

TRANSPORTATION IMPACT STUDY

BROOKLAND MANOR PUD

WASHINGTON, DC

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ZONING COMMISSION
District of Columbia
CASE NO.14-18
EXHIBIT NO.23C

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Contents

Executive Summary.....	i
Introduction	1
Project Summary.....	1
Purpose of Study.....	1
Contents of Study	2
Study Area Overview	4
Major Transportation Features.....	4
Future Regional Projects.....	6
Project Design	11
Overview	11
Phasing.....	11
Access and Loading	12
Parking	12
Bicycle Parking	12
Transportation Demand Management (TDM).....	12
Trip Generation.....	22
Traffic Operations	24
Study Area, Scope, & Methodology.....	24
Capacity Analysis Results	28
Simulation Results.....	30
Internal Streets	31
Transit	47
Existing Transit Service.....	47
Proposed Transit Service.....	48
Site-Generated Transit Impacts	48
Pedestrian Facilities	50
Pedestrian Study Area.....	50
Pedestrian Infrastructure.....	50
Site Impacts.....	51
Bicycle Facilities	55
Existing Bicycle Facilities	55
Proposed Bicycle Facilities	55
Site Impacts.....	56
Crash Data Analysis.....	60
Summary of Available Crash Data.....	60
Potential Impacts	61
Summary and Conclusions.....	63

Figures

Figure 1: Site Location.....	3
Figure 2: Summary of Walkscore and Bikescore.....	5
Figure 3: move DC's 14th Street Connection	6
Figure 4: Major Regional Transportation Facilities	8
Figure 5: Major Local Transportation Facilities.....	9
Figure 6: Planned Development Map	10
Figure 7: Existing Site Conditions.....	14
Figure 8: Block and Program Summary.....	15
Figure 9: Proposed Roadway Network	16
Figure 10: Additional Pedestrian Connectivity.....	17
Figure 11: Vehicular Access Plan.....	18
Figure 12: Phase 1.....	19
Figure 13: Phase 2.....	20
Figure 14: Phase 3.....	21
Figure 15: Study Area Intersections.....	32
Figure 16: Trip Distribution	33
Figure 17: Capacity Analysis Results - Existing Conditions.....	34
Figure 18: Existing Conditions Recommendations.....	35
Figure 19: Potential Improvements at Franklin St/12 th St	36
Figure 20: Year 2019 Analysis Results.....	37
Figure 21: Year 2019 Recommendations	38
Figure 22: Year 2022 Analysis Results.....	39
Figure 23: Year 2022 Recommendations	40
Figure 24: Proposed Improvements at Rhode Island Ave & 15th St Extended.....	41
Figure 25: Proposed Improvements at Rhode Island Ave/Montana Ave	42
Figure 26: Proposed Improvements at Montana Ave/18th St.....	43
Figure 27: Year 2025 Results.....	44
Figure 28: Year 2025 Recommendations	45
Figure 29: Traffic Operations of Internal Roadways	46
Figure 30: Existing Transit Service.....	49
Figure 31: Pedestrian Pathways.....	53
Figure 32: Existing Pedestrian Infrastructure.....	54
Figure 33: Existing Bicycle Facilities	57
Figure 34: Proposed Bicycle Facilities	58
Figure 35: Bicycle Treatments at Saratoga Avenue & Brentwood Road.....	59

Tables

Table 1: Summary of Findings and Recommendations.....	i
Table 2: Summary of Carshare Locations.....	5
Table 3: Multi-Modal Trip Generation Summary.....	23
Table 4: Metrobus Route Information	47
Table 5: Sidewalk Requirements.....	50
Table 6: Intersection Crash Rates (2011 to 2013).....	60
Table 7: High Crash Rate Intersections by Crash Type.....	61



EXECUTIVE SUMMARY

The following report is a Transportation Impact Study (TIS) for the Brookland Manor Planned Unit Development (PUD). This report reviews the transportation aspects of the Planned Unit Development (PUD) application. The Zoning Commission Case Number is 14-18.

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

Proposed PUD

The Brookland Manor site is currently the site of an apartment complex and a strip commercial shopping center located at the intersection of Rhode Island Avenue and Montana Avenue NE. The site is generally bound by Rhode Island Avenue, NE to the north, Montana Avenue, NE to the east, Downing Street, NE/14th Street, NE/Saratoga Avenue, NE to the south, and Brentwood Road, NE to the west.

The PUD application, which is for Stage 1 approval only, calls for the redevelopment of the site with residential and commercial/retail uses and an improved street grid. It contains 2,215 residential units and 200,680 square feet of retail space over 8 'blocks'.

The approximately 2,200 residential units will include multi-family buildings, senior housing, two-over-two buildings, and row-houses. The project will include a mix of for-sale and rental residential units.

The PUD also includes approximately 200,000 square feet of updated and enhanced retail space. In addition to a full sized grocery store of approximately 56,000 square feet, the project will have ground-floor retail uses ringing Rhode Island, Montana, and Saratoga Avenues, NE, as well as the community green.

There are several significant transportation improvements incorporated into the plan. The PUD Master Plan takes

advantage of the significant size of the project to greatly enhance the street network. Not only will the project add more roads to the site, it lays out the roads in a fashion that provides more connectivity for drivers, pedestrians and cyclists. First, a new '15th Street Extended' will connect all of the way through the site from Downing Street to Rhode Island Avenue. Second, 14th Street will be extended through the site to Rhode Island Avenue as a pedestrian connection, providing a second access point on Rhode Island Avenue. Finally, the PUD Master Plan includes a new alley network that provides quality access to parking facilities and loading docks.

Analysis Findings and Recommendations

The following report reviews the transportation elements of the PUD, supplementing material provided in the Site Plan Package that accompanied the Zoning Commission Application. The analyses contained in the report are based on industry and District guidelines and the report's assumptions and methodologies were detailed and discussed with the District Department of Transportation (DDOT), and were only performed with concurrence on the study scope from DDOT.

This report includes a detailed examination of each mode of travel, and the PUD's potential impact. As many details will be unknown until the subsequent Stage 2 applications of this PUD, the analyses were mostly of the overall Master Plan. Thus, many evaluations, such as those on exact parking counts or TDM measures, will be incorporated into the Stage 2 applications.

The following table summarizes the report's findings and conclusions, broken down by subject/travel mode, and development phase.



Table 1: Summary of Findings and Recommendations

Scenario	Existing*	2019 - Phase 1	2022 - Phase 2	2025 - Phase 3
Description	Program: 535 residential units, shopping center (minimal activity, mostly vacant)	Program: 259 Residential Units	Program: 1,359 Residential Units 200,680 SF Retail	Program: 617 Residential Units
Parking/Loading	The existing development on the site is accommodated by a combination of off-street and on-street parking.	Both accessed via alley. Amount of loading docks and parking spaces to be further refined in Stage 2 applications.	Both accessed via alley. Amount of loading docks and parking spaces to be further refined in Stage 2 applications.	Both accessed via alley. Amount of loading docks and parking spaces to be further refined in Stage 2 applications.
Traffic Operations	<p>Most arterial roadways process commuter traffic well, given the urban environment. Many side streets along Rhode Island Ave have high delays, partly due to long cycle lengths and how signal timings focus on through traffic. Many intersections have non-traditional geometries including multiple legs, which lead to inefficient operations.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> Consider re-timing some signals in the study area to eliminate high side street delays Consider changes at Franklin St/12th St to process NB left turns (Figure 19) Consider re-striping the northbound approach of Saratoga Avenue to Rhode Island Avenue to help drivers orient themselves to the most efficient use of the roadway (exclusive left turn lane, and through-right lane) 	<p>Background traffic raises delays at some intersections. Slight changes to signal timings alleviate most concerns.</p> <p>The addition of PUD traffic and the removal of 14th Street have no detrimental impact to traffic operations.</p>	<p>The addition of background and Phase 2 traffic creates long delays at several intersections, especially on the Montana Ave corridor. Signal timing changes help, but do not alleviate all concerns. The extension of 15th Street to Rhode Island Avenue operates at acceptable conditions.</p> <p>Recommendations for inclusion as PUD mitigation measures:</p> <ul style="list-style-type: none"> Install a traffic signal at Saratoga Ave/Montana Ave Incorporate 15th Street extended as fourth leg of intersection at Rhode Island Ave (Figure 24) Lane marking/striping changes at two intersections (Figure 25, Figure 26) 	<p>The addition of Phase 3 traffic does not have a significant impact on study area intersections. Additional slight changes to signal timings are suggested.</p>
Transit	The Rhode Island Avenue Metrorail Station is an ~11 minute walk from center of PUD and several bus lines run along major corridors surrounding the PUD with no lines operating over capacity.	No transit adjustments are necessary during Phase 1	Need to adjust bus stop at 15 th St extended and Rhode Island Ave – this report recommends this is discussed and solved during the Stage 2 and public space process for Phase 2.	No transit adjustments are necessary during Phase 3
Pedestrian	<p>Existing conditions show gaps in marked crosswalks and many substandard curb ramps. Some marked crosswalks at unsignalized intersections do not meet modern standards. Additionally, high speeds along Rhode Island Avenue create an intimidating environment for pedestrians.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> Consider removing crosswalks at Rhode Island Ave/15th Street Consider geometry changes at Rhode Island Ave/Girard St/17th St to shorten crossings and reduce curb radii 	Phase 1 walking routes to Metro and nearby shopping centers are sufficient.	<p>Walking routes to the east will be helped significantly though the new signal at Saratoga Ave and Montana Ave. Although crosswalks currently exist, a new signal will add protected pedestrian phases that will improve the overall safety.</p> <p>Enhancements to the intersection of Brentwood Road/15th Street extended at Rhode Island Avenue will also improve pedestrian conditions. Crosswalks across Rhode Island Avenue will be added along both sides of the intersection.</p> <p>Overall pedestrian enhancements will be implemented within the PUD site such as curb extensions, crosswalks, and ADA compliant curb ramps.</p>	No additional pedestrian improvements will be required during Phase 3
Bicycle	There are limited bicycle facilities in the vicinity of the site. Residential streets with low speeds and volumes provide acceptable conditions for bikes, but arterials can be mobility barriers for cyclists. Cyclists can access the Metropolitan Branch Trail via 12 th Street and Franklin Street, and areas south of the site can be accessed along sharrows and a signed bike route along 18 th Street and Montana Avenue.	Bike parking to be determined at Stage 2 application.	<p>Bike parking to be determined at Stage 2 application. Applicant is willing to locate and fund a Capital Bikeshare station as part of Phase 2.</p> <p>A signed bike route is possible to connect the site to bicycle facilities on 12th Street and 18th Street.</p>	Bike parking to be determined at Stage 2 application. Applicant is willing to locate and fund a Capital Bikeshare station as part of Phase 3.
Transportation Demand Management (TDM)	n/a	TDM plans to be determined at Stage 2 application.	TDM plans to be determined at Stage 2 application.	TDM plans to be determined at Stage 2 application.

*Improvements listed here are general recommendations for DDOT. They are planning level and are recommended for further study and possible implementation by DDOT. It is possible they could be incorporated as amenities in Stage 2 PUD applications.



INTRODUCTION

This report is a Transportation Impact Study (TIS) for the proposed Brookland Manor Planned Unit Development (PUD) located in Ward 5 in the Northeast quadrant of Washington DC. This TIS is submitted into the Zoning Commission record for this case, as an evaluation of the transportation impacts of construction of the application. The Zoning Commission Case Number is 14-18.

Contained within this report are a review of the transportation components of the application and the development's transportation impacts.

PROJECT SUMMARY

The Brookland Manor site is currently the site of an apartment complex and a strip commercial shopping center located at the intersection of Rhode Island Avenue and Montana Avenue NE. The site is generally bound by Rhode Island Avenue, NE to the north, Montana Avenue, NE to the east, Downing Street, NE/14th Street, NE/Saratoga Avenue, NE to the south, and Brentwood Road, NE to the west.

The PUD application, which is for Stage 1 approval only, calls for the redevelopment of the site with residential and commercial/retail uses and an improved street grid. It contains 2,215 residential units and 200,680 square feet of retail space over 8 'blocks'.

The approximately 2,200 residential units will include multi-family buildings, senior housing, two-over-two buildings, and row-houses. The project will include a mix of for-sale and rental residential units.

The PUD also includes approximately 200,000 square feet of updated and enhanced retail space. In addition to a full sized grocery store of approximately 56,000 square feet, the project will have ground-floor retail uses ringing Rhode Island, Montana, and Saratoga Avenues, NE, as well as the community green.

There are several significant transportation improvements incorporated into the plan. The PUD Master Plan takes advantage of the significant size of the project to greatly enhance the street network. Not only will the project add more roads to the site, it lays out the roads in a fashion that provides more connectivity for drivers, pedestrians and cyclists. First, a

new '15th Street Extended' will connect all of the way through the site from Downing Street to Rhode Island Avenue. Second, 14th Street will be extended through the site to Rhode Island Avenue as a pedestrian connection, providing a second access point on Rhode Island Avenue. Finally, the PUD Master Plan includes a new alley network that provides quality access to parking facilities and loading docks.

PURPOSE OF STUDY

This report reviews the transportation elements of the PUD, supplementing material provided in the Site Plan Package that accompanied the Zoning Commission Application.

Additionally, this report determines if the construction of the PUD will lead to adverse impacts on the transportation network. This is accomplished the following study scenarios:

1. 2014 Existing Conditions
2. 2019 Background Conditions (without the PUD)
3. 2019 Future Conditions (with Phase 1 of the PUD)
4. 2022 Background Conditions (with Phase 1 of the PUD)
5. 2022 Future Conditions (with Phase 1 and 2 of the PUD)
6. 2025 Background Conditions (with Phase 1 and 2 of the PUD)
7. 2025 Future Conditions (with full build-out of the PUD)
8. 2040 Horizon Conditions (with full build-out of the PUD)

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

This TIS bases what it considers acceptable conditions for transportation services on typical standards for urban environments. This means that during a roadway's (or other piece of infrastructure) peak hours of use, it is processing users efficiently and generating the most positive impact for resources dedicated. In other words, when a road has the most cars on it, the desire is for that road to be just under (or at) its capacity limit. Unacceptable conditions result when a roadway is not operating efficiently, either through too high of a delay at peak times, or having unused capacity at peak times.

In addition, this TIS attempts to strike a balance between modes of travel when making recommendations on



transportation improvements. For example, roadway widening including turn lanes will typically have negative impacts to pedestrian and bicycle modes, and sometimes to transit. This report approaches its recommendations with this context in mind, only suggesting improvements when it is necessary to mitigate unnecessary conditions on one mode without negatively impacting another.

CONTENTS OF STUDY

This report contains seven sections as follows:

- *Study Area Overview*
This section reviews 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 PUD, 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 PUD. 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
- *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 impacts development of the project would have on safety. This includes a review of crash data at intersections in the study area and a qualitative discussion on how the Ingleside expansion 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.

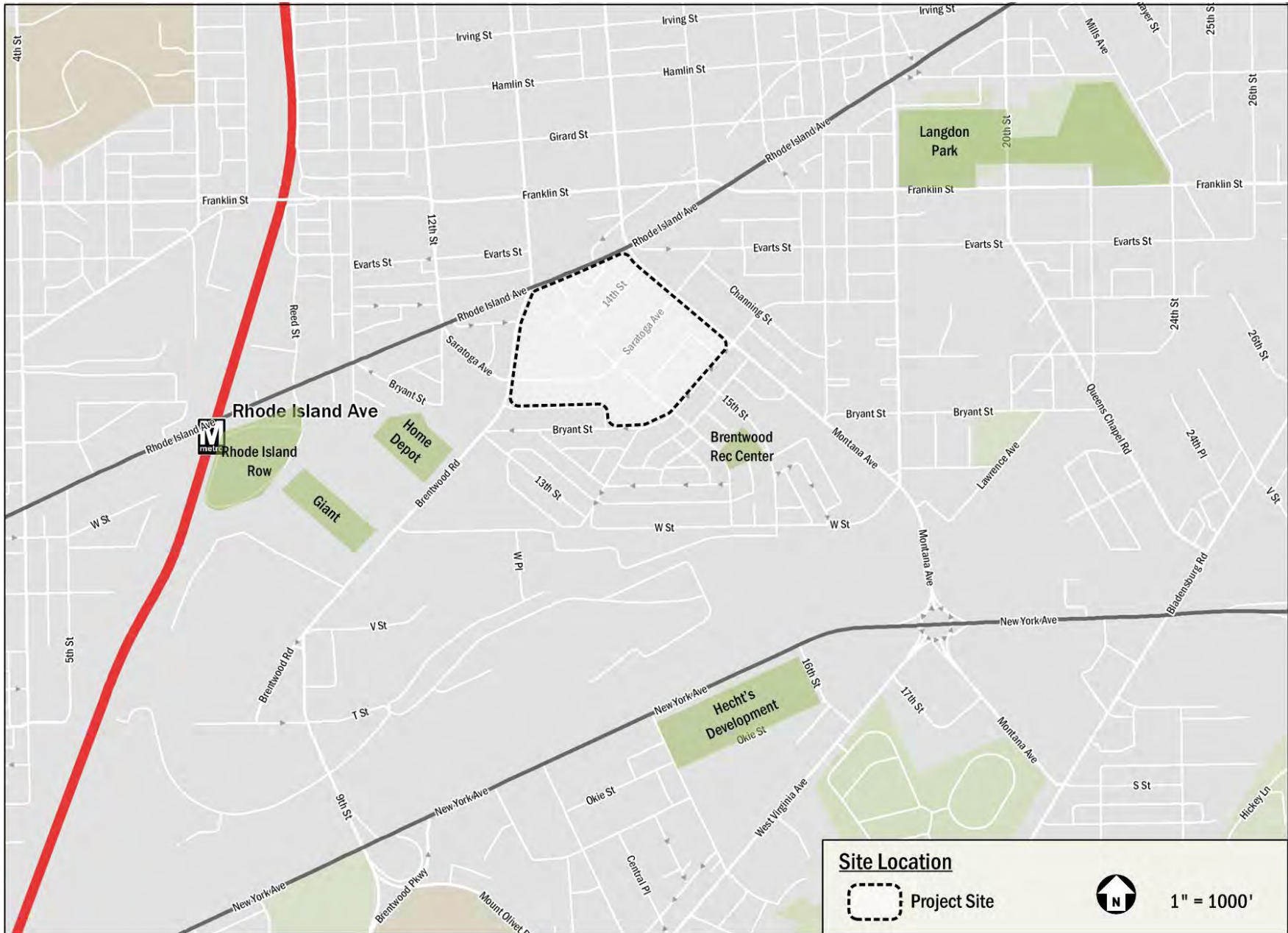


Figure 1: Site Location



STUDY AREA OVERVIEW

This section reviews the study area and includes an overview of the site location, including a summary of the major transportation characteristics of the area and of future regional projects.

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 and patrons of the proposed Brookland Manor development
- The site is well-served by public transportation with access to the Metrorail Red Line and several Metro bus lines.
- There is some existing bicycle infrastructure including the Metropolitan Branch Trail, and more facilities are proposed in the vicinity of the site.
- Pedestrian conditions are generally very good, particularly along anticipated major walking routes.

MAJOR TRANSPORTATION FEATURES

Overview of Regional Access

The Brookland Manor 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 US highways, including US-50 (New York Avenue) and US-1 (Rhode Island Avenue). These roadways also connect the site to multiple interstates such as I-395, I-295, and the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs. All of these roadways bring vehicular traffic within half-mile of the site, at which point arterials and local roads can be used to access the site directly.

The Brookland Manor site has access to the Red Line 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 connection to Union Station, which is a hub for commuter rail – such as Amtrak, MARC, and VRE – in addition to Metrorail. In addition, the Red Line provides connections to all additional Metrorail lines allowing for access to much of the DC Metropolitan area.

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, as shown on Figure 5.

