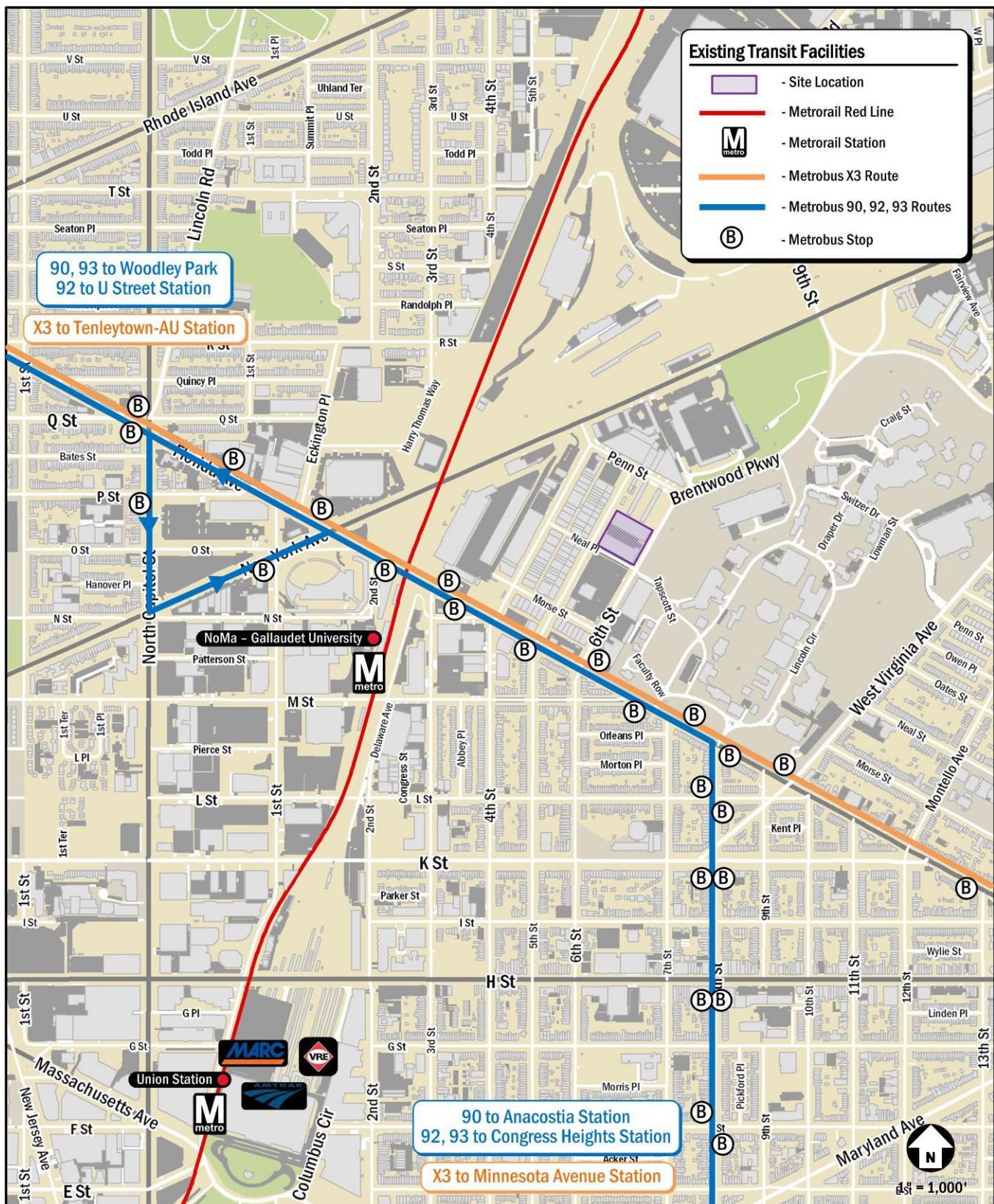
US Census data was used to determine the distribution of those taking Metrorail and those taking Metrobus. The site lies near the border of two census tracts: census tract 88.03 and census tract 106. Based on data from these two census tracts, it is expected that about half of the transit trips will be attributed to Metrorail and the other half to Metrobus.

WMATA studied capacity of Metrorail stations in its *Station Access & Capacity Study*. The study analyzed the capacity of Metrorail stations for their vertical transportation, for example the capacity of the station at elevators, stairs, and escalators to shuttle patrons between the street, mezzanine, and platforms. The study also analyzed stations capacity to process riders at fare card gates. For both analyses, vertical transportation and fare card gates, volume-to-capacity ratios were calculated for existing data (from 2005) and projections for the year 2030. According to the study, high volume-to-capacity ratios were not observed at the NoMa Station in 2005 nor are they expected by 2030. Therefore, the station can accommodate the additional riders generated by the development.

WMATA also studied capacity along Metrobus routes. DC's *Transit Future System Plan* lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). A load factor is considered unacceptable if it is over 1.2 during peak periods or over 1.0 during off-peak or weekend periods. According to this study both Metrobus routes near the site exceed these load factors: The U Street-Garfield Line with an all-day load factor of 1.06 and the Benning Road Line with a peak period load factor of 1.34.

Based on this load factor data, route specific studies were completed for both lines. The Benning Road Line report determined that a Metro Express route would help ease the capacity issues and thus the X9 Limited-Stop route was implemented. Over the coming years it is anticipated that this line will increase its frequency and expand service to midday rather than strictly peak hours. The U Street-Garfield Line report, as discussed above, also determined that a Metro Express route would be the best option for remedying capacity concerns, but this route has not yet been implemented.

Overall, Metrobus service is constrained along the Florida Avenue corridor; however, DDOT and WMATA are aware of these issues and have implemented or have plans to implement improvements to all routes with capacity concerns. Although the development is expected to generate approximately 64 bus trips during the morning peak hour and 90 bus trips during the afternoon peak hour, enhancements to the Florida Avenue corridor routes will support the additional trips.



