

COMPREHENSIVE TRANSPORTATION REVIEW

SURSUM CORDA PUD

WASHINGTON, DC

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EXECUTIVE SUMMARY

The following report is a Comprehensive Transportation Review (CTR) for the Sursum Corda project. This report reviews the transportation aspects of the project's Planned Unit Development (PUD) application. The PUD is in two phases; both phases are applying for Stage 1 approval only. The Zoning Commission Case Number is 15-20. The Applicant will be applying for Stage 2 approval for Phase 1 shortly after this application; therefore, this report includes a Stage 2 review for Phase 1 of the project.

The purpose of this study is to evaluate whether the project will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, two background conditions, and two future conditions. This report concludes that **the project will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigations are implemented.

Proposed Project

The development, which will redevelop the existing Sursum Corda Cooperate housing development, is located in the NoMa neighborhood, in the Northwest quadrant of Washington, DC. The site is generally bounded by M Street to the north, First Place to the west, L Street to the south, and First Place/an existing alley to the east.

The application plans to develop the site over two phases:

- **Phase 1** includes up to 430 residential units and 8,315 square feet of community-serving space. For the purpose of this analysis it was assumed that the community-serving space would break down to 2,030 square feet of daycare space and 6,285 square feet of recreational community center space. Although the specific uses of the community-serving space may change, these uses were assumed since they generate a relatively high amount of traffic compared to other potential uses, and thus offer a conservative analysis.
- **Phase 2** includes up to 712 residential units, 23,225 square feet of retail space, and 17,880 square feet of commercial/office space. For the purpose of this analysis, it was assumed that this space will comprise of office uses in order to study the more conservative option.

As part of the development, the internal roadway network will be reconfigured. First Terrace, L Place, and the alley abutting the adjacent church will be removed, to be replaced with a more robust street grid. The existing portion of First Place will be extended south as a public roadway to meet L Street and Pierce Street will be extended east from First Street as a private roadway to meet First Place. L Street will be improved per DDOT standards as possible to provide a half section that will allow two-way operations west of First Place and one-way eastbound operations east of First Place. This allows for improved pedestrian and vehicular connectivity throughout the site, increased porosity, and better integration into the urban fabric.

A shared parking and loading access for Phase 1 will be off of L Street, with head-in/head-out loading operations, with an additional parking access along the new portion of First Place. Parking will be located in a below-grade garage and will provide 272 parking spaces. For Phase 2, there will be one parking access off Pierce Street and one access off First Place. Parking will be located in a below-grade garage with 474 parking spaces. Additionally, two back-in/head-out loading areas will be situated along Pierce Street, which will be a new private street.

Pedestrian facilities along the perimeter of the site will be improved to include sidewalk and buffer widths that meet or exceed DDOT requirements, and Pierce Street, although a private street, will provide ample pedestrian space that exceeds DDOT requirements. The development will supply long-term bike parking within both the Phase 1 and Phase 2 garages and supply short-term bicycle parking in and around the perimeter of the site. The Applicant will also fund the installation of a Capital Bikeshare station on-site.

Multi-Modal Impacts and Recommendations

Transit

The site is well-served by regional and local transit services such as Metrorail and Metrobus. The site is less than half a mile from the NoMa-Gallaudet U Metrorail station serving the Red Line. Metrobus stops are located near the site along M Street, North Capitol Street, New Jersey Avenue, K Street, and H Street.

Although the development will be generating new transit trips on the network, the existing facilities have enough capacity to handle the new trips. There is, however, an existing P6 bus stop along the perimeter of the site that the Applicant has agreed to

improve as part of the public space improvements of the development.

Pedestrian

The site is surrounded by a well-connected pedestrian network. Although some areas of deficiency exist, most will be addressed within the PUD. Most roadways within a quarter-mile radius provide sidewalks, crosswalks, and curb ramps that meet DDOT standards, particularly along primary walking routes. There are some pedestrian barriers surrounding the site such as limited connectivity to the east and west due to I-395 and Metrorail's Red Line tracks.

As a result of the planned development, pedestrian facilities along the perimeter of the site will be greatly improved, particularly along First Street and L Street. The east side of First Street and the north side of L Street currently do not meet DDOT standards and will be brought into compliance as part of the development. The development will ensure that sidewalks along the interior of the site also meet DDOT width requirements and provide an adequate pedestrian environment.

As part of the vehicular improvements to the intersections of First Street & Pierce Street and North Capitol Street & L Street, pedestrian improvements will also be made, including improved or additional crosswalks and updated curb ramps that meet DDOT standards.

Bicycle

The site has adequate access to existing on-and off-street bicycle facilities. The Metropolitan Branch Trail travels along the Metrorail Red Line tracks and several east-west and north-south bicycle facilities surround the site. On site, the planned development will provide secure, long-term bicycle parking within the garages that meet or exceed zoning requirements and provide short-term bicycle spaces within the interior and along the perimeter of the site. The Applicant will also fund the installation of a Capital Bikeshare station on-site to further increase the accessibility of cycling as an alternate mode of transportation.

Vehicular

The Sursum Corda site is well-connected to regional roadways such as I-395, as well as arterials such as North Capitol Street, New York Avenue, and H Street, and an existing network of collector and local roadways.

In order to determine if the proposed development will have a negative impact on this transportation network, this report projects future conditions with and without the development of the site and performs analyses of intersection delays. Due to the phased nature of this development, this analysis included two background conditions, and two future conditions with Phase 1 and full build-out of the site. The delays associated with each analysis scenario are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area.

The analysis concluded that three intersections required mitigation as a result of either Phase 1 or Phase 2 of the development. Mitigation measures were proposed as follows:

- *First Street & New York Avenue NW*
This report recommends this intersection be improved with the addition of a northbound left turn lane, accommodated within the existing roadway width, and PM peak parking restrictions along the southbound approach of First Street in addition to signal timing adjustments.
- *North Capitol Street & L Street NW*
This report recommends that L Street be incorporated into the signal, which is not the case under existing conditions, and subsequent vehicular and pedestrian design improvements should be made.
- *First Street & K Street NW*
This report recommends that PM peak parking restrictions be implemented along the westbound approach of K Street to increase the overall capacity of the roadway. This, along with signal timing adjustments, greatly improves overall intersection operations.
- *First Street & Pierce Street NW*
This report recommends the intersection of First Street & Pierce Street be converted from a two-way stop to an all-way stop, since it meets all-way stop warrants, and would aid east-west pedestrian flow across First Street.

Summary and Recommendations

The PUD has several positive elements contained within its design that minimize potential transportation impacts, including:

- The removal of existing internal roadways and subsequent replacing with new internal roadways provides an upgrade in

the urban fabric of the network, fits future planning efforts, and significantly increases site porosity for all modes of travel.

- The pedestrian facilities adjacent and within the site will be greatly improved. This includes upgrading the sidewalks along First Street adjacent to the PUD, and along L Street where no sidewalks currently exist.
- The inclusion of secure long-term bicycle parking spaces within both the Phase 1 and Phase 2 garages that meet or exceed zoning requirements and the installation of a new Capital Bikeshare station.

This report analyzed the potential impacts of the PUD, and concluded that the PUD will not have a detrimental impact to the surrounding transportation network, as long as the project implements the recommendations as follows:

- Operational improvements to the intersection of First Street and New York Avenue, including restriping pavement to add a northbound left turn lane (subsequently adding a southbound left turn at the intersection of First Street and M Street), restricting parking during the PM peak hour along the southbound approach of First Street, and signal timing adjustments.
- Incorporating the eastbound approach of L Street into the traffic signal at North Capitol Street and L Street. This includes traffic signal modifications, geometry adjustments, and signing/marketing upgrades.
- Operational improvements at the intersection of First Street and K Street NW, including PM peak hour parking restrictions and signal timing adjustments.
- Converting the intersection of First Street and Pierce Street NW from two-way stop controlled to all-way stop controlled, including upgrading curb ramps and crosswalk markings.
- Installing/upgrading curb ramps and crosswalks at the intersection of First Street and L Street NW.
- Implementing the Transportation Demand Management (TDM) plan detailed within the body of this report.
- Purchasing and installing a Capital Bikeshare station within the development in conjunction with DDOT.
- Upgrading the existing bus stop on the southwest corner of M Street and First Place.

These improvements and recommendations are summarized in Figure 1.

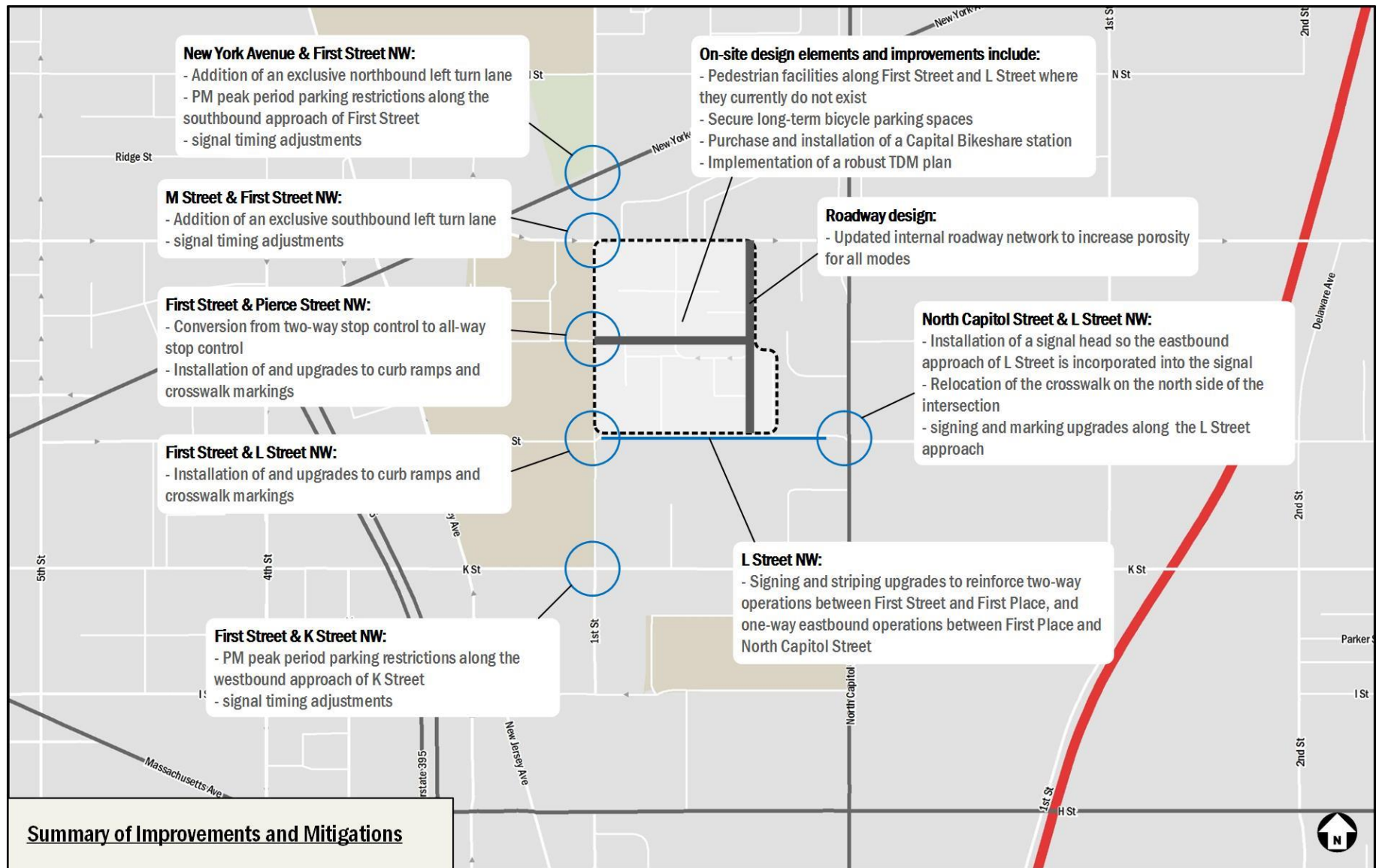


Figure 1: Summary of Improvements and Mitigations



INTRODUCTION

This report reviews the transportation elements of the Sursum Corda PUD. The site, shown in Figure 2, is located in the NoMa neighborhood of Northwest DC.

The purpose of this report is to:

1. Review the transportation elements of the development site plan and demonstrate that the site conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. 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 will be distributed on the network.
3. 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 analyses of vehicular 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 discusses what improvements to the transportation network are needed to mitigate adverse impacts.

CONTENTS OF STUDY

This report contains nine sections as follows:

- *Study Area Overview*
This section reviews transportation-related elements of the area near and adjacent to the proposed project and includes an overview of the site location.
- *Project Design*
This section reviews the transportation components of the project, including the site plan and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the site.
- *Trip Generation*
This section outlines the travel demand of the proposed project. It summarizes the proposed trip generation of the project.

- *Traffic Operations*
This section provides a summary of the existing roadway facilities and an analysis of the existing and future roadway capacity in the study area. This section highlights the vehicular impacts of the project, including presenting proposed mitigation measures.
- *Transit*
This section summarizes the existing and future transit service adjacent to the site, reviews how the project's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.
- *Pedestrian Facilities*
This section summarizes existing and future pedestrian access to the site, reviews walking routes to and from the project site, outlines impacts, and presents recommendations as needed.
- *Bicycle Facilities*
This section summarizes existing and future bicycle access to the site, reviews the quality of cycling routes to and from the project site, outlines impacts, and presents recommendations as needed.
- *Safety/Crash Analysis*
This section reviews the potential safety impacts of the project. This includes a review of crash data at intersections in the study area and a qualitative discussion on how the development will influence safety.
- *Summary and Conclusions*
This section presents a summary of the recommended mitigation measures by mode and presents overall report findings and conclusions.

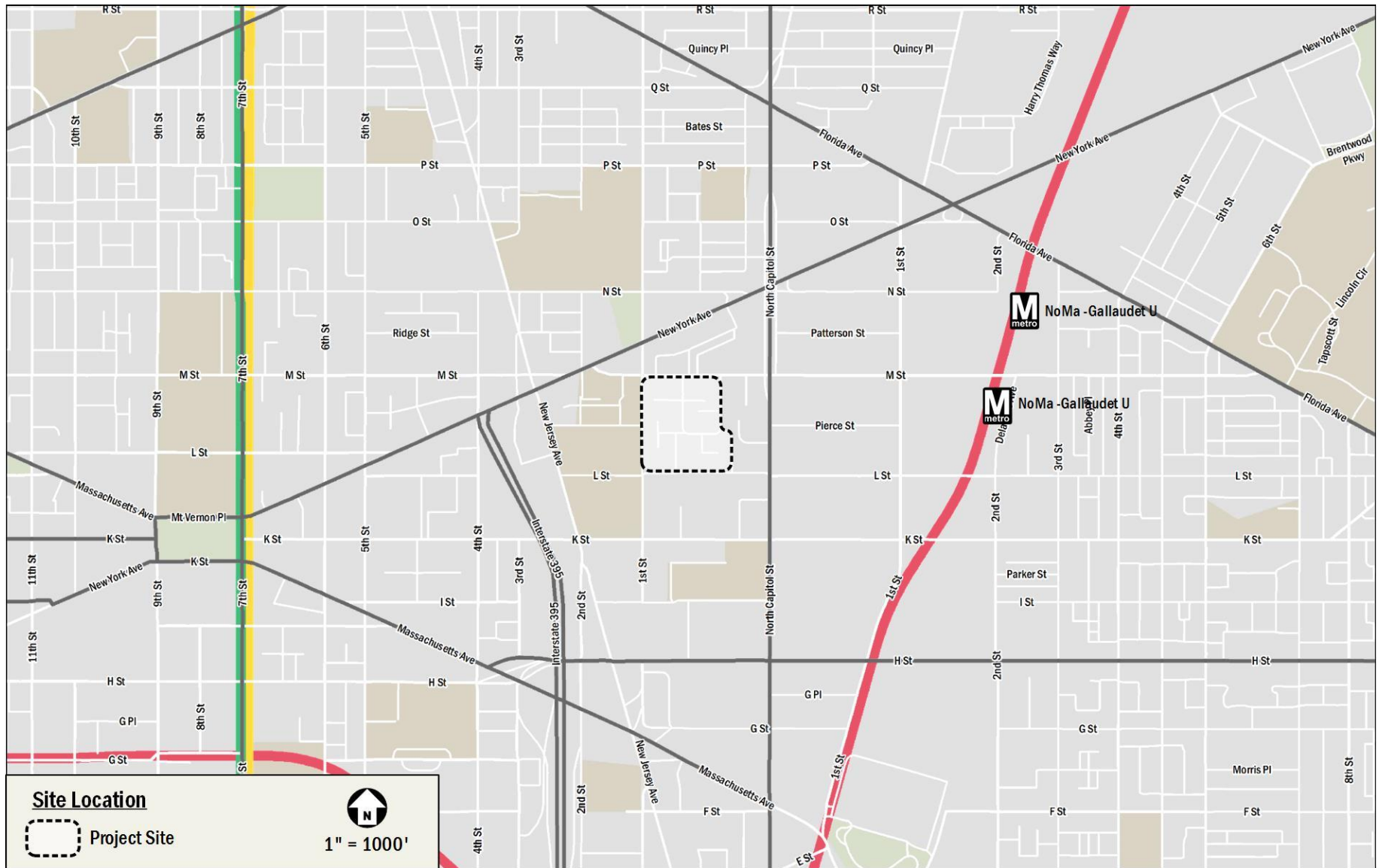


Figure 2: Site Location



STUDY AREA OVERVIEW

This section reviews the existing conditions of the surrounding transportation network and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects. More specific characteristics of each mode and their subsequent study areas will be defined in later sections of this report.

The following conclusions are reached within this chapter:

- The site is surrounded by an extensive regional and local transportation system that will accommodate the residents, employees, and patrons of the proposed development.
- The site is well-served by public transportation with access to the Metrorail's Red line and several local and regional Metrobus lines.
- There are several bicycle facilities surrounding the site including the Metropolitan Branch Trail and multiple east-west and north-south on-street bicycle facilities.
- The site is surrounded by a well-connected pedestrian environment, with the majority of sidewalks and crossings meeting DDOT requirements.

MAJOR TRANSPORTATION FEATURES

Overview of Regional Access

Under existing conditions the Sursum Corda site has ample access to regional vehicular- and transit-based transportation options, as shown in Figure 4, that connect the site to destinations within the District, Virginia, and Maryland.

The site is accessible from several interstates and principal arterials such as I-395, North Capitol Street, New York Avenue, and H Street. The interstate and arterials create connections to I-695, I-295, and ultimately the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs as well as regional access to I-95. All of these roadways bring vehicular traffic within a quarter-mile of the site, at which point minor arterials, collectors, and local roads can be used to access the site directly.

The site has access to the Red Line via the NoMa-Gallaudet U Metrorail station, which provides connections to areas in the District and Maryland. The Red Line connects Rockville, MD

with Glenmont, MD while providing access to the District core. Of particular importance, the Red Line provides a direct connection to Union Station, which is a hub for commuter rail – such as Amtrak, MARC, and VRE – in addition to all additional Metrorail lines, allowing for access to much of the DC Metropolitan area. The site is also just over half a mile from the Mt Vernon Sq/7th St-Convention Center Metrorail Station which serves the Green and Yellow lines. The Green and Yellow Lines travel through the District core and serve destinations in the District, Virginia and Maryland. The Green line terminates to the south at Branch Avenue station in Maryland and to the north in Greenbelt, Maryland. The Yellow Line terminates to the north at Fort Totten near the border of Maryland and the District and to the south in Huntington, Virginia.

Overall, the site has access to several regional roadways and transit options, making it convenient to travel between the site and destinations in the District, Virginia, and Maryland.

Overview of Local Access

There are several local transportation options near the site that serve vehicular, transit, walking, and cycling trips under existing conditions, as shown on Figure 5.

The site is served by a local vehicular network that includes several minor arterials and collectors such as New Jersey Avenue, K Street, First Street NW, and M Street. In addition, there is an existing network of connector and local roadways that provide access to the site.

The Metrobus system provides local transit service in the vicinity of the site, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 5 there are six bus routes that service the site. In the vicinity of the site the majority of routes travel along North Capitol Street, M Street, New Jersey Avenue, K Street, and H Street.

There are existing bicycle facilities that connect the site to areas within the District, most notably the Metropolitan Branch Trail which travels along the Red Line Metrorail tracks and provides a connection to Union Station. Other facilities include a cycle track along First Street NE and M Street NE and several east-west and north-south bicycle lanes within a few blocks of the site. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later section of this report.



In the vicinity of the site, most sidewalks meet DDOT requirements. Anticipated pedestrian routes, such as those to public transportation stops, retail zones, and community amenities, provide well-connected pedestrian facilities. There are some pedestrian barriers in the area that limit the overall connectivity to and from the site and some sidewalks that do not meet DDOT standards; however, background developments may improve upon some of these deficiencies. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report.

Overall, the site is surrounded by an extensive local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

Car-sharing

Three car-sharing companies provide service in the District: Zipcar, Enterprise Carshare, and Car2Go. All three services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar and Enterprise Carshare have designated spaces for their vehicles. There are no Enterprise Carshare locations located within a quarter-mile of the site; however, there are three Zipcar locations within a quarter-mile. These locations and the number of available vehicles are listed in Table 1.

Car-sharing is also provided by Car2Go, which provides point-to-point car sharing. Unlike Zipcar or Enterprise Carshare, which require two-way 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 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.

Table 1: Summary of Carshare Locations

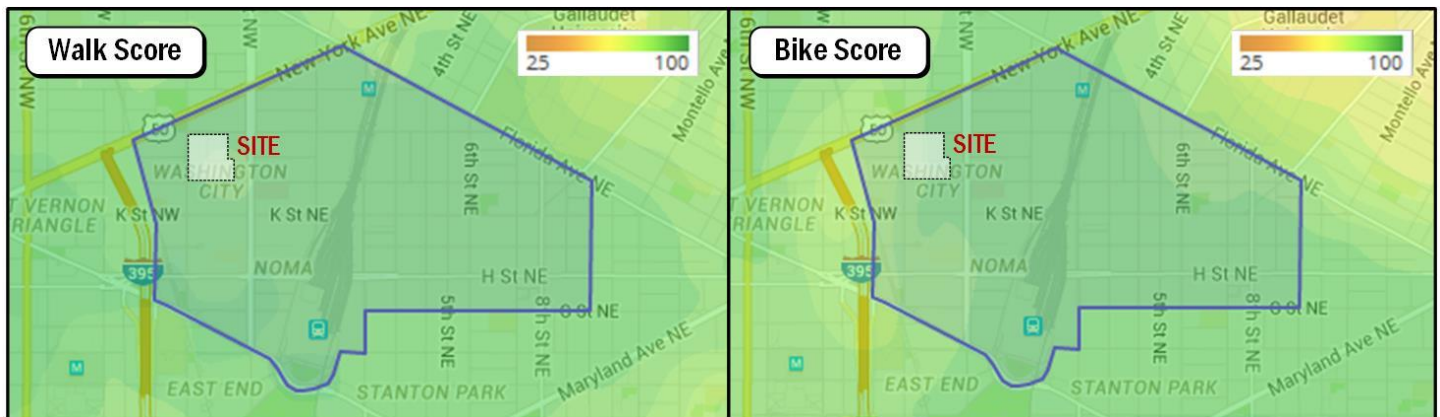
Carshare Location	Number of Vehicles
77 H St Apartments	3 vehicles
Constitution Square	1 vehicle
First and M Apartments	1 vehicle
Total	5 vehicles

Walkscore

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions within neighborhoods of the District. Based on this website the planned development is located in the H Street-NoMa Neighborhood. This project location itself has a walk score of 93 (or “Walker’s Paradise”), transit score of 81 (or “Excellent Transit”), and a bike score of 91 (or “Biker’s Paradise”). Figure 3 shows the neighborhood borders in relation to the site location and displays a heat map for walkability and bikeability.