The site is served by a local vehicular network that includes several primary and minor arterials such as Rhode Island Avenue, New York Avenue, Brentwood Road/13th Street NE, Franklin Street, and 12th Street NE. 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. As shown in Figure 5, there are fourteen bus routes that service the site. In the vicinity of the site these routes travel along Rhode Island Avenue, Brentwood Road, 12th Street, 14th Street, 18th Street, and Franklin Street. These bus lines connect the site to many areas of the District and Maryland, including several Metrorail stations serving four of the six Lines.

There are a few existing bicycle facilities that connect the site to areas within the District, most notably the Metropolitan Branch Trail which runs along the Metrorail Red Line and provides a connection between Union Station and Silver Spring. South of the site the trail is primarily off-street, but some areas to the north are still being built and require users to travel along signed routes throughout the roadway network. Other facilities include sharrows along 12th Street and 18th Street, and signed bike routes along 8th Street and Montana Avenue/West Virgin Avenue. Of note, multiple bicycle improvements are planned near the site such as a new trail along the north side of New York Avenue and sharrows or bicycle lanes along West Virginia Avenue.

In the vicinity of the site, most roadways provide sidewalks with crosswalks present at most intersections. Anticipated pedestrian routes, such as those to public transportation stops and shopping centers, provide acceptable pedestrian facilities; however there are some pedestrian barriers in the area that limit the overall connectivity to and from the site. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report.



Although there are some issues, overall the Brookland Manor site is surrounded by an extensive local 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 carshare locations located within a half-mile of the site; however there are two Zipcar locations near the Rhode Island Avenue Metro Station which is located just under 0.6 miles from the site. These locations are listed in Table 2.

Car-sharing is also provided by Car2Go, which provides point-to-point car sharing. Unlike Zipcar, Enterprise, or Hertz on Demand, 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 the meters or pay stations. Car2Go does not have permanent designated spaces for their vehicles; however availability is tracked through their website, which provides an additional option for car-sharing patrons.

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 Brookland Manor development is located in the Brentwood neighborhood. This neighborhood has a walk score of 75, a transit score of 67, and a bike score of 49. Within the neighborhood, the PUD location itself has a walk score of 81, transit score of 70, and a bike score of 53. Figure 2 shows the neighborhood borders in relation to the site location and displays a heat map for walkability and bikeability.

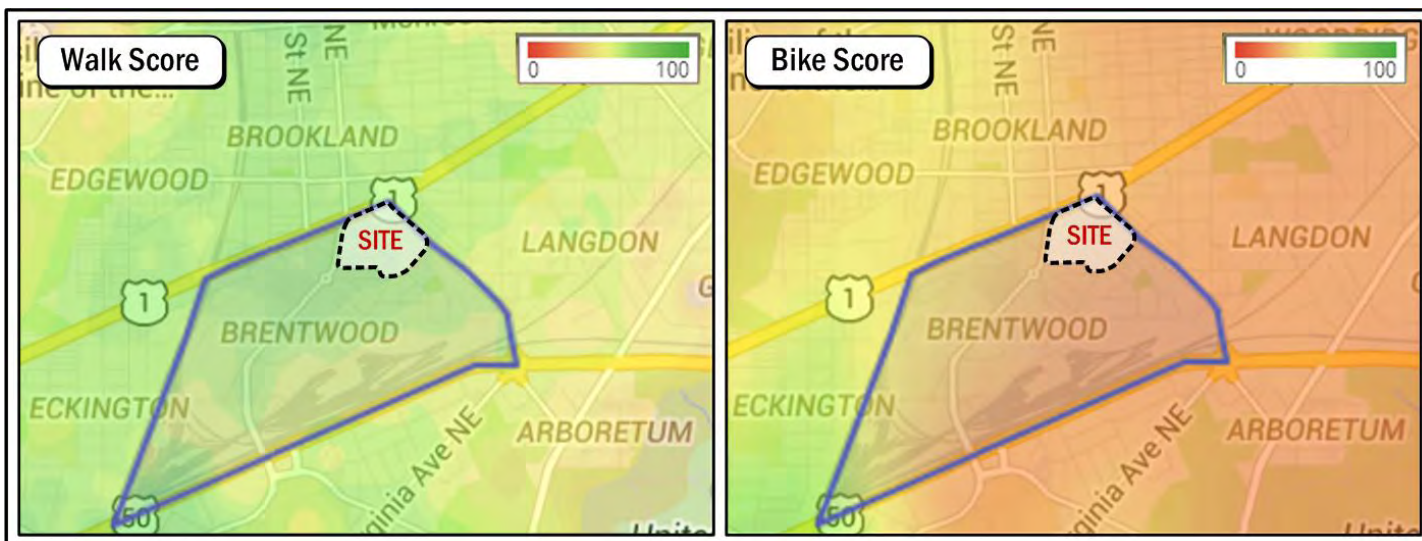
As represented in Figure 2, the site is situated in a neighborhood that encompasses some good and some average walk scores. However, the site is in an area that provides a better walking environment than areas to the south which observe barriers such as the rail yard along New York Avenue.

The site is situated in an area with poor bike scores due to its

Table 2: Summary of Carshare Locations

Carshare Location	Number of Vehicles
Rhode Island Avenue Metro	3 vehicles
Rhode Island Avenue Shopping Center	7 vehicles
Total	10 vehicles

Figure 2: Summary of Walkscore and Bikescore





lack of exclusive bike facilities and moderate connectivity issues. For this reason, biking is not found to be a particularly prominent mode of transportation in the area. However, as stated previously, there are multiple bicycle infrastructure projects planned for the surrounding area that will help improve the overall bike score near the site.

Overall, the Brentwood neighborhood has more average walk, transit, and bike scores; however, the site location itself is located in a part of the neighborhood that has moderately better connectivity to pedestrian facilities, on- and off-street bicycle facilities, and transit than areas in the southern part of the neighborhood. Additionally, the Brookland Manor PUD and other planned developments and roadway improvements will help increase the walk and bike scores in the Brentwood neighborhood.

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

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 street connections along 14th Street NE. These recommendations would connect 14th Street

north to Rhode Island Avenue and south to New York Avenue, as shown in Figure 3. These connections are not planned or funded, but are thought to improve the overall vehicular network surrounding the area.

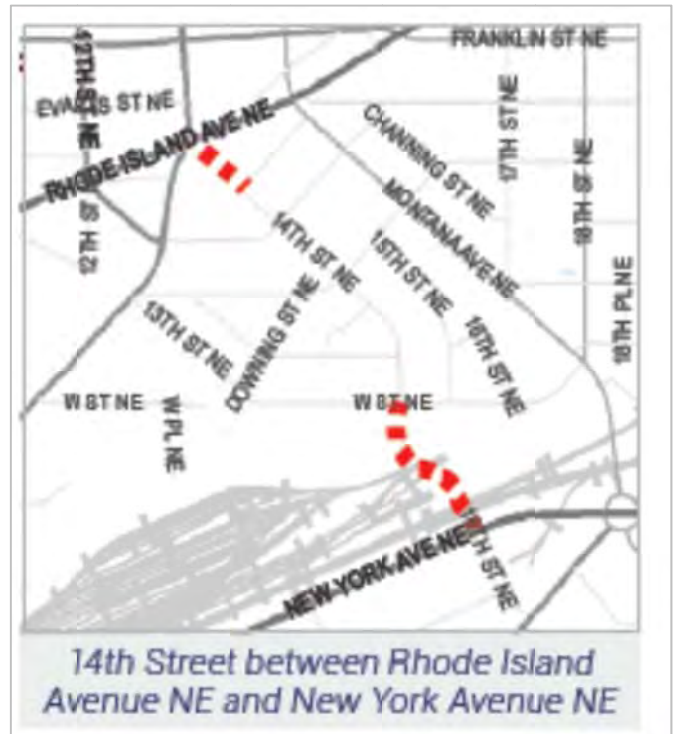


Figure 3: move DC's 14th Street Connection

As is noted in the following chapter, the PUD does not incorporate an extension of 14th Street to Rhode Island Avenue. Instead, it incorporates an extension of 15th Street to Rhode Island Avenue. This is because the 15th Street extension results in a fourth leg of an intersection that can accommodate it without a negative impact to the corridor, while a 14th Street connection would add a 5th leg to an intersection resulting in much higher delays and queues. The PUD design team has also noted significant grade issues that would make a 14th Street connection difficult. Thus, a 14th Street extension is made, but for pedestrians and cyclists only.

This report does not assume the connection from 14th Street to New York Avenue is constructed in its traffic analysis; Although, the traffic capacity analyses do show that congestion due to regional growth on Montana Avenue could be partially relieved by such a connection. At minimum, it would allow for local traffic to avoid congestion generated by regional driving patterns.



This report also included an update to the Bicycle Master Plan and Pedestrian Plan, which was used to determine improvements within the study area not covered by the previously discussed studies.

Planned Developments

There are five potential development projects in the vicinity of the Brookland Manor site. Figure 6 shows the location of these developments in relation to the proposed development.

Rhode Island Avenue Gateway

The Rhode Island Avenue Gateway development is located at 2313-2321 4th Street NE and includes 116 affordable/workforce residential units with 5,000 square feet of street-level retail.

Brookland Square

The Brookland Square development is located at 2711 13th Street NE and includes 263 residential units.

Life Learning Center

The Life Learning Center development is located at 1251 Saratoga Avenue NE and includes a 42,000 square foot life learning center with two floors for a community health clinic and one for social and recreational space for the Israel Baptist Church.

Square 4268

The Square 4268 development is located at the intersection of New York Avenue and Montana Avenue NE and includes a 312,000 square foot shopping center.

Hecht's Warehouse PUD

The Hecht's Warehouse development is located at the intersection of New York Avenue and Fenwick Street. The project will be developed over two phases and ultimately include 333 residential units and over 200,000 square feet of retail space.

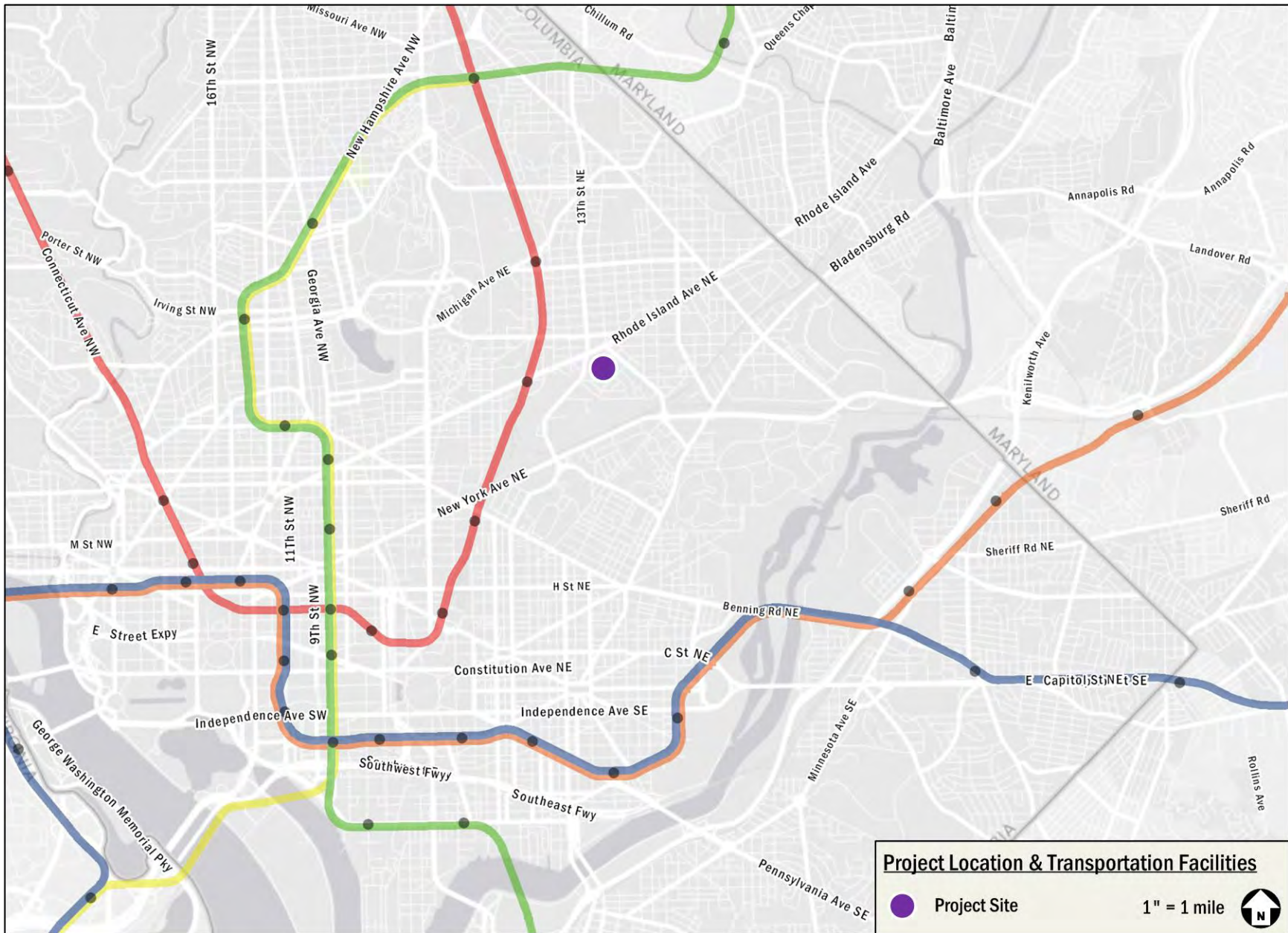


Figure 4: Major Regional Transportation Facilities



Figure 5: Major Local Transportation Facilities

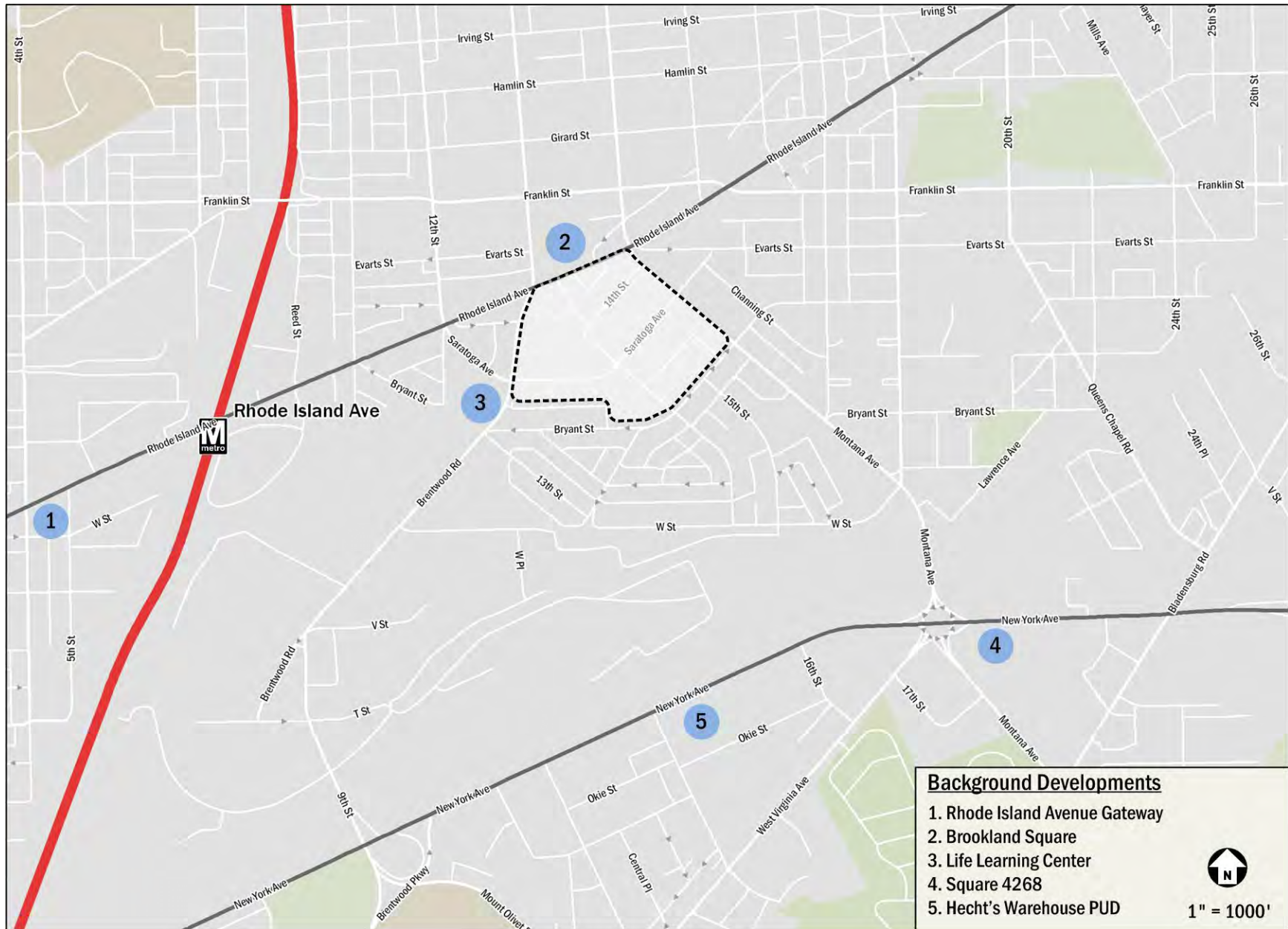


Figure 6: Planned Development Map



PROJECT DESIGN

This section reviews the transportation components of the Brookland Manor PUD, 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.

OVERVIEW

The Brookland Manor site is currently the site of an apartment complex and a strip commercial shopping center located at the intersection of Rhode Island Avenue and Montana Avenue NE. The site is generally bounded by Rhode Island Avenue NE to the north, Montana Avenue NE to the east, Downing Street NE/14th Street NE/Saratoga Avenue NE to the south, and Brentwood Road NE to the west. The current state of the site is summarized on

Figure 7.

The PUD application, which is for Stage 1 approval only, calls for the redevelopment of the site with residential and commercial/retail uses and an improved street grid. It contains 2,215 residential units and 200,680 square feet of retail space over 8 'blocks'. A summary of the blocks, including a breakdown of residential units and retail spaces per block, is provided in Figure 8.

The approximately 2,200 residential units will include multi-family buildings, senior housing, two-over-two buildings, and row-houses. The project will include a mix of for-sale and rental residential units. The Applicant is committed to the creation of a seniors building on the site and will seek to make the development of the seniors building one of the first projects to go through Stage 2 PUD approval. For purposes of this study, the first phase of the development is assumed to be this senior building, Block 7.

The PUD also includes approximately 200,000 square feet of updated and enhanced retail space. In addition to a full-sized grocery store of approximately 56,000 square feet, the project will have ground-floor retail uses along Rhode Island, Montana, and Saratoga Avenues, NE. The community green park space will be placed in the center of the site.

There are several significant transportation improvements incorporated into the plan. The PUD Master Plan takes advantage of the significant size of the project to greatly enhance the street network. Not only will the project add more

roads to the site, it lays out the roads in a fashion that provides more connectivity for drivers, pedestrians and cyclists.

First, a new '15th Street Extended' will connect all of the way through the site from Downing Street to Rhode Island Avenue. At Rhode Island Avenue, it will connect to an existing traffic signal as a new fourth leg of the intersection. As demonstrated later in this report, this connection will not negatively impact traffic operations on Rhode Island Avenue.

The extension of 15th Street and the closure of a portion of 14th Street will occur based on D.C. Council approval of a street dedication/closing application, which is being processed concurrently with the PUD application.

Second, 14th Street will be extended through the site to Rhode Island Avenue as a pedestrian connection, providing a second access point on Rhode Island Avenue. This location is not ideal for vehicular access, since it would disrupt operations on Rhode Island Avenue, but provides an excellent pedestrian amenity.

Finally, the PUD Master Plan includes a new alley network that provides quality access to parking facilities and loading docks. This allows this activity to take place off of the neighborhood streets, and reduces pedestrian and vehicular conflicts. This alley based access plan allows for the existing curb cuts along Rhode Island Avenue to be removed.

The proposed roadway network is shown on Figure 9. The additional pedestrian connections are shown on Figure 10. The parking and loading access plan, taking advantage of the new alley network, is shown on Figure 11.