PEDESTRIAN FACILITIES

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

The following conclusions are reached within this chapter:

- The majority of pedestrian facilities outside of the Union Market district provide a friendly pedestrian environment. Those that do not, particularly Florida Avenue, are being studied to improve pedestrian safety as part of DDOT's *Florida Avenue Multimodal Transportation Study*.
- Within the Union Market district, pedestrian facilities reflect the industrial nature of the site. The development will greatly improve pedestrian conditions on 5th Street adjacent the site by increasing the amount of pedestrian space and decreasing the width of vehicular travel lanes thus creating a streetscape that encourages safer conditions for all modes of transportation.
- The site will generate more pedestrian activity, particularly along 5th and 6th Streets, than the Market currently observes. The proposed improvements along 5th Street will create a safer environment for pedestrians.
- Placing the primary vehicular access for the North Building on 6th Street will lead to smoother traffic and pedestrian operations within the Union Market district. The placement of vehicular access on the perimeter of the Market will reduce the amount of potential vehicular and pedestrian conflicts within the market.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the site were evaluated as well as routes to nearby transit facilities. When evaluating pedestrian facilities, those located within the footprint of the Union Market district study area were not assessed based on typical DDOT standards. The Union Market district consists of an industrial wholesale market, and although this report recognizes that many pedestrian facilities within the market do not provide sufficient functionality, improving conditions does not require conforming to DDOT standards. The Applicant has instead submitted plans that improve pedestrian conditions

adjacent to the PUD while providing the necessary functionality needed (final plans will be reviewed and approved during the Public Space permit process). Thus, this report discusses existing conditions of the Market, how the development will improve the overall pedestrian environment, and how the Market will change over time as more parcels are developed. All other pedestrian facilities surrounding the Market were evaluated based on DDOT and ADA standards.

The site is easily accessible to transit options such as bus stops on Florida Avenue and the NoMa Metrorail Station portal at N Street and 2nd Street NE. The site is also within walking distance of Gallaudet University, the H Street corridor, and Union Station. There are some barriers and areas of concern within the study area that negatively impact the quality of and attractiveness of the walking environment. This includes roadway conditions that reduce the quality of walking conditions, narrow or nonexistent sidewalks, and incomplete or insufficient crossings at busy intersections. Figure 16 shows suggested pedestrian pathways, walking time and distances, and barriers and areas of concern.

SURROUNDING PEDESTRIAN INFRASTRUCTURE

This section outlines the existing and proposed pedestrian infrastructure surrounding the Union Market district.

Existing Conditions

A review of pedestrian facilities surrounding the Market shows that many facilities meet DDOT standards and provide a quality walking environment. Figure 17 shows a detailed inventory of the existing pedestrian infrastructure outside of the Market study area. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by DDOT's *Public Realm Design Manual* in addition to ADA standards. Sidewalk widths and requirements for the District are shown below in Table 5.

Within the area shown, most roadways are considered residential with a low to moderate density. Most of the sidewalks surrounding the site comply with these standards; however there are some areas, which have inadequate sidewalks or no sidewalks at all. The area of poor quality, which

Table 5: Sidewalk Requirements

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

is expected to have the greatest effect on residents and patrons of the development, are the sidewalks along Florida Avenue. As discussed later in this section, however, pedestrian conditions are expected to improve along Florida Avenue. DDOT is aware of the safety concerns associated with Florida Avenue and has initiated the *Florida Avenue Multimodal Transportation Study* which will evaluate safety, streetscape, and operational enhancements along the roadway between New York Avenue and H Street with the vision of improving safety for pedestrian and bicyclists while ensuring all users have safe access within and through the corridor.

ADA standards require that all curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks is not desired. As shown in the figure, under existing conditions there are some issues with crosswalks and curb ramps near the site; however, several of these issues will be remedied through improvements from the *Florida Avenue Multimodal Transportation Study*.

Proposed Pedestrian Facilities

In the vicinity of the site, there are proposed streetscape improvements along 6th Street and Florida Avenue, in coordination with the ongoing *Florida Avenue Multimodal Transportation Study*. Although the final design has not been determined at this time, all potential alternatives result in pedestrian improvements along both roadways.

Under existing conditions, Florida Avenue operates as a 6-lane roadway. The majority of sidewalks are narrow and within the quarter-mile pedestrian study area, no buffers are provided. The sidewalk conditions in conjunction with the high volumes and high speeds along Florida Avenue results in an intimidating experience for pedestrians. The proposed recommendations all including reducing the number of vehicular lanes and using this extra space to support additional and improved pedestrian space.

Under existing conditions 6th Street north of Florida Avenue consists of two 22-foot travel lanes with a 6-foot painted median and 10-foot parking lanes on either side. Additionally there is an 8-foot sidewalk on the west side and a 6-foot sidewalk on the east side. The wide lanes make it easier for cars to travel at higher speeds, therefore all recommendation options for 6th Street show narrower travel lanes, extensive

pedestrian space, and bicycle facilities, all while maintaining the same amount of parking.

The NoMa BID is also embarking on a project to improve the pedestrian walking experience under four underpasses, where the elevated railroad tracks serving Union Station cross Florida Avenue, M Street, L Street, and K Street. These improvements will be mostly artistic in nature, designed to make these underpasses more pleasant and accommodating of pedestrian traffic. The project is completely funded and is in the design stages.

UNION MARKET DISTRICT PEDESTRIAN INFRASTRUCTURE

This section evaluates the existing and proposed pedestrian infrastructure within the Union Market district.

Existing Conditions

As mentioned, the Union Market district study area consists of a industrial wholesale marketplace. Under existing conditions the area is not very pedestrian friendly, with large vehicles blocking sight lines, loading/unloading activity taking place across sidewalks, and a lack of activity at night which creates safety concerns.

Most streets within the Market, including 5th Street in the vicinity of the development, have very wide cross sections, which do very little to encourage safe vehicular speeds and creates unnecessarily long distances for pedestrian to cross. 5th Street also functions as one-way northbound under existing conditions with enough room for two-way traffic and poor signage. Vehicles are occasionally seen traveling the wrong way down the roadway, which creates unsafe conditions for vehicular and pedestrian traffic alike.

Given that the existing sidewalks often double as loading/unloading areas, the majority of sidewalks are approximately 8 to 10 feet. Although some areas even extend as wide as 15 feet, adjacent to the PUD site sidewalks are particularly narrow. Although the sidewalks may be wide in many areas of the Market, the sidewalks are in poor condition and there are very few crosswalks or curb ramps within the Market.

Proposed Improvements

Although the Market plans to maintain the industrial feel of the area, it will be necessary to improve the facilities in the direct vicinity of the site along 5th Street and ensure accessible routes

to and from nearby destinations. It is expected that as the Union Market district is developed, pedestrian facilities will be replaced and improved on a parcel by parcel basis. It is the hope that the streetscape improvements completed for the development will serve as a baseline for developments to come and set the stage for an improved sense of place within the Market.