As shown in Figure 3, the site is situated in a neighborhood that encompasses very good walk scores, and is ranked as the 8th most walkable neighborhood in the district. The site is situated in an area with excellent bike scores as well due to the proximity to bicycle facilities, and overall bicycle-friendly roadways. Overall, the H Street-NoMa neighborhood has extensive pedestrian, transit, and bike facilities, and the high scores reflect these.

Figure 3: Summary of Walk and Bike Scores





FUTURE REGIONAL PROJECTS

There are several District initiatives and background developments located in the vicinity of the site. These planned and proposed projects are summarized below.

Local Initiatives

New Jersey Avenue NW From H to N Street Safety Upgrades & Two-Way Conversion Project

This study was performed by STV Incorporated in June of 2012 to develop and analyze alternatives for the two-way conversion of New Jersey Avenue with the goal of increasing capacity along the corridor while integrating safety enhancements at intersections with high crash activity.

Ultimately, Alternative 3 was chosen as the final design for improvements along New Jersey Avenue. This design converts New Jersey Avenue from one-way northbound to two-way between I Street and Morgan Street, integrates selected safety improvements identified by DDOT, and integrates multi-modal considerations where possible, including north and southbound bicycle lanes. The lane geometry and traffic operations associated with this project are implemented in all Background and Future Conditions within this analysis.

MoveDC: Multimodal Long-Range Transportation Plan

MoveDC is an implementation-based plan that provides a vision for the future of DC's transportation system. As the District grows, so must the transportation system, specifically in a way that expands transportation choices while improving the reliability of all transportation modes.

The MoveDC report outlines recommendations by mode with the goal of having them complete by 2040. The plan hopes to achieve a transportation system for the District that includes:

- 70 miles of high-capacity transit (streetcar or bus)
- 200 miles of on-street bicycle facilities or trails
- Sidewalks on at least one side of every street
- New street connections
- Road management/pricing in key corridors and the Central Employment Area
- A new downtown Metrorail loop
- Expanded commuter rail
- Water taxis

In direct relation to the proposed development, the MoveDC plan outlines recommended transit and bicycle improvements

such as a Streetcar route and new bicycle facilities. These recommendations would create additional multi-modal capacity and connectivity to the proposed development.

Mid-City East Livability Study

The purpose of this plan is to improve the overall livability of the Bloomingdale, Eckington, eastern Shaw, and LeDroit Park neighborhoods by: (1) addressing day to day transportation challenges faced by residents; (2) enhance community access and circulation (particular for walking and bicycling) for all residents; (3) protect local streets as the "home zone" of neighborhoods and communities; and (4) provide opportunities in the public rights of ways to celebrate community identity and place.

These goals are proposed to be addressed by designating pedestrian priority streets, prioritizing safety improvements at major intersections, enhance multimodal travel options along minor corridors, create unique, functional landscapes that provide mitigation for stormwater runoff, and where possible replace pavement with green stormwater management spaces.

Planned Developments

There are several potential development projects in the vicinity of the Sursum Corda site. For the purpose of this analysis, only approved developments expected to be complete prior to planned development with an origin/destination within the study area were included. A detailed list of all background developments considered and a description of their applicability for incorporation in the study is included in the Technical Attachments. Of the background developments considered, six were ultimately included. Figure 6 shows the location of these developments in relations to the proposed development. These background developments are as follows:

▪ *Skanska USA Development*

The Skanska USA Development is a mixed-use development consisting of three buildings. Building 1 (88 M Street) is planned to include 315,000 square feet of office space and 6,500 square feet of retail space. Building 2 (44 M Street) is also proposed to include 315,000 square feet of office space and 6,500 square feet of retail space. Building 3 (22 M Street) is expected to include 285 residential units and 5,000 square feet of retail space. All three buildings of this development are expected to be complete in 2017.



- AVA 55M
AVA 55M is the second phase of the Archstone 1st + M development. AVA 55M offers 436 apartments ranging from studios to 3-bedroom units. The site was previously owned by Archstone, but was later purchased by AvalonBay. A building permit was issued in October 2013. This development is under construction with an expected delivery date of 2017.

- 1150 First Street NE
1150 First Street NE is a mixed-use development which is proposed to include 335,000 square feet of office space and 15,000 square feet of retail space. The development is targeted for completion in 2017.

- 1005 N Capitol Street NE
1005 N Capitol Street NE is a 124-unit multifamily project. The development is currently under construction and expected to be complete early in 2016.

- Camden NoMa Phase II
Phase II of the Camden NoMa development will consist of 406-unit residential building with 2,454 square feet of retail space and 250 parking spaces. The development has an expected delivery date of 2016.

- N Street NoMa
N Street NoMa is a multi-building, mixed-use development located on both sides of N Street, just east of North Capitol Street. The hotel aspect of the site has been constructed and 33 N Street, a building with 340 residential units and 5,000 square feet of ground-floor retail, is currently under construction. The plans for all other lots within the boundaries of the site have not yet been finalized.



Figure 4: Major Regional Transportation Facilities



Figure 5: Major Local Transportation Facilities

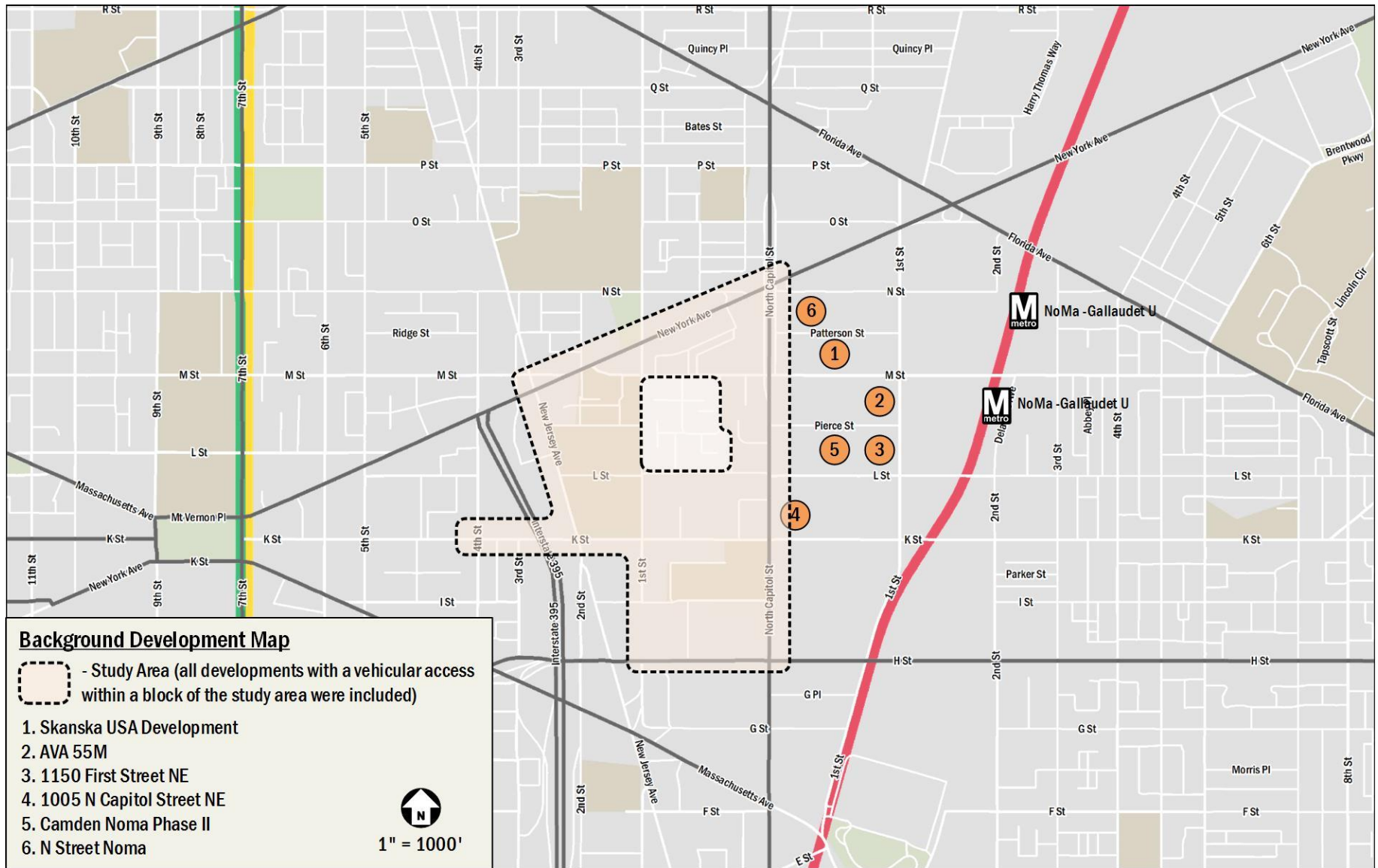


Figure 6: Background Development Map



PROJECT DESIGN

This section reviews the transportation components of the Sursum Corda development, including the proposed site plan and access points. It includes descriptions of the site's vehicular access, loading, parking, and Transportation Demand Management (TDM) plan. It supplements the information provided in the site plans package that accompanied the Zoning Application, which includes several illustrations of site circulation and layout.

The project will redevelop the existing 199 dwelling units at The Sursum Corda Cooperative with a high density, mixed-use project with a thriving, pedestrian-friendly environment. The project will be developed in two phases:

- The southern portion of the site will be developed as Phase 1. Over three buildings, Phase 1 will include up to 430 residential units and 8,315 square feet of community-serving space. For the purpose of this analysis, this space was designated as 6,285 square feet of community recreation space and 2,030 square feet of daycare space, as these are the highest trip generators of the likely uses for this space. Phase 1 will also include all of the proposed changes to the roadway network within the site.
- Phase 2 will encompass the northern portion of the site and include up to 712 residential units, 23,225 square feet of retail space, and 17,880 square feet of commercial/office space, over two buildings. For the purpose of this analysis, it was assumed that this space would comprise of office uses in order to study the most conservative scenario.

The existing site and roadway configuration is shown on Figure 7 and the proposed site plan and subsequent roadway configuration is shown on Figure 8.

The PUD takes advantage of the size of the development to reconfigure and enhance the internal roadway network. The existing alley and street network within the site does not provide robust vehicular or pedestrian connectivity, as shown on Figure 7. Additionally, L Street acts more like an alley than a street and does not provide adequate signage or striping to signify the desired operations. As such, illegal turning movements are observed along and onto the street under existing conditions.

As part of the development, First Terrace, L Street, and the existing alleys will be removed. Pierce Street will be extended to First Place as a private street, First Place will be extended to

L Street as a public street, and L Place will be improved to reinforce the desired operations of the roadway. These improvements to the roadway configuration will create more desirable pedestrian and vehicular flow and will result in an improved pedestrian environment.

The proposed functionality of the internal roadways is as follows:

- Pierce Street between First Street NW and First Place will be a new private roadway with a right-of-way of 70'. Ultimate distribution of this right-of-way will be further refined; however, the current plans include two 10' travel lanes, with 7' wide striped parking lanes along both sides, and 18' sidewalks (including buffers) on both sides of the roadway.
- First Place between M Street NW and L Street NW will be a public roadway extending the existing public road south to L Street NW with a right-of-way of 60'. First Place will have two 10' travel lanes, with 8' wide striped parking lanes. There will be 12' sidewalks (including buffers) on both sides of the roadway.
- L Street NW between First Street NW and First Place is an existing public roadway that once had a right-of-way of 90'. However, the right-of-way was partially vacated decades ago and is slowly being reestablished, as can be seen from the required setback at the newly constructed development on the southeast corner of First Street & L Street. Over time, as parcels along L Street are redeveloped, it is the plan of DDOT to fully reestablish the existing right-of-way of L Street and redesign the roadway to reflect DDOT standards. The development will aid in the gradual improvement process by adding signing and striping along the roadway to include two 10' travel lanes in both directions, with no parking on either side. The sidewalk on the north side of the street will be improved to include a 12' sidewalk (including buffer).
- L Street NW between First Place and North Capitol Street was also impacted by the right-of-way being partially vacated. It is hoped that the right-of-way for this portion of L Street is also reestablished; however, due to the existing properties on either side of L Street, the proposed development will not be able to aid in any physical improvements to this section of L Street other than installing additional signage to improve the enforcement of the one-way eastbound operations.

Figure 9 gives a summary of the proposed roadway changes.



SITE ACCESS

Primary pedestrian access to Phase 1 of the Sursum Corda development will be along Pierce Street for Building 1A and 1B and along L Street for Building 1C. There will be an additional pedestrian access to Building 1C accessible from Pierce Street via an internal pedestrian plaza. Pedestrian access to Phase 2 of the development will be along First Street and Pierce Street for Building 2A/B, and along M Street and Pierce Street for Building 2C/D.

Vehicular access to Phase 1 of the development will be from a shared parking/loading access on L Street with an additional parking access off of the new private portion of First Place. Due to the grade along the Phase 1 site, the two parking access points will access two separate levels of the garage. The loading area will accommodate head-in/head-out loading. There will be four curb cuts as part of Phase 2 of the development. Two curb cuts will be used for parking access – one along Pierce Street and one along First Place – and two will be used for loading access. Both loading accesses will be along the new private Pierce Street and will require back-in/head-out loading. Figure 10 shows a summary of pedestrian and vehicular access throughout the site.

LOADING

Figure 11 and Figure 12 show detailed plans for the loading areas for Phase 1 and Phase 2, respectively. As shown, the shared loading/parking access for Phase 1 will lead to two separate loading areas – one for Buildings 1A and 1C that will have two 30' loading berths and two 20' service/delivery areas, and one for Building 1B that will have one 30' loading berth and one 20' service/delivery area. Each loading area will provide access corridors to the buildings service elevators, each building having a designated trash/service areas. For Phase 2, the two loading areas will each provide one 30' loading berth and one 20' service/delivery area and serve Buildings 2A/B and 2C/D. The loading areas will have service corridors to each

buildings primary service elevator with shared trash/service areas adjacent to each loading area.

Truck routing to and from the site will be focused on designated primary truck routes, such as I-395, New York Avenue, North Capitol Street, New Jersey Avenue, and H Street. The only restricted truck routes surrounding the site are First Street north of New York Avenue, and N Street west of First Street. Turning maneuvers into and out of the site for each loading area are included in the Technical Attachments.

The amount of loading expected at the site is estimated as follows:

- As a baseline, it is assumed that there will be three daily truck deliveries at each of the four individual loading areas (covering trash, a general shared delivery, and mail).
- Residential loading activity is estimated assuming an expected rental turnover of 18 months, with two trucks per move – one move in and one move out.
- Although the exact nature and distribution of retail space is not know at this time, it is expected that there will be four (4) individual retailers. General retail stores are expected to produce an additional two (2) deliveries per day in addition to the baseline shared deliveries.
- Office loading activity is estimated assuming 15 van/UPS deliveries and three (3) 30' truck deliveries per week per building. This site is expected to have two individual office areas.
- For the daycare and recreation center it is assumed that each will have two deliveries per day. This amount of loading is conservative and may be lessened if the development implements alternative commercial or amenity uses.

Table 2: Summary of Loading Supply and Demand

Loading Area	Proposed Loading Facilities	Anticipated Daily Loading Demand
Building 1A/1C	Two (2) 30' Loading Berths	Seven (7) SU-30 deliveries
	Two (2) 20' Service/Delivery Areas	Four (4) Van deliveries
Building 1B	One (1) 30' Loading Berth	Three (3) SU-30 deliveries
	One (1) 20' Service/Delivery Space	Two (2) Van deliveries
Building 2A/2B	One (1) 30' Loading Berth	Six (6) SU-30 deliveries
	One (1) 20' Service/Delivery Space	Six (6) SU-30 deliveries
Building 2C/2D	One (1) 30' Loading Berth	Six (6) SU-30 deliveries
	One (1) 20' Service/Delivery Space	Six (6) SU-30 deliveries



Using these estimates, the anticipated loading activity for each loading area is shown in Table 2.

According to DC zoning requirements, the residential component of the development required to provide one (1) 55' loading berth and one (1) 20' delivery space per each of the five residential buildings. The development is proposing to include one (1) 30' loading berth and one (1) 20' delivery space alternatively. The retail, office, and community-serving spaces within the development do not require a loading areas as they encompass less than 10 percent of the gross square footage of the development. Based on the anticipated loading demand, the proposed amount of loading is sufficient to accommodate all loading and service requirements on site.

PARKING

On-Site Parking

Based on current District zoning laws, and cited on page A-12 of the Zoning application, the development is required to supply 347 parking spaces per zoning requirements, which the site will meet by supplying a total of 746 spaces.

Parking will be allocated to the residential components of the site at a ratio of 0.6 parking spaces per unit. Based on data collection in the Gorove/Slade library, residential buildings in the NoMa neighborhood observe parking demands of approximately 0.45 spaces per unit. Based on the mix of units in the Sursum Corda development and the inclusion of 3-bedroom units, it is believed that a parking ratio of 0.6 spaces per unit will be more suitable to serve the specific needs of this development without promoting vehicle use.

The minimum number of parking spaces required by zoning will be supplied to the remainder of the uses within the development.

Table 3: Proposed Parking Supply

Land Use	Proposed Parking Supply
Phase 1	
Residential	258 spaces
Community Space	14 spaces
Phase 2	
Residential	427 spaces
Retail	27 spaces
Office	20 spaces
Total	746 spaces

A summary of the parking supply by phase and by land use is shown in Table 3.

BICYCLE AND PEDESTRIAN FACILITIES

The project will include both short- and long-term bicycle parking spaces. Secure long-term bicycle parking that meet or exceed zoning requirements will be supplied in both the Phase 1 and Phase 2 garages. In addition, short-term bicycle parking spaces will be placed along the interior and perimeter of the site. These short-term spaces will include inverted U-racks placed in high-visibility areas. The applicant will work with DDOT to determine the exact location of bicycle racks in public space. Additionally, the applicant has agreed to pay for the installation of one Capital Bikeshare station within the site. The exact location of the Bikeshare station will be determined during the Stage 2 PUD review.

Pedestrian facilities will be improved along the perimeter of the site. Sidewalks along First Street currently do not meet DDOT standards and there are no sidewalks along L Street. Sidewalks will be added or improved along the entire perimeter of site, as well as the new extension of Pierce Street, to meet or exceed DDOT standards. Additionally, a pedestrian plaza will be built through the center of site that will be open to the public. Overall the development will provide a greatly improved pedestrian environment in the vicinity of the site.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

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

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

- The Applicant will identify TDM Leaders (for planning, construction, and operations). The TDM Leaders will work with residents to distribute and market various transportation alternatives and options.
- The Applicant will establish a TDM marketing program that provides detailed transportation information and promotes walking, cycling, and transit. An effective

marketing strategy should consist of a multi-modal access guide that provides comprehensive transportation information. This information can be compiled in a brochure for distribution. The marketing program should also utilize and provide website links to CommuterConnections.com and goDCgo.com, which provide transportation information and options for getting around the District.

- The Applicant will unbundle all parking costs from the cost of the lease and set the cost at no less than the charges of the lowest fee garage located within a quarter-mile of the site.
- The Applicant will dedicate two (2) parking spaces in each garage for car sharing services to use with right of first refusal. These spaces should be located near the garage entrance and available to all members of the car-sharing service at all times without restriction.
- The Applicant will install Transportation Information Center Displays (kiosks or screens) within the lobbies of the residential multi-family buildings and the community serving buildings, containing information related to local transportation alternatives.
- The Applicant will supply long-term secure bicycle parking within the garages and short-term bicycle parking along the interior and perimeter of the site that exceed zoning requirements.
- The Applicant has agreed to fund the installation of a Capital Bikeshare station within the site.