PHASING

The PUD will be completed in phases. Although is unknown the exact order each block will be constructed, there is a general understanding of how the site will undergo redevelopment. For purposes of this study, three phases were assumed:

- **Phase 1**, which includes a senior residential building and other residential uses on Block 7. This building will be used in part to house residents from the existing buildings on site in order to allow them to remain on site while providing room for the remaining Phases. In addition, this phase includes the removal of a portion of 14th Street, making way for the future roadway additions. For this study's purposes, this phase provides an evaluation of the roadway removal as much as it does an evaluation of Block 7's impacts. This Phase is summarized on Figure 12.



- **Phase 2**, which includes the block centered around the extended 15th Street, Blocks 2, 3, 5, 6, and 8. Phase 2 contains the main retail component of the PUD, including the grocery store. It also includes the community green. This Phase is summarized on Figure 13.
- **Phase 3** includes the final two blocks, Blocks 1 and 2, which are multi-family residential buildings. This Phase is summarized on Figure 14.

ACCESS AND LOADING

As stated above, the PUD Master Plan includes a new alley network that provides quality access to parking facilities and loading docks. This allows for activity to take place off of the neighborhood streets, and reduces pedestrian and vehicular conflicts. This alley based access plan also allows for the existing curb cuts along Rhode Island Avenue to be removed. Parking and loading access points are depicted on Figure 11.

Truck routing to and from the site will focus on Rhode Island Avenue, which is a designated truck route. Of note, Saratoga Avenue is currently a restricted truck route. In order for some of loading docks in the Master Plan to operate efficiently, portions of Saratoga Avenue internal to the PUD may need to have these restrictions removed.

PARKING

Although the PUD application contains a breakdown of parking by Block and land use, the amount of parking is still in flux and will be revisited during the subsequent Stage 2 applications for each Block.

The application lists 1,692 residential parking spaces for 2,215 dwelling units, or around 0.76 spaces per unit. This is slightly higher than the recent trend for District residential developments, which are closer to 0.4 to 0.6 spaces per unit. This report recommends that for each Stage 2 application, the parking be revisited for each residential building, taking into account the mix of affordable versus market rate units, whether the units are rentals or for-sale, and other trends in parking demand. For Phases 2 and 3, it may be beneficial to perform an inventory and occupancy count of on-street parking to help gauge the amount of off-street parking needed, and to ensure residents won't spillover onto nearby residential streets.

The application lists 303 retail parking spaces for 200,680 square feet of retail, or around 1.5 spaces per 1,000 square

feet. Typical retail parking demand in the District ranges from less than 1 space per thousand square feet up to 3 spaces per thousand square feet depending on the type of retail: ground floor retail being at the low end of the scale, and grocery stores at the high end. Thus, 1.5 spaces per thousand square feet is a good placeholder for Master Planning purposes. This report recommends that for each Stage 2 application, the parking be revisited for each retail component, taking into account the type of store and/or tenant. Special attention may be needed to ensure the grocery store has a sufficient parking supply in order to attract a quality tenant, and also not to over-park neighborhood serving retail.

BICYCLE PARKING

As the application is only a Stage 1 Master Plan, a detailed parking count is not provided in the application and will be forthcoming in the subsequent Stage 2 applications. Although this is the case, the Master Plan located nine areas on the streetscape for bike racks, and two potential Capital Bikeshare locations (one for Phase 2 and one for Phase 2).

Although the amount and positioning of these racks and Bikeshare stations will be determined later, they have been thought-out at an early stage to make sure there is room saved for their inclusion.

As for long-term bicycle parking for residents and employees of the retail stores, each Block will at minimum meet the Zoning Requirements for bicycle parking, including providing 1 space for every 3 residential units. For buildings with significant retail space, showers will be provided for retail employees.

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 TDM plans for Brookland Manor will be defined during the Stage 2 PUD applications. The types of TDM measures that could be incorporated in those plans are:

- TDM Coordinators
- Pricing parking at market rates and unbundling parking from the costs of residential units



- Providing bicycle parking exceeding minimums
- Funding the installation of Capital Bikeshare stations
- Placing electronic message boards in the building lobbies



Figure 7: Existing Site Conditions

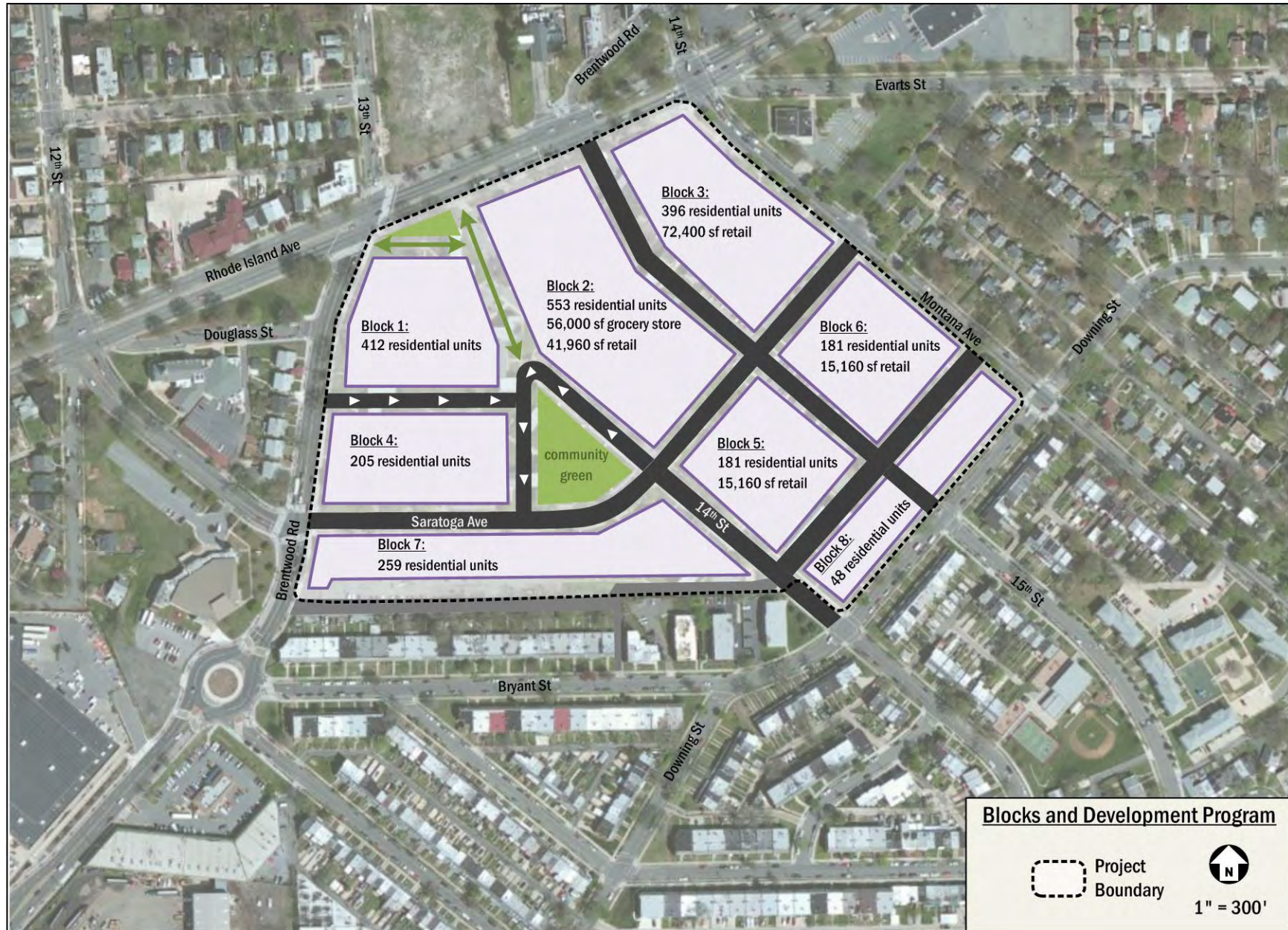


Figure 8: Block and Program Summary

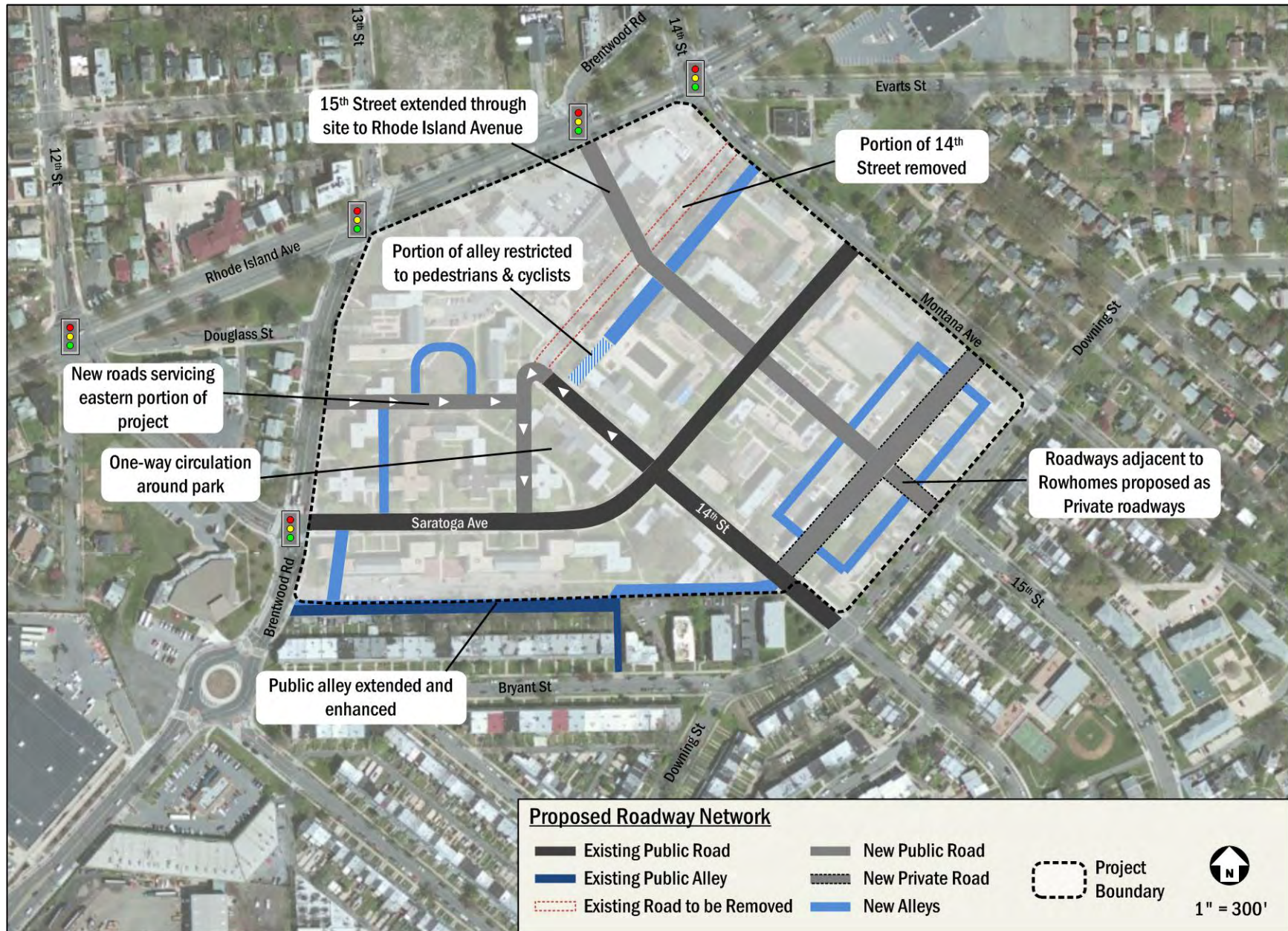


Figure 9: Proposed Roadway Network

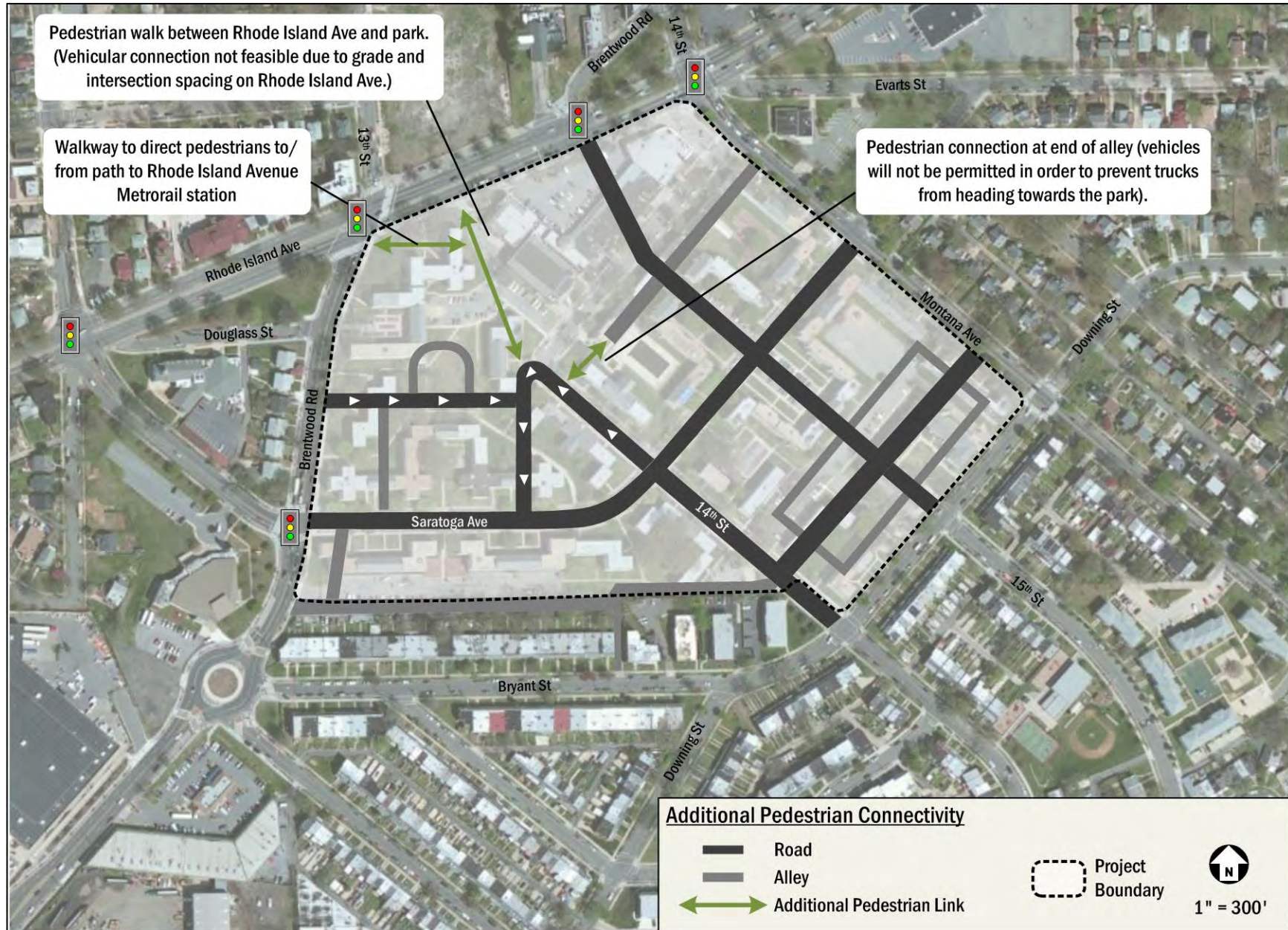


Figure 10: Additional Pedestrian Connectivity



Figure 11: Vehicular Access Plan



Figure 12: Phase 1

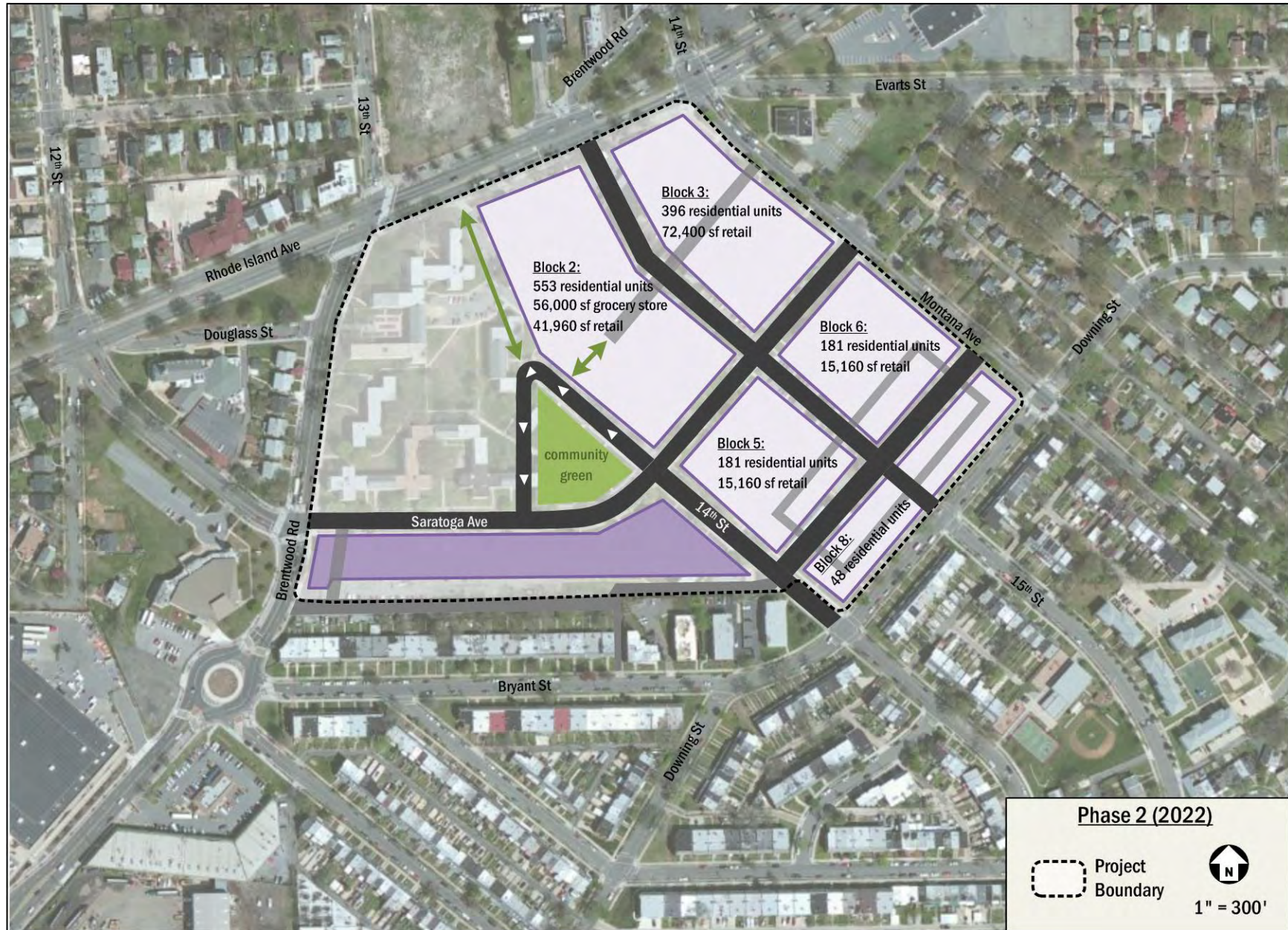


Figure 13: Phase 2



Figure 14: Phase 3



TRIP GENERATION

This section outlines the transportation demand of the proposed Brookland Manor PUD. It summarizes the projected trip generation of the site by mode, which forms the basis for the chapters that follow.

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 use sites) and to generate trips for multiple modes.

Residential trip generation was calculated based on ITE land use 220, Apartment, splitting trips into different modes using assumptions derived from census data for the residents that currently live near the site.