As part of the development, 5th Street will be converted to a two-way street with more distinct signage to provide some much-needed organizational structure to the roadway. The streetscape improvements along 5th Street will also include a curbless design that encourages an organization of user facilities while maintaining the industrial feel of the site. This design intends to encourage vehicles, pedestrians, and cyclists to pay attention, slow down, and share the street. This is accomplished by greatly decreasing the width of the vehicular lanes, increasing the amount of pedestrian space, adding pedestrian amenities and seating within pedestrian space, and incorporating landscaped elements into the parking lane.

This design also allows the Market to grow over time. As more parcels continue to develop, this same design principle can be easily incorporated into future designs. Pedestrian-specific improvements of this design include the following:

- Café seating outside of restaurants;
- Additional pedestrian amenity space including sidewalks, tree boxes, bicycle parking, and built-in outdoor furniture;
- A shared parking and planter lane as an added buffer between pedestrian space and travel lanes

SITE IMPACTS

This section summarizes the impacts of the development on the overall pedestrian operations within and surrounding the Market.

Pedestrian Trip Generation

The development is expected to generate 46 walking trips (40 inbound, 6 outbound) during the morning peak hour, 59 walking trips (17 inbound, 42 outbound) during the afternoon peak hour, and 34 (18 inbound, 16 outbound) during the Saturday peak hour. The origins and destinations of these trips are likely to be:

- Employment opportunities where residents can walk to work

- Retail locations, such as other locations within the Market, within NoMa, and along H Street

In addition to these trips, the transit trips generated by the site will also generate pedestrian demand between the site and nearby transit stops. The majority of these transit riders will be walking to Florida Avenue to access Metrobus Service or to 2nd and N Street, NE, the nearest portal of the NoMa Metrorail station.

Based on these origins/destinations, most pedestrians generated by the development will be traveling south of the site, along Florida Avenue, 5th Street, and 6th Street, with a small portion of pedestrians traveling within the Market itself.

Pedestrian and Vehicular Interactions

Primary vehicular access to the project, including passenger cars and trucks, will be off 6th Street. For the South Building, the primary parking lot for cars will be the surface lot south of Neal Place, accessed via 6th Street. For the North Building, the parking garage and loading dock will be located off a combined curb cut on 6th Street.

Placing the parking access on the perimeter or the Union Market district reduces the amount of vehicular traffic within the Market and creates a safer environment for pedestrians and cyclists. If the primary vehicular access were located on 5th Street, there would be more opportunity for unnecessary vehicular and pedestrian conflicts.