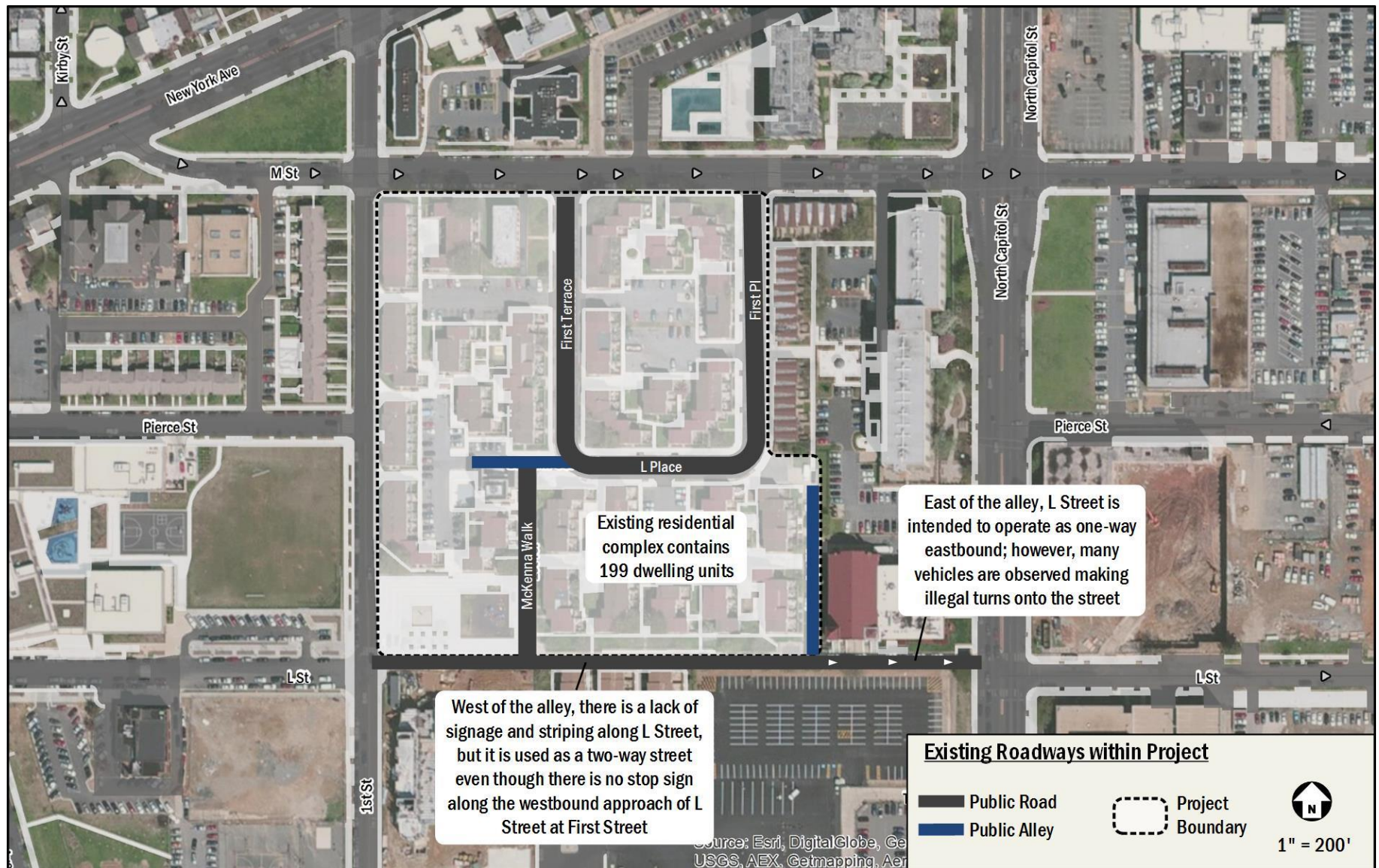


Figure 7: Existing Site and Roadway Configuration

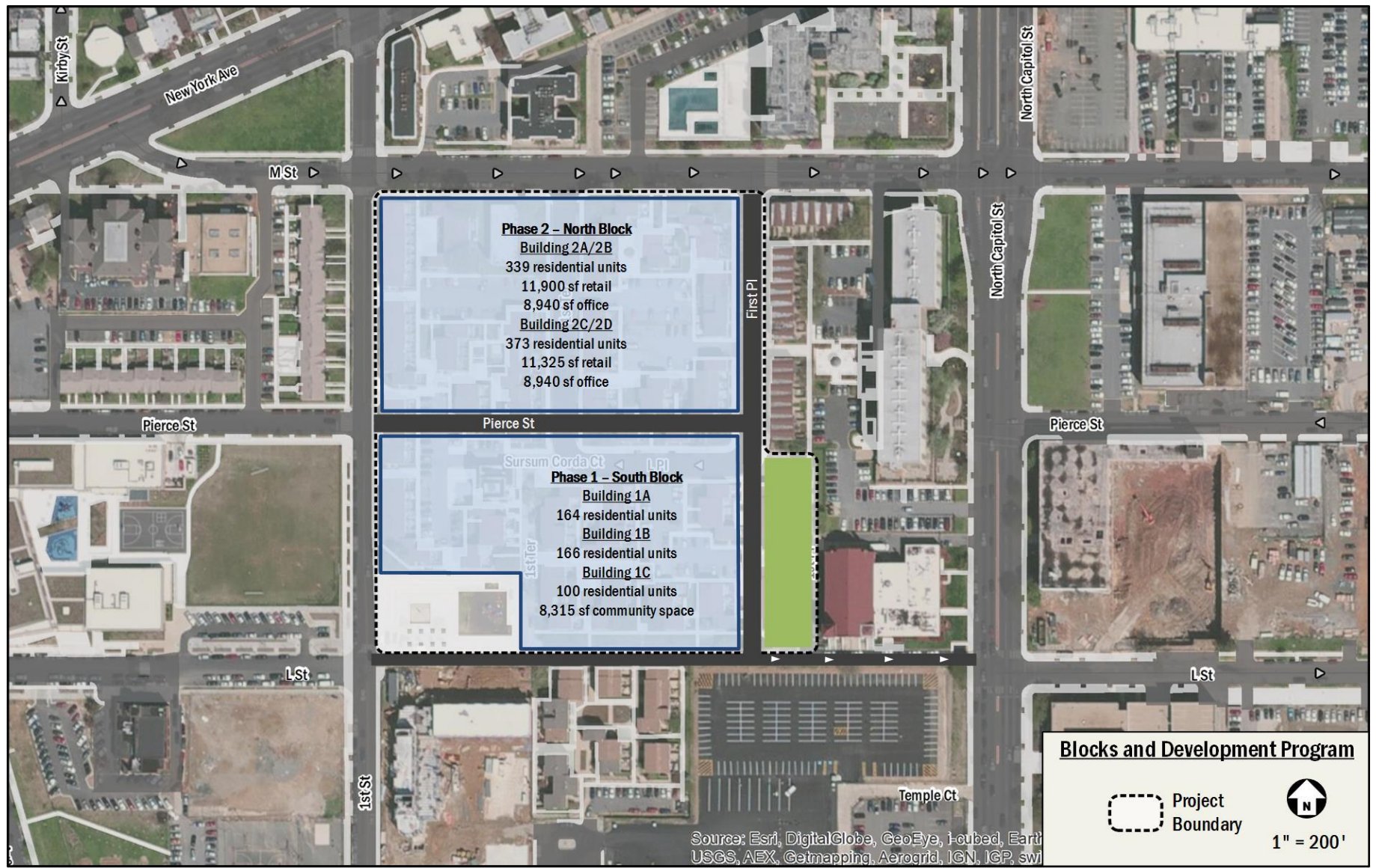


Figure 8: Proposed Development Program

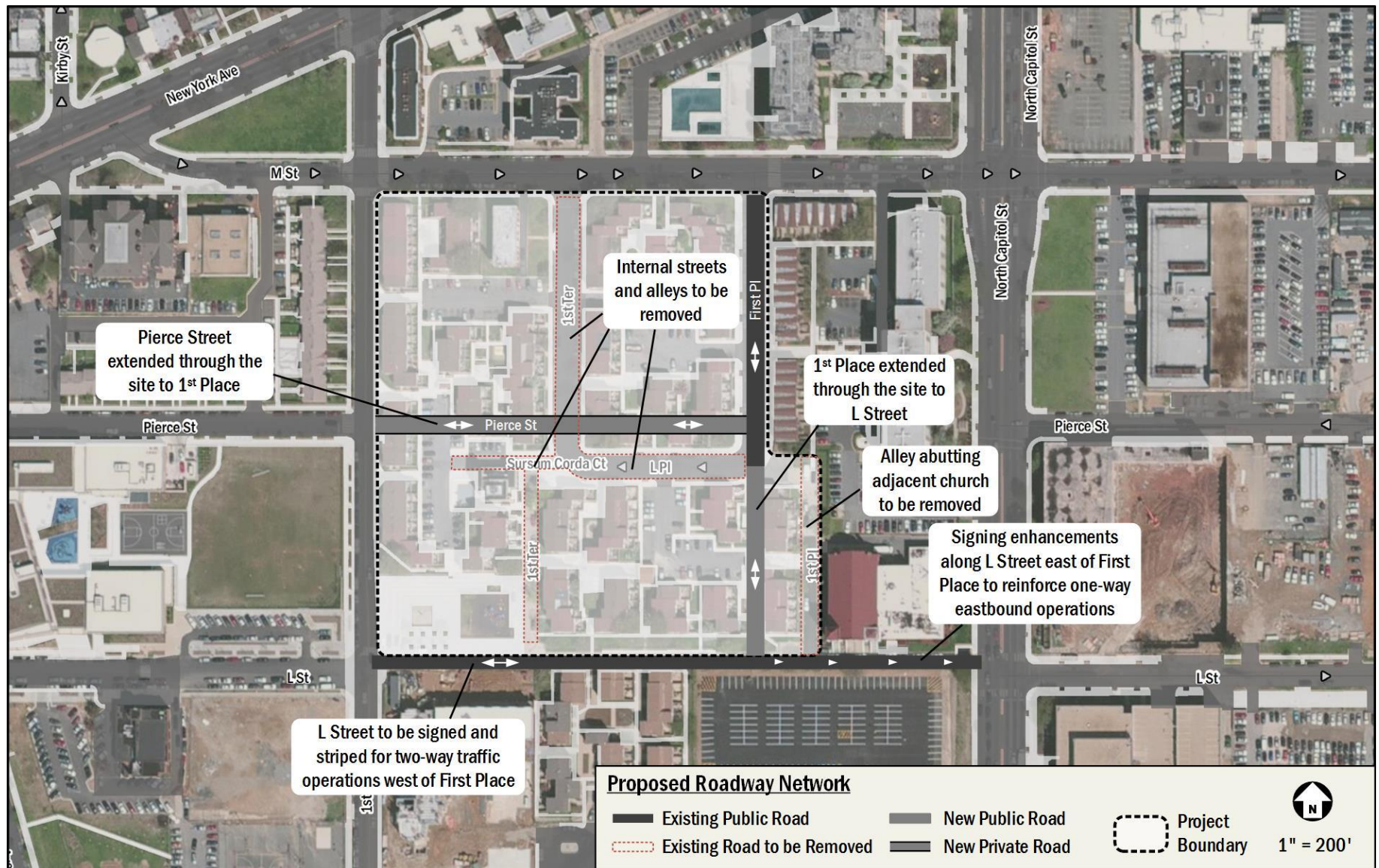


Figure 9: Proposed Roadway Network

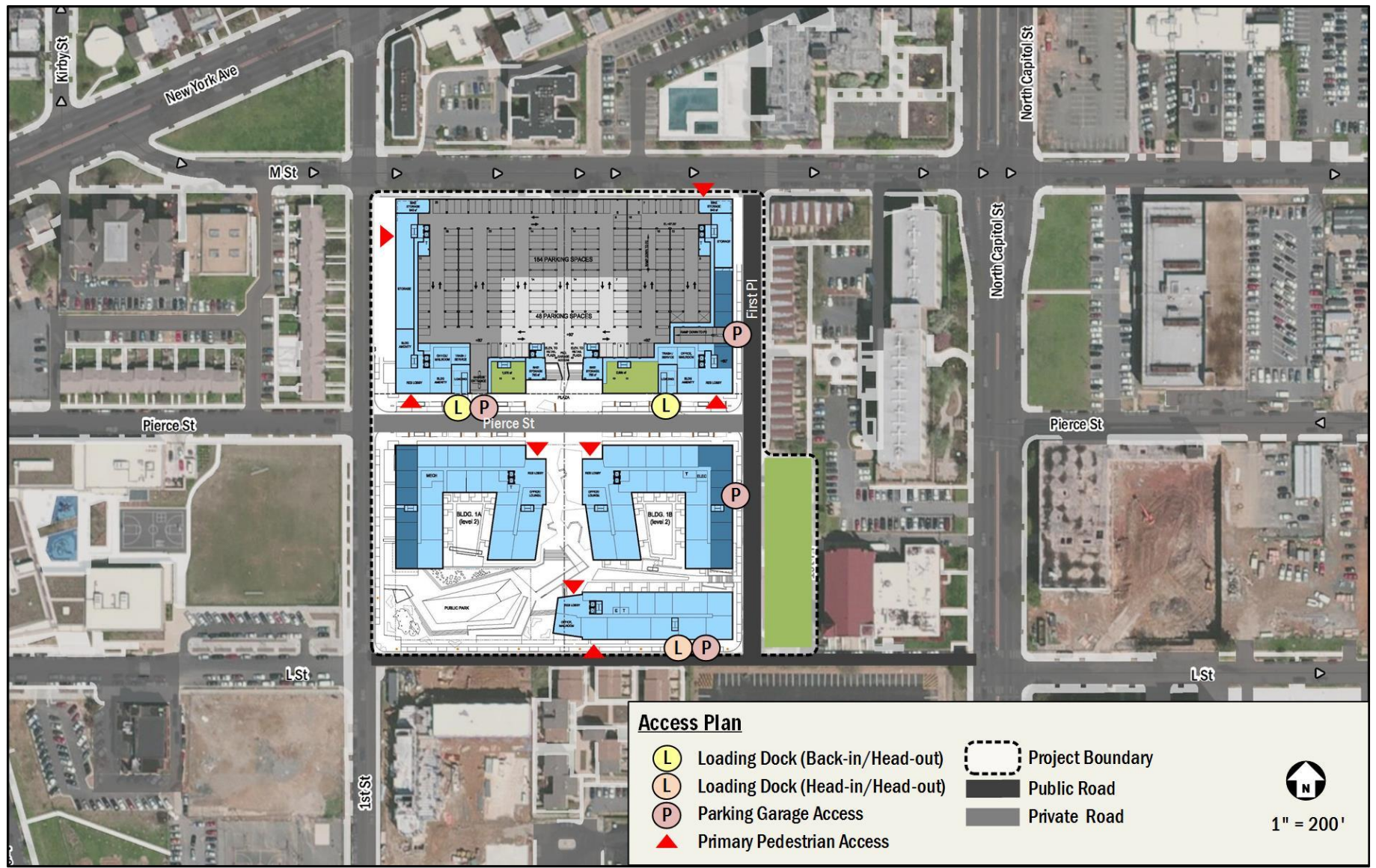
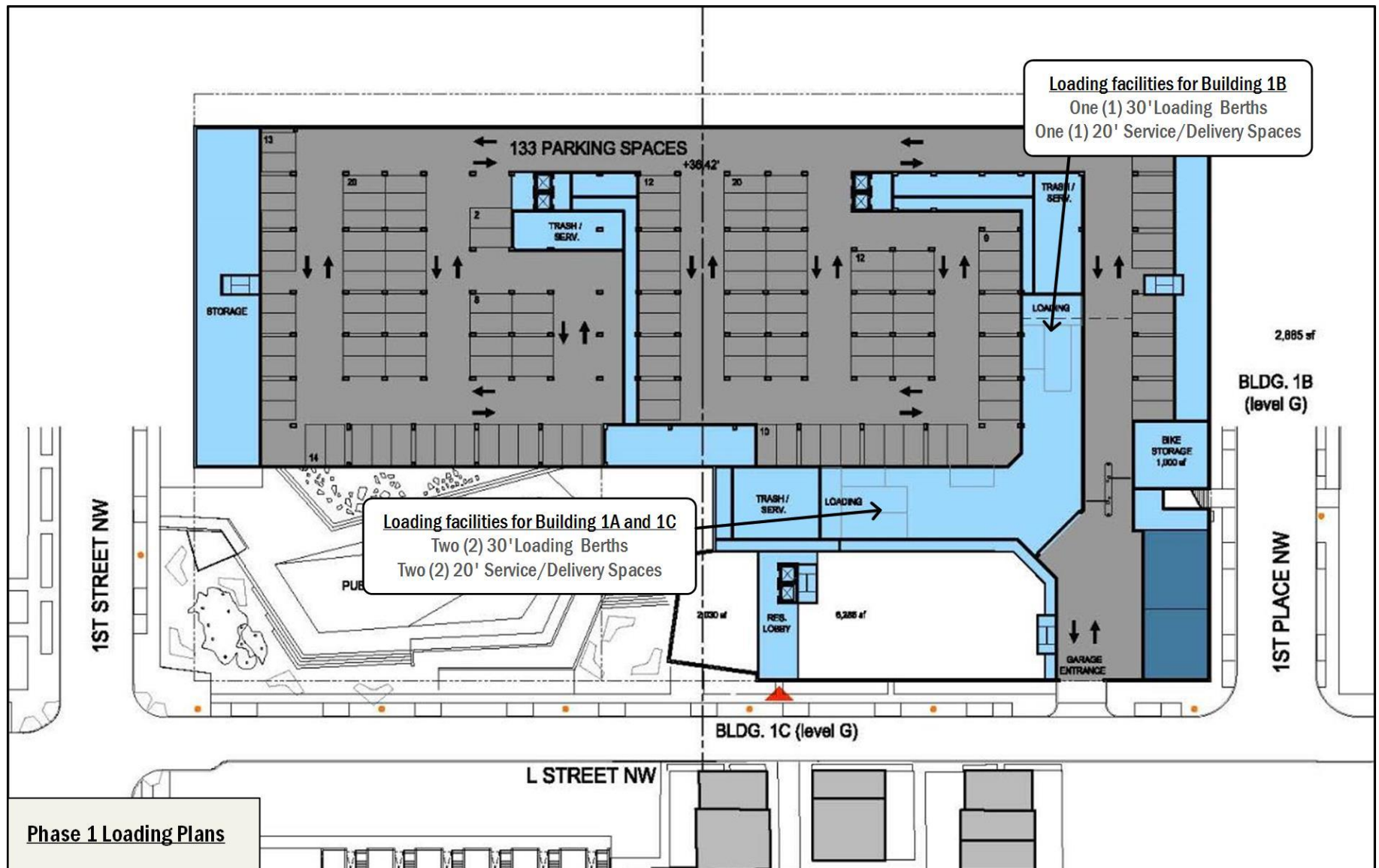


Figure 10: Access Plan



Phase 1 Loading Plans

Figure 11: Phase 1 Loading Plans

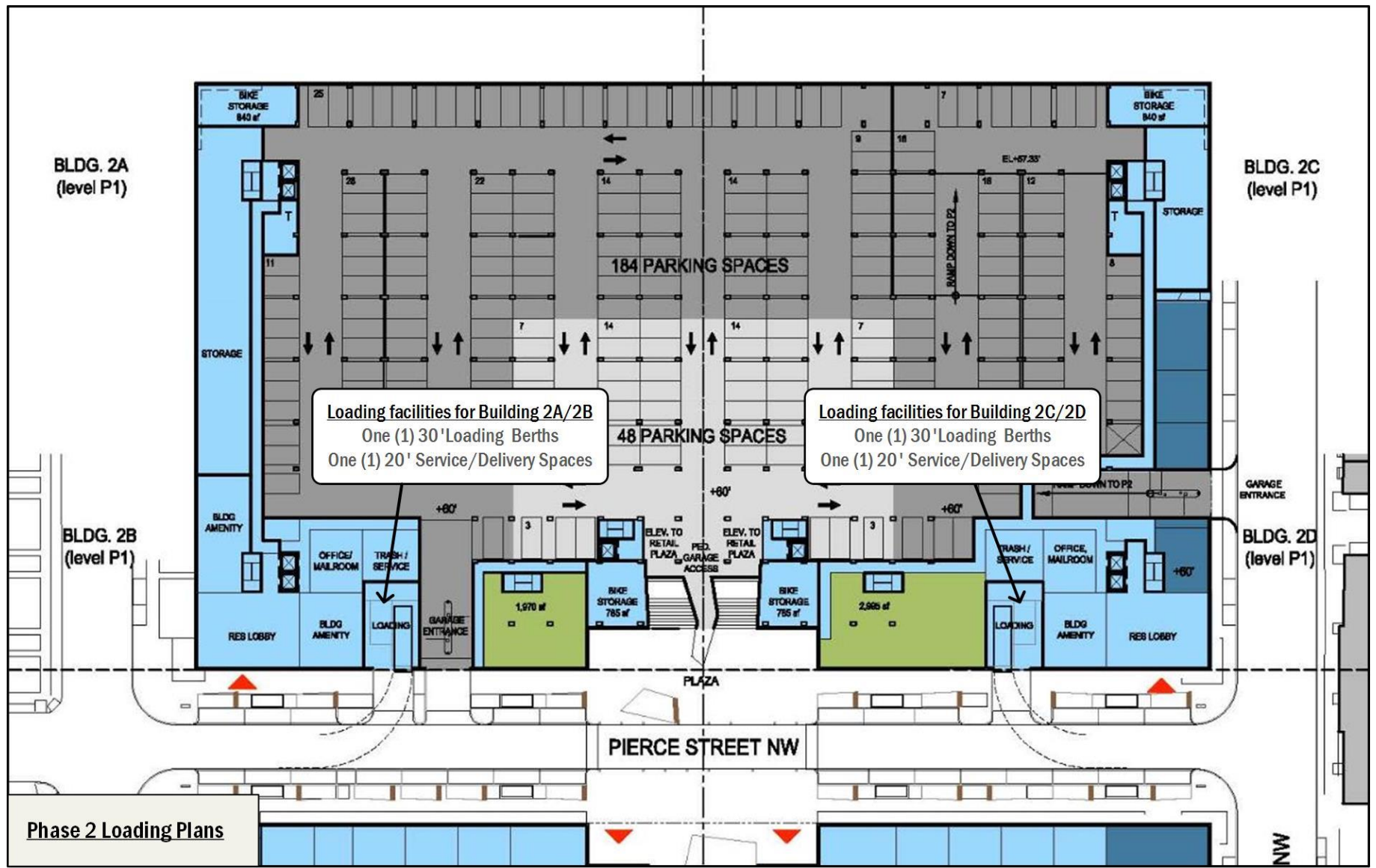


Figure 12: Phase 2 Loading Plans



TRIP GENERATION

This section outlines the transportation demand of the proposed Sursum Corda development. It summarizes the projected trip generation of the site by land use and by mode, which forms the basis for the chapters that follow. This development incorporates several land uses including residential, office, retail, daycare, and recreation center. Daycare and recreation center land uses were assumed for the ground-floor community-serving space of Phase 1 as they result in a conservative trip generation.

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 9th Edition. This methodology was supplemented to account for the urban nature of the site (the *Trip Generation Manual* provides data for non-urban, low transit uses) to generate trips for multiple modes.

Residential trip generation was calculated based on ITE land use 220, Apartments, splitting trips into different modes using assumptions based on census data for the residents that currently live near the site. The vehicular mode split was then adjusted up from the census data to reflect the parking supply and other developments with similar proximity to Metrorail.

Office trip generation was calculated based on ITE land use 710, General Office Building. Due to the small scale of office space the ITE rate for General Office Building was used in lieu of the equation. Mode split for the office component was based on census data for employees that travel to the site and data for office sites from WMATA's *Development-Related Ridership Study*.

Retail trip generation was calculated based on ITE land use 820, Shopping Center. Due to the small scale of the retail space the ITE rate for Shopping Center was used in lieu of the equation. Mode split for the retail component was primarily based on data for retail sites from the *Ridership Survey*, influenced by census data for employees that travel to the site to take into account employees that will be arriving or departing during the peak hours.

Daycare trip generation was calculated based on ITE land use 565, Day Care Center. Mode split for the daycare was influenced by mode splits used for other daycares in the District and the general nature of the land use within the site and the surrounding area. It is expected that a daycare would

operate primarily via pick-up/drop-off, with some walking traffic from residential units within the development and in the surrounding neighborhoods.

Recreation center trip generation was calculated based on ITE land use 495, Recreational Community Center. Based on discussions regarding the use of this space, particularly in regards to its location on a less-trafficked road, it is expected that a recreation center at this location would primarily cater towards residents of the development or the directly adjacent community and would not be a "destination". Therefore, it is expected that half of trips would be by walking or cycling, with less reliance on vehicular and transit modes than other uses within the development.

Trip generation was also performed for the existing residential uses on site, in the same methodology as the future trips. These trips were estimated instead of collected in the field, as the prevalence of on-street parking within the existing site limited their usefulness.

The mode split assumptions for all land uses within the development is summarized in Table 4. A summary of the multimodal trip generation for Phase 1 is shown on Table 5 and a summary for Phase 2 is shown on Table 6 for morning and afternoon peak hours. Multi-modal trip generation for the overall development is provided in Table 7 for the both peak hours. Detailed calculations are included in the Technical Appendix.