Retail trip generation was also calculated based on ITE land use 820, Shopping Center, with the exception of the grocery store, which was based on ITE land use code 850, Supermarket. Mode splits for the retail portion of the site were based on information contained in WMATA's *Ridership Survey*. The grocery store was assumed to have a much higher auto mode split as it is likely to draw from a larger area than the remaining ground floor retail.

Trip generation was 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 because of the high use of on-street parking by existing residents. No trips were generated for the existing shopping center, as it generated minimal activity during the time of data collection.

A summary of the multimodal trip generation is provided in Table 3 for the morning and afternoon peak hours. Detailed calculations are included in the Technical Appendix.



Table 3: Multi-Modal Trip Generation Summary

Mode	Block	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	1	18 veh/hr	74 veh/hr	93 veh/hr	72 veh/hr	38 veh/hr	110 veh/hr
Auto	2	101 veh/hr	145 veh/hr	246 veh/hr	268 veh/hr	220 veh/hr	488 veh/hr
Auto	3	33 veh/hr	81 veh/hr	114 veh/hr	115 veh/hr	86 veh/hr	201 veh/hr
Auto	4	9 veh/hr	37 veh/hr	47 veh/hr	38 veh/hr	20 veh/hr	59 veh/hr
Auto	5	12 veh/hr	37 veh/hr	48 veh/hr	45 veh/hr	30 veh/hr	75 veh/hr
Auto	6	12 veh/hr	37 veh/hr	48 veh/hr	45 veh/hr	30 veh/hr	75 veh/hr
Auto	7	12 veh/hr	47 veh/hr	59 veh/hr	47 veh/hr	25 veh/hr	72 veh/hr
Auto	8	2 veh/hr	11 veh/hr	13 veh/hr	10 veh/hr	5 veh/hr	15 veh/hr
Auto	Existing	-24 veh/hr	-96 veh/hr	-120 veh/hr	-91 veh/hr	-49 veh/hr	-140 veh/hr
Auto	Total	175 veh/hr	373 veh/hr	548 veh/hr	547 veh/hr	405 veh/hr	952 veh/hr
Transit	1	21 ppl/hr	84 ppl/hr	105 ppl/hr	81 ppl/hr	43 ppl/hr	124 ppl/hr
Transit	2	89 ppl/hr	149 ppl/hr	238 ppl/hr	255 ppl/hr	206 ppl/hr	461 ppl/hr
Transit	3	51 ppl/hr	100 ppl/hr	151 ppl/hr	171 ppl/hr	142 ppl/hr	313 ppl/hr
Transit	4	11 ppl/hr	42 ppl/hr	53 ppl/hr	43 ppl/hr	23 ppl/hr	66 ppl/hr
Transit	5	16 ppl/hr	43 ppl/hr	59 ppl/hr	59 ppl/hr	43 ppl/hr	102 ppl/hr
Transit	6	16 ppl/hr	43 ppl/hr	59 ppl/hr	59 ppl/hr	43 ppl/hr	102 ppl/hr
Transit	7	13 ppl/hr	53 ppl/hr	67 ppl/hr	53 ppl/hr	28 ppl/hr	81 ppl/hr
Transit	8	3 ppl/hr	12 ppl/hr	15 ppl/hr	11 ppl/hr	6 ppl/hr	17 ppl/hr
Transit	Existing	-27 ppl/hr	-108 ppl/hr	-135 ppl/hr	-103 ppl/hr	-55 ppl/hr	-159 ppl/hr
Transit	Total	220 ppl/hr	527 ppl/hr	747 ppl/hr	733 ppl/hr	534 ppl/hr	1267 ppl/hr
Bike	1	0 ppl/hr	2 ppl/hr	2 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Bike	2	3 ppl/hr	4 ppl/hr	7 ppl/hr	8 ppl/hr	7 ppl/hr	16 ppl/hr
Bike	3	1 ppl/hr	2 ppl/hr	3 ppl/hr	4 ppl/hr	3 ppl/hr	7 ppl/hr
Bike	4	0 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr
Bike	5	0 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	2 ppl/hr
Bike	6	0 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	2 ppl/hr
Bike	7	0 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	1 ppl/hr	2 ppl/hr
Bike	8	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr	0 ppl/hr
Bike	Existing	-1 ppl/hr	-2 ppl/hr	-3 ppl/hr	-2 ppl/hr	-1 ppl/hr	-4 ppl/hr
Bike	Total	6 ppl/hr	10 ppl/hr	16 ppl/hr	17 ppl/hr	14 ppl/hr	31 ppl/hr
Walk	1	4 ppl/hr	17 ppl/hr	21 ppl/hr	16 ppl/hr	9 ppl/hr	25 ppl/hr
Walk	2	68 ppl/hr	61 ppl/hr	129 ppl/hr	168 ppl/hr	156 ppl/hr	323 ppl/hr
Walk	3	22 ppl/hr	28 ppl/hr	50 ppl/hr	72 ppl/hr	69 ppl/hr	140 ppl/hr
Walk	4	2 ppl/hr	8 ppl/hr	11 ppl/hr	9 ppl/hr	5 ppl/hr	13 ppl/hr
Walk	5	6 ppl/hr	10 ppl/hr	16 ppl/hr	20 ppl/hr	17 ppl/hr	36 ppl/hr
Walk	6	6 ppl/hr	10 ppl/hr	16 ppl/hr	20 ppl/hr	17 ppl/hr	36 ppl/hr
Walk	7	3 ppl/hr	11 ppl/hr	13 ppl/hr	11 ppl/hr	6 ppl/hr	16 ppl/hr
Walk	8	1 ppl/hr	2 ppl/hr	3 ppl/hr	2 ppl/hr	1 ppl/hr	3 ppl/hr
Walk	Existing	-5 ppl/hr	-22 ppl/hr	-27 ppl/hr	-21 ppl/hr	-11 ppl/hr	-32 ppl/hr
Walk	Total	106 ppl/hr	126 ppl/hr	232 ppl/hr	295 ppl/hr	267 ppl/hr	562 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 Brookland Manor PUD and recommendations for improvements and mitigation measures.

The purpose of the capacity analysis is to:

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

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

1. 2014 Existing Conditions
2. 2019 Background Conditions (without the PUD)
3. 2019 Future Conditions (with Phase 1 of the PUD)
4. 2022 Background Conditions (with Phase 1 of the PUD)
5. 2022 Future Conditions (with Phase 1 and 2 of the PUD)
6. 2025 Background Conditions (with Phase 1 and 2 of the PUD)
7. 2025 Future Conditions (with full build-out of the PUD)
8. 2040 Horizon Conditions (with full build-out of the PUD)

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:

- Under existing conditions:
 - Most arterial roadways process commuter traffic well, given the urban environment.
 - Many side streets along Rhode Island Avenue have high delays, partly due to long cycle lengths and how signal timings focus on through traffic.
 - Many intersections have non-traditional geometries including five or more legs, which leads to inefficient operations.

- This report includes general recommendations for DDOT to consider to address existing issues including:
 - Consider re-timing some signals in the study area to eliminate high side street delays
 - Consider changes at Franklin Street/12th Street to process NB left turns
 - Consider re-striping the northbound approach of Saratoga Avenue to Rhode Island Avenue to help drivers orient themselves to the most efficient use of the roadway

- Year 2019/Phase 1 Conditions:
 - Growth in non-PUD traffic raises delays at some intersections. Slight changes to signal timings alleviate most concerns.
 - The addition of PUD traffic and the removal of 14th Street have no detrimental impact to traffic operations.
- Year 2022/Phase 2 Conditions:
 - The addition of background and Phase 2 traffic creates long delays at several intersections, especially on the Montana Avenue corridor.
 - Signal timing changes help, but do not alleviate all concerns.
 - The extension of 15th Street to Rhode Island Avenue operates at acceptable conditions.
 - Recommendations for inclusion as PUD mitigation measures:
 - Install a traffic signal at Saratoga Avenue & Montana Avenue
 - Incorporate 15th Street extended as fourth leg of intersection at Rhode Island Avenue
 - Lane marking/stripping changes at Rhode Island Avenue & Montana Avenue/14th Street and Montana Avenue & 18th Street/W Street
- Year 2025/Phase 3 Conditions:
 - The addition of Phase 3 traffic does not have a significant impact on study area intersections.

STUDY AREA, SCOPE, & METHODOLOGY

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



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

Capacity Analysis Scenarios

The vehicular analyses are performed to determine if the proposed development of the Brookland Manor PUD will lead to adverse impacts on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing future scenarios: (1) without the proposed application (referred to as the Background conditions) and (2) with the application approved and constructed (referred to as the Total Future conditions). Due to the phased nature of this PUD, there are several background and total future conditions.

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2014 Existing Conditions
2. 2019 Background Conditions (without the PUD)
3. 2019 Future Conditions (with Phase 1 of the PUD)
4. 2022 Background Conditions (with Phase 1 of the PUD)
5. 2022 Future Conditions (with Phase 1 and 2 of the PUD)
6. 2025 Background Conditions (with Phase 1 and 2 of the PUD)
7. 2025 Future Conditions (with full build-out of the PUD)
8. 2040 Horizon Conditions (with full build-out of the PUD)

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

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. Rhode Island Avenue/Reed Street/Washington Place
2. Rhode Island Avenue/10th Street/Bryant Street
3. Rhode Island Avenue/12th Street
4. Rhode Island Avenue/Brentwood Road/13th Street
5. Rhode Island Avenue/Brentwood Road/Fire Station/Shopping Center
6. Rhode Island Avenue/Montana Avenue/14th Street
7. Rhode Island Avenue/15th Street
8. Rhode Island Avenue/Franklin Street
9. Rhode Island Avenue/17th Street
10. Rhode Island Avenue/18th Street
11. Franklin Street/12th Street
12. Franklin Street/13th Street
13. Franklin Street/14th Street
14. Brentwood Road/Bryant Street/13th Street
15. Brentwood Road/Saratoga Avenue
16. Brentwood Road/Douglas Street
17. Montana Avenue/14th Street
18. Montana Avenue/Saratoga Avenue
19. Montana Avenue/Downing Street/Douglas Street
20. Montana Avenue/17th Street/Bryant Street
21. Montana Avenue/w Street/18th Street
22. Saratoga Avenue/14th Street
23. Downing Street/14th Street
24. Downing Street/15th Street

Figure 15 shows a map of the study area intersections.

Traffic Volume Assumptions

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

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which were collected on Tuesday, December 9 through Thursday, December 11, 2014. The results of the traffic counts, including the peak hour traffic volumes, are shown in the Technical Attachments.

For intersections along Rhode Island Avenue, a system peak hour was used as the hour of analysis, in order to better assess conditions along the corridor. For other intersections in the study area, individual peak hours were used.



2019 Background Traffic Volumes (without the PUD)

The traffic projections for the 2019 Background conditions consist of the existing volumes with two additions:

- Traffic generated by developments expected to be completed prior to Phase 1 of the PUD (known as background developments); and
- Inherent growth on the roadway (representing regional traffic growth).

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

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

Based on these criteria, two developments were included in in the 2019 Background scenario:

- **Brookland Square**
Located at 2711 13th Street NE, this is a proposed 263 unit apartment building. The development is approved according to BZA Orders 17474/A/B/C. The latest BZA Order expired in April 2012. However, to provide a conservative analysis, it will be included in the background scenario.
- **Hecht's Development**
Located at the intersection of New York Avenue and Fenwick Street, this is a proposed multi-use development. Phase 1 of the project is expected to be complete in 2015 and has a development program of 49,000 square feet of retail space. Phase 2 of the project is expected to be complete in 2017 and will include approximately 333 residential units and 166,435 square feet of retail space.

The traffic volumes generated by Brookland Square were assigned using the same residential trip generation and distribution assumptions made for the residential components of the Brookland Manor PUD. The traffic volumes generated by the Hecht's Development were taken from the *Hecht's Redevelopment Transportation Impact Statement* performed by

Gorove/Slade in May of 2013 and the *Hecht's Warehouse Phase II PUD TIS* performed by Gorove/Slade in April of 2014.

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

These background growth rates were applied to thru movements at study area intersections. The peak hour traffic volumes for the 2019 Background conditions are shown in the Technical Attachments.

2019 Future Traffic Volumes (with Phase 1 of the PUD)

The 2019 Future traffic volumes consist of the 2019 Background volumes with the addition of the traffic volumes generated by Phase 1 of the proposed development (site-generated trips), the removal of the existing residential trips, and the rerouted trips from the closure of 14th Street. Thus, the 2019 Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and Phase 1 of the proposed PUD.

The trip distributions for PUD generated trips were assembled based on a review of existing traffic patterns and flow data from CTPP (Census Transportation Planning Products). Separate distributions were developed for the residential and retail components of the project. The residential trip distribution was influenced significantly by the CTPP TAZ flow data for drivers commuting from the site's TAZ, and adjusted based on traffic volumes and patterns. This flow information showed significant commuting patterns to downtown DC, Washington Hospital Center, and suburban Maryland.

The retail distribution was mostly based on locations of other retail centers and grocery stores, with some influence on the CTPP TAZ flow data for drivers commuting to the site's TAZ (representing retail employees that drive). Thus, the retail trip distribution is much more weighted to the north and west relative to the residential trip distribution.

Based on this review and the existing site access locations, the site-generated trips were distributed through the study area



intersections. A summary of the trip distribution assumptions is provided on Figure 16. The site-generated traffic volumes and the peak hour traffic volumes for the 2019 Future conditions are shown in the Technical Attachments.

2022 Background Conditions (with Phase 1 of the PUD)

The traffic projections for the 2022 Background conditions consist of the 2019 Future volumes with additional regional background growth. These background growth rates were applied to thru movements at study area intersections. The peak hour traffic volumes for the 2022 Background conditions are shown in the Technical Attachments.

2022 Future Traffic Volumes (with Phase 1 and Phase 2 PUD)

The 2022 Future traffic volumes consist of the 2022 Background volumes with the addition of the traffic volumes generated by Phase 2 of the proposed development (site-generated trips). Thus, the 2022 Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and Phase 1 and 2 of the proposed Brookland Manor PUD.

The site-generated trips were distributed through the study area intersections based on existing traffic volume and travel patterns. The site-generated traffic volumes and the peak hour traffic volumes for the 2022 Future conditions are shown in the Technical Attachments.

2025 Background Conditions (with Phase 1&2 of the PUD)

The traffic projections for the 2025 Background conditions consist of the 2022 volumes with additional regional background growth. These background growth rates were applied to thru movements at study area intersections. The peak hour traffic volumes for the 2025 Background conditions are shown in the Technical Attachments.

2025 Future Traffic Volumes (with entire PUD)

The 2025 Future traffic volumes consist of the 2025 Background volumes with the addition of the traffic volumes generated by Phase 3 of the proposed development (site-generated trips). Thus, the 2025 Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and Phase 1, 2, and 3 of the proposed Brookland Manor PUD.

The site-generated trips were distributed through the study area intersections based on existing traffic volume and travel patterns. The site-generated traffic volumes and the peak hour traffic volumes for the 2025 Future conditions are shown in the Technical Attachments.

2040 Horizon Conditions

The traffic projections for the 2040 Horizon conditions consist of the 2025 volumes with additional regional background growth. These background growth rates were applied to thru movements at study area intersections. The peak hour traffic volumes for the 2040 Background conditions are shown in the Technical Attachments.

Geometry and Operations Assumptions

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

Existing Geometry and Operations Assumptions

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

Future Geometry and Operations Assumptions

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

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

Based on this criteria, no background improvements were included in the any of the future conditions.

Where signal timing changes were recommended in one scenario, they were carried over for all future scenarios. All signal timing recommendations were made without altering phasing or deviating from the existing signal settings (i.e. they were only changes to green time splits).



Where recommendations were made for mitigation measures to be incorporated into the Zoning Commission’s Order for the PUD, they were carried over to any future phases.

Analysis Methodology

Following DDOT guidelines, the capacity analyses were performed using *Highway Capacity Manual* (HCM) methodologies. For signalized and unsignalized intersections, the HCM calculates the delay experienced by drivers traveling through an intersection. This delay is associated with vehicles slowing in advance of an intersection, the time spent stopped at an intersection, the time spent as vehicles move up in the queue, and the time needed to vehicles to accelerate to the speed limit. Traffic delay also results from the interaction of vehicles, primarily in a state where the traffic volumes exceed the available capacity.

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

For this report, the analysis was performed using the *Vistro, Version 3* software package, using the HCM methodologies (2010 version). The *Vistro* models were compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade.

CAPACITY ANALYSIS RESULTS

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. The detailed capacity analysis tables and worksheets are contained in the Technical Attachments.

The results of the capacity analysis showed:

- 2014 Existing Conditions:

- Summary of results is provided in Figure 17. Details are included in the Technical Attachments.
- Most arterial roadways process commuter traffic well, given the urban environment.
- Many side streets along Rhode Island Ave have high delays, partly due to long cycle lengths and how signal timings focus on through traffic.
- Many intersections have non-traditional geometries including five or more legs, which leads to inefficient operations.
- This report includes general recommendations for DDOT to consider to address existing issues including:
 - Consider re-timing some signals in the study area to eliminate high side street delays
 - Consider changes at the intersection of Franklin Street and 12th Street to process northbound left turns. A conceptual sketch of this improvement is shown on Figure 19. Currently, the presence of the bus stop allows for the northbound traffic to essentially use two lanes when buses aren’t stopped. Thus, many cars pass other cars waiting to turn left using the bus stop. This improvement would formalize this driver behavior, better defining it to help increase efficiency and safety. The downside to this improvement would be the elimination of several parking spaces from the bus stop relocation. Another option would be to remove the bus stop. This report recommends that DDOT, the community, and WMATA consider this as a possible improvement.
 - Consider re-striping the northbound approach of Saratoga Avenue to Rhode Island Avenue to help drivers orient themselves to the most efficient use of the roadway. Currently, the two northbound lanes are not marked and drivers do not necessarily use the roadway in the most efficient manner, leading to quick lane changes. This report recommends that DDOT consider some lane marking and signing improvements such that the northbound approach of Saratoga Avenue operates as a left turn lane and a through-right lane.
 - A summary of recommendations is provided in Figure 18.

- Year 2019/Phase 1 Conditions:



- Summary of results is provided in Figure 20. Details are included in the Technical Attachments.
- Growth in background/non-PUD traffic raises delays at some intersections.
- Slight changes to signal timings alleviate most concerns.
- The addition of PUD traffic and the removal of 14th Street have no detrimental impact to traffic operations.
- A summary of recommendations is provided in Figure 21.
- Year 2022/Phase 2 Conditions:
 - Summary of results is provided in Figure 22. Details are included in the Technical Attachments.
 - The addition of background and Phase 2 traffic creates long delays at several intersections, especially along the Montana Avenue corridor.
 - Signal timing changes help, but do not alleviate all concerns.
 - The extension of 15th Street to Rhode Island Avenue operates at acceptable conditions. This analysis assumed that the new northbound leg would operate concurrently with the actuated southbound leg of Brentwood Road. This allowed the intersection to maintain almost the same amount of green time for Rhode Island Avenue. There will be some impact from creating more actuation triggers, and needing a longer minimum to accommodate crosswalks, but the capacity analyses found these changes had a minimal impact on overall intersection operations.
 - This study recommends several mitigation measures to alleviate Phase 2 traffic. These are recommended for inclusion in the Zoning Order, given DDOT concurrence:
 - Install a traffic signal at the intersection of Saratoga Avenue and Montana Avenue. Traffic volumes generated by Phase 2 generate long delays, and background growth on Montana Avenue leads to fewer gaps for unsignalized operations. This study concludes that this intersection will meet signal warrants.
 - Incorporate 15th Street extended as a fourth leg of the intersection at Rhode Island Avenue, which will require some changes to Rhode Island Avenue. This study recommends that the design be revisited during Phase 2's Stage 2 PUD application. Current options involve several ways to handle a necessary bus stop removal, whether a westbound left turn lane is desired (there is 72' curb to curb, which could accommodate one), and whether separate right and left turn lanes exiting the site are desired¹. A conceptual sketch of this improvement is shown on Figure 24.
- Install lane marking and signing improvements at the intersection of Rhode Island Avenue and Montana Avenue. This includes removing two parking spaces on westbound Rhode Island Avenue so the approach to the traffic signal can always accommodate three lanes of traffic. This also includes restriping the northbound approach to formalize two lanes, a left turn lane and a shared right/through lane. Finally, the southbound approach should be re-striped as one receiving lane, one left turn lane, and one shared right/through lane. All of these improvements can be accomplished without altering curbs or intersection geometry. A conceptual sketch of this improvement is shown on Figure 25.
- Install lane marking and signing improvements at the intersection of Montana Avenue and 18th Street. Currently, the southeastbound approach of Montana Avenue is officially one shared lane, although it is wide enough to accommodate two cars side-by-side. Two receiving lanes exist on the opposite side of Montana Avenue, and thus this report recommends officially marking the southeastbound approach as two lanes, to ensure drivers take advantage of both lanes and reduce confusion. A conceptual sketch of this improvement is shown on Figure 26.
- A summary of recommendations is provided in Figure 23.
- Year 2025/Phase 3 Conditions:
 - Summary of results is provided in Figure 27. Details are included in the Technical Attachments.