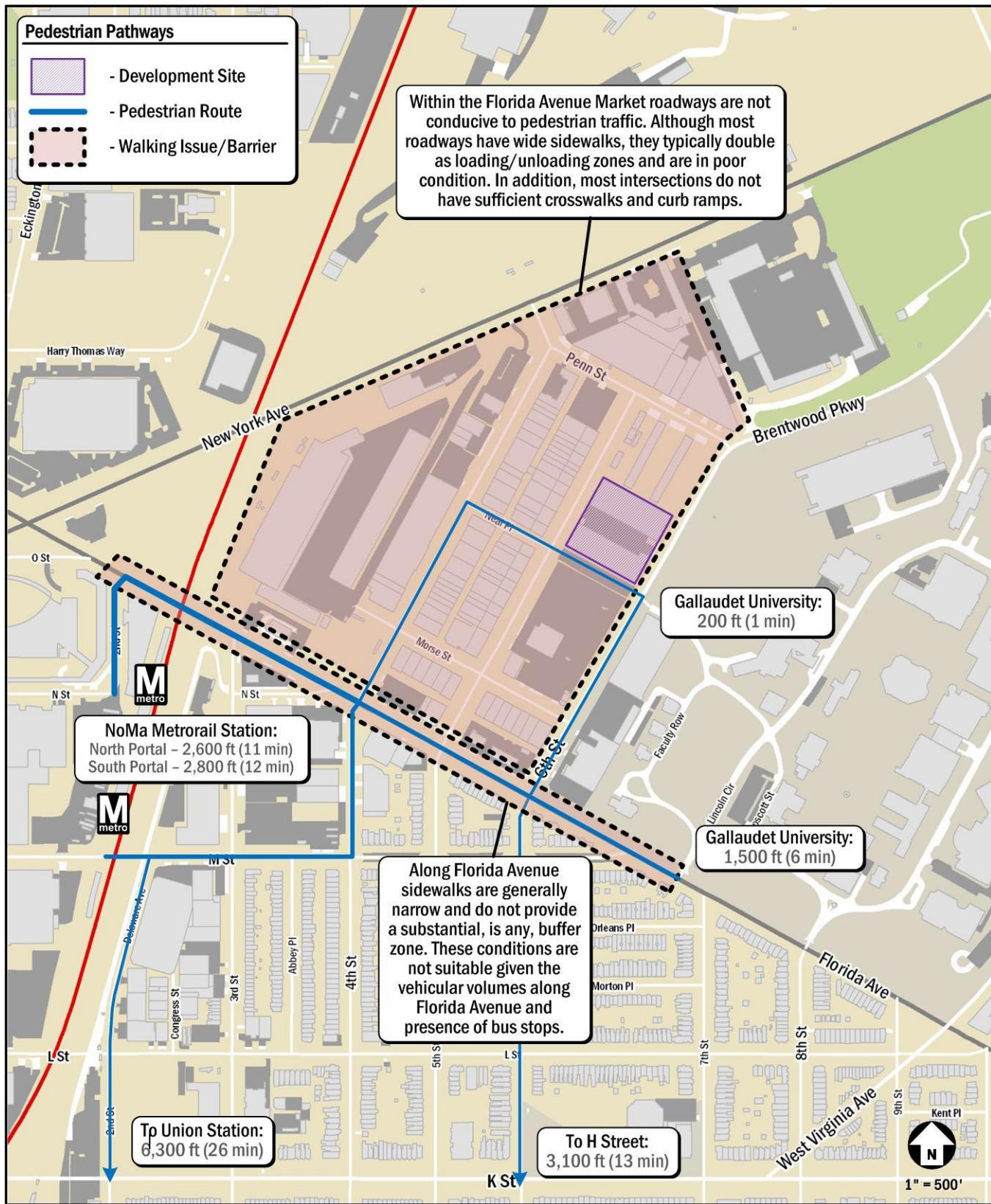


Figure 16: Pedestrian Pathways

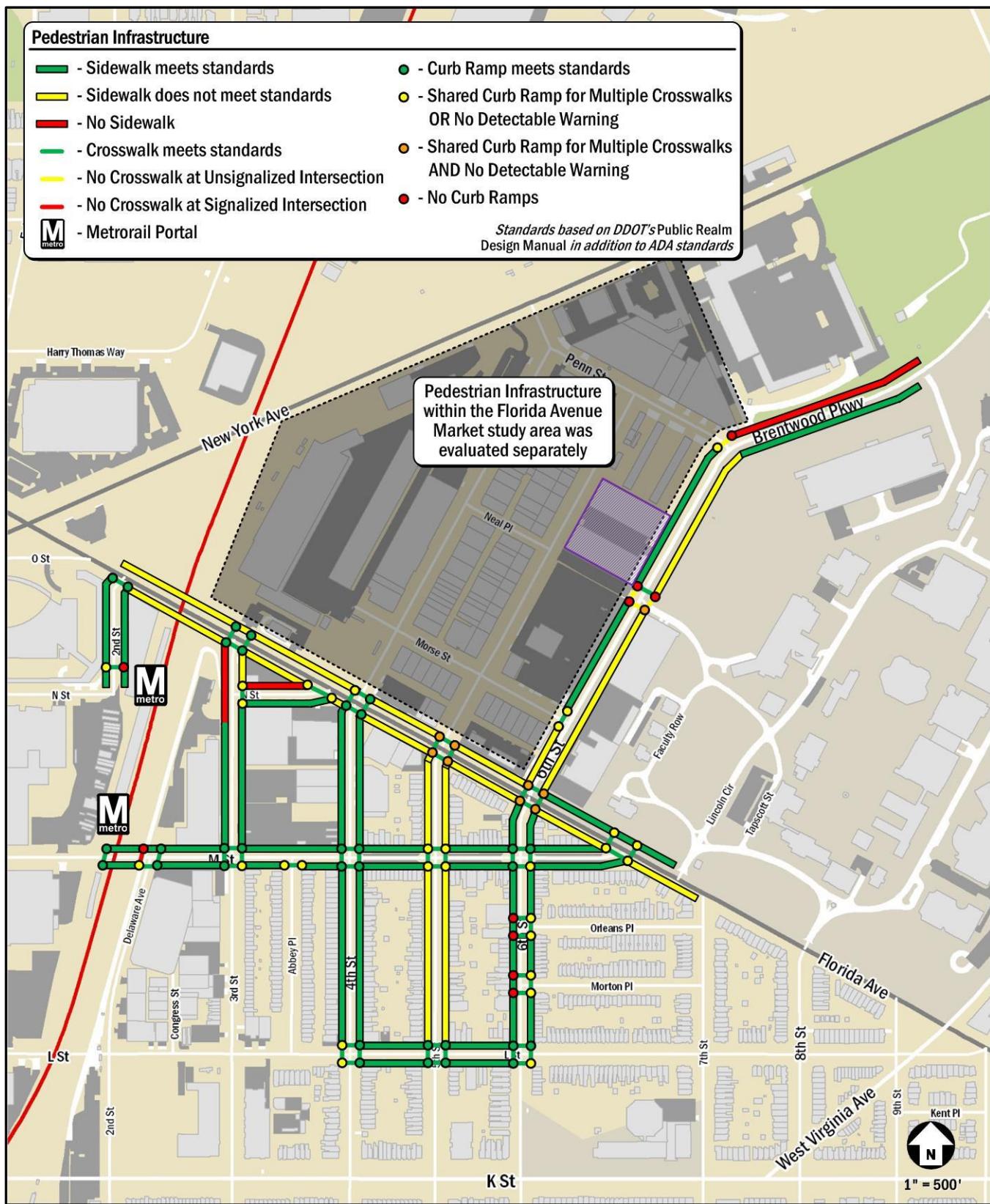


Figure 17: Existing Pedestrian Infrastructure

BICYCLE FACILITIES

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

The following conclusions are reached within this chapter:

- There are multiple high-quality bicycle facilities within the vicinity of the site.
- New protected bicycle infrastructure will be implemented near the site in the coming years that will further improve the cycling conditions in the area.
- There are several bicycle-focused elements of the development plan that will encourage cycling as a safe and effective transportation option for residents and patrons of the development.
- Given the existing and proposed bicycle infrastructure in the study area, the site-generated bicycle trips will not result in detrimental impacts to the bicycle system.

EXISTING BICYCLE FACILITIES

The site has excellent connectivity to existing on- and off-street bicycle facilities. Northbound bicycle lanes along 6th Street NE and southbound bicycle lanes along 4th Street NE provide two-way bicycle circulation between the site and the Navy Yard neighborhood in addition to providing a connection to the bicycle facilities on I Street and G Street. In addition, bicycle facilities along 6th Street have been extended to include a two-way cycle track between Florida Avenue and Penn Street. The site is located just a few blocks from the Metropolitan Branch Trail which provides on- and off-street bike facilities along the Red Line between Union Station and Silver Spring. The Metropolitan Branch Trail also provides connections to many east-west bicycle connections such as the R and Q Street bike lanes which run eastbound and westbound, respectively. Additionally, south of the site, the Metropolitan Branch Trail connects the site to the E Street bike lane. Figure 18 illustrates existing and planned bicycle facilities in the area.

In addition to personal bicycles, the Capital Bikeshare program provides an additional cycling option for residents and patrons of the development. The Bikeshare program has placed over 300 bicycle-share stations across Washington, DC, Arlington and Alexandria, VA, and most recently Montgomery County, MD with over 2,500 bicycles provided. Although there are no Capital Bikeshare stations within a quarter mile of the site,

there are three stations within a half mile: 8th Street & Florida Avenue at Gallaudet University, M Street & Delaware Avenue at the NoMa Metrorail station, and 1st Street & M Street supplying a total of 57 docks. Figure 18 identifies existing station locations in the study area.

PROPOSED BICYCLE FACILITIES

As discussed previously, the Florida Avenue Multimodal Transportation Study is currently in the process of being completed by DDOT. This study focuses on the Florida Avenue corridor between New York Avenue and H Street and will evaluate safety, streetscape, and operational improvements for all users of the corridor. Three alternatives have been conceived for Florida Avenue and 6th Street and one, or a combination of multiple, will be implemented.