Table 4: Summary of Mode Split Assumptions

Land Use	Mode			
	Auto	Transit	Bike	Walk
Residential	50%	40%	2%	8%
Office	65%	30%	2%	3%
Retail	40%	40%	5%	15%
Daycare	60%	0%	0%	40%
Community Center	35%	15%	10%	40%



Table 5: Phase 1 Multi-Modal Trip Generation Summary

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Apartments	22 veh/hr	85 veh/hr	107 veh/hr	82 veh/hr	45 veh/hr	127 veh/hr
	Daycare	8 veh/hr	7 veh/hr	15 veh/hr	7 veh/hr	8 veh/hr	15 veh/hr
	Recreation Center	3 veh/hr	2 veh/hr	5 veh/hr	3 veh/hr	3 veh/hr	6 veh/hr
	Existing	-11 veh/hr	-39 veh/hr	-50 veh/hr	-42 veh/hr	-22 veh/hr	-64 veh/hr
	Total	22 veh/hr	55 veh/hr	77 veh/hr	50 veh/hr	34 veh/hr	84 veh/hr
Transit	Apartments	20 ppl/hr	77 ppl/hr	97 ppl/hr	74 ppl/hr	41 ppl/hr	115 ppl/hr
	Daycare	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
	Recreation Center	3 ppl/hr	1 ppl/hr	4 ppl/hr	3 ppl/hr	3 ppl/hr	6 ppl/hr
	Existing	-9 ppl/hr	-37 ppl/hr	-46 ppl/hr	-38 ppl/hr	-20 ppl/hr	-58 ppl/hr
	Total	14 ppl/hr	41 ppl/hr	55 ppl/hr	39 ppl/hr	24 ppl/hr	63 ppl/hr
Bike	Apartments	1 ppl/hr	4 ppl/hr	5 ppl/hr	4 ppl/hr	2 ppl/hr	6 ppl/hr
	Daycare	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
	Recreation Center	2 ppl/hr	1 ppl/hr	3 ppl/hr	2 ppl/hr	2 ppl/hr	4 ppl/hr
	Existing	0 ppl/hr	-2 ppl/hr	-2 ppl/hr	-2 ppl/hr	-1 ppl/hr	-3 ppl/hr
	Total	3 ppl/hr	3 ppl/hr	6 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Walk	Apartments	4 ppl/hr	15 ppl/hr	19 ppl/hr	15 ppl/hr	8 ppl/hr	23 ppl/hr
	Daycare	10 ppl/hr	10 ppl/hr	20 ppl/hr	10 ppl/hr	10 ppl/hr	20 ppl/hr
	Recreation Center	8 ppl/hr	4 ppl/hr	12 ppl/hr	7 ppl/hr	8 ppl/hr	15 ppl/hr
	Existing	-2 ppl/hr	-7 ppl/hr	-9 ppl/hr	-8 ppl/hr	-4 ppl/hr	-12 ppl/hr
	Total	20 ppl/hr	22 ppl/hr	42 ppl/hr	24 ppl/hr	22 ppl/hr	46 ppl/hr

Table 6: Phase 2 Multi-Modal Trip Generation Summary

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Apartments	35 veh/hr	142 veh/hr	177 veh/hr	134 veh/hr	70 veh/hr	204 veh/hr
	Office	16 veh/hr	3 veh/hr	19 veh/hr	4 veh/hr	14 veh/hr	18 veh/hr
	Retail	6 veh/hr	3 veh/hr	9 veh/hr	16 veh/hr	18 veh/hr	34 veh/hr
	Total	57 veh/hr	148 veh/hr	205 veh/hr	154 veh/hr	102 veh/hr	256 veh/hr
Transit	Apartments	32 ppl/hr	128 ppl/hr	160 ppl/hr	120 ppl/hr	65 ppl/hr	185 ppl/hr
	Office	8 ppl/hr	2 ppl/hr	10 ppl/hr	2 ppl/hr	7 ppl/hr	9 ppl/hr
	Retail	10 ppl/hr	6 ppl/hr	16 ppl/hr	29 ppl/hr	32 ppl/hr	61 ppl/hr
	Total	50 ppl/hr	136 ppl/hr	186 ppl/hr	151 ppl/hr	104 ppl/hr	255 ppl/hr
Bike	Apartments	2 ppl/hr	6 ppl/hr	8 ppl/hr	6 ppl/hr	3 ppl/hr	9 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Retail	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	4 ppl/hr	8 ppl/hr
	Total	4 ppl/hr	7 ppl/hr	11 ppl/hr	10 ppl/hr	8 ppl/hr	18 ppl/hr
Walk	Apartments	6 ppl/hr	26 ppl/hr	32 ppl/hr	24 ppl/hr	13 ppl/hr	37 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Retail	4 ppl/hr	2 ppl/hr	6 ppl/hr	11 ppl/hr	12 ppl/hr	23 ppl/hr
	Total	11 ppl/hr	28 ppl/hr	39 ppl/hr	35 ppl/hr	26 ppl/hr	61 ppl/hr



Table 7: Full Build-Out Multi-Modal Trip Generation Summary

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	Apartments	57 veh/hr	227 veh/hr	284 veh/hr	216 veh/hr	115 veh/hr	331 veh/hr
	Daycare	8 veh/hr	7 veh/hr	15 veh/hr	7 veh/hr	8 veh/hr	15 veh/hr
	Recreation Center	3 veh/hr	2 veh/hr	5 veh/hr	3 veh/hr	3 veh/hr	6 veh/hr
	Office	16 veh/hr	3 veh/hr	19 veh/hr	4 veh/hr	14 veh/hr	18 veh/hr
	Retail	6 veh/hr	5 veh/hr	14 veh/hr	19 veh/hr	21 veh/hr	40 veh/hr
	Existing	-11 veh/hr	-39 veh/hr	-50 veh/hr	-42 veh/hr	-22 veh/hr	-64 veh/hr
	Total		79 veh/hr	205 veh/hr	287 veh/hr	207 veh/hr	139 veh/hr
Transit	Apartments	52 ppl/hr	205 ppl/hr	257 ppl/hr	194 ppl/hr	106 ppl/hr	300 ppl/hr
	Daycare	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
	Recreation Center	3 ppl/hr	1 ppl/hr	4 ppl/hr	3 ppl/hr	3 ppl/hr	6 ppl/hr
	Office	8 ppl/hr	2 ppl/hr	10 ppl/hr	2 ppl/hr	7 ppl/hr	9 ppl/hr
	Retail	10 ppl/hr	6 ppl/hr	16 ppl/hr	29 ppl/hr	32 ppl/hr	61 ppl/hr
	Existing	-9 ppl/hr	-37 ppl/hr	-46 ppl/hr	-38 ppl/hr	-20 ppl/hr	-58 ppl/hr
	Total		64 ppl/hr	177 ppl/hr	241 ppl/hr	190 ppl/hr	128 ppl/hr
Bike	Apartments	3 ppl/hr	10 ppl/hr	13 ppl/hr	10 ppl/hr	5 ppl/hr	15 ppl/hr
	Daycare	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
	Recreation Center	2 ppl/hr	1 ppl/hr	3 ppl/hr	2 ppl/hr	2 ppl/hr	4 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Retail	1 ppl/hr	1 ppl/hr	2 ppl/hr	4 ppl/hr	4 ppl/hr	8 ppl/hr
	Existing	0 ppl/hr	-2 ppl/hr	-2 ppl/hr	-2 ppl/hr	-1 ppl/hr	-3 ppl/hr
	Total		7 ppl/hr	10 ppl/hr	17 ppl/hr	14 ppl/hr	11 ppl/hr
Walk	Apartments	10 ppl/hr	41 ppl/hr	51 ppl/hr	39 ppl/hr	21 ppl/hr	60 ppl/hr
	Daycare	10 ppl/hr	10 ppl/hr	20 ppl/hr	10 ppl/hr	10 ppl/hr	20 ppl/hr
	Recreation Center	8 ppl/hr	4 ppl/hr	12 ppl/hr	7 ppl/hr	8 ppl/hr	15 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Retail	4 ppl/hr	2 ppl/hr	6 ppl/hr	11 ppl/hr	12 ppl/hr	23 ppl/hr
	Existing	-2 ppl/hr	-7 ppl/hr	-9 ppl/hr	-8 ppl/hr	-4 ppl/hr	-12 ppl/hr
	Total		31 ppl/hr	50 ppl/hr	81 ppl/hr	59 ppl/hr	48 ppl/hr



TRAFFIC OPERATIONS

This section provides a summary of an analysis of the existing and future roadway capacity in the study area. Included is an analysis of potential vehicular impacts of the Sursum Corda development and a discussion of potential improvements.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the project on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips

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

1. 2015 Existing Conditions
2. 2018 Future Conditions without the development (2018 Background)
3. 2018 Future Conditions with Phase 1 of the development (2018 Future)
4. 2020 Future Conditions with Phase 1 of the development (2020 Background)
5. 2020 Future Conditions with Phase 1 and Phase 2 of the development (2020 Future)

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area.

The following conclusions are reached within this chapter:

- There are several study intersections that operate at unacceptable levels of service during at least one study scenario; three of these intersections operate at unacceptable conditions as a result of either Phase 1 or Phase 2 of the development.
- Mitigation measures were analyzed and discussed for each of the three intersections. These mitigations greatly improve the overall operations at these intersections.
- Signal and all-way stop warrants were performed where applicable. It was found that the intersection of First Street & Pierce Street NW should be converted to an all-way stop as part of the development.

- Overall, this report concludes that the project will not have a detrimental impact to the surrounding transportation network, assuming all mitigations are implemented.

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 DDOT. The general methodology of the analysis follows national and DDOT guidelines on the preparation of transportation impact evaluations of site development, unless stated otherwise.

Capacity Analysis Scenarios

The vehicular analyses are performed to determine if the proposed development of the Sursum Corda development 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 future scenarios: (1) without the proposed development (referred to as the Background conditions) and (2) with the development approved and constructed (referred to as the Future conditions). Due to the phased nature of this PUD, there are multiple background and total future conditions.

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2015 Existing Conditions
2. 2018 Future Conditions without the development (2018 Background)
3. 2018 Future Conditions with Phase 1 of the development (2018 Future)
4. 2020 Future Conditions with Phase 1 of the development (2020 Background)
5. 2020 Future Conditions with Phase 1 and Phase 2 of the development (2020 Future)

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. New York Avenue & New Jersey Avenue NW
2. New York Avenue & First Street NW
3. North Capitol Street Ramp SB & New York Avenue
4. North Capitol Street Ramp NB & New York Avenue
5. North Capitol Street & M Street
6. North Capitol Street & Pierce Street
7. North Capitol Street & L Street
8. North Capitol Street & K Street
9. North Capitol Street & H Street
10. First Street & M Street NW
11. First Street & Pierce Street NW
12. First Street & L Street NW
13. First Street & K Street NW
14. First Street & H Street NW
15. New Jersey Avenue & Pierce Street NW
16. New Jersey Avenue & L Street NW
17. New Jersey Avenue & K Street NW
18. 4th Street & K Street NW
19. M Street & First Terrace NW
20. M Street & First Place NW

Additionally, this analysis will determine if any capacity concerns arise at the new site roadways and site driveways. Figure 13 shows a map of the study area intersections.

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.

Of note, signage, striping, and overall operations along L Street between First Place and North Capitol Street are more similar to that of an alley rather than a street under existing conditions. Based on the lack of a stop sign at First Place NW and the “Do Not Enter” signs from North Capitol Street, it is intended for the street to function as one-way eastbound; however, based on the existing traffic volumes, it is evident that the street is treated as two-way by vehicles, with a significant amount of traffic turning onto L Street from North Capitol Street and exiting L Street to First Street NW. Additionally, the eastbound approach of L Street at North Capitol Street is not currently part of the signal at the intersection, as its purpose is to facilitate pedestrian crossings.

The lane configurations and traffic controls assumed for the Existing Conditions are included in the Technical Attachments.

2018 Background Geometry and Operations Assumptions (without the project)

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 these criteria, and discussions with DDOT, the conversion of New Jersey Avenue from one-way to two-way between I Street and Morgan Street, and subsequent lane configuration changes was included as a background improvement, as laid out in the *New Jersey Avenue NW Safety Upgrades & Two-Way Conversion Project* performed by STV Incorporated in June of 2012. Updated signal timings as a result of the two-way conversion were not provided; thus the signal timings were updated such that capacity concerns due to the conversion were mitigated to the highest degree.

The lane configurations and traffic controls for the 2018 Background Conditions are included in the Technical Attachments.

2018 Future Geometry and Operations Assumptions (with Phase 1 of the project)

The geometry and operations assumed in the 2018 Future Conditions are based on the 2018 Background Conditions with the changes to the site’s internal roadway network incorporated, as shown previously in Figure 9. This includes the



removal of 1st Terrace, L Place, Sursum Corda Court, and the alley abutting the adjacent church to be replaced by an extension of Pierce Street to First Place and an extension of First Place to L Street. This results in a better vehicular and pedestrian connectivity through the site.

Additionally, as part of the PUD, increased signage and striping along L Street between 1st Street NW and North Capitol Street will be implemented such that L Street will be two-way from 1st Street NW to First Place NW and one-way eastbound from First Place NW to North Capitol Street.

The lane configurations and traffic controls for the 2018 Future Conditions are included in the Technical Attachments.

2020 Background and Future Geometry and Operations Assumptions (with Phase 1 of the project)

The geometry and operations assumed in the 2020 Background and 2020 Future Conditions are based on the 2018 Future Conditions. No additional background improvements are assumed and there are no additional changes proposed to the site's internal roadway network.

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, which was collected on Thursday, May 7, 2015, Tuesday, May 12, 2015, and Thursday, May 14, 2015. Additionally, count data collected in early 2011 for the *New Jersey Avenue NW Safety Upgrades & Two-Way Conversion Project* was used for two of the study intersections: New Jersey Avenue & Pierce Street NW and New Jersey Avenue & L Street NW. Of note, these intersections were observed to have higher volumes along New Jersey Avenue than the adjacent New Jersey Avenue intersections collected in 2015. Although volume balancing issues occur due to the inclusion of the 2011 count data, the volumes were not adjusted in order to maintain a conservative analysis.

During the data collection process, it was found that a significant amount of traffic makes illegal southbound right turns and northbound left turns onto L Street from North Capitol Street, although there is currently two "Do Not Enter" signs along the curb cut. Because of the significant number of

illegal turns, and the proximity to the site, they were included in the analysis.

The results of the traffic counts and the existing peak hour traffic volumes are included in the Technical Attachments. For all intersections the individual morning and afternoon peak hours were used.

2018 Background Traffic Volumes (without the project)

Traffic projections for the background conditions typically 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).

Additionally for this project, volume changes based on the conversion of New Jersey Avenue from one-way northbound to two-way between I Street and Morgan Street were incorporated throughout the study area based on the finding of the *New Jersey Avenue NW Safety Upgrades & Two-Way Conversion Project*.

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

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

As discussed previously, multiple background developments were considered for inclusion in the study, with six developments ultimately meeting all of the criteria. These developments include the following:

- Skanska USA Development (88 M Street/44 M Street/22 M Street)
- AVA 55M
- 1150 First Street NE
- 1005 North Capitol Street
- Camden NoMa Phase 2
- N Street NoMa (33 N Street only)



There are no existing studies available for these developments therefore trip generation was calculated based on the Institute of Transportation Engineers' *Trip Generation Manual*, 9th Edition, with mode splits based on those used for similar developments in the NoMa neighborhood. Trip distribution assumptions for the background developments were based on those determined for the Sursum Corda development and altered where necessary based on anticipated travel patterns. Mode split and trip generation assumptions for the background developments are shown in Table 8.

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 from the Metropolitan Washington Council of Government's (MWCOC) currently adopted regional transportation model, comparing the difference between the year 2015 and 2020 model scenarios. The growth rates observed in this model served as a basis for analysis assumptions, and where negative growth was observed, a

Table 8: Summary of Background Development Trip Generation

Background Development	ITE Land Use Code Trip Generation, 9th Ed.	Quantity	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
88 M Street NE	710 General Office Building	315,000 sf	422	57	479	73	358	431
		Non-Auto Reduction: 50%	-211	-29	-240	-37	-179	-216
	820 Shopping Center (Rate)	6,500 sf	4	2	6	12	12	24
		Non-Auto Reduction: 50%	-2	-1	-3	-6	-6	-12
		Total Trips	213	30	243	43	185	228
44 M Street NE	710 General Office Building	315,000 sf	422	57	479	73	358	431
		Non-Auto Reduction: 50%	-211	-29	-240	-37	-179	-216
	820 Shopping Center (Rate)	6,500 sf	4	2	6	12	12	24
		Non-Auto Reduction: 50%	-2	-1	-3	-6	-6	-12
		Total Trips	213	30	243	43	185	228
22 M Street NE	220 Apartment	285 dwelling units	29	114	143	113	61	174
		Non-Auto Reduction: 50%	-15	-57	-72	-57	-31	-87
	820 Shopping Center (Rate)	5,000 sf	3	2	5	9	10	19
		Non-Auto Reduction: 50%	-2	-1	-3	-5	-5	-10
		Total Trips	16	58	74	61	36	97
AVA 55M	220 Apartment	436 dwelling units	43	174	217	167	90	257
		Non-Auto Reduction: 50%	-22	-87	-109	-84	-45	-129
		Total Trips	22	87	109	84	45	129
1150 First Street NE	710 General Office Building	335,000 sf	443	60	503	77	377	454
		Non-Auto Reduction: 50%	-222	-30	-252	-39	-189	-227
	820 Shopping Center (Rate)	15,000 sf	9	5	14	27	29	56
		Non-Auto Reduction: 50%	-5	-3	-7	-14	-15	-28
		Total Trips	226	33	259	52	203	255
1005 N Capitol Street NE	220 Apartment	124 dwelling units	13	51	64	56	30	86
		Non-Auto Reduction: 50%	-7	-26	-32	-28	-15	-43
		Total Trips	7	26	32	28	15	43
Camden Noma Phase II	220 Apartment	406 dwelling units	41	162	203	157	84	241
		Non-Auto Reduction: 50%	-21	-81	-102	-79	-42	-121
	820 Shopping Center (Rate)	2,452 sf	1	1	2	4	5	9
		Non-Auto Reduction: 50%	-1	-1	-1	-2	-3	-5
		Total Trips	21	82	103	81	45	125
33 N Street NE	220 Apartment	340 dwelling units	34	136	170	133	72	205
		Non-Auto Reduction: 50%	-17	-68	-85	-67	-36	-103
	820 Shopping Center (Rate)	5,000 sf	3	2	5	9	10	19
		Non-Auto Reduction: 50%	-2	-1	-3	-5	-5	-10
		Total Trips	19	69	88	71	41	112
Net Background Site Trips			1,471	825	2,296	922	1,508	2,430



Table 9: Applied Annual and Total Growth Rates

Roadway (Direction)	Proposed Annual Growth Rate		Total Growth Between 2015 and 2018		Total Growth Between 2015 and 2020	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
New York Avenue (Eastbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
New York Avenue (Westbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
North Capitol Street (Northbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
North Capitol Street (Southbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
M Street (Eastbound)	3.85%	0.10%	12.00%	0.30%	20.80%	0.50%
First Street NW (Northbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
First Street NW (Southbound)	0.10%	0.10%	0.30%	0.30%	0.50%	0.50%
K Street (Eastbound)	3.65%	0.79%	11.40%	2.40%	19.60%	4.00%
K Street (Westbound)	0.94%	3.56%	2.80%	11.10%	4.80%	19.10%

conservative 0.10 percent annual growth rate was applied to the roadway. The applied growth rates are shown in Table 9.

The traffic volumes generated by the inherent growth along the network were added to the existing traffic volumes in order to establish the 2018 Background traffic volumes. The traffic volumes for the 2018 Background conditions are included in the Technical Attachments.

2018 Future Traffic Volumes (with Phase 1 of the project)

The 2018 Total Future traffic volumes consist of the 2018 Background volumes with the addition of the traffic volumes generated by Phase 1 of the proposed development (Phase 1 site-generated trips). In addition, it was assumed that due to the upgraded signage, striping, and overall operations along L Street between First Place NW and North Capitol Street as part of the PUD, vehicles would no longer turn illegally onto L Street from North Capitol Street. These illegal movements were rerouted through the network.

Thus, the 2018 Total Future traffic volumes include traffic generated by: the existing volumes, the background developments, the inherent growth on the study area roadways, rerouted trips due to the two-way New Jersey venue conversion and enhanced operations along L Street, and trips generated by Phase 1 of the proposed project.

Trip distribution for the Phase 1 site-generated trips was determined based on: (1) CTPP TAZ data, (2) existing travel

patterns in the study area, and (3) the allotted parking locations of various users of the facilities.

The residential trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound Phase 1 residential vehicular trips was the garage driveways along First Place NW and L Street NW.

The daycare distribution was based on the residential and office trip distribution from the CTPP TAZ flow data, assuming that most of the day care patrons will be local residents who drop off their children on their way to work and pick them up on their way home. The origin of outbound and destination of inbound daycare vehicular trips was the garage driveways along First Place NW and L Street NW, assuming that parents would park and go inside to pick up and drop off their children.

The community recreation center trip distribution is based predominantly on residential zones situated north and east of the development as these are the neighborhoods most likely to utilize the recreation center. CTPP TAZ flow data for drivers commuting to the site's TAZ was also used as a reference to account for the recreation center employees commuting patterns. The origin of outbound and destination of inbound recreation center vehicular trips was the garage driveways along First Place NW and L Street NW.



Based on traffic patterns and a review of the site access locations, the site-generated trips were distributed through the study area intersections. A summary of trip distribution routing assumptions is shown on Figure 14 and Figure 15 for the inbound and outbound traffic, respectively.

The site-generated traffic volumes for Phase 1 and the 2018 Future traffic volumes are included in the Technical Attachments.

2020 Background Traffic Volumes (with Phase 1 of the project)

There are no additional background developments in the vicinity of the development that are expected to be complete between 2018 and 2020. Therefore, the 2020 Background traffic volumes consist of 2018 Future traffic volumes with the addition of regional traffic growth. As stated previously the growth rates are derived from the MWCOG regional transportation model and the growth rates applied to the 2020 scenarios are shown in Table 9.

The traffic volumes generated by the inherent growth along the network were added to the 2018 Future traffic volumes in order to establish the 2018 Background traffic volumes. The traffic volumes for the 2018 Background conditions are included in the Technical Attachments.

2020 Future Traffic Volumes (with Phase 1 and Phase 2 of the project)

The 2020 Future traffic volumes consist of the 2020 Background volumes with the addition of the traffic volumes generated by Phase 2 of the proposed development (Phase 2 site-generated trips). Thus, the 2020 Future traffic volumes include traffic generated by: the existing volumes, the background developments, the inherent growth on the study area roadways, rerouted trips due to the two-way New Jersey Avenue conversion and enhanced operations along L Street, and trips generated by Phase 1 and Phase 2 of the proposed project.

Trip distribution for the Phase 2 site-generated trips was determined based on: (1) CTPP TAZ data, (2) existing travel patterns in the study area, and (3) the allotted parking locations of various users of the facilities.

The residential trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound Phase 2

residential vehicular trips was the garage driveways along Pierce Street NW.

The office trip distribution was based on the CTPP TAZ flow data for drivers commuting to the site's TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound office vehicular trips was the garage driveways along Pierce Street NW.

The retail trip distribution is based predominantly on residential zones situated north and east of the development as these are the mostly likely driving customers of the retail space. CTPP TAZ flow data for drivers commuting to the site's TAZ was also used as a reference to account for the retail employees commuting patterns. The origin of outbound and destination of inbound retail vehicular trips was the garage driveways along Pierce Street NW.

Based on traffic patterns and a review of the site access locations, the site-generated trips were distributed through the study area intersections. A summary of trip distribution and routing assumptions is shown on Figure 14 and Figure 15 for the inbound and outbound traffic, respectively.

The site-generated traffic volumes for Phase 2 and the 2020 Future traffic volumes are included in the Technical Attachments.

VEHICULAR ANALYSIS RESULTS

Intersection Capacity Analysis

Intersection capacity analyses were performed for the three scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro*, version 8.0 was used to analyze the study intersections based on the Highway Capacity Manual 2000 (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 D is typically used as the acceptable LOS threshold in the District; although LOS E or F is sometimes accepted in urbanized areas if vehicular improvements would be a detriment to safety or non-auto modes of transportation.



The LOS capacity analyses were based on: (1) the peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (HCM) methodologies (using the *Synchro* 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 Attachments.

Table 10 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the Existing, 2018 Background, 2018 Future, 2020 Background, and 2020 Future scenarios. The capacity analysis results for the morning and afternoon peak hours are included in the Technical Attachments.

Several of the study intersections operate at unacceptable conditions or have an approach that operates at unacceptable conditions during at least one of the study scenarios. These intersections are as follows:

- New Jersey Avenue & New York Avenue
- First Street & New York Avenue
- North Capitol Street SB Ramp & New York Avenue
- North Capitol Street NB Ramp & New York Avenue
- North Capitol Street & M Street
- North Capitol Street & Pierce Street
- North Capitol Street & L Street
- North Capitol Street & K Street
- North Capitol Street & H Street
- First Street & M Street
- First Street & K Street
- First Street & H Street
- 4th Street & K Street

The following section discusses which intersections operate at unacceptable levels due to the development and offers mitigations measures to improve those intersections.