¹ The traffic analyses did not assume a westbound left turn lane, or separate right and left turn lanes northbound at this location.



- Growth in background/non-PUD traffic raises delays at some intersections.
- The addition of Phase 3 traffic does not have a significant impact on study area intersections.
- Slight changes to signal timings alleviate most concerns.
- A summary of recommendations is provided in Figure 28.
- Year 2040/Horizon Conditions:
 - The addition of background growth along the primary vehicular corridors exacerbates existing capacity concerns.
 - Signal timings mitigate most issues along Rhode Island Avenue and Brentwood Road.
 - Due to the substantial growth rates applied to Montana Avenue more significant changes will be required. Montana Avenue currently serves as a primary connection New York Avenue and Rhode Island Avenue. Because of physical barriers such as the rail yard along New York Avenue and multiple rail lines just west of the site, few connections between New York Avenue and Rhode Island Avenue are available other than Montana Avenue. Therefore as these areas continue to develop Montana Avenue will be more constrained. Two primary improvements that can help mitigate the capacity constraints are as follows:
 - Create one or more additional connections between New York Avenue and Rhode Island Avenue. A new connection between these two roadways is discussed in the MoveDC plan.
 - Add capacity to Montana Avenue by converting it from a two-lane roadway to a four-lane roadway between New York Avenue and Rhode Island Avenue (this could be done mostly through removing on-street parking).

SIMULATION RESULTS

During the scoping process, DDOT requested a traffic simulation of Rhode Island Avenue be performed in order to review in detail the signal timing progression and impacts of 15th Street extended to the corridor. As such, this study assembled two simulations of Rhode Island Avenue traffic, for the AM and PM peak hours of the 2025 Future scenario, with all three phases of the PUD constructed. The simulations were performed using the SimTraffic software. Results of the simulations are summarized below, with detailed simulation results and queuing graphics included in the Technical Appendix.

In general, the simulation analysis showed:

- Conditions along Rhode Island Avenue were acceptable, and generally reflected the HCM results, for them AM inbound, AM outbound, and PM outbound.
- Inbound traffic in the PM had significant delay and queuing issues in the simulation. This is partly due to how the westbound lanes on Rhode Island Avenues near the site shift from two and three effective lanes due to bus stops, curb cuts, and parking restrictions. The simulation model had difficulty replicating actual driver behavior due to these shifts. Additionally, the growth in westbound traffic by 2025 led to fewer gaps in traffic, which in turn led to significant delays to eastbound permissive left turns.

Improvements were made to the PM traffic simulation to improve the delay and queuing results. The following lists the changes necessary to the model to improve the results:

- Northbound 15th Street extended was changed to a separate left turn lane and right turn lane
- A left turn lane into 15th Street extended was added to westbound Rhode Island Avenue
- A right turn lane from Rhode Island Avenue to Montana Avenue was added
- A protected left turn lagging phase was added for westbound Rhode Island Avenue at Montana Avenue
- A northbound protected left turn phase was added for Montana Avenue at Rhode Island Avenue, with an accompanying overlap for the right turn lane on Rhode Island Avenue
- All peak hour factors were changes to 0.97 to better reflect the saturated conditions during the peak hour



- Signal timing and offset changes were made to help reduce queuing at specific intersections

This report does not recommend implementing these improvements, as some of them will have detrimental impacts to the pedestrian and cycling environments, or will remove on-street parking. This report does recommend that some improvements should be reconsidered during the Stage 2 application of Phase 2 of Brookland Manor, such as the potential left turn from Rhode Island Avenue to 15th Street extended, and providing separate right and left turns lanes on 15th Street extended.

INTERNAL STREETS

Although the traffic analyses did not incorporate all of the internal streets within the PUD as study area intersections, the traffic models used to assemble the analyses contained them in order to provide guidance on the project's site design moving forward.

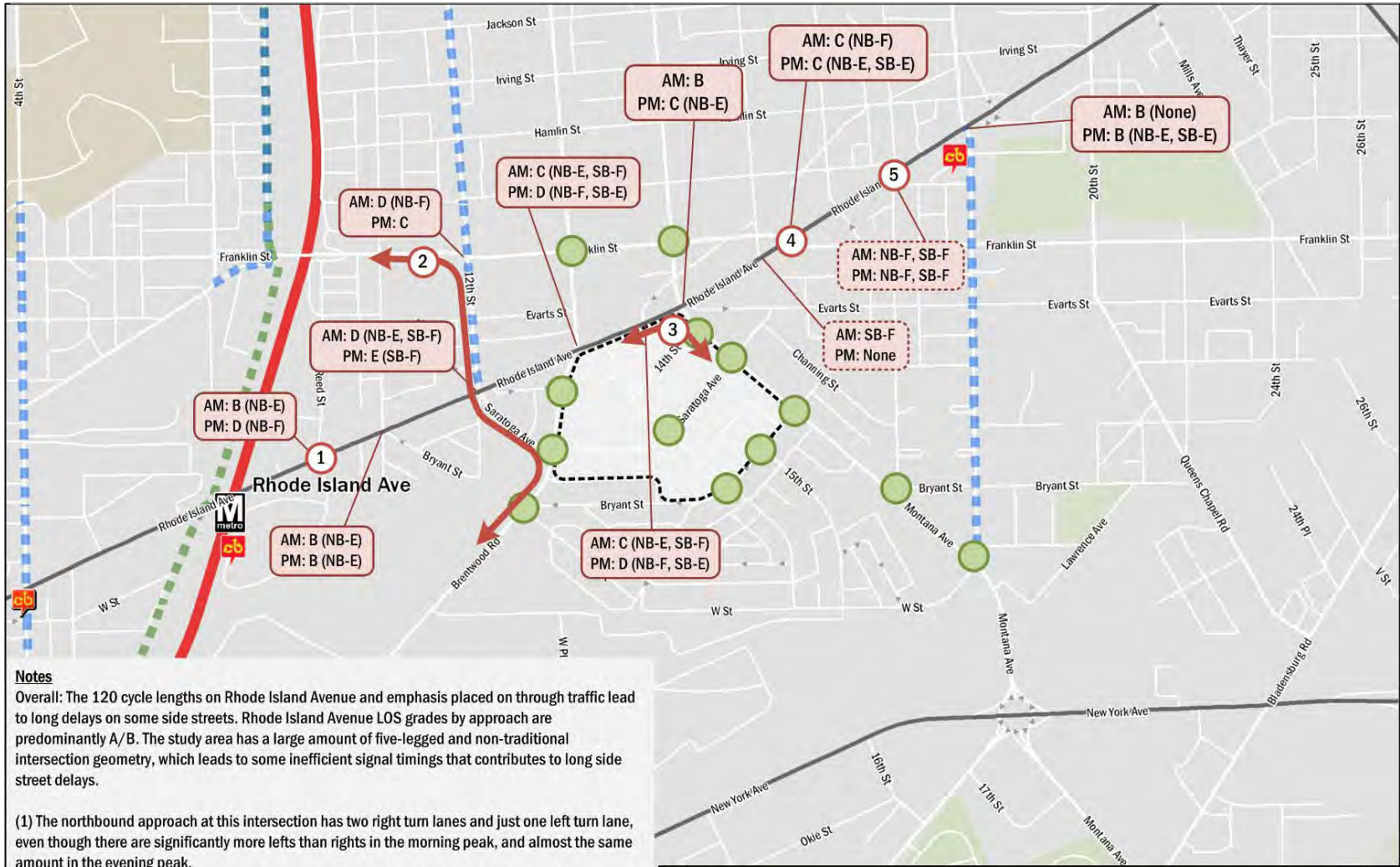
Recommendations on internal street traffic controls generated during the analyses performed for this study are summarized on Figure 29. In summary, all internal intersections and alleyways operated at acceptable levels of service, and most approaches can be stop-sign controlled.



Figure 15: Study Area Intersections



Figure 16: Trip Distribution



Notes

Overall: The 120 cycle lengths on Rhode Island Avenue and emphasis placed on through traffic lead to long delays on some side streets. Rhode Island Avenue LOS grades by approach are predominantly A/B. The study area has a large amount of five-legged and non-traditional intersection geometry, which leads to some inefficient signal timings that contributes to long side street delays.

- (1) The northbound approach at this intersection has two right turn lanes and just one left turn lane, even though there are significantly more lefts than rights in the morning peak, and almost the same amount in the evening peak.
- (2) There is a large movement between Brentwood Road and Franklin Street including significant turning volumes at several intersections. This is likely generated by commuter traffic to/from the Washington Hospital Center area, and the no left-turn prohibition on northbound Brentwood onto Rhode Island Avenue.
- (3) There is a significant northbound left turn volume from Montana Avenue to Rhode Island Avenue, and accompanying right turn from Rhode Island Avenue to Montana Avenue.
- (4) The channelized right turn on northwest-bound Franklin Street has very low volumes.
- (5) The odd geometry of the unsignalized intersection of Rhode Island Avenue, 17th Street, and Girard Street leads to some ambiguous spaces, large effective turning radii, and long crosswalk distances. Volumes on 17th Street and Girard Street using this intersection are very low.

Capacity Analysis Results: Existing Conditions

- Intersection with no delays exceeding acceptable thresholds (Overall LOS E/F, or approach LOS E/F)
- AM: B (NB-E)
PM: B (NB-E) Signalized intersection with delays exceeding acceptable thresholds, all approaches LOS E or worse noted
- AM: B (NB-E)
PM: B (NB-E) Unsignalized intersection with delays exceeding acceptable thresholds, all approaches LOS E or worse noted

1" = 1000'

Figure 17: Capacity Analysis Results - Existing Conditions

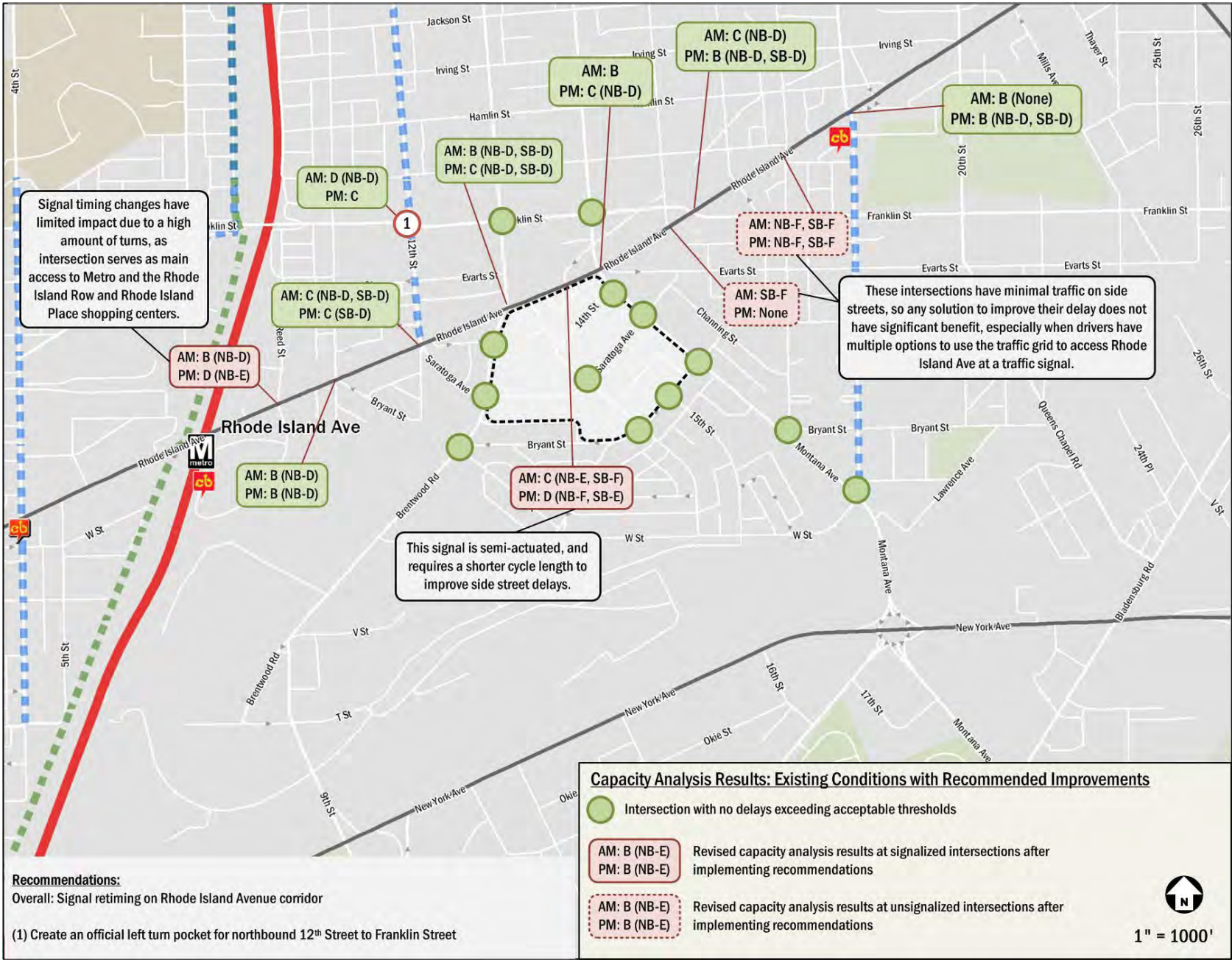
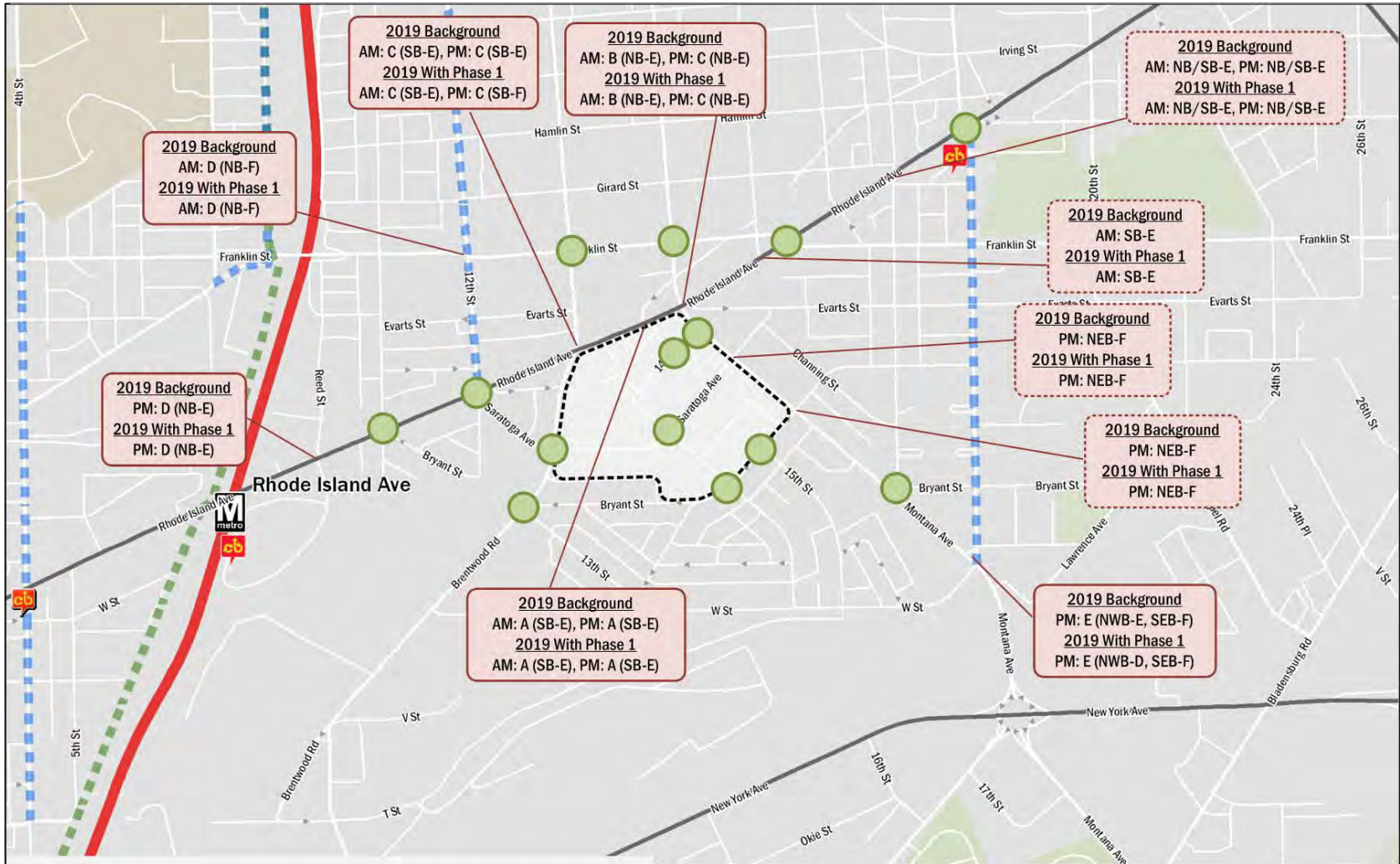


Figure 18: Existing Conditions Recommendations



Figure 19: Potential Improvements at Franklin St/12th St



Notes

Overall: The signal re-timings recommended in the Existing scenario are incorporated into the year 2019 scenarios (the other recommendation at 12th St & Franklin St is not).

Background traffic raises delays at some intersections past acceptable thresholds, notably on Montana Avenue (on side streets), and at the intersections of Rhode Island Avenue with Montana Avenue and Brentwood Rd/13th St.

All unsignalized intersections with delays exceeding acceptable thresholds do not meet signal warrants.