Along Florida Avenue, some of the improvements involve adding bicycle facilities along Florida Avenue; however, the potential inclusion of bicycle facilities is still undecided. Along 6th Street the most favorable alternative includes a two-way cycle track on the east side of the road. A temporary two-way cycle track was recently installed along 6th Street between Florida Avenue and Penn Street, but 6th Street may undergo more extensive improvements in the future. These additional improvements could include further narrowing the travel lanes to encourage slower vehicular speeds and widening the two-way cycle track. DDOT recently placed a Capital Bikeshare station near the intersection of 6th Street and Neal Place in space made available through the temporary improvements.

Along 6th Street all improvement alternatives include some kind of bicycle facility ranging from bicycles lanes to a two-way cycle track. Overall, the Florida Avenue and 6th Street corridors will become more bicycle-friendly as a result of the improvements.

In addition to updates along Florida Avenue and 6th Street, the MoveDC plan outlines several other bicycle improvements in the vicinity of the site. These improvements are broken up into four tiers that rank the priority for implementation. The four tiers are broken down as follows:

- Tier 1

Investments should be considered as part of DDOT's 6-year TIP and annual work program development, if they are not already included. Some projects may be able to move directly into construction, while others become high

priorities for advancement through the Project Development Process.

- **Tier 2**

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

- **Tier 3**

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

- **Tier 4**

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

Due to the timeline of the development, this report will focus on the Tier 1 recommendations within the vicinity of the site. These include the extension of the M Street cycle track from Thomas Circle to Florida Avenue and a bike trail along New York Avenue.

Given the existing alignment of the M Street cycle track between Thomas Circle and 28th Street NW, this extension (ultimately connecting Georgetown with NoMa) would provide a safer and more convenient east-west connection through the heart of downtown. The existing east-west bicycle connections are further from the site, do not typically provide protected facilities, and do not provide as extensive of a connection.

Under existing connections New York Avenue serves as a vehicle-centric roadway, but provides convenient access to many residential, office, and retail destinations in neighborhoods to the east. A multi-use trail along New York Avenue would open up these areas to more modes of transportation.

ON-SITE BICYCLE FACILITIES

As discussed in the previous section, the streetscape directly surrounding the site will be significantly altered to create a more favorable multimodal environment. 5th Street will

implement a curbless design that greatly differs from the existing layout of the roadway. Under existing conditions 5th Street is very wide, which does very little to discourage speeding. Bicycles benefit from a curbless design because it creates an environment that encourages vehicles, pedestrians, and cyclists to slow down, pay greater attention, and share the street. Further detail in regards to the streetscape and its implementation will be submitted to the Zoning Commission in a separate document. Although bicycle facilities will not be provided within the Market itself, it is expected that vehicular volumes and speeds within the Market will not be high enough to need them. Bicycles should be able to safely ride along the roadways within the Market to access the surrounding bicycle infrastructure. In addition, the conversion of 5th Street to two-way will improve the connectivity of the Market.

SITE IMPACTS

The project is expected to generate 17 bicycle trips (14 inbound, 3 outbound) during the morning peak hour, 21 bicycle trips (5 inbound, 16 outbound) during the afternoon peak hour, and 11 trips (6 inbound and 5 outbound) during the Saturday peak hour. Although bicycling will be an important mode for getting to and from the site, with significant bicycle facilities located on site and quality routes to and from the site, the impacts from bicycling will be relatively less than impacts to other modes. Overall, the development is not expected to have a negative impact on bicycle facilities in the area.