Mitigations

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 existing or

background conditions. The development is also considered to have an impact if there is an increase in delay at any approach or the overall intersection operating under LOS E or F of greater than 5 percent, when compared to the background condition. Following these guidelines there are impacts to three intersections as a result of the development. Mitigation measures were tested at these three intersections and the following conclusions were made:

- *First Street & New York Avenue*

Under the 2018 Future Conditions, delay along the northbound approach of First Street worsens by greater than 5 percent over the 2018 Background Conditions during the AM peak hour.

The intersection can be improved by adjusting signal timings such that the northbound and southbound approaches receive more green time and by adding an exclusive northbound left turn lane. The section of First Street between M Street and New York Avenue is 31 feet wide with no parking on either side, therefore it could accommodate a 10 foot thru lane, a 10 foot left turn lane, and an 11 foot receiving lane. Subsequently, the southbound approach of First Street at M Street could also benefit from a left turn as it currently has an exclusive southbound left turn phase without an exclusive left turn lane.

Under the 2020 Future Conditions, the overall delay worsens by more than 5 percent over the 2020 Background Conditions during the PM peak hour. Additionally, delay along the northbound approach worsens greater than 5 percent during the AM and PM peak hour.

The addition of the northbound left turn lane offsets the AM capacity concerns; however there are still issues during the PM peak hour. Due to the heavy traffic along both First Street and New York Avenue and the long cycle length at the intersection, shifting more green time to the north and southbound movements will create capacity concerns along New York Avenue. If in conjunction with signal timing changes, the AM peak parking restrictions along the southbound approach of First Avenue are extended to the PM peak to allow for a southbound right turn lane, the overall level of service at the intersection improves; the northbound and southbound approaches will still operate



under unacceptable conditions, but they will be greatly improved over existing conditions. This mitigation would only be viable if both DDOT and the community agree that a loss of parking is acceptable in order to improve operations at the intersection.

The proposed lane configuration for First Street & New York Avenue is shown in Figure 16.

- **North Capitol Street & L Street**

According to the capacity analysis results, this intersection requires mitigation under the 2020 Future Conditions; however, this intersection cannot be accurately analyzed in Synchro as L Street is not incorporated into the traffic signal.

Phase 1 of the development will be adding vehicular traffic to this intersection and thus it should be reconfigured during Phase 1 to implement acceptable operations at the intersection. This would include installing a signal head for the L Street approach and updating the timing plan to include the L Street approach. The pedestrian crosswalk on the north side of the intersection will also need to be relocated as it currently connects at the L Street curb cut.

An important design consideration that needs to be kept in mind with the reconfiguration of this intersection is the ability for vehicles to turn left onto North Capitol Street from L Street. Currently there is a median along North Capitol Street that may cause unnecessary difficulty for left turning vehicles; however, vehicles are seen to make this movement under existing conditions. The potential removal of part of the median should be analyzed in conjunction with the crosswalk relocation. In addition, any design considerations that would make the potential transition of L Street from one-way eastbound to two-way traffic should be implemented, as this is a potential long-term improvement.

The proposed lane configuration for North Capitol Street & L Street is shown in Figure 17.

- **First Street & K Street**

Under 2018 Future Conditions, overall delay for the intersection, delay along the westbound approach of K Street, and delay along the southbound approach of First Street worsen by greater than 5 percent during the AM peak hour.

Because there are excessive delays along both the north-south roadways and east-west roadways, changing signal timings will not remedy the capacity concerns. The simplest way to improve the capacity at this intersection is to restrict parking along the westbound approach of K Street during the PM peak. Parking is already restricted on this approach during the AM peak and parking on the receiving lane is restricted during both the AM and PM peaks. The westbound approach could then function as a shared thru-left lane and shared thru-right lane, greatly increasing capacity. With this increased capacity more green time could be given to the north and southbound movements without causing issues to the east and westbound traffic. This mitigation would only be viable if both DDOT and the community agree that a loss of parking is acceptable in order to improve operations at the intersection.

In addition, signal warrants and all-way stop control warrants were performed at several intersections within the study area. The following intersection warrants an all-way stop.

- **First Street & Pierce Street**

Although an all-way stop control is not warranted until 2020, it would be advantageous to implement the conversion to an all-way stop as part of Phase 1 as it will greatly improve the pedestrian conditions surrounding the site. Under existing conditions First Street is free-flowing between M Street and K Street, which can create speeding concerns and does not give pedestrians a designated area to cross First Street.

Table 11 shows the level of service improvements that occur with the proposed mitigations.

Queuing Analysis

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* 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 intersections, the 95th percentile queue is reported for each lane group (including



free-flowing left turns and stop-controlled movements) based on the HCM calculations.

Table 12 shows the queuing results for the study area intersections. The queuing analysis results generally align with the HCM capacity analysis results and generate the same overall conclusions. No additional mitigation measures are necessary as a result of the queuing analysis results.

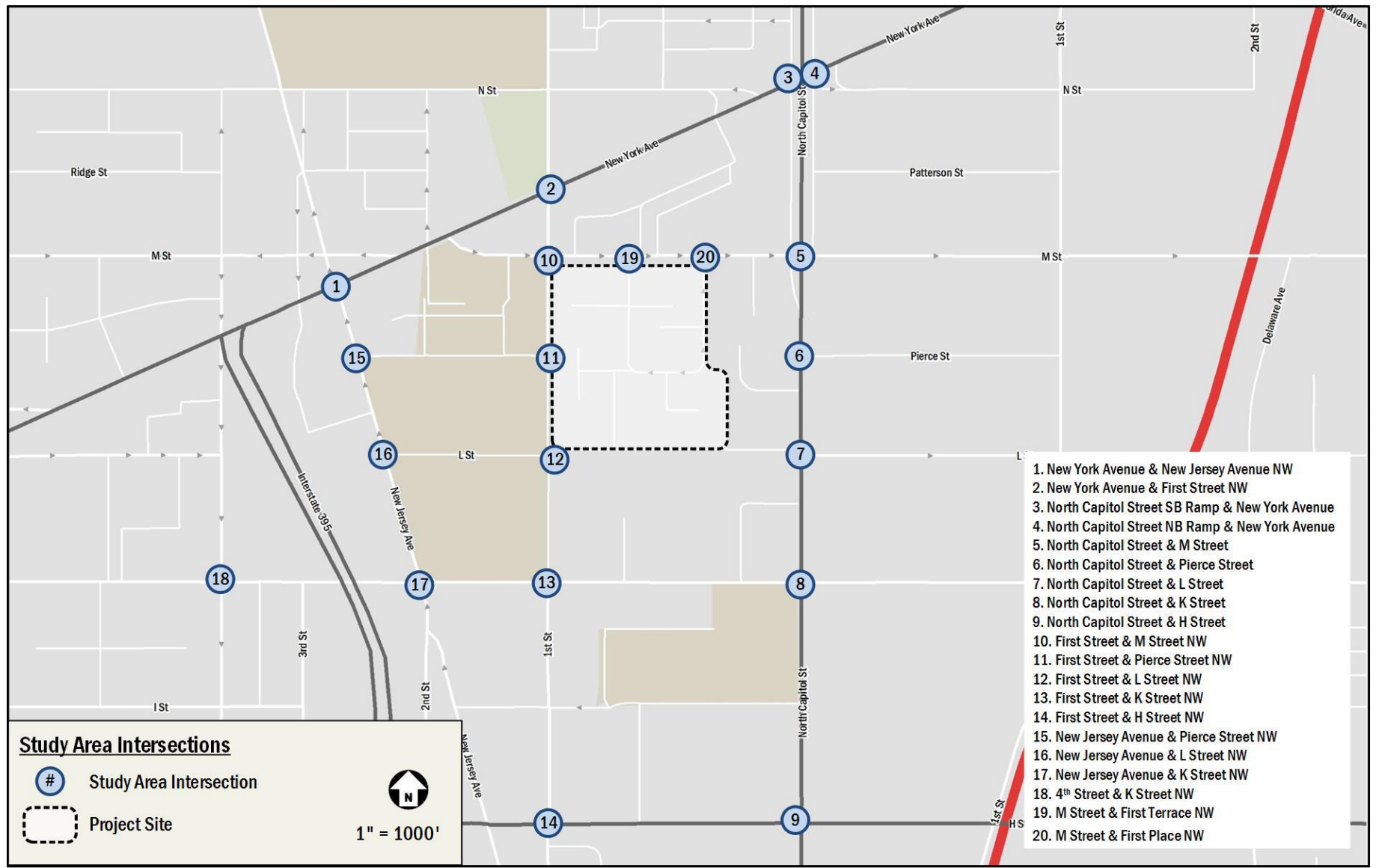


Figure 13: Study Area Intersections

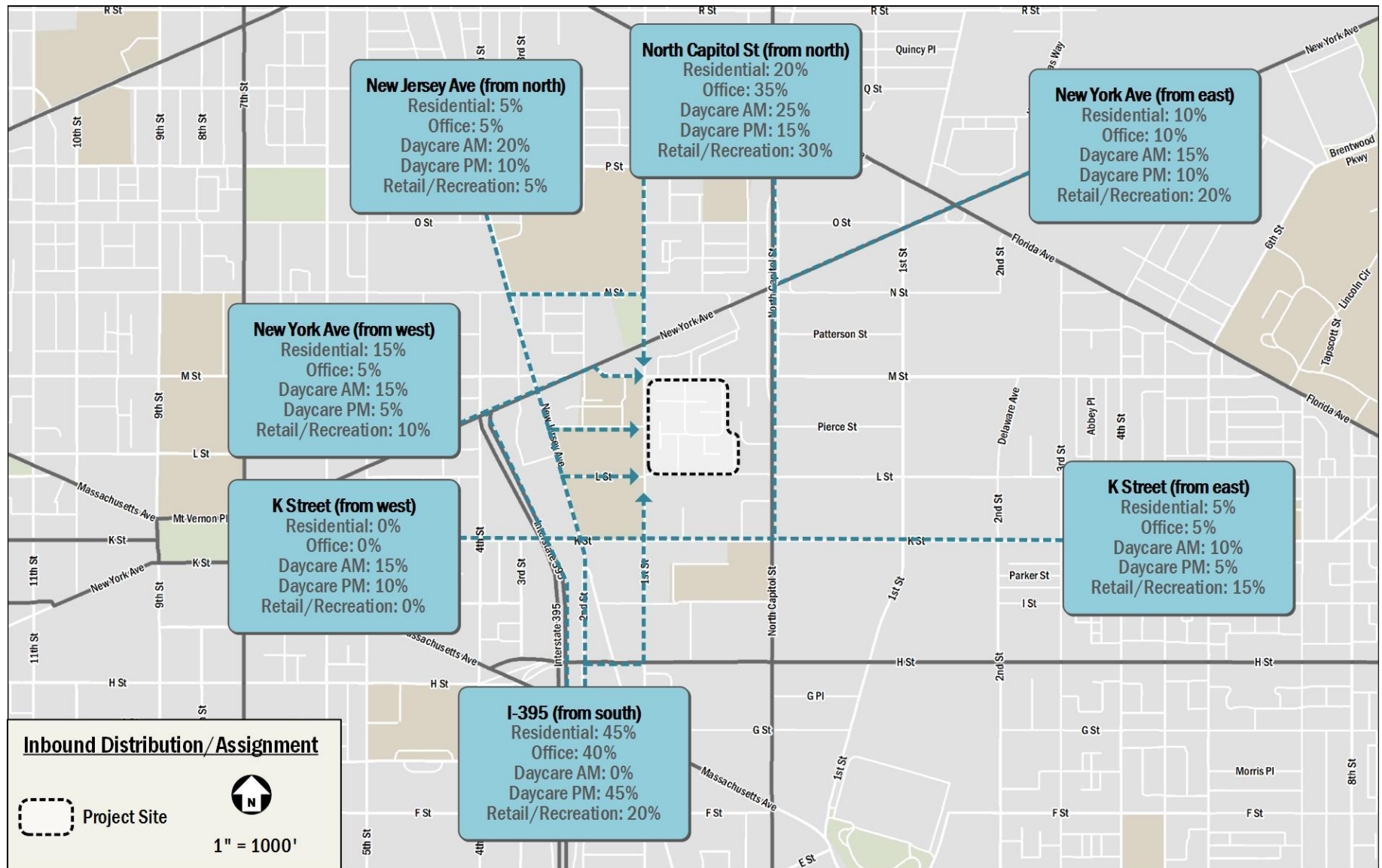


Figure 14: Inbound Distribution and Routing

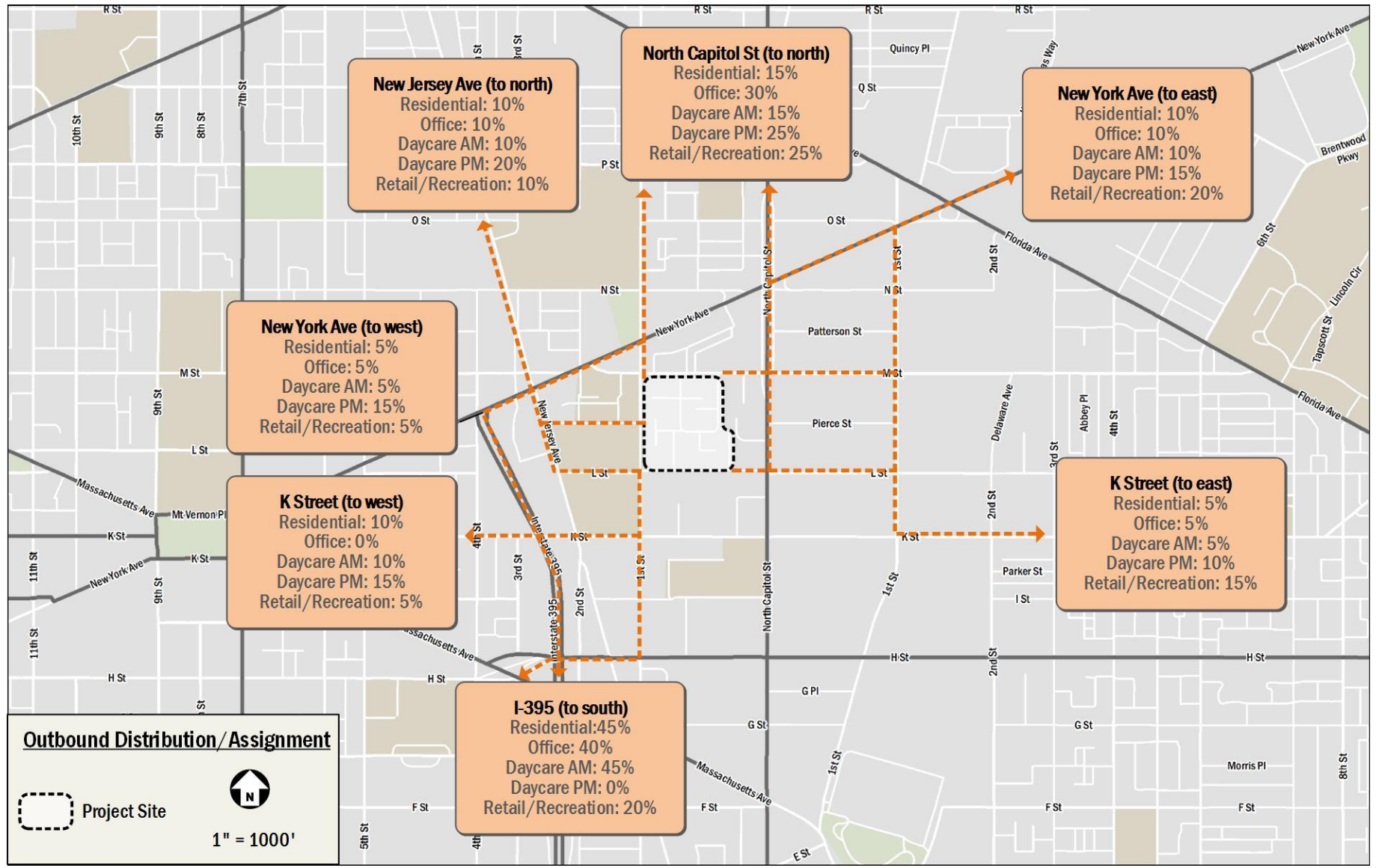


Figure 15: Outbound Distribution and Routing



Table 10: Vehicular Capacity Analysis Results

Intersection	Approach	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		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	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
New Jersey Ave & New York Ave	Overall	24.5	C	28.1	C	27.1	C	22.7	C	27.3	C	22.8	C	27.3	C	22.8	C	27.5	C	23.3	C
	Eastbound	12.9	B	13.9	B	14.7	B	16.0	B	14.6	B	16.0	B	14.6	B	16.0	B	14.8	B	16.6	B
	Westbound	11.4	B	10.5	B	20.1	C	17.8	B	20.0	C	17.7	B	20.0	C	17.7	B	20.1	C	17.8	B
	Northbound	84.7	F	93.6	F	42.1	D	43.9	D	42.7	D	44.4	D	42.7	D	44.4	D	43.7	D	45.3	D
	Southbound	0.0	A	0.0	A	62.4	E	34.0	C	63.0	E	34.3	C	63.0	E	34.3	C	62.6	E	34.9	C
1st Street & New York Ave	Overall	16.7	B	69.4	E	17.1	B	71.5	E	17.5	B	71.5	E	17.4	B	71.5	E	20.2	C	79.1	E
	Eastbound	7.4	A	8.7	A	7.4	A	8.9	A	7.4	A	8.9	A	7.4	A	8.9	A	7.4	A	8.9	A
	Westbound	4.1	A	5.8	A	4.5	A	7.4	A	4.4	A	7.3	A	4.4	A	7.3	A	4.4	A	7.3	A
	Northbound	62.7	E	175.5	F	61.7	E	187.1	F	66.2	E	193.5	F	65.7	E	193.5	F	94.3	F	258.9	F
	Southbound	73.3	E	501.9	F	77.4	E	524.7	F	77.2	E	522.5	F	77.2	E	522.5	F	79.8	E	531.1	F
N Capitol SB Ramp & New York Ave	Overall	16.3	B	17.3	B	30.1	C	22.0	C	30.0	C	22.0	C	30.0	C	22.0	C	30.0	C	22.1	C
	Eastbound	21.3	C	22.8	C	21.5	C	23.0	C	21.2	C	23.0	C	21.2	C	23.0	C	21.1	C	23.0	C
	Westbound	3.9	A	4.7	A	5.3	A	7.8	A	5.1	A	7.8	A	5.1	A	7.8	A	5.3	A	8.1	A
	Southbound	63.7	E	35.1	D	138.4	F	59.2	E	138.4	F	59.2	E	138.4	F	59.2	E	138.4	F	59.2	E
N Capitol NB Ramp & N Street & New York Ave	Overall	11.6	B	17.5	B	20.0	B	96.0	F	19.0	B	90.2	F	19.0	B	90.2	F	19.2	B	90.9	F
	Eastbound	4.4	A	5.3	A	7.7	A	7.4	A	10.5	B	7.4	A	10.5	B	7.4	A	10.5	B	7.4	A
	Westbound	8.4	A	7.8	A	8.4	A	7.8	A	8.4	A	7.9	A	8.4	A	7.9	A	8.4	A	7.9	A
	Northbound	65.0	E	101.8	F	107.2	F	464.9	F	96.0	F	443.4	F	96.0	F	443.4	F	97.9	F	447.4	F
North Capitol Street & M Street	Overall	29.2	C	17.9	B	32.9	C	18.4	B	32.4	C	18.1	B	32.4	C	18.1	B	33.2	C	18.5	B
	Eastbound	33.8	C	39.1	D	36.0	D	40.8	D	35.6	D	40.1	D	35.7	D	40.1	D	36.5	D	40.9	D
	Northbound	18.4	B	4.3	A	20.2	C	5.6	A	19.2	B	5.7	A	19.2	B	5.7	A	19.0	B	5.7	A
	Southbound	30.8	C	15.4	B	39.8	D	16.1	B	40.0	D	16.2	B	40.0	D	16.2	B	41.4	D	16.5	B
North Capitol Street & Pierce Street	Westbound	11.2	B	11.7	B	17.8	C	33.1	D	17.9	C	35.7	E	17.9	C	35.7	E	18.0	C	36.2	E
North Capitol Street & L Street	Overall	7.4	A	18.5	B	9.6	A	18.5	B	9.3	A	19.4	B	9.2	A	19.7	B	9.4	A	19.5	B
	Eastbound	71.3	E	55.0	E	61.3	E	55.8	E	58.3	E	53.7	D	58.2	E	53.7	D	53.1	D	55.8	E
	Northbound	11.6	B	12.1	B	14.1	B	14.1	B	13.0	B	13.2	B	13.0	B	13.2	B	12.6	B	13.2	B
	Southbound	5.0	A	23.6	C	6.5	A	21.4	C	6.2	A	23.5	C	6.2	A	23.5	C	6.7	A	23.4	C
North Capitol Street & K Street	Overall	29.9	C	43.2	D	36.8	D	62.6	E	36.9	D	62.8	E	38.3	D	69.3	E	38.2	D	70.6	E
	Eastbound	52.9	D	58.2	E	77.7	E	93.1	F	76.6	E	92.9	F	82.3	F	98.1	F	81.5	F	98.0	F
	Westbound	36.7	D	88.2	F	39.6	D	129.3	F	39.6	D	132.1	F	40.5	D	155.2	F	40.9	D	161.5	F
	Northbound	18.1	B	11.6	B	22.4	C	12.7	B	23.2	C	12.7	B	23.2	C	12.7	B	23.2	C	12.7	B
	Southbound	26.2	C	31.1	C	27.5	C	32.3	C	27.8	C	31.8	C	27.8	C	31.8	C	27.8	C	32.5	C
North Capitol Street & H Street	Overall	24.7	C	28.9	C	23.6	C	46.8	D	23.6	C	46.9	D	23.6	C	46.9	D	23.7	C	46.9	D
	Eastbound	22.1	C	24.3	C	25.6	C	25.6	C	25.6	C	25.6	C	25.6	C	25.6	C	25.6	C	25.6	C
	Westbound	33.5	C	40.8	D	30.2	C	41.3	D	30.2	C	41.3	D	30.2	C	41.3	D	30.2	C	41.3	D