Capacity Analysis Results: 2019 Background and Total Future Conditions

- Intersection with no delays exceeding acceptable thresholds
- AM: B (NB-E)
PM: B (NB-E) Signalized intersection with delays exceeding acceptable thresholds, all approaches LOS E or worse noted
- AM: B (NB-E)
PM: B (NB-E) Unsignalized intersection with delays exceeding acceptable thresholds, all approaches LOS E or worse noted



1" = 1000'

Figure 20: Year 2019 Analysis Results

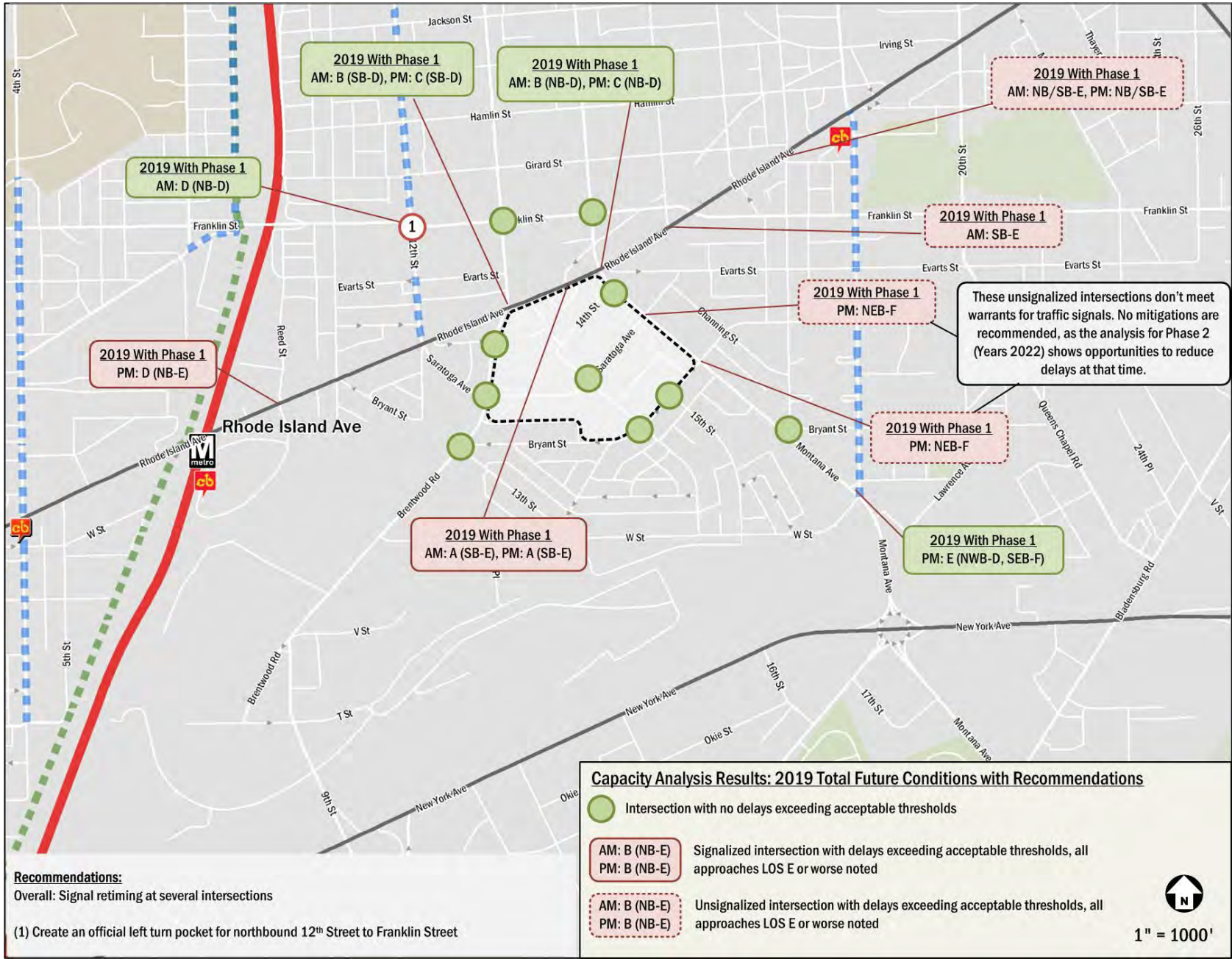


Figure 21: Year 2019 Recommendations

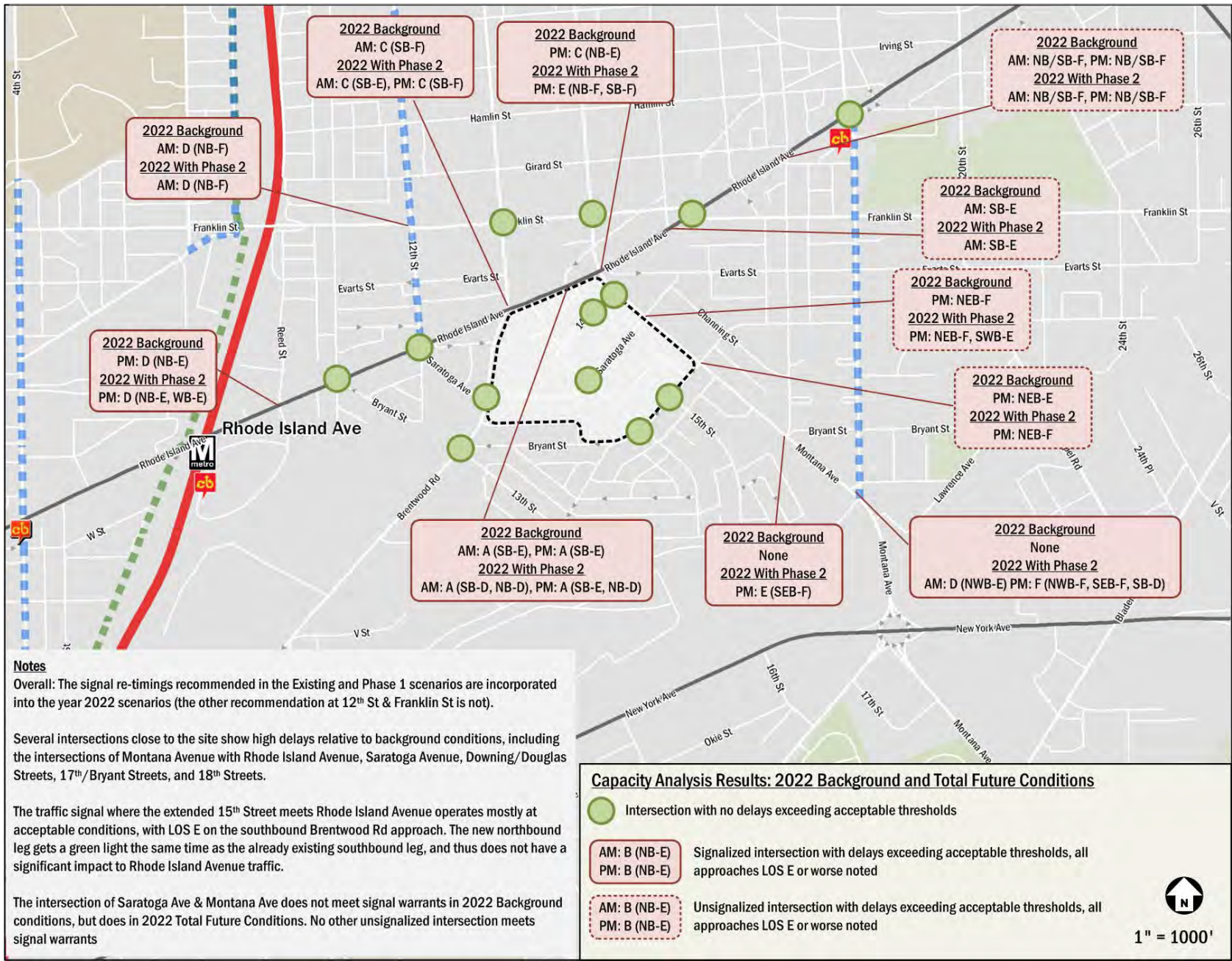


Figure 22: Year 2022 Analysis Results

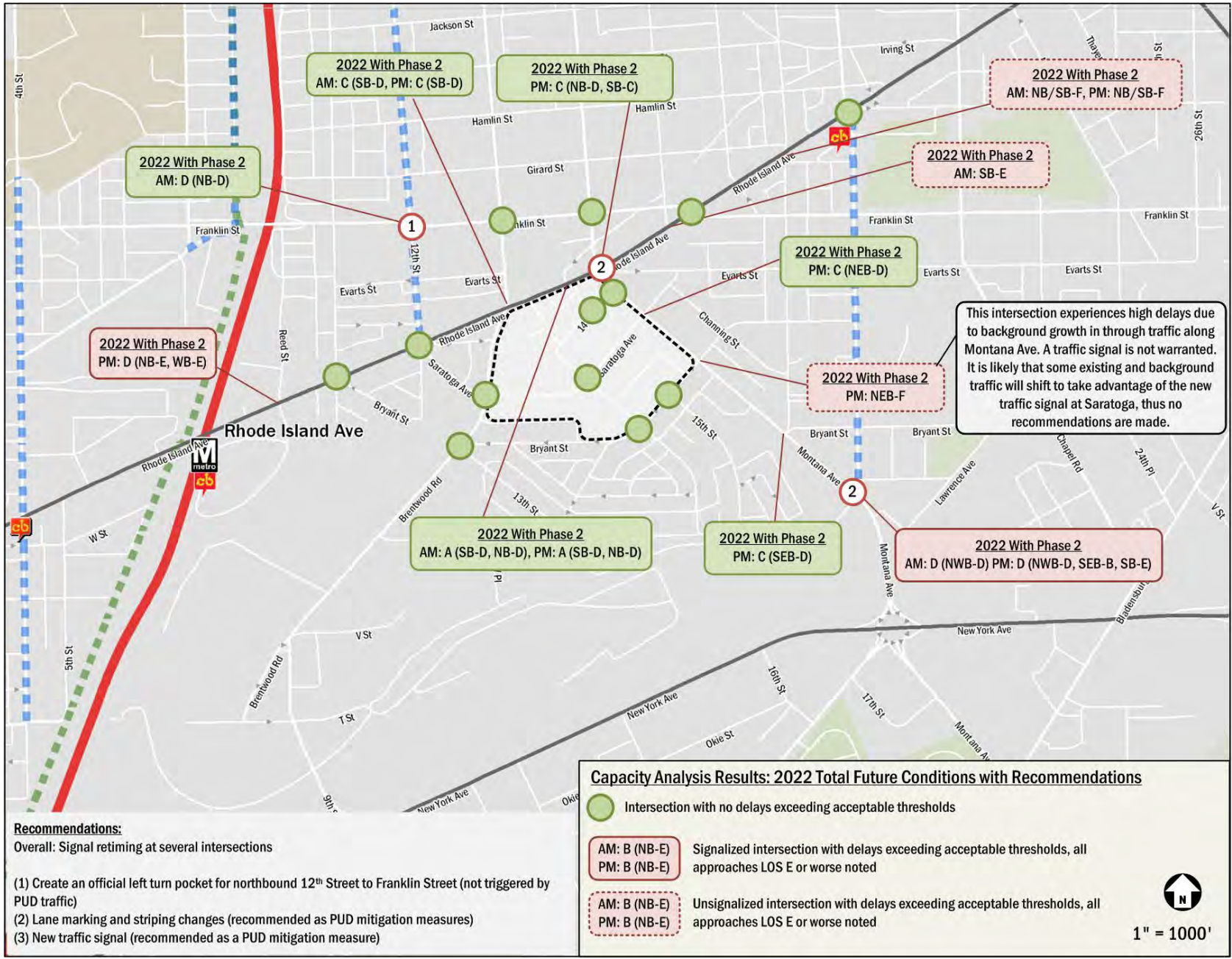


Figure 23: Year 2022 Recommendations

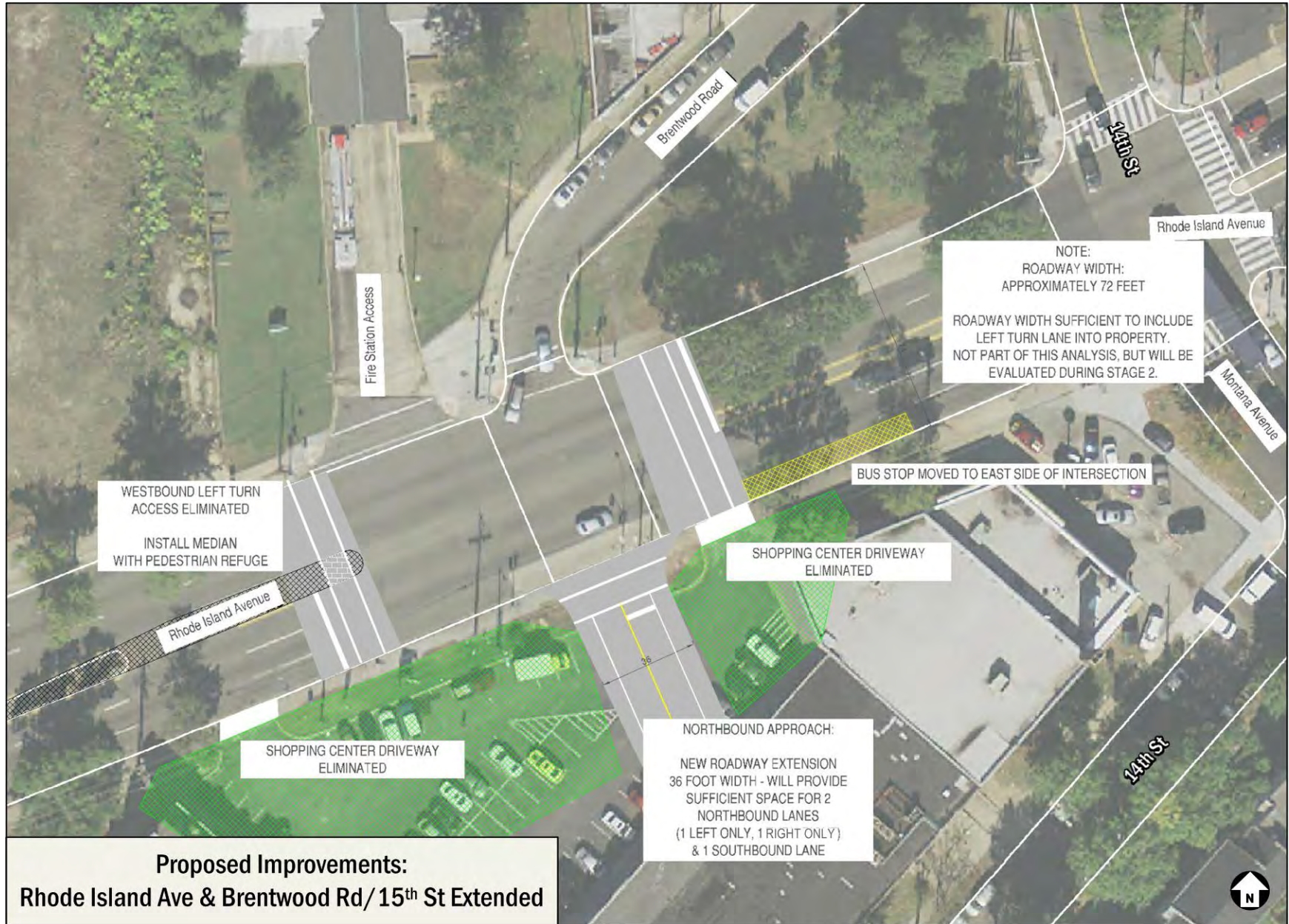


Figure 24: Proposed Improvements at Rhode Island Ave & 15th St Extended

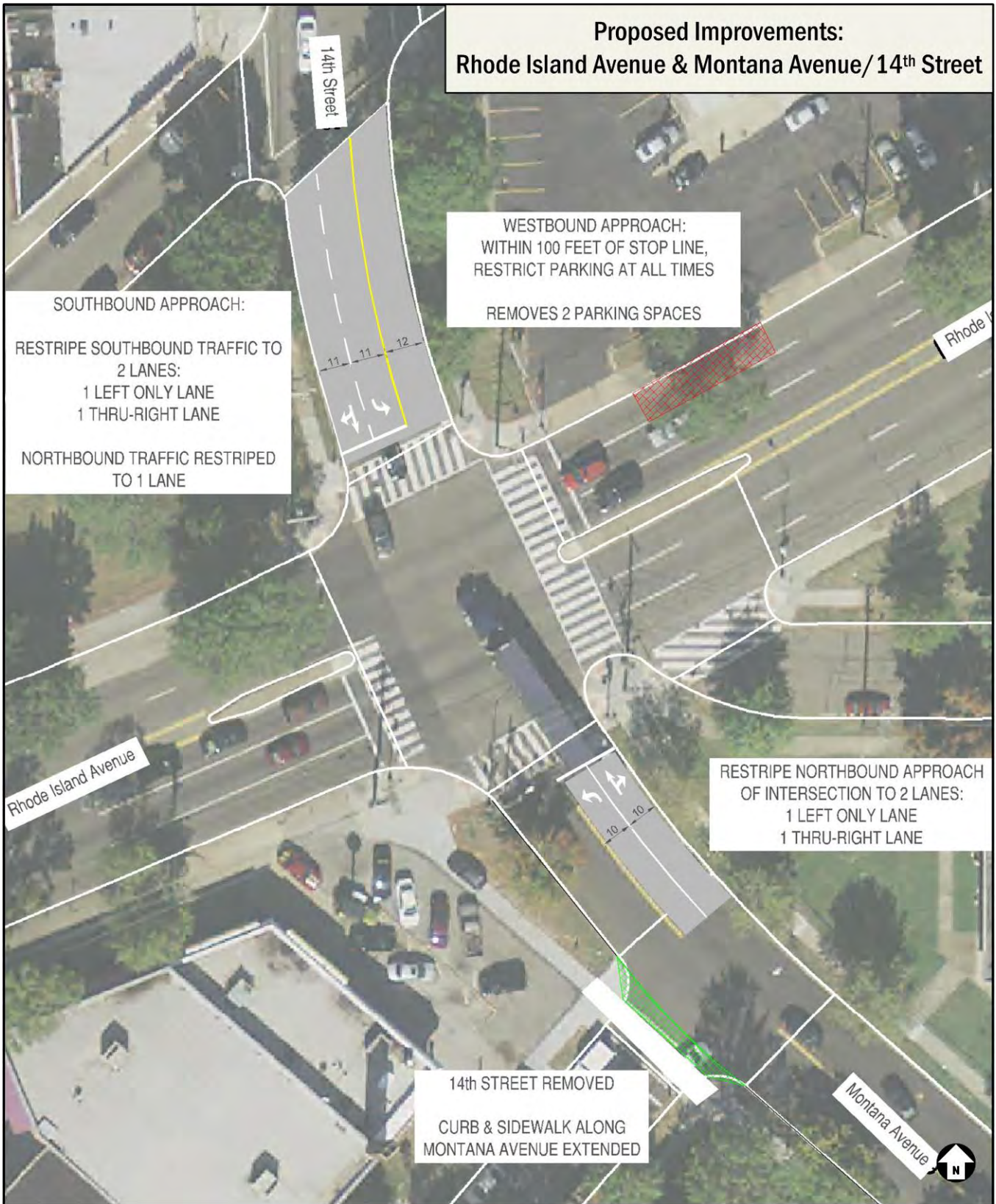


Figure 25: Proposed Improvements at Rhode Island Ave/Montana Ave

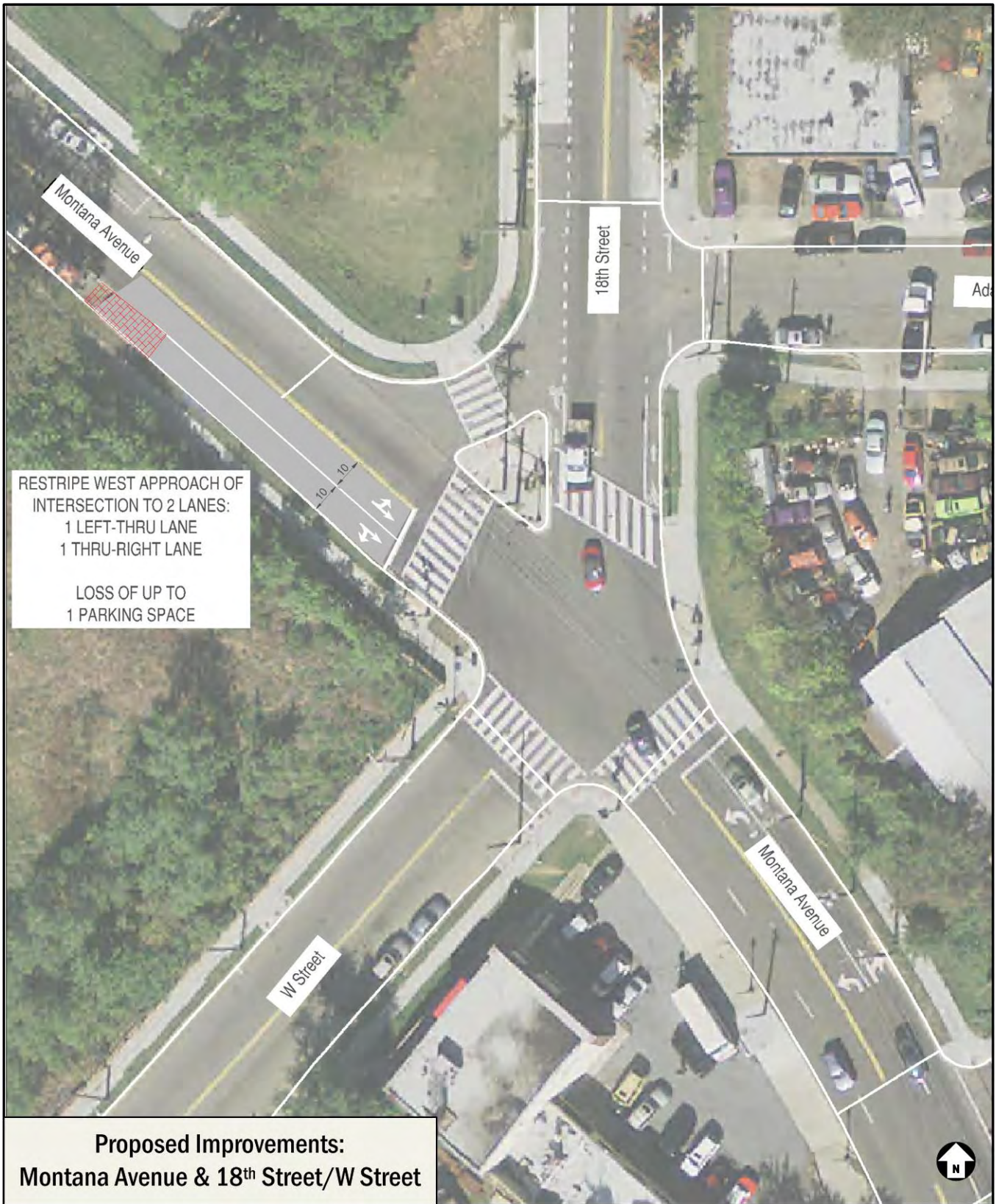


Figure 26: Proposed Improvements at Montana Ave/18th St

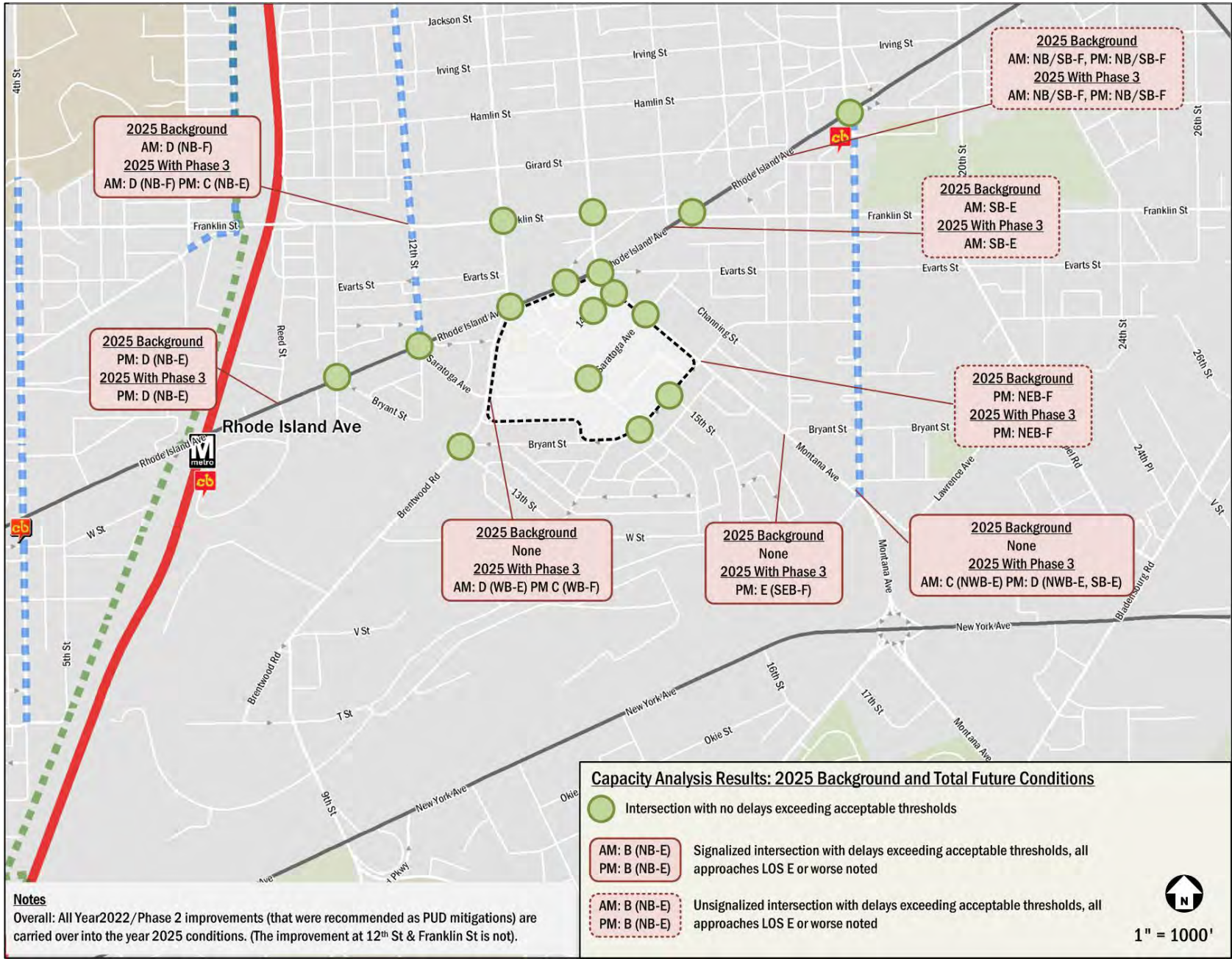


Figure 27: Year 2025 Results

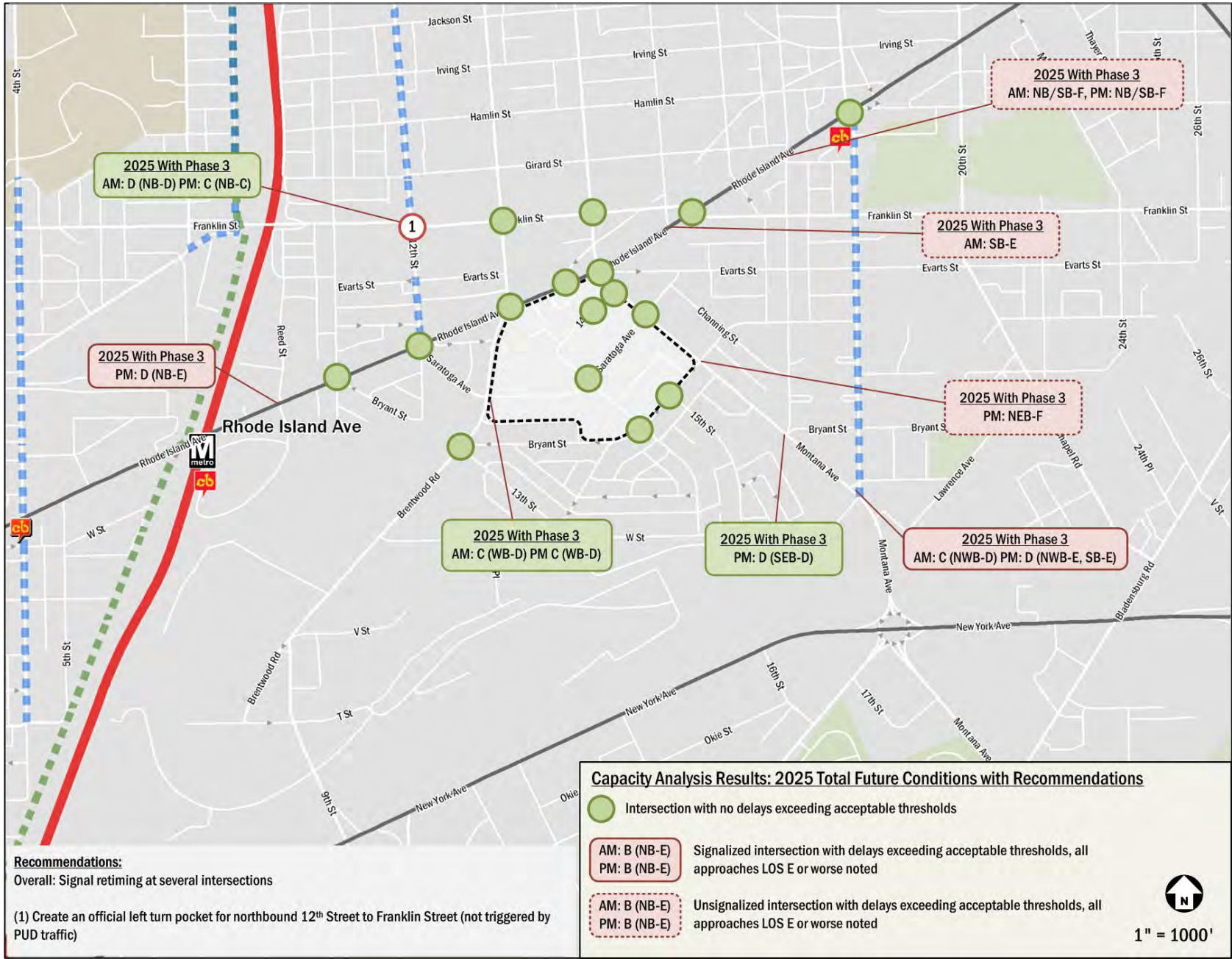


Figure 28: Year 2025 Recommendations



Figure 29: Traffic Operations of Internal Roadways



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 Brookland Manor PUD.

The following conclusions are reached within this chapter:

- The development site is near one Metrorail station and surrounded by several Metrobus routes that travel along multiple primary corridors
- One new Streetcar line is expected to travel along Rhode Island Avenue in the vicinity of the site
- The site is expected to generate a substantial amount of transit trips, but the existing service is capable of handling these new trips
- One Metrobus stop will be relocated due to the extension of 15th Street to Rhode Island Avenue

EXISTING TRANSIT SERVICE

The study area is well served by Metrorail and Metrobus. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 30 identifies the major transit routes, stations, and stops in the study area.

The Rhode Island Avenue Metrorail station is located approximately 0.6 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 hours. They run about every 5 to 6 minutes during weekday non-peak hours, every 10 to 15 minutes on weekday evenings after 7:00 pm and 6 to 15 minutes on the weekends.

The site is also serviced by Metrobus along multiple primary corridors. These bus lines connect the site to many areas of the District and Maryland, including several Metrorail stations serving four of the six Lines. Table 4 shows a summary of the

Table 4: Metrobus Route Information

Route Number	Route Name	Service Hours	Headway	Distance to Nearest Stop
81,82,83,86	College Park Line	Weekdays: 4:45 am - 1:45 am Saturdays: 5:45 am - 1:45 am Sundays: 6:45 am - 12:00 am	Peak: 5-15 min Non-Peak: 10-30 min Weekend: 30 min	0.1 miles
B8,B9	Fort Lincoln Shuttle Line	Weekdays: 6:00 am - 7:15 pm	Peak: 15-20 min Non-Peak: 30-60 min	0.1 miles
D8	Hospital Center Line	Weekdays: 5:30 am - 2:00 am Weekends: 6:15 am - 1:00 am	Peak: 12-15 min Non-Peak: 15-30 min Weekend: 15-30 min	0.2 miles
E2,E3	Military Road-Crosstown Line	Mon-Sat: 5:15 am - 1:30 am Sunday: 5:30 am - 12:30 am	Peak: 12-20 min Non-Peak: 15-30 min Weekend: 15-30 min	0.4 miles
H6	Brookland-Fort Lincoln Line	Mon-Sat: 5:00 am - 12:45 am Sunday: 7:00 am - 10:45 pm	Peak: 10-15 min Non-Peak: 15-25 min Weekend: 20-30 min	0.3 miles
H8,H9	Park Road-Brookland Line	Weekdays: 5:15 am - 2:30 am Saturday: 6:00 am - 2:30 am Sunday: 6:00 am - 1:00 am	Peak: 5-15 min Non-Peak: 10-30 min Weekend: 20-30 min	0.3 miles
P6	Anacostia-Eckington Line	Mon-Sat: 5:15 am - 2:00 am Sunday: 6:45 am - 12:15 am	Peak: 12-20 min Non-Peak: 20-30 min Weekend: 30 min	0.6 miles
T18	Annapolis Road Line	Weekday: 5:45 am - 11:15 pm Saturdays: 7:30 am - 9:30 pm Sundays: 8:15 am - 7:00 pm	Peak: 10-20 min Non-Peak: 15-45 min Weekend: 30-45 min	0.1 miles



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. 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.

One streetcar route is expected to travel near the site. This route would run along Rhode Island Avenue and connect the site with Washington Circle and several Metrorail stations. This route is planned to be part of Phase 2.

SITE-GENERATED TRANSIT IMPACTS