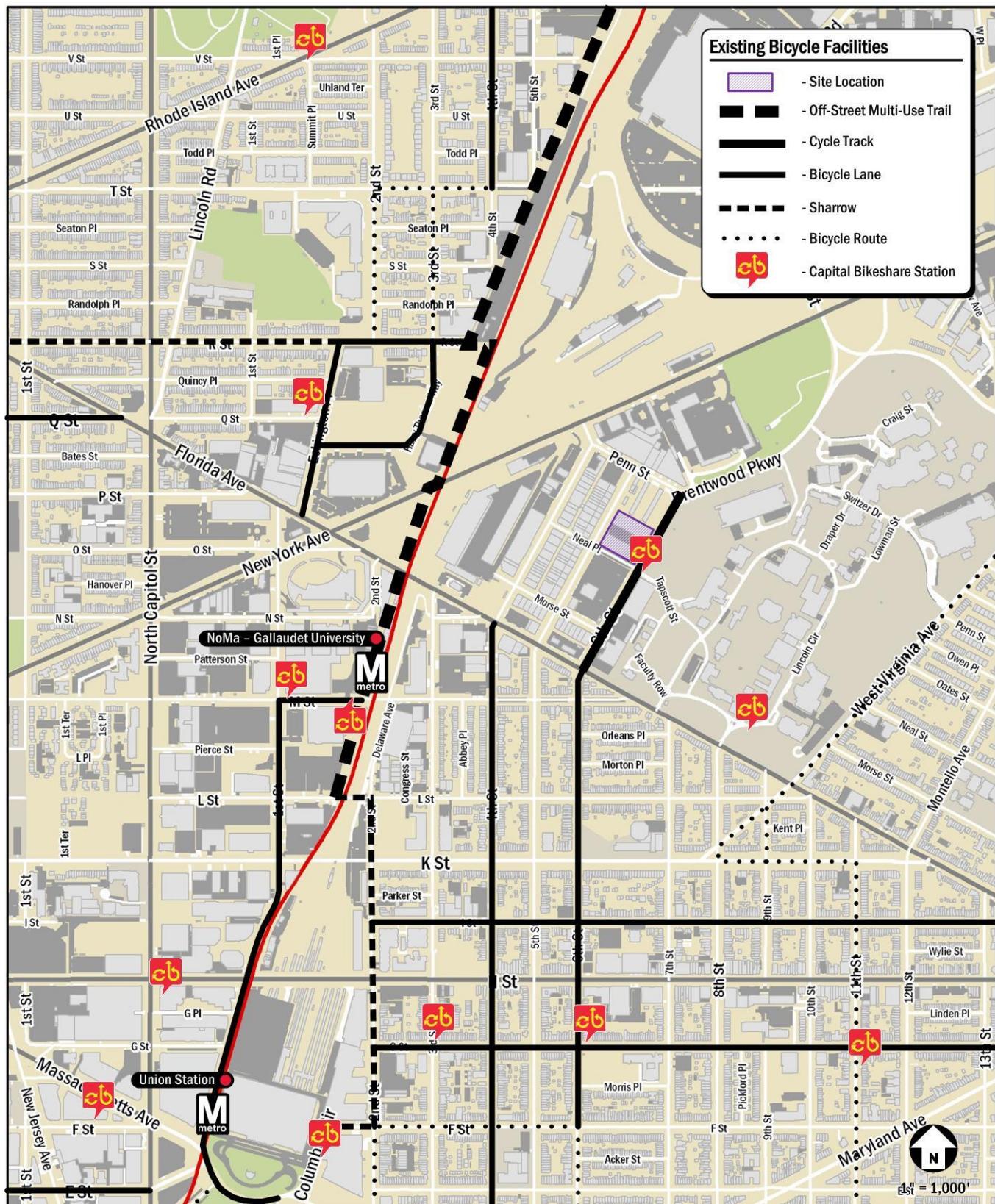


Figure 18: Existing Bicycle Facilities

CRASH DATA ANALYSIS

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

SUMMARY OF AVAILABLE CRASH DATA

A crash analysis was performed to determine if there was an abnormally elevated crash rate at study area intersections. DDOT provided the last three years of intersection crash data, from 2011 to 2013 for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections, the crash rate is measured in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 6.

According to the Institute of Transportation Engineers' *Transportation Impact Analysis for Site Development*, a crash rate of 1.0 or higher is an indication that further study is required. Seven intersections in this study area meet this criterion (as shown in red in Table 6 and detailed in Table 7). The development should be developed in a manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

The crash summary data in Table 6 shows seven intersections

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 elevated crash rates due to operational, geometric, or other issues. Additionally, the crash data does not provide detailed location information. In some cases, the crashes were located near the intersections and not necessarily within the intersection.

For these seven intersections, the crash type information from the DDOT crash data was reviewed to see if there is an elevated percentage of certain crash types. Generally, the reasons for why an intersection has an elevated 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 7 contains a breakdown of crash types reported for the seven intersections with a crash rate over 1.0 per MEV.

POTENTIAL IMPACTS

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

- 4th Street/Penn Street & New York Avenue

This intersection was found to have a crash rate of 2.94 crashes per MEV over the course of the 3-year study

Table 6: Intersection Crash Rates (2011 to 2013)

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
1. 4th Street/Penn Street & New York Avenue NE	93	0	0	2.94
2. Penn Street & 4th Street/Alley NE	3	0	0	0.50
3. Penn Street & 5th Street	2	0	0	0.47
4. Penn Street & 6th Street/Brentwood Pkwy	11	1	0	0.69
5. Neal Place & 4th Street NE	14	0	0	4.01
6. Neal Place & 5th Street NE	7	0	0	2.21
7. Neal Place & 6th Street NE	8	1	1	0.60
8. Morse Street & 4th Street NE	26	2	0	6.11
9. Morse Street & 5th Street NE	10	0	0	2.55
10. Morse Street & 6th Street NE	5	0	0	0.37
11. Florida Avenue & 2nd Street NE	26	0	3	1.77
12. Florida Avenue & 3rd Street NE	48	1	2	2.96
13. Florida Avenue & 4th Street NE	18	0	0	0.96
14. Florida Avenue & 5th Street NE	6	1	0	0.35
15. Florida Avenue & 6th Street NE	24	1	0	0.89
16. Florida Avenue & N Street NE	5	1	0	0.32

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

period. The majority of the crashes at this intersection were rear end and side swiped vehicles. These are likely due to the lack of an exclusive left turn lane along New York Avenue to access the site. Those traveling through the intersection may rear end or side swipe vehicles waiting to turn left. The recent improvements near Mt. Olivet Road, which provide a more conducive route for left-turning traffic, will likely have a positive impact at this intersection. Although no mitigation measures are suggested as part of the PUD, wayfinding signage could be used to direct vehicular traffic to the Union Market district by way of Mt. Olivet Road.

▪ Neal Place & 4th Street NE

This intersection was found to have a crash rate of 4.01 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were rear end and side swiped vehicles. The elevated crash rate is partially due to the very low vehicular traffic observed at this intersection. The elevated crash rate is also likely due to general operations of 4th Street and the intersection itself. 4th Street is wide enough to facilitate two-way traffic however it is restricted to one-way southbound traffic. Signage in regards to the one-way nature of the roadway is infrequent and can be confusing. In addition, the prevalence of truck traffic and implementation of back-in parking creates additional obstacles along the roadway. All of these operational elements likely combine to achieve

the resulting crash rate.

The majority of these operational issues are expected to be improved as part of the 1270 4th Street NE PUD development. This PUD includes converting 4th Street to two-way circulation with more signage implemented to eliminate confusion. The streetscape will create better definition and organization within the roadway and the west side of 4th Street will eliminate back-in parking in favor of parallel parking. An additional advantage is the decrease in truck traffic as a result of the 1270 4th Street NW PUD. Although crash data is not organized by vehicle type, trucks generally have less visibility and thus have an elevated risk of crashes. Overall the improvements will encourage slower speeds along 4th Street and all the new design elements will likely reduce the number of crashes.

▪ Neal Place & 5th Street NE

This intersection was found to have a crash rate of 2.21 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were right angle and side swiped vehicles. The elevated crash rate is partially due to the very low vehicular traffic observed at this intersection. The elevated crash rate is also likely due to general operations of 5th Street and the intersection itself. 5th Street is wide enough to facilitate two-way traffic however it is restricted to one-way northbound traffic. Signage in regards to the one-way nature of the roadway is infrequent and can be confusing.