Intersection	Approach	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		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	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1st Street & M Street	Northbound	25.9	C	23.5	C	24.8	C	23.6	C	24.8	C	23.6	C	24.8	C	23.6	C	24.8	C	23.6	C
	Southbound	16.2	B	30.7	C	16.1	B	97.0	F	16.3	B	97.4	F	16.3	B	97.4	F	16.3	B	97.5	F
	Overall	18.3	B	20.7	C	18.8	B	20.3	C	19.1	B	20.4	C	19.4	B	20.4	C	19.9	B	21.0	C
	Eastbound	13.7	B	11.8	B	15.1	B	12.1	B	15.0	B	12.1	B	15.6	B	12.1	B	15.7	B	12.3	B
	Southbound	19.2	B	13.4	B	17.7	B	13.3	B	18.1	B	13.2	B	18.1	B	13.2	B	17.8	B	13.0	B
1st Street & Pierce Street	Eastbound	12.5	B	10.6	B	12.5	B	10.6	B	13.6	B	11.0	B	13.6	B	11.0	B	15.4	C	14.3	B
	Westbound	-	-	-	-	-	-	-	-	13.5	B	11.9	B	13.5	B	11.9	B	17.2	C	15.7	C
	Northbound (Left)	1.6	A	1.0	A	1.6	A	1.0	A	1.6	A	1.0	A	1.6	A	1.0	A	1.3	A	0.7	A
	Southbound (Left)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	A	1.9	A
1st Street & L Street	Eastbound	11.5	B	13.1	B	12.5	B	13.7	B	12.9	B	14.9	B	12.9	B	14.9	B	14.6	B	17.4	C
	Westbound	12.7	B	14.3	B	12.9	B	14.6	B	14.3	B	16.2	C	14.3	B	16.2	C	16.7	C	19.7	C
	Northbound Left	1.5	A	0.8	A	1.5	A	0.8	A	1.4	A	0.6	A	1.4	A	0.6	A	1.2	A	0.5	A
	Southbound Left	0.1	A	0.3	A	0.1	A	0.3	A	0.1	A	0.3	A	0.1	A	0.3	A	0.0	A	0.3	A
1st Street & K Street	Overall	12.0	B	25.6	C	13.2	B	64.0	E	14.7	B	80.2	F	15.0	B	90.9	F	18.0	B	112.0	F
	Eastbound	7.3	A	8.5	A	9.1	A	9.4	A	9.2	A	9.8	A	9.0	A	9.9	A	9.7	A	10.5	B
	Westbound	6.1	A	30.7	C	8.4	A	134.8	F	10.0	B	173.7	F	10.9	B	198.6	F	11.7	B	240.6	F
	Northbound	42.7	D	49.8	D	42.8	D	50.1	D	43.9	D	52.2	D	43.9	D	52.2	D	48.5	D	57.0	E
	Southbound	40.1	D	54.6	D	40.3	D	61.8	E	42.8	D	68.7	E	42.8	D	68.7	E	54.1	D	100.9	F
1st Street & H Street	Overall	17.6	B	16.8	B	16.9	B	16.6	B	17.2	B	16.7	B	17.2	B	16.7	B	17.8	B	17.0	B
	Eastbound	3.4	A	6.2	A	3.5	A	6.4	A	3.5	A	6.4	A	3.5	A	6.4	A	3.6	A	6.6	A
	Westbound	13.1	B	12.2	B	13.5	B	12.9	B	13.5	B	12.9	B	13.5	B	12.9	B	13.5	B	12.9	B
	Northbound	46.9	D	35.7	D	46.9	D	35.7	D	46.9	D	35.7	D	46.9	D	35.7	D	46.9	D	35.7	D
	Southbound	56.9	E	59.9	E	53.7	D	58.6	E	48.7	D	56.4	E	48.7	D	56.4	E	44.5	D	53.1	D
New Jersey Ave & Pierce Street	Westbound	9.8	A	10.2	B	33.6	D	24.6	C	33.0	D	24.8	C	33.0	D	24.8	C	31.1	D	26.1	D
	Southbound Left	-	-	-	-	2.8	A	1.9	A	2.9	A	2.1	A	2.9	A	2.1	A	3.4	A	3.9	A
New Jersey Ave & L Street	Westbound	8.5	A	8.7	A	20.2	C	26.2	D	23.5	C	30.0	D	23.5	C	30.0	D	23.5	C	30.3	D
	Southbound Left	-	-	-	-	2.5	A	1.3	A	2.8	A	2.2	A	2.8	A	2.2	A	2.8	A	2.2	A
New Jersey Ave & K Street	Overall	28.9	C	24.2	C	30.9	C	26.9	C	33.3	C	27.2	C	35.0	C	28.0	C	36.2	D	28.0	C
	Eastbound	39.8	D	18.5	B	36.5	D	19.8	B	36.8	D	20.0	B	37.8	D	20.7	C	38.0	D	20.8	C
	Westbound	33.9	C	44.4	D	36.6	D	47.2	D	42.9	D	47.6	D	46.5	D	48.6	D	49.6	D	48.2	D
	Northbound	19.2	B	16.3	B	25.2	C	20.8	C	25.3	C	21.0	C	25.3	C	21.0	C	25.5	C	21.4	C
	Southbound	-	-	-	-	18.9	B	16.0	B	17.5	B	16.1	B	17.5	B	16.1	B	17.6	B	16.3	B
4th Street & K Street	Overall	13.0	B	45.5	D	14.2	B	46.7	D	14.3	B	46.9	D	14.9	B	48.3	D	15.0	B	48.4	D
	Eastbound	21.7	C	50.1	D	22.8	C	55.5	E	22.8	C	56.1	E	23.6	C	59.1	E	23.6	C	59.1	E
	Westbound	5.5	A	50.9	D	7.3	A	48.4	D	7.7	A	48.4	D	8.0	A	49.3	D	8.3	A	49.6	D
	Northbound	31.8	C	24.9	C	31.8	C	24.9	C	31.8	C	24.9	C	31.8	C	24.9	C	31.8	C	24.9	C
	Southbound	36.8	D	36.8	D	36.8	D	36.8	D	36.8	D	36.8	D	36.8	D	26.8	D	36.8	D	36.8	D



Intersection	Approach	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		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	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
First Terrace & M Street	Northbound	9.8	A	12.2	B	9.9	A	12.3	B	-	-	-	-	-	-	-	-	-	-	-	-
First Place & M Street	Northbound	-	-	-	-	-	-	-	-	10.3	B	11.9	B	10.3	B	11.9	B	10.2	B	12.4	B
First Place & Pierce Street	Eastbound	-	-	-	-	-	-	-	-	8.4	A	8.5	A	8.4	A	8.5	A	8.8	A	8.8	A
	Northbound Left	-	-	-	-	-	-	-	-	3.6	A	3.1	A	3.6	A	3.1	A	3.6	A	3.1	A
L Street & First Place	Southbound	-	-	-	-	-	-	-	-	0.0	A	0.0	A	0.0	A	0.0	A	8.7	A	8.6	A
L Street & Site Dwy	Eastbound	-	-	-	-	-	-	-	-	4.8	A	6.7	A	4.8	A	6.7	A	4.8	A	6.7	A
	Southbound	-	-	-	-	-	-	-	-	8.8	A	8.8	A	8.8	A	8.8	A	8.8	A	8.8	A
First Place & Site Dwy	Eastbound	-	-	-	-	-	-	-	-	8.6	A	8.6	A	8.6	A	8.6	A	8.6	A	8.7	A
	Southbound	-	-	-	-	-	-	-	-	0.0	A	0.0	A	0.0	A	0.0	A	7.1	A	7.3	A
Pierce Street & Site Dwy 1	Eastbound Left	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.8	A	8.6	A
	Southbound	-	-	-	-	-	-	-	-	0.0	A	0.0	A	0.0	A	0.0	A	8.7	A	8.7	A



Figure 16: New York Avenue & First Street NW Mitigations



Figure 17: North Capitol Street & L Street Mitigations



Table 11: Mitigated Capacity Analysis Results

Intersection	Approach	Total Future Conditions (2018)				Total Future Conditions (2018) with Mitigations				Total Future Conditions (2020)				Total Future Conditions (2020) with Mitigations			
		AM Peak Hour		PM Peak Hour		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	Delay	LOS	Delay	LOS
1st Street & New York Ave	Overall	17.5	B	71.5	E	19.1	B	21.8	C	20.2	C	79.1	E	19.2	B	22.2	C
	Eastbound	7.4	A	8.9	A	17.0	B	16.5	B	7.4	A	8.9	A	17.0	B	16.5	B
	Westbound	4.4	A	7.3	A	13.8	B	15.1	B	4.4	A	7.3	A	13.8	B	15.1	B
	Northbound	66.2	E	193.5	F	33.2	C	44.9	D	94.3	F	258.9	F	33.6	C	45.7	D
	Southbound	77.2	E	522.5	F	40.5	D	54.2	D	79.8	E	531.1	F	40.7	D	56.5	E
North Capitol Street & L Street	Overall	9.3	A	19.4	B	No Capacity Changes				9.4	A	19.5	B	No Capacity Changes			
	Eastbound	58.3	E	53.7	D	No Capacity Changes				53.1	D	55.8	E	No Capacity Changes			
	Northbound	13.0	B	13.2	B	No Capacity Changes				12.6	B	13.2	B	No Capacity Changes			
	Southbound	6.2	A	23.5	C	No Capacity Changes				6.7	A	23.4	C	No Capacity Changes			
1st Street & M Street	Overall	19.1	B	20.4	C	19.4	B	20.1	C	19.9	B	21.0	C	20.2	C	20.6	C
	Eastbound	15.0	B	12.1	B	15.0	B	12.1	B	15.7	B	12.3	B	15.7	B	12.3	B
	Northbound	58.8	E	63.7	E	54.2	D	57.7	E	60.3	E	65.4	E	55.2	E	58.8	E
	Southbound	18.1	B	13.2	B	30.0	C	17.6	B	17.8	B	13.0	B	29.9	C	17.1	B
1st Street & Pierce Street	Overall	-	-	-	-	8.3	A	8.2	A	-	-	-	-	9.2	A	9.3	A
	Eastbound	13.6	B	11.0	B	7.9	A	7.8	A	15.4	C	14.3	B	8.5	A	8.8	A
	Westbound	13.5	B	11.9	B	7.8	A	7.8	A	17.2	C	15.7	C	9.2	A	8.9	A
	Northbound (Left)	1.6	A	1.0	A	8.6	A	8.4	A	1.3	A	0.7	A	9.5	A	9.6	A
	Southbound (Left)	0.0	A	0.0	A	8.2	A	8.1	A	0.7	A	1.9	A	9.0	A	9.2	A
1st Street & K Street	Overall	14.7	B	80.2	F	14.7	B	17.1	B	18.0	B	112.0	F	18.0	B	19.8	B
	Eastbound	9.2	A	9.8	A	9.2	A	11.0	B	9.7	A	10.5	B	9.7	A	11.9	B
	Westbound	10.0	B	173.7	F	10.0	B	11.3	B	11.7	B	240.6	F	11.7	B	14.1	B
	Northbound	43.9	D	52.2	D	43.9	D	40.9	D	48.5	D	57.0	E	48.5	D	42.4	D
	Southbound	42.8	D	68.7	E	42.8	D	43.5	D	54.1	D	100.9	F	54.1	D	50.3	D



Table 12: Queuing Analysis Results

Intersection	Lane Group	Storage Length (ft)	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
New Jersey Ave & New York Ave	Eastbound T(R)	290.0	290.0	340.0	329.0	384.0	354.0	415.0	398.0	466.0	353.0	413.0	400.0	468	353.0	413.0	400.0	468.0	358.0	418.0	417.0	487.0
	Westbound TR	750.0	223.0	263.0	181.0	215.0	323.0	380.0	266.0	315.0	320.0	377.0	263.0	312	320.0	377.0	263.0	312.0	322.0	379.0	265.0	314.0
	Northbound Thru	970.0	263.0	379.0	284.0	402.0	230.0	305.0	244.0	342.0	233.0	314.0	247.0	346	233.0	314.0	247.0	346.0	239.0	333.0	251.0	355.0
	Northbound Right	175.0	19.0	44.0	44.0	79.0	5.0	45.0	46.0	107.0	5.0	45.0	46.0	107	5.0	45.0	46.0	107.0	5.0	45.0	46.0	107.0
	Southbound TR	50.0	--	--	--	--	222.0	429.0	81.0	164.0	225.0	435.0	89.0	174	225.0	435.0	89.0	174.0	221.0	426.0	100.0	185.0
	Southbound Right	50.0	--	--	--	--	225.0	368.0	97.0	168.0	225.0	368.0	97.0	168	225.0	368.0	97.0	168.0	232.0	381.0	100.0	171.0
1st Street & New York Ave	Eastbound TR	710	133.0	153.0	231.0	253.0	138.0	158.0	241.0	264.0	138.0	158.0	241.0	264.0	138.0	158.0	241.0	264.0	138.0	158.0	241.0	264.0
	Westbound TR	850	49.0	65.0	409.0	474.0	50.0	65.0	531.0	608.0	50.0	65.0	518.0	595.0	50.0	65.0	518.0	595.0	50.0	65.0	518.0	594.0
	Northbound LTR	140	205.0	320.0	356.0	557.0	206.0	355.0	368.0	573.0	205.0	380.0	373.0	581.0	204.0	379.0	373.0	581.0	208.0	453.0	417.0	628.0
	Southbound LTR	255	157.0	224.0	555.0	757.0	168.0	245.0	579.0	783.0	166.0	242.0	570.0	774.0	166.0	242.0	570.0	774.0	169.0	249.0	591.0	797.0
N Capitol SB Ramp & New York Ave	Eastbound Thru	850	223.0	247.0	299.0	m317	228.0	252.0	308.0	m326	227.0	251.0	309.0	m326	227.0	251.0	309.0	m326	227.0	m252	309.0	m327
	Westbound Left	825	33.0	78.0	11.0	m32	40.0	m83	15.0	m35	41.0	m85	18.0	m41	41.0	m85	18.0	m41	45.0	m89	25.0	m52
	Westbound Thru	825	35.0	38.0	56.0	m61	58.0	m63	264.0	m104	54.0	m58	256.0	m100	54.0	m58	256.0	m100	54.0	m58	100.0	m99
	Southbound (L)T	145	81.0	132.0	173.0	277.0	340.0	488.0	244.0	429.0	340.0	488.0	244.0	429.0	340.0	488.0	244.0	429.0	340.0	488.0	244.0	429.0
	Southbound Right	145	82.0	156.0	0.0	26.0	82.0	156.0	0.0	26.0	82.0	156.0	0.0	26.0	82.0	156.0	0.0	26.0	82.0	156.0	0.0	26.0
N Capitol NB Ramp & N Street & New York Ave	Eastbound TR	850	38.0	42.0	64.0	69.0	97.0	m102	88.0	m94	338.0	m350	88.0	m94	338.0	m350	88.0	m94	338.0	m352	88.0	m94
	Westbound TR	825	156.0	174.0	116.0	132.0	156.0	174.0	116.0	132.0	157.0	175.0	117.0	133.0	157.0	175.0	117.0	133.0	158.0	176.0	119.0	135.0
	Northbound LT	245	140.0	219.0	245.0	394.0	252.0	439.0	839.0	1027.0	233.0	404.0	809.0	996.0	233.0	404.0	809.0	996.0	233.0	404.0	809.0	996.0
	Northbound Right	245	0.0	73.0	42.0	170.0	21.0	146.0	133.0	285.0	21.0	146.0	131.0	281.0	21.0	146.0	131.0	281.0	27.0	158.0	139.0	293.0
	Northwestbound Right	720	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Capitol Street & M Street & N Capitol SB Ramp & N Capitol NB Ramp	Eastbound Left	230	204.0	310.0	195.0	302.0	236.0	353.0	213.0	326.0	234.0	351.0	205.0	315.0	234.0	351.0	205.0	315.0	242.0	362.0	213.0	326.0
	Eastbound LTR	230	205.0	271.0	195.0	262.0	240.0	313.0	215.0	286.0	232.0	303.0	208.0	278.0	235.0	307.0	208.0	278.0	246.0	320.0	217.0	287.0
	Northbound Thru	285	171.0	203.0	48.0	46.0	179.0	251.0	68.0	75.0	173.0	246.0	70.0	76.0	173.0	246.0	70.0	76.0	175.0	247.0	70.0	76.0
	Northbound Right	120	11.0	32.0	--	--	101.0	179.0	18.0	29.0	95.0	179.0	19.0	29.0	95.0	179.0	19.0	29.0	96.0	177.0	19.0	29.0
	Southbound Thru	515	572.0	715.0	282.0	341.0	653.0	858.0	309.0	373.0	655.0	861.0	313.0	376.0	655.0	861.0	313.0	376.0	664.0	869.0	323.0	388.0
	Southeastbound Right	500	8.0	21.0	20.0	40.0	8.0	21.0	20.0	40.0	9.0	24.0	24.0	45.0	9.0	24.0	24.0	45.0	11.0	27.0	28.0	52.0
North Capitol Street & Pierce Street	Westbound RL	810	--	24.0	--	23.0	--	103.0	--	223.0	--	103.0	--	236.0	--	103.0	--	236.0	--	105.0	--	238.0
North Capitol Street & L Street	Eastbound LTR	210	1.0	m3	7.0	m17	12.0	m29	13.0	m29	27.0	m55	21.0	m49	27.0	m55	21.0	m49	32.0	m63	28.0	m59
	Northbound TR	360	139.0	168.0	151.0	m171	199.0	m210	181.0	m195	179.0	m193	181.0	m195	179.0	m191	181.0	m195	179.0	m190	181.0	m194
	Southbound LT	285	41.0	m53	211.0	301.0	58.0	m67	290.0	380.0	57.0	m66	314.0	391.0	57.0	m66	314.0	391.0	60.0	m68	332.0	409.0
North Capitol Street & K Street	Eastbound Left	110	81.0	134.0	93.0	m152	130.0	228.0	124.0	m226	130.0	229.0	124.0	m225	132.0	236.0	125.0	m224	132.0	m238	124.0	m218
	Eastbound TR	530	267.0	369.0	244.0	419.0	368.0	535.0	398.0	536.0	368.0	536.0	400.0	536.0	392.0	585.0	412.0	550.0	392.0	586.0	414.0	m544
	Westbound Left	165	39.0	72.0	47.0	84.0	55.0	94.0	83.0	167.0	55.0	94.0	83.0	167.0	55.0	103.0	83.0	167.0	55.0	103.0	83.0	167.0
	Westbound TR	795	255.0	326.0	390.0	599.0	283.0	36.0	501.0	720.0	283.0	361.0	507.0	726.0	290.0	368.0	556.0	780.0	293.0	372.0	571.0	794.0
	Northbound LTR	735	127.0	177.0	99.0	108.0	168.0	218.0	121.0	131.0	168.0	221.0	121.0	131.0	168.0	221.0	121.0	131.0	168.0	222.0	121.0	131.0
	Southbound TR	360	188.0	242.0	265.0	331.0	227.0	280.0	201.0	410.0	232.0	306.0	347.0	427.0	232.0	306.0	347.0	427.0	235.0	320.0	360.0	451.0



Intersection	Lane Group	Storage Length (ft)	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
North Capitol Street & H Street	Eastbound LTR	780	115.0	143.0	173.0	212.0	149.0	181.0	190.0	231.0	149.0	181.0	190.0	231.0	149.0	181.0	190.0	231.0	149.0	181.0	190.0	231.0
	Westbound TR	555	246.0	298.0	167.0	218.0	246.0	298.0	168.0	219.0	246.0	298.0	168.0	219.0	246.0	298.0	168.0	219.0	246.0	298.0	168.0	219.0
	Northbound LTR	380	153.0	194.0	182.0	223.0	146.0	184.0	183.0	226.0	146.0	184.0	183.0	226.0	146.0	184.0	183.0	226.0	146.0	184.0	183.0	226.0
	Southbound TR	315	92.0	96.0	98.0	m362	97.0	m102	176.0	m335	98.0	m106	185.0	m342	98.0	m106	185.0	m342	98.0	m109	387.0	m343
1st Street & M Street	Eastbound LTR	277	252.0	301.0	142.0	176.0	324.0	383.0	162.0	198.0	321.0	377.0	159.0	196.0	351.0	412.0	159.0	196.0	356.0	417.0	167.0	205.0
	Northbound TR	285	90.0	157.0	135.0	217.0	91.0	158.0	136.0	219.0	99.0	169.0	138.0	221.0	99.0	169.0	138.0	221.0	116.0	189.0	152.0	238.0
	Southbound LT	115	35.0	m46	52.0	m30	37.0	m48	55.0	m30	36.0	m48	54.0	m29	36.0	m48	54.0	m29	38.0	m49	58.0	m30
1st Street & Pierce Street	Easbound L(T)R	--	--	11.0	--	8.0	--	11.0	--	8.0	--	13.0	--	9.0	--	13.0	--	9.0	--	19.0	--	22.0
	Westbound LTR	575	--	--	--	--	--	--	--	--	1.0	--	--	--	1.0	--	--	--	31.0	--	17.0	
	Northbound LT(R)	285	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0
	Southbound (L)TR	285	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0	--	2.0
1st Street & L Street	Eastbound LTR	480	--	4.0	--	11.0	--	7.0	--	13.0	--	8.0	--	18.0	--	8.0	--	18.0	--	10.0	--	23.0
	Westbound LTR	195	--	6.0	--	11.0	--	6.0	--	11.0	--	13.0	--	16.0	--	13.0	--	16.0	--	16.0	--	21.0
	Northbound LTR	365	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0	--	2.0	--	1.0
	Southbound LTR	285	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1st Street & K Street	Eastbound LTR	345	48.0	60.0	230.0	285.0	98.0	125.0	257.0	312.0	93.0	121.0	267.0	328.0	96.0	122.0	273.0	354.0	99.0	126.0	291.0	387.0
	Westbound LTR	180	74.0	75.0	162.0	m174	368.0	456.0	797.0	m743	384.0	469.0	871.0	m815	398.0	478.0	938.0	m838	406.0	486.0	1022.0	m908
	Northbound LTR	350	101.0	162.0	156.0	252.0	102.0	163.0	157.0	255.0	106.0	169.0	167.0	287.0	106.0	169.0	167.0	287.0	113.0	181.0	180.0	318.0
	Southbound LTR	360	78.0	132.0	116.0	218.0	80.0	134.0	125.0	246.0	107.0	168.0	138.0	273.0	107.0	168.0	138.0	273.0	182.0	267.0	184.0	357.0
1st Street & H Street	Eastbound LTR	105	20.0	39.0	75.0	93.0	27.0	50.0	82.0	102.0	28.0	50.0	83.0	103.0	28.0	50.0	83.0	103.0	28.0	51.0	85.0	105.0
	Westbound LTR	775	128.0	160.0	94.0	112.0	146.0	180.0	124.0	143.0	146.0	180.0	124.0	143.0	146.0	180.0	124.0	143.0	146.0	180.0	124.0	143.0
	Northbound LTR	365	59.0	112.0	39.0	97.0	59.0	112.0	39.0	97.0	59.0	112.0	39.0	97.0	59.0	112.0	39.0	97.0	59.0	112.0	39.0	97.0
	Southbound LT	305	41.0	81.0	90.0	181.0	41.0	81.0	90.0	181.0	41.0	81.0	90.0	181.0	41.0	81.0	90.0	181.0	41.0	81.0	90.0	181.0
	Southbound Right	305	10.0	38.0	14.0	45.0	23.0	55.0	30.0	65.0	43.0	82.0	41.0	80.0	43.0	82.0	41.0	80.0	43.0	84.0	137.0	64.0
New Jersey Ave & Pierce Street	Westbound Left	585	--	--	--	--	--	35.0	--	19.0	--	36.0	--	20.0	--	36.0	--	20.0	--	38.0	--	24.0
	Westbound Right	585	--	2.0	--	4.0	--	3.0	--	5.0	--	4.0	--	5.0	--	4.0	--	5.0	--	6.0	--	7.0
	Northbound TR	290	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Southbound LT	175	--	--	--	--	--	5.0	--	3.0	--	5.0	--	4.0	--	5.0	--	4.0	--	7.0	--	9.0
New Jersey Ave & L Street	Westbound Right	490	--	1.0	--	2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Westbound LR	490	--	--	--	--	--	9.0	--	29.0	--	9.0	--	31.0	--	9.0	--	31.0	--	9.0	--	31.0
	Northbound TR	375	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Southbound LT	290	--	--	--	--	--	4.0	--	2.0	--	5.0	--	4.0	--	5.0	--	4.0	--	5.0	--	4.0
New Jersey Ave/New Jersey Ave & K Street	Eastbound LT	320	161.0	199.0	95.0	m112	173.0	214.0	99.0	m116	173.0	215.0	99.0	m116	189.0	232.0	100.0	m115	189.0	232.0	100.0	m115
	Westbound TR	355	379.0	464.0	218.0	m231	294.0	511.0	266.0	m218	334.0	543.0	271.0	m208	355.0	561.0	288.0	m213	375.0	572.0	292.0	m201
	Northbound Left	110	59.0	100.0	42.0	75.0	62.0	108.0	44.0	80.0	62.0	109.0	44.0	80.0	62.0	109.0	44.0	80.0	62.0	109.0	44.0	80.0
	Northbound TR	155	104.0	129.0	101.0	125.0	273.0	348.0	247.0	315.0	274.0	349.0	252.0	321.0	274.0	349.0	253.0	322.0	278.0	355.0	263.0	334.0
	Southbound Left	365	--	--	--	--	22.0	59.0	25.0	61.0	11.0	32.0	25.0	62.0	11.0	32.0	25.0	62.0	11.0	33.0	25.0	63.0
	Southbound TR	365	--	--	--	--	49.0	88.0	58.0	98.0	54.0	96.0	58.0	98.0	54.0	96.0	58.0	98.0	54.0	96.0	58.0	98.0