The trip generation estimates for the Brookland Manor development show that a substantial amount of new transit riders will be generated. The proposed development is projected to generate 747 transit trips (220 inbound, 527 outbound) during the morning peak hour and 1,267 transit trips (773 inbound, 534 outbound) during the afternoon peak hour.

US Census data was used to determine the distribution of those taking Metrorail and those taking Metrobus. The site lies within census tract 91.02 which shows a near even distribution between Metrorail and Metrobus. That said, approximately 375 people will be using each service during the morning peak hour and approximately 630 people will be using each service 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 Rhode Island Avenue Station in 2005 nor are they expected by 2030. Therefore, the station can accommodate the additional riders generated by the Brookland Manor development.

WMATA also studied capacity along Metrobus routes. DC's *Transit Future System Plan* lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). A load factor is considered unacceptable if it is over 1.2 during peak periods or over 1.0 during off-peak or weekend periods. According to this study none of the Metrobus routes that travel near the site operate at an unacceptable load factor. Based on this information and the extensive Metrobus service surrounding the site, it is not expected that site-generated transit trips will cause detrimental impacts to Metrobus service.

In addition to site-generated transit trips, the implementation of 15th Street extended to Rhode Island Avenue will result in the relocation of one Metrobus stop, as shown previously in Figure 24. Under existing conditions the bus stop is located just west of the outbound shopping center driveway, where 15th Street extended is expected to access Rhode Island Avenue. When this new public roadway is added and the shopping center driveways are removed, the bus stop will be relocated to the far side of the intersection to best serve residents and patrons of the Brookland Manor development. This report recommends this issue be examined in detail during the Stage 2 PUD application for Phase 2.

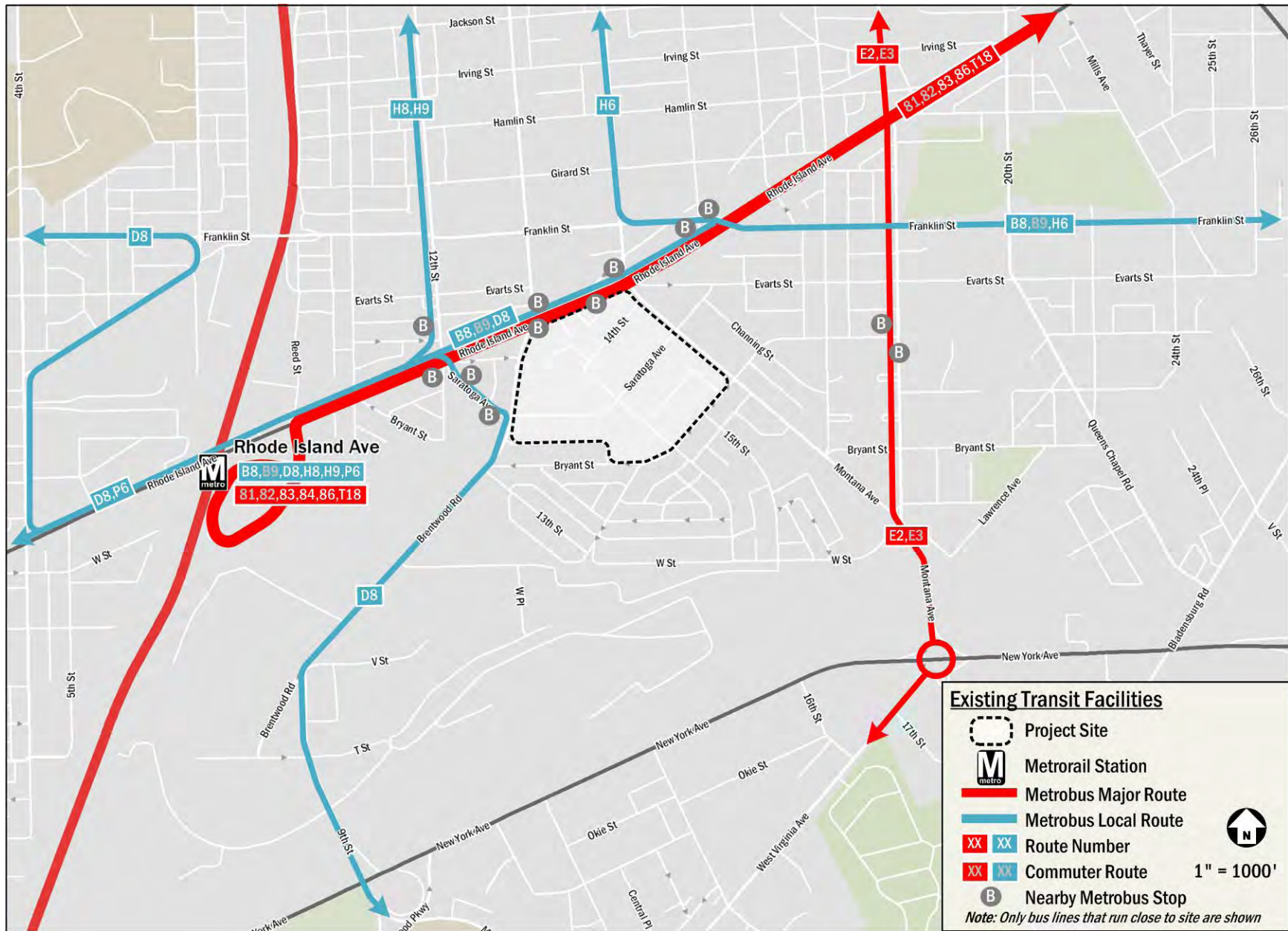


Figure 30: Existing Transit Service



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 a quality walking environment. There are some gaps in the system, but there are sidewalks along all primary routes to pedestrian destinations.
- Some existing unsignalized intersections along Rhode Island Avenue would benefit from updating existing pedestrian infrastructure or geometry to meet modern standards.
- The site will generate a substantial amount of pedestrian trips, particularly along Rhode Island Avenue with other major pedestrian routes along Brentwood Road, Montana Avenue, and residential streets. Site-generated pedestrian trips can be accommodated by the existing pedestrian infrastructure.
- Within the site, an updated roadway grid will improve the overall pedestrian connectivity with several new pedestrian routes coming into effect. All sidewalks, crosswalks, and curb ramps will be updated to meet or exceed DDOT standards
- Improvements and changes to the intersections of Rhode Island Avenue & Brentwood Road/15th Street extended and Montana Avenue & Saratoga Avenue will result in improved pedestrian connectivity and safety at both intersections.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the site were evaluated as well as routes to nearby transit facilities and prominent retail and neighborhood destinations. The site is easily accessible to transit options such as bus stops along Rhode Island Avenue,

Saratoga Avenue/12th Street, Franklin Street, and 18th Street as well as the Rhode Island Avenue Metrorail Station. The site is also within walking distance of the Rhode Island Avenue shopping center, Landon Park, the Brentwood Recreation Center, and the future Hecht’s Development. There are some barriers and areas of concern within the study area that negatively impact the quality of and attractiveness of the walking environment. This includes roadway conditions that reduce the quality of walking conditions, narrow or nonexistent sidewalks, incomplete or insufficient crossings at busy intersections, and the rail yard along New York Avenue that impacts connectivity to the south. Figure 31 shows suggested pedestrian pathways, walking time and distances, and barriers and areas of concern.