Table 7: Elevated 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	Non-Collision	Under/Over Ride	Unspecified	Total
4th Street/Penn Street & New York Avenue NE	2.94	4 4%	10 11%	5 5%	32 34%	27 29%	4 4%	1 1%	1 1%	3 3%	0 0%	3 3%	2 2%	0 0%	1 1%	93
Neal Place & 4th Street NE	4.01	0 0%	2 14%	0 0%	4 29%	4 29%	0 0%	0 0%	0 0%	0 0%	1 7%	2 14%	0 0%	0 0%	1 7%	14
Neal Place & 5th Street NE	2.21	2 29%	0 0%	0 0%	0 0%	3 43%	0 0%	1 14%	0 0%	0 0%	0 0%	1 14%	0 0%	0 0%	0 0%	7
Morse Street & 4th Street NE	6.11	2 8%	1 4%	0 0%	2 8%	7 27%	1 4%	3 12%	0 0%	2 8%	2 8%	3 12%	0 0%	0 0%	3 12%	26
Morse Street & 5th Street NE	2.55	2 20%	0 0%	0 0%	1 10%	5 50%	0 0%	0 0%	0 0%	0 0%	0 0%	2 20%	0 0%	0 0%	0 0%	10
Florida Avenue & 2nd Street NE	1.77	4 15%	3 12%	0 0%	4 15%	10 38%	0 0%	0 0%	1 4%	0 0%	0 0%	1 4%	0 0%	0 0%	3 12%	26
Florida Avenue & 3rd Street NE	2.96	6 13%	5 10%	2 4%	18 38%	11 23%	0 0%	0 0%	1 2%	0 0%	1 2%	0 0%	0 0%	0 0%	4 8%	48

In addition, the prevalence of truck traffic and implementation of back-in parking creates additional obstacles along the roadway. All of these operational elements likely combine to achieve the resulting crash rate.

The majority of these operational issues are expected to be improved as part of the development, as includes converting 5th Street to two-way circulation with more signage implemented to eliminate confusion. The streetscape will create better definition and organization within the roadway and the west side of 5th Street will eliminate back-in parking in favor of parallel parking. An additional advantage is the decrease in truck traffic

- **Morse Street & 4th Street NE**

This intersection was found to have a crash rate of 6.11 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were side swiped vehicles. This intersection suffers from the same operational issues as Neal Place & 4th Street, discussed above and will therefore benefit from the same planned site improvements. In addition to the site improvements listed above, Morse Street & 4th Street NE will be converted from 2-way stop-controlled to 4-way stop controlled which will further reduce the confusion at this intersection and result in slower vehicular speeds.

- **Morse Street & 5th Street NE**

This intersection was found to have a crash rate of 2.55 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were side swiped vehicles. This intersection suffers from the same operational issues as Neal Place & 5th Street, discussed above and will therefore benefit from the same planned site improvements. Further safety improvements may be possible through a conversion from a 2-way stop-controlled to 4-way stop controlled intersection. Although the capacity analyses contained in this report show that such an improvement is not necessary for capacity reasons, it may be worth further study by DDOT to determine if an all-way stop would likely decrease the crash rate at this intersection.

- **Florida Avenue & 2nd Street NE**

This intersection was found to have a crash rate of 1.77 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were rear end and side swiped vehicles. As discussed previously, DDOT is in the process of completing a safety study along the Florida Avenue corridor between New York Avenue and H Street. Although the specific improvements have not been finalized, it is expected that more in depth crash analyses along the corridor will result in improved safety at this intersection, and thus decrease the number of crashes.

- **Florida Avenue & 3rd Street NE**

This intersection was found to have a crash rate of 2.96 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were rear end and side swiped vehicles. As discussed previously, DDOT is in the process of completing a safety study along the Florida Avenue corridor between New York Avenue and H Street. Although the specific improvements have not been finalized, it is expected that more in depth crash analyses along the corridor will result in improved safety at this intersection, and thus decrease the number of crashes.

Overall, the combination of thoughtful site design elements and the *Florida Avenue Multimodal Transportation Study* provide the opportunity to greatly improve the overall transportation operations in the area.

SUMMARY AND CONCLUSIONS

The TIS for the proposed 1309-1329 5th Street NE PUD (1309-1329 5th Street NE) development, Zoning Case Number 14-12, reviewed the transportation aspects of the PUD application. This report concluded that **the PUD will not have detrimental impact** to the surrounding transportation network assuming completion of all background improvements and site improvements.

Proposed PUD

The 1309-1329 5th Street PUD project consists of two separate buildings constructed within the Union Market district. Figure 1 contains the project location map.

The first building, known as the South Building, would be constructed over the existing The Market at Union Market building, and will include a movie theater with approximately 1,250 seats over 8 screens and plus either office or residential uses in the upper floors. Option 1 for the South Building would include up to approximately 115,000 gross square feet of office space while Option 2 would include up to approximately the same amount of residential space, consisting of approximately 100 dwelling units. The existing uses, consisting of approximately 62,000 gross square feet of retail space, would remain. The development team is applying for consolidated PUD approval of this building.

The second building, known as the North Building, would replace the existing building north of the Market, and contain approximately 35,000 new gross square feet of retail space and a parking garage comprising between 300-475 spaces plus either office or residential uses in the upper floors. Option 1 for the North Building would include up to 290,000 gross square feet of office space while Option 2 would include up to approximately the same amount of residential space, consisting of approximately 368 dwelling units. The site plan is shown in Figure 2. This building is only applying for Stage 1 PUD approvals.

This project also proposes to implement public space improvements along 5th Street in front of the site, including converting 5th Street to two-way operation. The goal of these changes is to accommodate nearby wholesale market activities while providing ample pedestrian space in keeping with the broader goals of the *Florida Avenue Market Study Small Area Plan*. The concept accommodates public space activities as

diverse as on-street truck backing maneuvers for the adjacent buildings on the west side of 5th Street and café seating for street-level retail tenants, with the option to allow for redevelopment to a more urbanized streetscape as future conditions warrant. Specific elements were added to accommodate the existing wholesale uses on the west side of 5th Street to remain. It is the hope that this concept could set an example for future redevelopment projects

Parking

- Parking for the PUD will be provided in a below-grade parking garage under the North Building with 300 to 475 parking spaces, depending on final tenancy. Access to the garage will be from 6th Street. At full build-out, the amount of parking will be appropriate, accommodating all demand while not encouraging driving as a mode.
- Until construction of the North Building, the South Building will continue to use the existing surface parking lot across Neal Place.

Loading Facilities

- The South Building loading area will be off the entry plaza between the two buildings while trash service will occur off 6th Street. The existing and future loading demand of the South Building addition can be accommodated within the docks provided.
- The North Building loading area is accessed via 6th Street, via head-in/head-out maneuvers, and can accommodate all expected demand within its two 30' truck docks and a trash truck berth.