Intersection	Lane Group	Storage Length (ft)	Existing Conditions (2015)				Future Background Conditions (2018)				Total Future Conditions (2018)				Future Background Conditions (2020)				Total Future Conditions (2020)			
			AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
			50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
4th Street & K Street	Eastbound Left	120	1.0	8.0	2.0	10.0	1.0	8.0	2.0	10.0	1.0	8.0	2.0	10.0	2.0	8.0	2.0	11.0	2.0	8.0	2.0	11.0
	Eastbound TR	685	180.0	264.0	394.0	612.0	210.0	305.0	420.0	650.0	210.0	305.0	422.0	655.0	230.0	332.0	433.0	671.0	230.0	332.0	433.0	671.0
	Westbound Left	105	7.0	m13	118.0	m184	6.0	m11	117.0	m159	7.0	m85	116.0	m156	7.0	m13	117.0	m149	7.0	m12	117.0	m147
	Westbound TR	180	92.0	m110	324.0	430.0	566.0	m614	378.0	493.0	581.0	M611	383.0	499.0	591.0	m612	410.0	m507	601.0	m617	417.0	m511
	Northbound LTR	340	10.0	33.0	61.0	105.0	10.0	33.0	61.0	105.0	10.0	33.0	61.0	105.0	10.0	33.0	61.0	105.0	10.0	33.0	61.0	105.0
	Southbound LTR	345	77.0	345.0	200.0	287.0	77.0	128.0	200.0	287.0	77.0	128.0	200.0	287.0	77.0	128.0	200.0	287.0	77.0	128.0	200.0	287.0
First Terrace & M Street	Northbound Right	335	--	3.0	--	7.0	--	3.0	--	7.0	--	--	--	--	--	--	--	--	--	--	--	--
First Place & M Street	Northbound Right	335	--	--	--	--	--	--	--	--	--	4.0	--	1.0	--	4.0	--	1.0	--	4.0	--	5.0
First Place & Pierce Street	Eastbound LR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	--	3.0
L Street & First Place	Southbound LR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0	--	1.0
L Street & Site Dwy	Eastbound LT	--	--	--	--	--	--	--	--	--	--	1.0	--	3.0	--	1.0	--	3.0	--	1.0	--	3.0
	Southbound LR	--	--	--	--	--	--	--	--	--	--	7.0	--	4.0	--	7.0	--	4.0	--	7.0	--	4.0
First Place & Site Dwy (S)	Eastbound LR	--	--	--	--	--	--	--	--	--	--	1.0	--	--	--	1.0	--	--	--	1.0	--	--
Pierce Street & Site Dwy	Eastbound LT	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	--	8.0
	Southbound LR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.0	--	6.0
First Place & Site Dwy (N)	Southbound LR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0	--	3.0



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 Sursum Corda project.

The following conclusions are reached within this chapter:

- The development site is approximately 0.4 miles from the NoMa-Gallaudet U Metrorail station and is surrounded by several Metrobus routes that travel along multiple primary corridors.
- The site is expected to generate a manageable amount of transit trips, and the existing service is capable of handling these new trips.

EXISTING TRANSIT SERVICE

The study area is well-served by both 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 18 identifies the major transit routes, stations, and stops in the study area.

The NoMa-Gallaudet U Metrorail station is located approximately 0.4 miles 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 periods. They run about every 5 to 6 minutes during weekday non-peak periods, every 10 to 15 minutes on weekday evenings after 7 pm and 6 to 16 minutes on the weekends.

The site is also serviced by Metrobus along multiple primary corridors. These bus lines connect the site to many areas of the District, including several Metrorail stations serving all of the six lines. Table 13 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.

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.

Table 13: Metrobus Route Information

Route Number	Route Name	Service Hours	Headway	Walking Distance to Nearest Bus Stop
80	North Capitol Street Line	Weekdays: 4:30 am - 1:20 am Weekends: 4:40 am - 12:15 am	15 - 30 min	< 0.1 miles (< 2 minutes)
96	East Capitol Street-Cardozo Line	Monday-Saturday: 4:45 am - 3:55 am Sundays: 5:00 am - 1:25 am	10 - 30 min	< 0.1 miles (< 2 minutes)
D3	Ivy City-Dupont Circle Line	Weekdays: 4:15 am - 1:00 am Weekends: 5:00 am - 1:00 am	15 - 30 min	0.25 miles (5 minutes)
D4	Ivy City-Franklin Square Line	Weekdays: 4:15 am - 1:00 am Weekends: 5:00 am - 1:00 am	15 - 30 min	0.1 miles (2 minutes)
P6	Anacostia-Eckington Line	Monday-Saturday: 5:15 am - 2:00 am Sundays: 6:45 am - 12:15 am	12 - 30 min	directly adjacent to the site
X2	Benning Road-H Street Line	Monday-Saturday: 4:05 am - 3:00 am Sundays: 4:10 am - 2:00 am	6 - 20 min	0.25 miles (5 minutes)



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 prior to completion of the Sursum Corda development. The nearest stop location will be just under a half-mile from the site. The line will be extended to the west in the future and connect with the Georgetown neighborhood, at which time a stop location nearer to the site will be completed.

Additionally, WMATA and DDOT have published two Metrobus studies: the *Metrobus North Capitol Street Line Study: Route 80* in October 2013 and the *Metrobus Service Evaluation Study: East Capitol Street-Cardozo Line (Route 96/97)* in January 2013. The *North Capitol Street Line Study* evaluates additional express route that is considered for the 80 Line. This route would likely have 15 minute headways, which would add four new buses per hour to the North Capitol Street Corridor. Currently it is only expected to operate during peak periods on weekday, but there is potential for adding mid-day, late night, and weekend service in the future. The majority of recommendations in the *East Capitol-Cardozo Line Study* would not impact the development; however, it is possible that 96 buses traveling southbound will be rerouted to New Jersey Avenue as part of the New Jersey Avenue two-way conversion. This would relocate southbound 96 stops slightly further from the site, but still within a quarter mile.

TRANSIT SITE IMPACTS

Site-Generated Transit Trips

The proposed development is projected to generate 241 transit trips (64 inbound, 177 outbound) during the morning peak hour and 318 transit trips (190 inbound, 128 outbound) during the afternoon peak hour.

US Census data was used as a basis for determining the distribution of those taking Metrorail and those taking Metrobus. The site lies on the far east side of TAZ 20203 which shows that approximately 15 percent of transit riders used Metrorail and the remaining 85 percent use Metrobus. Given the sites position within the TAZ, it is expected that the Metrorail split for the site will be higher than the overall TAZ. It was assumed that approximately 25 percent of transit trips would be via Metrorail and 75 percent via Metrobus. Given the transit trip generation of the development, approximately 60

people will use Metrorail and 181 will use Metrobus during the morning peak hour; approximately 80 people will use Metrorail and 238 will use Metrobus during the afternoon peak hour.

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-Gallaudet U Station in 2005 nor are they expected by 2030. However, this station had only been open for approximately one year when data was collected.

WMATA also studied capacity along Metrobus routes. DC's *Transit Future System Plan (2010)* 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, two of the Metrobus routes that travel near the site, the D3 Line and the X1 line, exceed acceptable load factors. The remaining four lines do not experience any existing capacity concerns. Based on this information and the peak period headways of the surrounding Metrobus routes, it is not expected that site-generated transit trips will cause detrimental impacts to Metrobus service.

Transit Mitigations

Under existing conditions there is a bus stop serving the P6 line on the southwest corner of M Street and First Place. The Applicant has agreed to work with DDOT on improving this bus stop as part of the public space improvements along the perimeter of the site, to include elements such as a shelter.

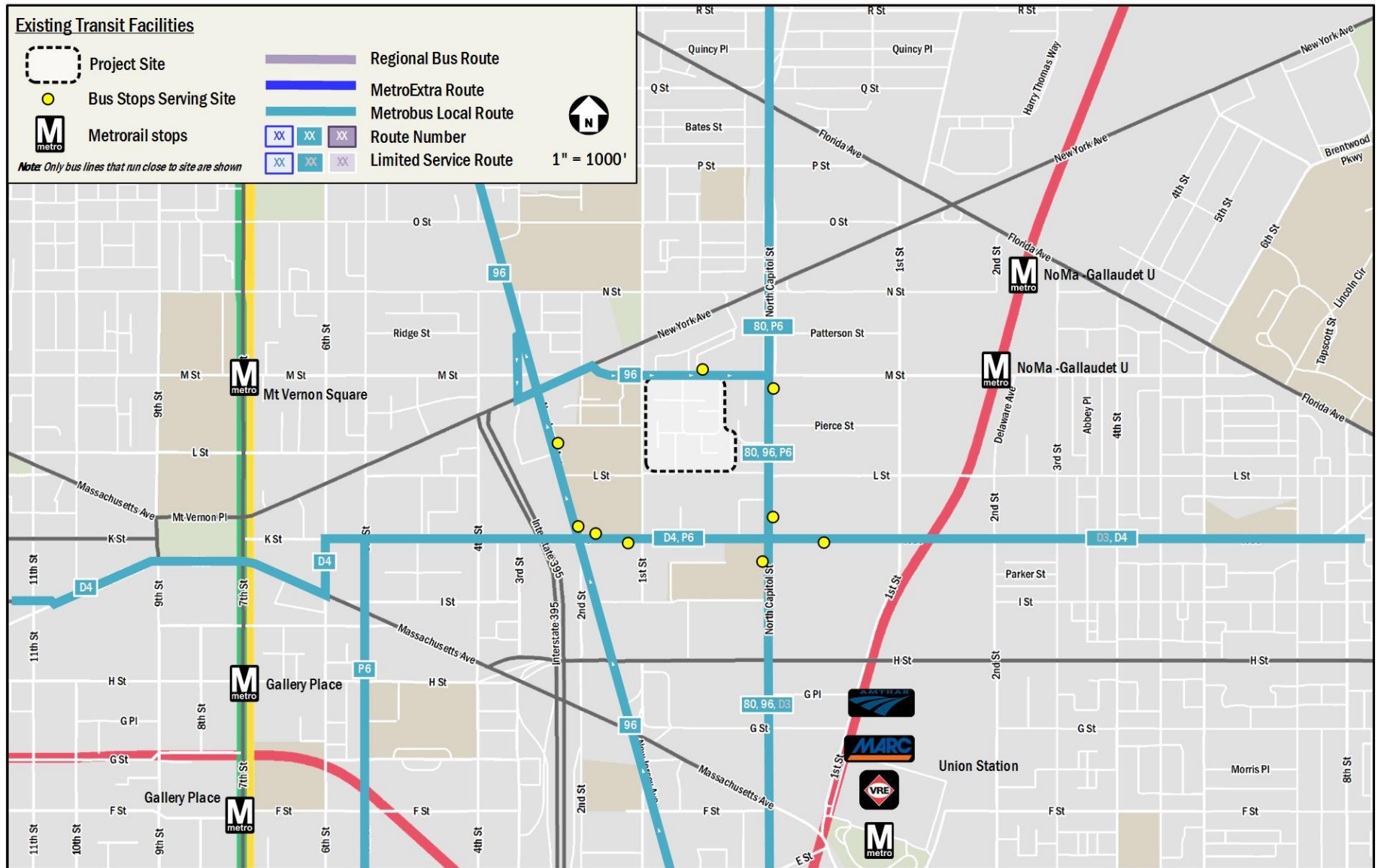


Figure 18: Existing Transit Service



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 existing pedestrian infrastructure surrounding the site provides an excellent walking environment. There are some barriers near the site, but overall there is a well-connected pedestrian network.
- The site will improve the overall pedestrian environment on site by providing improved or new sidewalks along the interior and perimeter of the site, most notably along First Street and L Street where sidewalks do not currently meet DDOT standards, and by constructing a public pedestrian plaza through the site.
- Additional pedestrian improvements will be made off-site that will enhance pedestrian safety and improve the pedestrian connectivity in the neighborhood.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the site were evaluated as well as routes to the NoMa-Gallaudet U Metrorail station portals. The site is easily accessible to Metrorail along M Street and several Metrobus stops along M Street, New Jersey Avenue, North Capitol Street, K Street, and H Street. 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 I-395 and the Red Line Metrorail tracks which create some limitations to the number of pedestrian connections available to the east and west. Figure 19 shows suggested pedestrian pathways, walking time and distances, and barriers or areas of concern.

Table 14: 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

PEDESTRIAN INFRASTRUCTURE

This section outlines the existing and proposed pedestrian infrastructure within the pedestrian study area.

Existing Conditions

A review of pedestrian facilities surrounding the planned development shows that many facilities meet DDOT standards and provide a quality walking environment. Figure 20 shows a detailed inventory of the existing pedestrian infrastructure surrounding the site. 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 14.

Within the area shown, there are a variety of roadway types ranging from low to moderate density residential, like the area surrounding the existing site, high density residential, such as the new apartment buildings near the Metro, and non-downtown commercial, such as the office buildings along K Street. Most of the sidewalks surrounding the site comply with DDOT standards; however there are some areas that do not have adequate sidewalks or lack sidewalks completely. Some of these sidewalks, such as those along M Street and Patterson Street will likely be remedied as part of the background developments and the Sursum Corda development itself will result in pedestrian improvements around the perimeter of the site.

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 minimal issues with crosswalks and curb ramps near the site.

SITE IMPACTS

This section summarizes the impacts of the development on the overall pedestrian operations in the vicinity of the site.



Pedestrian Trip Generation

The planned development is expected to generate 81 walking trips (31 inbound, 50 outbound) during the morning peak hour and 107 walking trips (59 inbound, 48 outbound) during the afternoon peak hour. The origins and destinations of these trips are likely to be:

- Employment opportunities where residents can walk to work
- Retail locations in the vicinity of the site
- Employees and patrons of the Sursum Corda development
- Nearby neighborhood destinations, such as schools or community gathering areas

In addition to these trips, the transit trips generated by the site will also generate pedestrian demand between the site and nearby transit stops. About 25 percent of these will be walking to the NoMa-Gallaudet U Metrorail station located approximately 0.4 miles from the site and the rest will be walking to Metrobus stops, which are primarily located along M Street, North Capitol Street, K Street, New Jersey Avenue, and H Street.

On-Site Pedestrian Infrastructure

The removal and reconfiguration of roadways within the site will improve the pedestrian connectivity within and through the site, and create a more welcoming and safer feeling pedestrian environment.

Within the site, the development will result in new or improved sidewalks along the interior and perimeter of the site. This will be particularly impactful along First Street where unsafe pedestrian facilities currently exist, and along L Street where no sidewalks exist and the roadway acts more like an alley than a street. In addition a public north-south pedestrian plaza will be implemented through the center of the site, providing an additional pedestrian connection that enhances the overall pedestrian environment in the vicinity of the site.

Off-Site Pedestrian Infrastructure

In addition to pedestrian improvements within the site and along the perimeter, the Applicant will improve the northern pedestrian crosswalk at the intersection of L Street and North Capitol Street, such that the crosswalk no longer enters the west side of the street at the L Street curb cut.

As part of the conversion of First Street and Pierce Street from two-way stop-controlled to all-way stop-controlled (described in the Traffic Operations chapter of this report), the Applicant will add crosswalks and ADA compliant curb ramps along all approaches of the intersection. As part of the improvements to L Street, the westbound approach of the intersection will be enhanced to promote pedestrian safety by adding a crosswalk, a stop sign, and a stop bar.

The review of pedestrian infrastructure also noted deficiencies at the intersection of First Street and L Street NW. Although this intersection does not meet all-way stop sign warrants, this report recommends enhancements to curb ramps and crosswalk markings be performed at this location to improve the pedestrian environment.

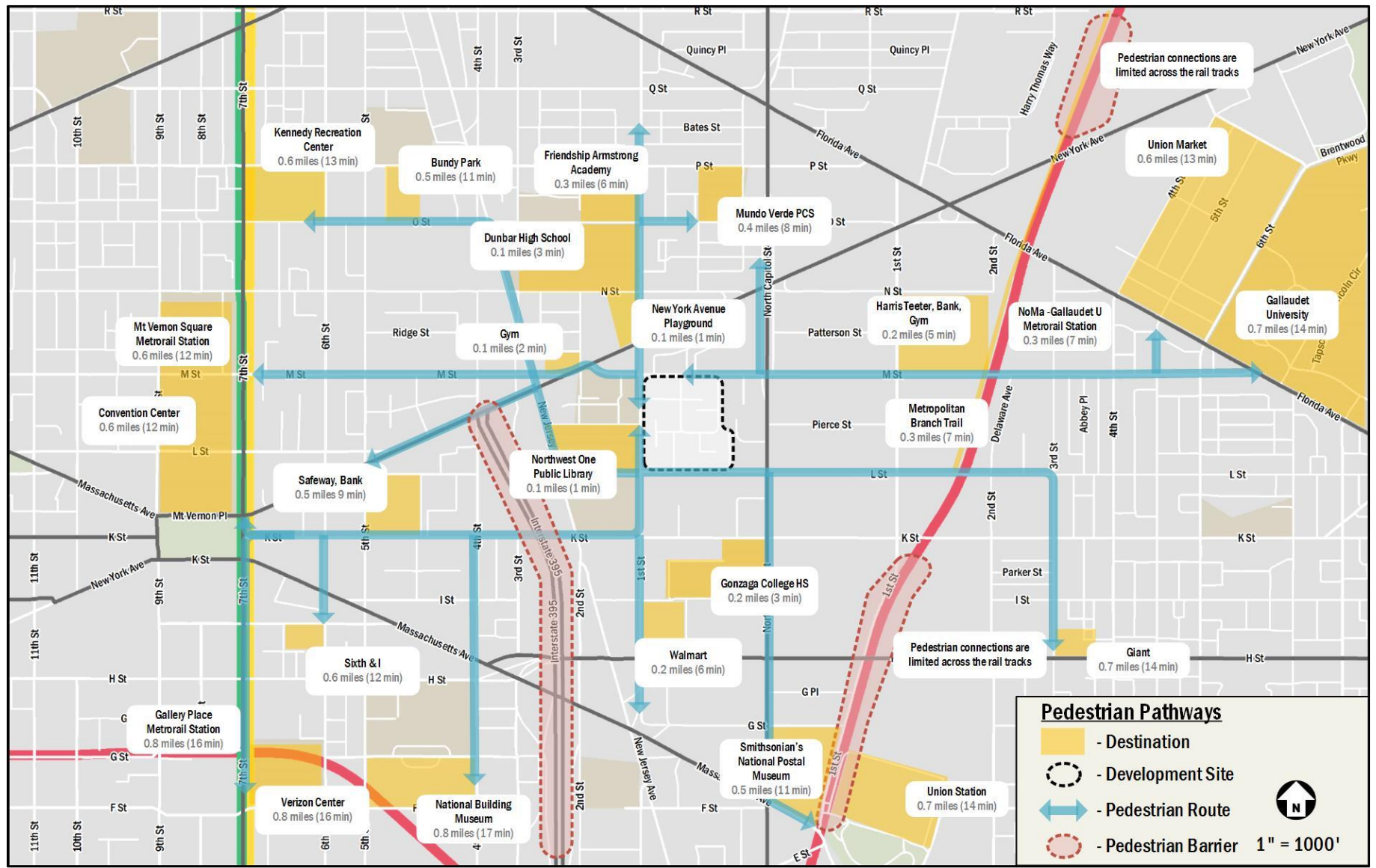


Figure 19: Pedestrian Pathways

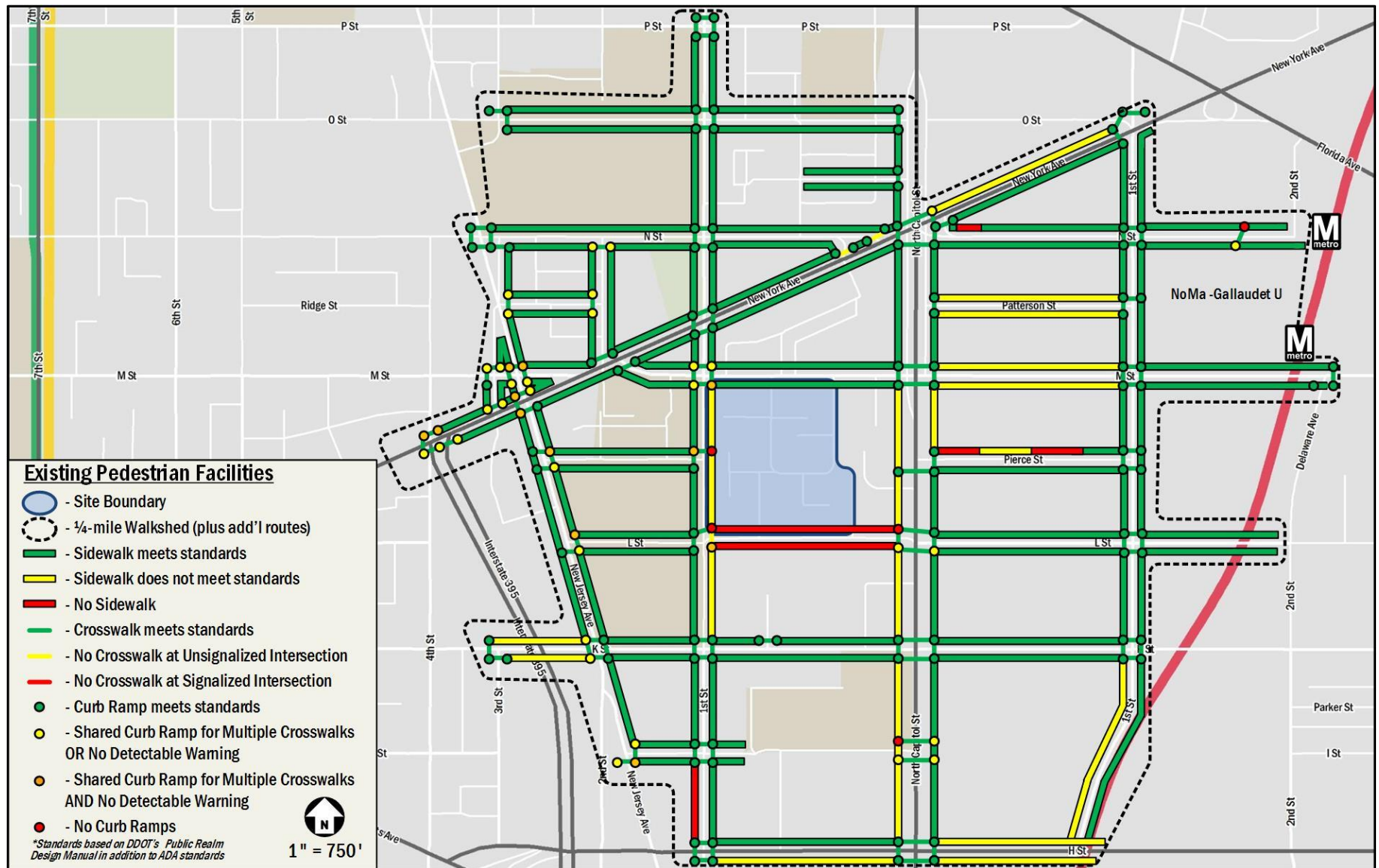


Figure 20: Existing Pedestrian Infrastructure



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:

- The site has access to several on- and off-street bicycle facilities including the Metropolitan Branch Trail.
- New north-south bicycle lanes will be constructed near the site along New Jersey Avenue as part of the *New Jersey Avenue Safety Upgrades & Two-Way Conversion Project*
- The site is not expected to generate a significant amount of bicycle trips, therefore all site-generated bike trips can be accommodated on existing infrastructure.
- The development site will include long-term bicycle parking within the parking garages and short-term bicycle parking within the site and along the perimeter of the site. The Applicant has also agreed to install a Capital Bikeshare station within the perimeter of the site.