Vehicular Impacts

The report includes an analysis of potential vehicular impacts of the PUD and recommendations for improvements and mitigation measures. The following conclusions are reached:

- The existing study area roadways generally operate under acceptable conditions during the morning and afternoon peak hour.
- Existing areas of concern for roadway capacity are primarily focused along the heavily trafficked commuter routes: New York Avenue NE and Florida Avenue NE.
- The existing configuration of 4th Street NE and 5th Street NE as one-way with one wide travel lane results in driver confusion as the roadway is wide enough to accommodate two lanes. Additionally, a lack of signage and striping along these roadways, combined with heavy truck volumes,

today results in high vehicular speeds and elevated crash rates.

- The addition of the trips generated by the background developments and inherent growth on the study area roadways has a negligible impact on the study area roadways.
- The background roadway improvements due to the *Florida Avenue Multimodal Study* are projected to have negligible impact on the roadway capacity in the study area.
- The conversion of 4th and 5th Streets NE to two-way operation within the Market will provide a positive benefit, by providing more intuitive and redundant routing options for drivers. Traffic capacity analyses show no negative impacts to vehicular capacity will result from these changes.
- The addition of the trips generated by the South Building leads to unacceptable conditions at the intersection of 6th Street NE and Morse Street NE. However, this TIS is not recommending improvements at this intersection because vehicles experiencing delay while waiting to turn left onto 6th Street NE will likely divert north on 5th Street NE and turn at the intersection of 6th Street NE with Penn Street NE/Brentwood Road NE.
- The addition of the trips generated by the North Building leads to unacceptable conditions at the intersection of Florida Avenue and 6th Street NE. However, this TIS does not recommend any improvements at this intersection beyond those recommended in the *Florida Avenue Multimodal Study*. Necessary improvements to vehicular capacity would have detrimental impacts to other modes. These considerations were reviewed in greater depth in the *Florida Avenue Multimodal Study*.
- This TIS recommends two mitigation measures for the PUD. First, the intersection of 4th Street and Morse Street should be converted to an all-way stop controlled intersection. Second, the southbound approach of 4th Street with its intersection with Florida Avenue should operate with a right-turn only lane and a shared through/left lane during peak times (with associated changes to signal timing/phasing as appropriate to accommodate the change in lane striping).

Crash Data Analysis

Crash data for the past three years was analyzed at the study intersections. The analysis came to the following conclusions:

- The combination of thoughtful site design elements and the *Florida Avenue Multimodal Transportation Study*

provide the opportunity to greatly improve the overall transportation operations in the area.

- Seven intersections within the study area were found to have an elevated crash rate:
 - Four of these intersections are located within the bounds of the Union Market district along 4th and 5th Streets. The overall traffic operations along these streets will undergo extensive changes and improvements as a result of this development combined with the 1270 4th Street NE PUD that are expected to improve safety and operations.
 - Two intersections are along Florida Avenue, which is currently being studied by DDOT as a part of the *Florida Avenue Multimodal Transportation Study*. Although the final recommendations have not been determined, multimodal safety along the Florida Avenue corridor in the vicinity of the site is expected to improve as a result.
 - The intersection of New York Avenue with 4th Street/Penn Street also has an elevated crash rate. The crash data details suggest that this may be due to the lack of a dedicated left turn lane on New York Avenue. The recent improvements near Mt. Olivet Road, which provide a more conducive route for left-turning traffic, will likely have a positive impact at this intersection.

Transit

The following summarizes the site's access to transit and the expected site impacts:

- The site is served by the Metrorail Red Line via the NoMa Station and two Metrobus routes that travel along Florida Avenue.
- The Metrobus routes along Florida Avenue have been studied with proposed recommendations for improved service including a Metro Express route with limited-stop service.
- Transit-trips generated by the site will not have a detrimental impact on the surrounding transit system.

Pedestrian

Based on an analysis of the existing pedestrian conditions, a review of the background improvements and planned site design elements, the following conclusions were made:

- The majority of pedestrian facilities outside of the Union Market district provide a friendly pedestrian environment. Those that do not, particularly Florida Avenue, are being studied to improve pedestrian safety as part of DDOT's *Florida Avenue Multimodal Transportation Study*.
- Within the Union Market district, pedestrian facilities reflect the industrial nature of the site. The development will greatly improve pedestrian conditions on 5th Street adjacent the site by increasing the amount pedestrian space and decreasing the width of vehicular travel lanes thus creating a streetscape that encourages safer conditions for all modes of transportation.
- The site will generate more pedestrian activity, particularly along 5th and 6th Streets, than the Market currently observes. The proposed improvements along 5th Street will create a safer environment for pedestrians.
- Placing the primary vehicular access for the North Building on 6th Street will lead to smoother traffic and pedestrian operations within the Union Market district. The placement of vehicular access on the perimeter of the Market will reduce the amount of potential vehicular and pedestrian conflicts within the market.

Bicycle

The bicycle facilities within the study area were evaluated and the following conclusions were made in regards to the existing and proposed bicycle facilities and the overall impact of the site on bicycle infrastructure:

- There are multiple high-quality bicycle facilities within the vicinity of the site. This includes a two-way cycletrack adjacent to the project on 6th Street, and a Capital Bikeshare station across 6th Street from the site.
- New protected bicycle infrastructure will be implemented near the site in the coming years that will further improve the cycling conditions in the area.
- There are several bicycle-focused elements of the development plan that will encourage cycling as a safe and effective transportation option for residents and patrons of the development.
- Given the existing and proposed bicycle infrastructure in the study area, the site-generated bicycle trips will not result in detrimental impacts to the bicycle system.

Transportation Demand Management

The PUD will include a TDM plan in order to help minimize its potential traffic impacts to the surrounding neighborhood. The following TDM plan is based on the DDOT expectations for TDM

programs, modified to fit the specific needs of the PUD and transportation network. The Applicant proposes that upon construction, the project incorporate several TDM measures, including the following:

- The Applicant shall designate a TDM coordinator, who is responsible for organizing and marketing the TDM plan and who will act as a point of contact with DDOT.
- All parking on site will be priced at market rates at minimum, defined as the average cost for parking in a 0.25 mile radius from the site. All residential parking will be unbundled from the costs of leasing apartments or purchasing condos.
- Bicycle parking will be provided in the North Building garage meeting existing regulatory minimums.
- The building lobbies will display transit and other alternate mode information, using electronic messaging boards.