EXISTING BICYCLE FACILITIES

The site has access to existing on- and off-street bicycle facilities. The Sursum Corda development is located just blocks from the Metropolitan Branch Trail that runs along the Metrorail Red Line and several north-south and east-west bicycle lanes and cycle tracks. Although none of these facilities are directly adjacent to the site, lower-volume local streets can typically be used to access these facilities. Figure 21 illustrates the existing bicycle facilities in the area and the anticipated access routes to and from the site.

No bike parking is provided along the perimeter of the site under existing conditions.

PROPOSED BICYCLE FACILITIES

The MoveDC plan outlines several 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.

A bicycle trail from Stanton Road to Firth Sterling Avenue along Suitland Parkway will be in the tier 1 additions.

- 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.

There are a not tier 2 additions in the vicinity of the site.

- 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 project development in the early years of implementation.

Due to the timeline of the Sursum Corda development, this report focuses on the Tier 1 and Tier 2 recommendations within the vicinity of the site. These include 1.8 miles of bicycle facilities along M Street NW/NE between Florida Avenue NE and Thomas Circle NW, a 4.6 mile bicycle trail along New York Avenue between M Street NW and the Maryland state line, and an extension of the First Street NE cycle track to connect to Florida Avenue.

Although these projects are discussed in the MoveDC plan, they are not currently funded or included in DDOT’s Transportation Implementation Plan thus they will not be assumed as complete for this analysis.

In addition to the MoveDC plan, the *New Jersey Avenue Safety Upgrades & Two-Way Conversion Project* will implement north and southbound bicycle lanes along New Jersey Avenue between K Street and N Street NW.



SITE IMPACTS

This section summarizes the impacts of the development on the overall bicycle operations surrounding the site and develops recommendations for connectivity improvements.

Bicycle Trip Generation

The planned development is expected to generate 17 bicycle trips (7 inbound, 10 outbound) during the morning peak hour and 25 bicycle trip (14 inbound, 11 outbound) during the afternoon peak hour. Although bicycling will be an important mode for getting to and from the site, with facilities located on site and routes to and from the site, the impacts from bicycling will be relatively less than impacts to other modes.

On-Site Bicycle Elements

The project will provide amenities that cater to cyclists including long-term and short-term bicycle racks. Phase 1 will supply 183 secure long-term bicycle spaces in its parking garage and Phase 2 will supply 270 spaces. These spaces will be conveniently located on the first floor of each garage.

Exact numbers and locations of short-term bicycle racks have not yet been determined; however, it is expected that bicycle racks will be located in the interior and along the perimeter of the site. The Applicant is willing to work with DDOT to determine the locations of bicycle racks within public space.

Additionally, the Applicant has agreed to fund the installation of a Capital Bikeshare station within the perimeter of the site. The exactly location of the station has not yet been determined; however will be located in an area that is convenient to both residents of the development and the surrounding neighborhood.

Off-Site Bicycle Elements

As noted during the DDOT scoping process, DDOT is actively studying the area surrounding the development site for the including of an east-west bicycle facility. One possible option includes L Street, adjacent to the site. The Applicant should work with DDOT to design the roadway improvements to best accommodate the potential bicycle facility; however, at this time the right-of-way to include a bicycle facility does not exist.

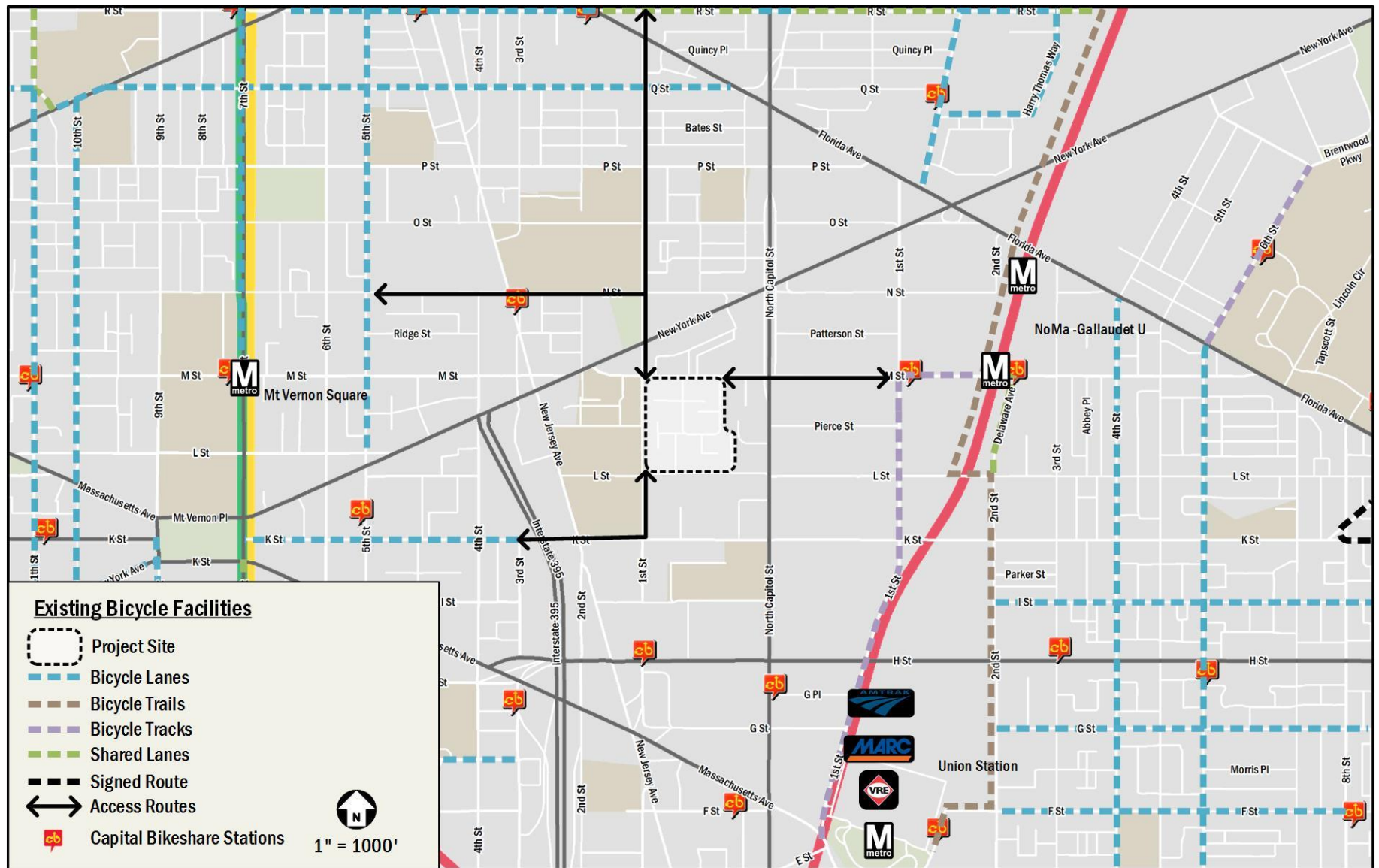


Figure 21: Existing Bicycle Facilities



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 high crash rate at study area intersections. DDOT provided the last three years of intersection crash data, from 2012 to 2014 for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections, the crash rate is measure in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 15.

According to the Institute of Transportation Engineer’s *Comprehensive Transportation Review 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 15 and detailed in Table 16). The Sursum Corda development should be developed in a

manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

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. In some cases, the crashes were located near the intersection 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 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 possible causes. Table 16 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.

Table 15: Intersection Crash Rates (2012 to 2014)

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
New York Avenue & New Jersey Avenue NW	63	3	0	0.96
New York Avenue & First Street NW	1	0	0	0.02
North Capitol Street & New York Avenue	187	11	0	3.81
North Capitol Street & M Street	60	2	0	1.46
North Capitol Street & Pierce Street	19	1	0	0.53
North Capitol Street & L Street	36	1	0	0.99
North Capitol Street & K Street	74	7	0	1.50
North Capitol Street & H Street	114	10	0	2.31
First Street & M Street NW	30	1	0	1.99
First Street & Pierce Street NW	13	1	0	2.61
First Street & L Street NW	3	0	0	0.53
First Street & K Street NW	28	1	0	1.02
First Street & H Street NW	23	1	0	0.91
New Jersey Avenue & Pierce Street NW	9	0	0	0.58
New Jersey Avenue & L Street NW	10	0	0	0.65
New Jersey Avenue & K Street NW	22	0	0	0.67
4th Street & K Street NW	14	0	0	0.65
M Street & First Terrace NW	2	0	0	0.16
M Street & First Place NW	5	0	0	0.39

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



- North Capitol Street & New York Avenue**
 This intersection was found to have a significantly high crash rate of 3.81 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. High rear end crashes are more typical at signalized intersections and may be elevated due to the atypical geometry of the intersection. Based on the crash report, side swiped vehicles are more prevalent along the roadways leading to the intersection, but within 100 feet of the intersection. This may be due to parked vehicles entering the roadway, traveling vehicles avoiding parked cars, or vehicles trying to move around turning vehicles.

The safety concerns at this intersection are primarily due to the existing geometry. Site-generated traffic is not expected to degrade the safety at this intersection; thus no improvements are recommended as part of the PUD.

- North Capitol Street & M Street**
 This intersection was found to have a high crash rate of 1.46 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. High rear end crashes are more typical at signalized intersections and may be elevated due to the atypical geometry of the intersection. Side swiped vehicles may be particularly high due to the

southbound merge at North Capitol Street just past the intersection and last minute left-turning decisions from M Street to the North Capitol Street underpass or ramp.

The safety concerns at this intersection are primarily due to this existing geometry. Site-generated traffic is not expected to degrade the safety at this intersection; thus no improvements are recommended as part of the PUD.

- North Capitol Street & K Street**
 This intersection was found to have a high crash rate of 1.50 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. Rear end and side swiped vehicles may be elevated due to the lack of exclusive left-turn lanes along North Capitol Street. Northbound left turns restricted during the PM peak period and southbound left turns are restricted during the AM peak period; thus it would not be advantageous to supply left turn lanes when they would not be used for periods of the day. Additionally, side swiped crashes may be more prevalent due to unstriped on-street parking along both K Street and North Capitol Street, some of which is peak period restricted.

The safety concerns at this intersection are primarily due to the existing lane configurations and flexible on-street

Table 16: Crash Type Breakdown

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	Under/Over Ride	Unspecified	Other	Total
North Capitol Street & New York Avenue	3.81	12 6%	20 11%	12 6%	40 21%	76 41%	2 1%	1 1%	1 1%	0 0%	9 5%	2 1%	1 1%	9 5%	2 1%	187
North Capitol Street & M Street	1.46	8 13%	6 10%	0 0%	13 22%	22 37%	0 0%	3 5%	3 5%	0 0%	2 3%	1 2%	0 0%	1 2%	1 2%	60
North Capitol Street & K Street	1.50	6 8%	9 12%	2 3%	20 27%	20 27%	0 0%	2 3%	2 3%	0 0%	8 11%	2 3%	0 0%	3 4%	0 0%	74
North Capitol Street & H Street	2.31	9 8%	11 10%	7 6%	29 25%	34 30%	1 1%	0 0%	3 3%	0 0%	10 9%	4 4%	0 0%	2 2%	4 4%	114
First Street & M Street NW	1.99	2 7%	1 3%	1 3%	6 20%	12 40%	0 0%	0 0%	3 10%	0 0%	1 3%	4 13%	0 0%	0 0%	0 0%	30
First Street & Pierce Street NW	2.61	2 15%	1 8%	0 0%	2 15%	3 23%	0 0%	1 8%	0 0%	0 0%	1 8%	2 15%	0 0%	1 8%	0 0%	13
First Street & K Street NW	1.02	1 4%	0 0%	0 0%	10 36%	7 25%	0 0%	0 0%	1 4%	0 0%	3 11%	5 18%	0 0%	1 4%	0 0%	28



parking. Changes to either of these elements would result in different issues, therefore there is not an easy solution to the elevated crashes at this intersection. Site-generated traffic is not expected to degrade the safety at this intersection; thus no improvements are recommended as part of the PUD.

- *North Capitol Street & H Street*

This intersection was found to have a significantly high crash rate of 2.31 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. Similarly to the intersection of North Capitol Street & K Street, northbound and southbound left turns are restricted during the PM and AM peak periods, respectively, which may cause elevated rear end and side swiped crashes as vehicles may stop suddenly to turn or vehicles will swerve to get around a left-turning vehicle. Additionally, westbound left turns are restricted during the AM peak hour. No left turn lanes are supplied for these approaches as a left turn lane would be unutilized during portions of the day. Another possible cause of elevated crash rates could be the exclusive eastbound left turn phase without the inclusion of an exclusive eastbound left turn lane.

The safety concerns at this intersection are primarily due to the existing lane configurations and operations. The site-generated traffic at this intersection is minimal and not expected to degrade the safety; thus no improvements are recommended as part of the PUD.

- *First Street & M Street NW*

This intersection was found to have a high crash rate of 1.99 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. Elevated rear end and side swiped crashes may be as a result of on-street parking along M Street and the existing signal operations. There is currently an exclusive southbound left turn phase without an exclusive southbound left turn lane.

As part of the PUD, the section of First Street between M Street and New York Avenue will be reconfigured to including a northbound left turn lane at New York Avenue and a southbound left turn lane at M Street. This may help

in the reduction of crashes at the intersection and allow the intersection to operate more intuitively.

- *First Street & Pierce Street NW*

This intersection was found to have a significantly high crash rate of 2.61 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were side swiped vehicles. Side swiped crashes could be elevated at this intersection due to the prevalence of on-street parking along Pierce Street and parts of First Street and the two-way stop controlled nature of the intersection. Northbound vehicles traveling through the intersection may try to squeeze around left-turning vehicles, but end up side swiping the turning vehicle.

This intersection will be improved as part of the PUD to include an all-way stop as opposed to a two-way stop. This should alleviate some safety concerns at the intersection and generally slow down speeds along First Street.

- *First Street & K Street NW*

This intersection was found to have a crash rate just over the threshold at 1.02 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. Rear end and side swiped crashes may be elevated at this intersection due to the prevalence of on-street parking and the lack of exclusive left turn lanes along the east, west, and southbound approaches.

This intersection will be reconfigured as part of the PUD to restrict parking along the westbound approach during the PM peak period. Given that the westbound approach lane restricts parking during the PM peak period, this will give the intersection a higher capacity without causing any additional safety concerns. Side swiped crashes may be reduced as a result of PM parking restrictions as well.



SUMMARY AND CONCLUSIONS

This report presents a review of the transportation aspects of a Planned Unit Development (PUD) application for Sursum Corda. The purpose of this study is to evaluate whether the project will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, two background conditions, and two future conditions. This report concludes that **the project will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigations are implemented.

Proposed Project

The development, which will redevelop the existing Sursum Corda Cooperate housing development, is located in the NoMa neighborhood, in the Northwest quadrant of Washington, DC. The site is generally bounded by M Street to the north, First Place to the west, L Street to the south, and First Place/an existing alley to the east.

The application plans to develop the site over two phases:

- **Phase 1** includes up to 430 residential units and 8,315 square feet of community-serving space. For the purpose of this analysis it was assumed that the community-serving space would break down to 2,030 square feet of daycare space and 6,285 square feet of recreational community center space. Although the specific uses of the community-serving space may change, these uses were assumed since they generate a relatively high amount of traffic compared to other potential uses, and thus offer a conservative analysis.
- **Phase 2** includes up to 712 residential units, 23,225 square feet of retail space, and 17,880 square feet of commercial/office space. For the purpose of this analysis, it was assumed that this space will comprise of office uses in order to study the more conservative option.

As part of the development, the internal roadway network will be reconfigured. First Terrace, L Place, and the alley abutting the adjacent church will be removed, to be replaced with a more robust street grid. The existing portion of First Place will be extended south as a public roadway to meet L Street and Pierce Street will be extended east from First Street as a private roadway to meet First Place. L Street will be improved per DDOT standards as possible to provide a half section that will allow two-way operations west of First Place and one-way

eastbound operations east of First Place. This allows for improved pedestrian and vehicular connectivity throughout the site, increased porosity, and better integration into the urban fabric.

A shared parking and loading access for Phase 1 will be off of L Street, with head-in/head-out loading operations, with an additional parking access along the new portion of First Place. Parking will be located in a below-grade garage and will provide 272 parking spaces. For Phase 2, there will be one parking access off Pierce Street and one access off First Place. Parking will be located in a below-grade garage with 474 parking spaces. Additionally, two back-in/head-out loading areas will be situated along Pierce Street, which will be a new private street.

Pedestrian facilities along the perimeter of the site will be improved to include sidewalk and buffer widths that meet or exceed DDOT requirements, and Pierce Street, although a private street, will provide ample pedestrian space that exceeds DDOT requirements. The development will supply long-term bike parking within both the Phase 1 and Phase 2 garages and supply short-term bicycle parking in and around the perimeter of the site. The Applicant will also fund the installation of a Capital Bikeshare station on-site.

Multi-Modal Impacts and Recommendations

Transit

The site is well-served by regional and local transit services such as Metrorail and Metrobus. The site is less than half a mile from the NoMa-Gallaudet U Metrorail station serving the Red Line. Metrobus stops are located near the site along M Street, North Capitol Street, New Jersey Avenue, K Street, and H Street.

Although the development will be generating new transit trips on the network, the existing facilities have enough capacity to handle the new trips. There is, however, an existing P6 bus stop along the perimeter of the site that the Applicant has agreed to improve as part of the public space improvements of the development.

Pedestrian

The site is surrounded by a well-connected pedestrian network. Although some areas of deficiency exist, most will be addressed within the PUD. Most roadways within a quarter-mile radius provide sidewalks, crosswalks, and curb ramps that meet DDOT standards, particularly along primary walking routes. There are



some pedestrian barriers surrounding the site such as limited connectivity to the east and west due to I-395 and Metrorail's Red Line tracks.

As a result of the planned development, pedestrian facilities along the perimeter of the site will be greatly improved, particularly along First Street and L Street. The east side of First Street and the north side of L Street currently do not meet DDOT standards and will be brought into compliance as part of the development. The development will ensure that sidewalks along the interior of the site also meet DDOT width requirements and provide an adequate pedestrian environment.

As part of the vehicular improvements to the intersections of First Street & Pierce Street and North Capitol Street & L Street, pedestrian improvements will also be made, including improved or additional crosswalks and updated curb ramps that meet DDOT standards.

Bicycle

The site has adequate access to existing on-and off-street bicycle facilities. The Metropolitan Branch Trail travels along the Metrorail Red Line tracks and several east-west and north-south bicycle facilities surround the site. On site, the planned development will provide secure, long-term bicycle parking within the garages that meet or exceed zoning requirements and provide short-term bicycle spaces within the interior and along the perimeter of the site. The Applicant will also fund the installation of a Capital Bikeshare station on-site to further increase the accessibility of cycling as an alternate mode of transportation.

Vehicular

The Sursum Corda site is well-connected to regional roadways such as I-395, as well as arterials such as North Capitol Street, New York Avenue, and H Street, and an existing network of collector and local roadways.

In order to determine if the proposed development will have a negative impact on this transportation network, this report projects future conditions with and without the development of the site and performs analyses of intersection delays. Due to the phased nature of this development, this analysis included two background conditions, and two future conditions with Phase 1 and full build-out of the site. The delays associated with each analysis scenario are compared to the acceptable

levels of delay set by DDOT standards to determine if the site will negatively impact the study area.

The analysis concluded that three intersections required mitigation as a result of either Phase 1 or Phase 2 of the development. Mitigation measures were proposed as follows:

- *First Street & New York Avenue NW*
This report recommends this intersection be improved with the addition of a northbound left turn lane, accommodated within the existing roadway width, and PM peak parking restrictions along the southbound approach of First Street in addition to signal timing adjustments.
- *North Capitol Street & L Street NW*
This report recommends that L Street be incorporated into the signal, which is not the case under existing conditions, and subsequent vehicular and pedestrian design improvements should be made.
- *First Street & K Street NW*
This report recommends that PM peak parking restrictions be implemented along the westbound approach of K Street to increase the overall capacity of the roadway. This, along with signal timing adjustments, greatly improves overall intersection operations.
- *First Street & Pierce Street NW*
This report recommends the intersection of First Street & Pierce Street be converted from a two-way stop to an all-way stop, since it meets all-way stop warrants, and would aid east-west pedestrian flow across First Street.

Summary and Recommendations

The PUD has several positive elements contained within its design that minimize potential transportation impacts, including:

- The removal of existing internal roadways and subsequent replacing with new internal roadways provides an upgrade in the urban fabric of the network, fits future planning efforts, and significantly increases site porosity for all modes of travel.
- The pedestrian facilities adjacent and within the site will be greatly improved. This includes upgrading the sidewalks along First Street adjacent to the PUD, and along L Street where no sidewalks currently exist.



- The inclusion of secure long-term bicycle parking spaces within both the Phase 1 and Phase 2 garages that meet or exceed zoning requirements and the installation of a new Capital Bikeshare station.

This report analyzed the potential impacts of the PUD, and concluded that the PUD will not have a detrimental impact to the surrounding transportation network, as long as the project implements the recommendations as follows:

- Operational improvements to the intersection of First Street and New York Avenue, including restriping pavement to add a northbound left turn lane (subsequently adding a southbound left turn at the intersection of First Street and M Street), restricting parking during the PM peak hour along the southbound approach of First Street, and signal timing adjustments.
- Incorporating the eastbound approach of L Street into the traffic signal at North Capitol Street and L Street. This includes traffic signal modifications, geometry adjustments, and signing/marketing upgrades.
- Operational improvements at the intersection of First Street and K Street NW, including PM peak hour parking restrictions and signal timing adjustments.
- Converting the intersection of First Street and Pierce Street NW from two-way stop controlled to all-way stop controlled, including upgrading curb ramps and crosswalk markings.
- Installing/upgrading curb ramps and crosswalks at the intersection of First Street and L Street NW.
- Implementing the Transportation Demand Management (TDM) plan detailed within the body of this report.
- Purchasing and installing a Capital Bikeshare station within the development in conjunction with DDOT.
- Upgrading the existing bus stop on the southwest corner of M Street and First Place.