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 Brookland Manor development shows that many facilities meet DDOT standards and provide a quality walking environment. Figure 32 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 5.

Within the area shown, most roadways are considered residential with a low to moderate density. Some areas along Rhode Island Avenue, Brentwood Road, Montana Avenue, and New York Avenue are considered commercial and thus require wider sidewalks. Most of the sidewalks surrounding the site comply with DDOT standards; however there are some areas, which have inadequate sidewalks or no sidewalks at all. These areas or poor quality are primarily observed within the residential neighborhoods, but generally do not impact the

Table 5: Sidewalk Requirements

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



pedestrian connectivity of the site. All primary pedestrian destinations are accessible via routes with sidewalks, most of which meeting DDOT standards. The sidewalks that do not meet DDOT standards are typically along commercial routes that do not provide an acceptable buffer width, but do maintain 10 feet of sidewalk space.

ADA standards require that all curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks is not desired. As shown in the figure, under existing conditions there are some issues with crosswalks and curb ramps near the site. Some of these issues will be remedied as part of the PUD.

Proposed Improvements

Upon review of the existing pedestrian infrastructure, it was observed that some marked crosswalks at unsignalized intersections do not meet modern standards. Additionally, high speeds along Rhode Island Avenue create an intimidating environment for pedestrians. This analysis recommends that DDOT consider the following pedestrian improvements:

- Consider removing crosswalks across Rhode Island Avenue at the intersection of 15th Street with Rhode Island Avenue. These crosswalks span a width greater than 70 feet, and although there is some pedestrian signage along the free-flowing Rhode Island Avenue, there is little other protection for crossing pedestrian at this 6-lane, high-volume roadway. The crosswalks may also give pedestrians a false sense of safety when crossing at these crosswalks. Although vehicles are required to stop for pedestrians in crosswalks, situations occur when vehicles do not stop or do not see pedestrians in the crosswalk. If these crosswalks were removed pedestrians would be more likely to cross at the signalized intersection of Rhode Island Avenue and Franklin Street which is less than 100 feet to the east.
- Geometry changes should be considered at the unsignalized intersection of Rhode Island Avenue and Girard Street/17th Street. Crosswalks at this location are excessively long across Rhode Island Avenue where traffic is free-flowing. This intersection would be better served towards pedestrians if crosswalk lengths were minimized and curb radii reduced.

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 Brookland Manor development is expected to generate 212 walking trips (94 inbound, 118 outbound) during the morning peak hour and 483 walking trips (257 inbound, 483 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 outside of the site, such as the Rhode Island Shopping Center
- Retail locations within the site such as the planned grocery store
- Neighborhood destinations such as Langdon Park and the Brentwood Community Center
- Future development such as the Hecht's development

In addition to these trips, the transit trips generated by the site will also generate pedestrian demand between the Brookland Manor site and nearby transit stops. About half of these will be walking to the Rhode Island Avenue Metrorail Station located approximately 0.6 miles from the site and the other half will be walking to Metrobus stops, which are primarily located along Rhode Island Avenue directly adjacent to the site boundary.

Based on these origins/destinations, most pedestrians generated by the development will be traveling west of the site along Rhode Island Avenue to access the Metrorail station or the shopping center, with other high frequency routes along Brentwood Road, Montana Avenue, and residential streets.

On-Site Pedestrian Infrastructure

The PUD provides extensive pedestrian improvements to the site. Several new pedestrian routes will be created as part of the internal roadway changes thus improving the overall connectivity within and through the site. Pedestrian infrastructure improvements will also be implemented throughout the entirety of the site.

Under existing conditions connectivity within the site is fairly limited to east-west connectivity via Saratoga Avenue. There is no pedestrian route that provides efficient north-south connectivity since 14th Street does not connect through to



Rhode Island Avenue. The updated internal roadway system increases the amount of pedestrian routes within and through the site. Of particular importance, two pedestrian routes are created that provide efficient access to Rhode Island Avenue. One route is along the new 15th Street extension and the other is along a pedestrian only plaza extended from 14th Street.

Several pedestrian infrastructure improvements will be implemented as part of the PUD. Internally, all sidewalks, crosswalks, and curb ramps will be updated to meet or exceed DDOT standards. In some locations, where applicable, curb extensions will be implemented to reduce the overall length of crosswalks thus creating safer pedestrian conditions within the site.

Geometry changes to the intersection of Rhode Island Avenue at Brentwood Road/15th Street extended provide updated pedestrian infrastructure that is currently absent. Although this intersection is currently signalized, crosswalks and pedestrian signal heads to cross Rhode Island Avenue are not available. With the extension of 15th Street to meet Rhode Island Avenue this intersection and signal timing will be reconfigured to include crosswalks and pedestrian signal heads across Rhode Island Avenue. This will result in more effective access to the bus stops along the north side of Rhode Island Avenue for many of the building within the development site.

This report recommends, as a traffic operations mitigation measures, that the intersection of Montana Avenue and Saratoga Avenue be signalized as part of the Phase 2 of the PUD. Under existing conditions this intersection is two-way stop-controlled with free-flowing traffic along Montana Avenue. Although there are currently crosswalks across Montana Avenue, pedestrians still must stop and wait for a gap in Montana Avenue traffic to cross. Although traffic volumes along Montana Avenue are relatively low under existing conditions, extensive growth is expected along Montana Avenue in the future. The addition of a signalized intersection at this location with pedestrian signal heads will result in a much safer pedestrian crossing, especially in future scenarios. This crossing is likely to become a primary pedestrian route, particularly in conjunction with Phase 2 of the PUD. Phase 2 will include a grocery store along Saratoga Avenue which will draw walking trips from surrounding residential neighborhoods. Residents of Phase 2 buildings are also likely to use this crossing to access Langdon Park to the east.

Under existing conditions there is a large gap (approximately 1,800 feet) between signalized intersections along this segment of Montana Avenue. A large gap such as this can lead to elevated speeds, thus the addition of a traffic signal in between may also help reduce speeds along this corridor where additional pedestrian traffic is expected as part of the development. The addition of a traffic signal at this location is highly beneficial to the PUD and surrounding neighborhood's pedestrian facilities, and would likely merit inclusion as a mitigation measure for the PUD even if it was not already being recommended for traffic operation reasons.

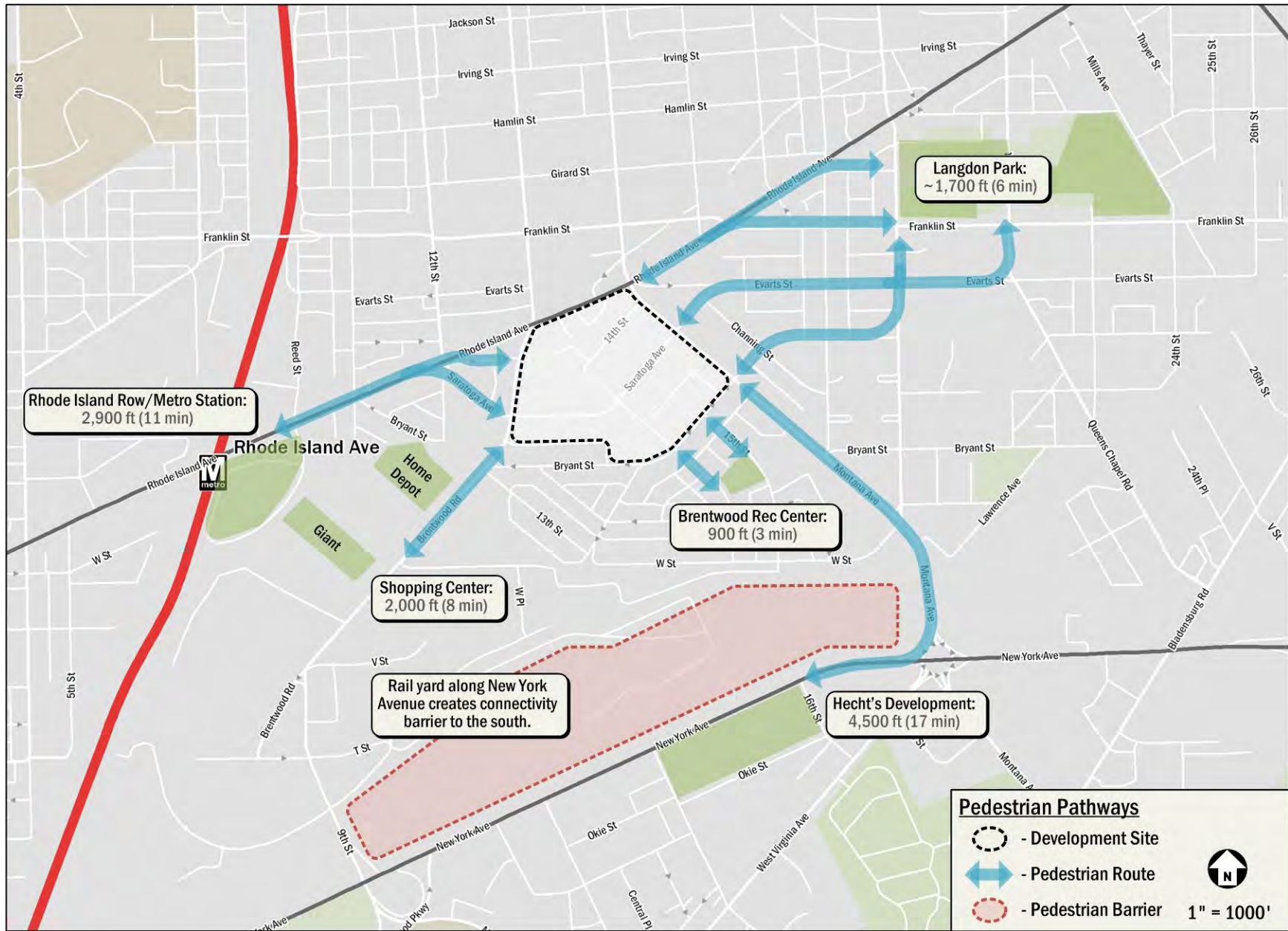


Figure 31: Pedestrian Pathways

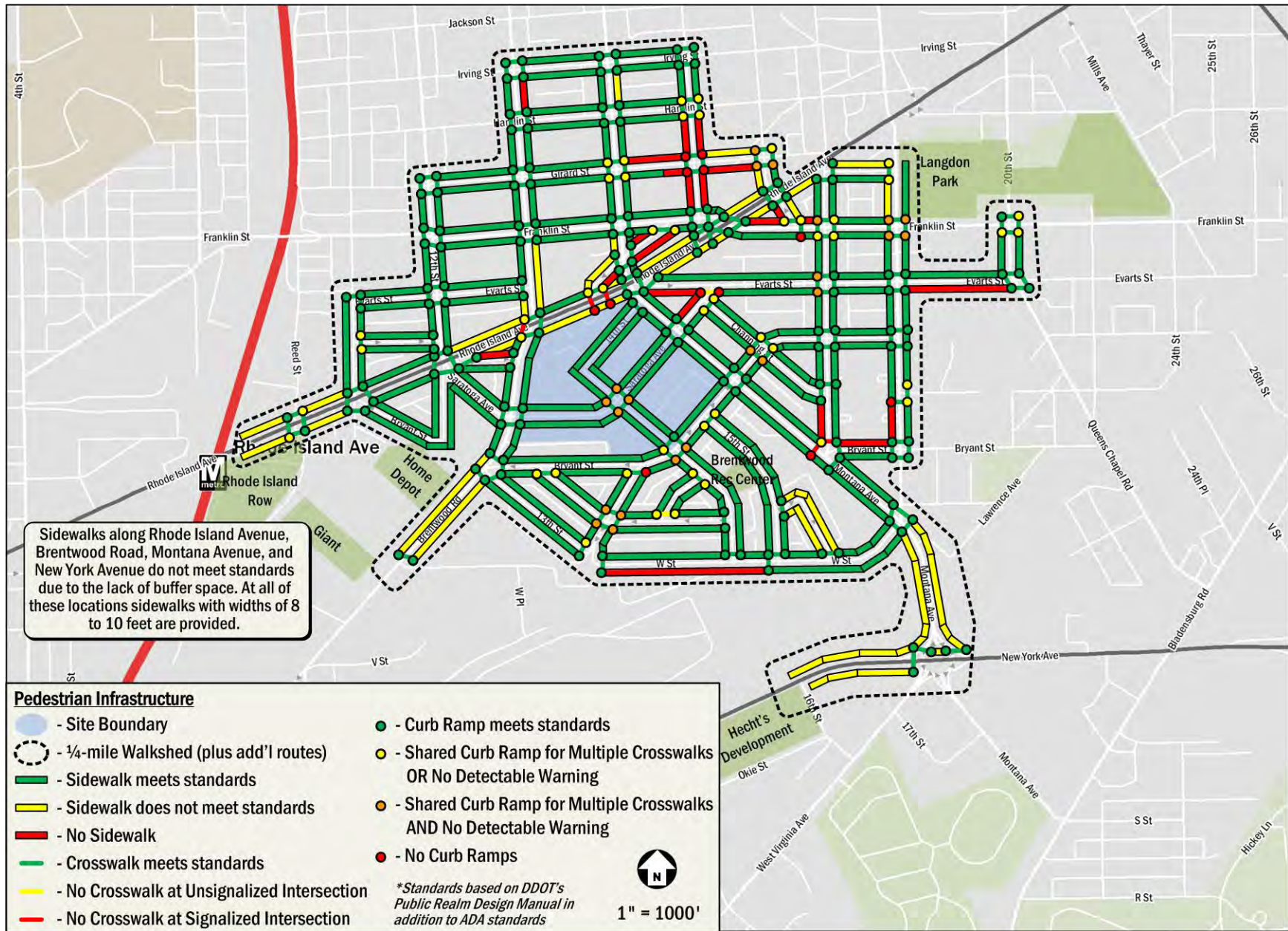


Figure 32: Existing Pedestrian Infrastructure



BICYCLE FACILITIES

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

The following conclusions are reached within this chapter:

- There are limited bicycle facilities in the vicinity of the site. Some north-south bicycle connections exist and are accessible from the site via neighborhood roadways, but no east-west connections currently exist.
- The MoveDC report recommends bicycle facilities along New York Avenue and Rhode Island Avenue as Tier 1 and Tier 2 improvements, respectively. Neither project is currently included in DDOT's Transportation Improvement Plan.
- The site is not expected to generate a significant amount of bicycle trips, primarily due to the lack of existing bicycle infrastructure.
- The development site will include secure bicycle parking and bicycle racks throughout, and the Applicant plans to install two Capital Bikeshare stations, one each during Phase 2 and Phase 3.
- It is recommended that a signed bicycle route be added through the site creating access to the site from the 12th Street and 18th Street bicycle facilities and acting as an east-west bicycle connection.

EXISTING BICYCLE FACILITIES

The site lacks direct connectivity to existing on- and off-street bicycle facilities. North-south connectivity is provided along the Metropolitan Branch Trail that runs along the west side of the Red Line and sharrows/signed bike routes along 12th Street and 18th Street. Of note, 18th Street provides striped bicycle lanes on either the west or east side of the roadway between Montana Avenue and Rhode Island Avenue. There are no bike facilities in the vicinity of the site that provide east-west connectivity. That said, under existing conditions, the nearby bike facilities must be accessed from neighborhood roads. Figure 33 illustrates the existing bicycle facilities in the area.

Little to no bike parking is provided in the direct vicinity of the site. Cyclists that do bike to the existing site are likely to use street signs or similar objects to secure their bicycles.

In addition to personal bicycles, the Capital Bikeshare program provides an additional cycling option for residents and patrons of the Brookland Manor development. The Bikeshare program has placed over 300 bicycle-share stations across Washington, DC, Arlington and Alexandria, VA, and most recently Montgomery County, MD with over 2,500 bicycles provided. Under existing conditions there are no Bikeshare stations within a quarter-mile of the site; however, there are three stations located approximately half a mile from the site. These stations provide a total of 49 docks. Figure 33 identifies existing station locations in the study area.

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.
- Tier 2
Investments within this tier are not high priorities in the early years of MoveDC implementation. They could begin moving through the Project Development Process if there are compelling reasons for their advancement.
- Tier 3
Investments within this tier are not priorities for DDOT-led advancement in the early years of MoveDC's implementation. They could move forward earlier under circumstances such as real estate development initiatives and non-DDOT partnerships providing the opportunity for non-District-led completion of specific funding.
- Tier 4
Generally, investments within this tier are not priorities for DDOT-led advancement and are lower priority for project development in the early years of implementation.

Due to the timeline of the Brookland Manor development, this report will focus on the Tier 1 and Tier 2 recommendations within the vicinity of the site. These include the New York Avenue multi-use trail between Kirby Street NW and the



Maryland Line, bicycle lanes along Rhode Island Avenue between Reed Street NE and the Maryland Line, and a cycle track along Rhode Island Avenue between Connecticut Avenue/M Street NW and Reed Street NE. These facilities would greatly improve the east-west bicycle connectivity near the site which is currently lacking.

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.

SITE IMPACTS

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

Bicycle Trip Generation

The Brookland Manor development is expected to generate 15 bicycle trips (5 inbound, 10 outbound) during the morning peak hour and 28 bicycle trips (16 inbound, 12 outbound) during the afternoon peak hour. Bicycle trip generation for the development is relatively low compared to the other modes due to the lack of exclusive bicycle facilities surrounding the site. It is possible that the number of bicycle trips may increase in the future if sufficient bicycle facilities are added to adjacent roadways. Overall, the development is not expected to have a negative impact on bicycle facilities in the area.

On-Site Bicycle Elements

The PUD will provide extensive amenities that cater to cyclists including long-term bicycle parking, bicycle racks, and new Capital Bikeshare stations.

Although the amount of long-term bicycle parking spaces is not yet determined, at a minimum, the Applicant has agreed to meet the current requirement for bicycle parking. This amounts to one secure bicycle parking space for each 3 residential units and 5 percent of the number of automobile spaces required for all other uses. Exact locations of the bicycle racks have not yet been determined; however, it is expected that bicycle racks will be located along the perimeter of most buildings. Specific bicycle parking numbers and locations will be discussed during the Phase 2 application process.

The Applicant has also agreed to the installation of two new Capital Bikeshare stations: one during Phase 2 and one during

Phase 3. Locations of these stations have been tentatively identified near the intersection of Saratoga Avenue and Montana Avenue and near the intersection of Rhode Island Avenue and Brentwood Road/12th Street, as shown in Figure 34. The ultimate location of the Bikeshare stations will be determined during the Phase 2 application.

Proposed Bicycle Improvements

As discussed, east-west bicycle connectivity near the site via exclusive bicycle facilities or signed bike routes is non-existent. In order to make the site more bike-friendly and promote bicycling as an alternative mode, it is recommended that a bike route be created through the site, connecting the 12th Street and 18th Street bicycle facilities, as shown on Figure 34. Under existing conditions this route would be hindered by the two-way stop-controlled intersection of Saratoga Avenue and Montana Avenue; however, the addition of a traffic signal at this location makes the route a good candidate for a signed bicycle route. This route would create a connection to the primary retail corridor of the site, which will likely generate the most bicycle traffic, and double as an east-west connection between two of the neighborhoods north-south bicycle routes. As this connection would be of the most advantage at the completion of the retail corridor along Saratoga Avenue and community green, this report recommends that this be considered after Phase 2 is constructed.

For most of the connection, the installation of DDOT's bicycle route signage will be acceptable to guide bicycles; however, further striping and signage will be necessary along the eastbound approach of Saratoga Avenue at Brentwood Road. This approach has an exclusive right turn lane (with an overlapping right turn phase) and a through-left lane. Special treatment will be taken at this approach to ensure safe conditions for bicyclists including sharrows leading up to the intersection, a short exclusive bike lane at the intersection between the right lane and through-left lane, a bike box in front of the through-left lane, and signage indicating the lane configuration. These treatments are shown in Figure 35. Similar treatments have been observed throughout the District such as the westbound approach of Columbia Road at 18th Street/Adams Mill Road NW and the westbound approach of C Street at 15th Street NE.

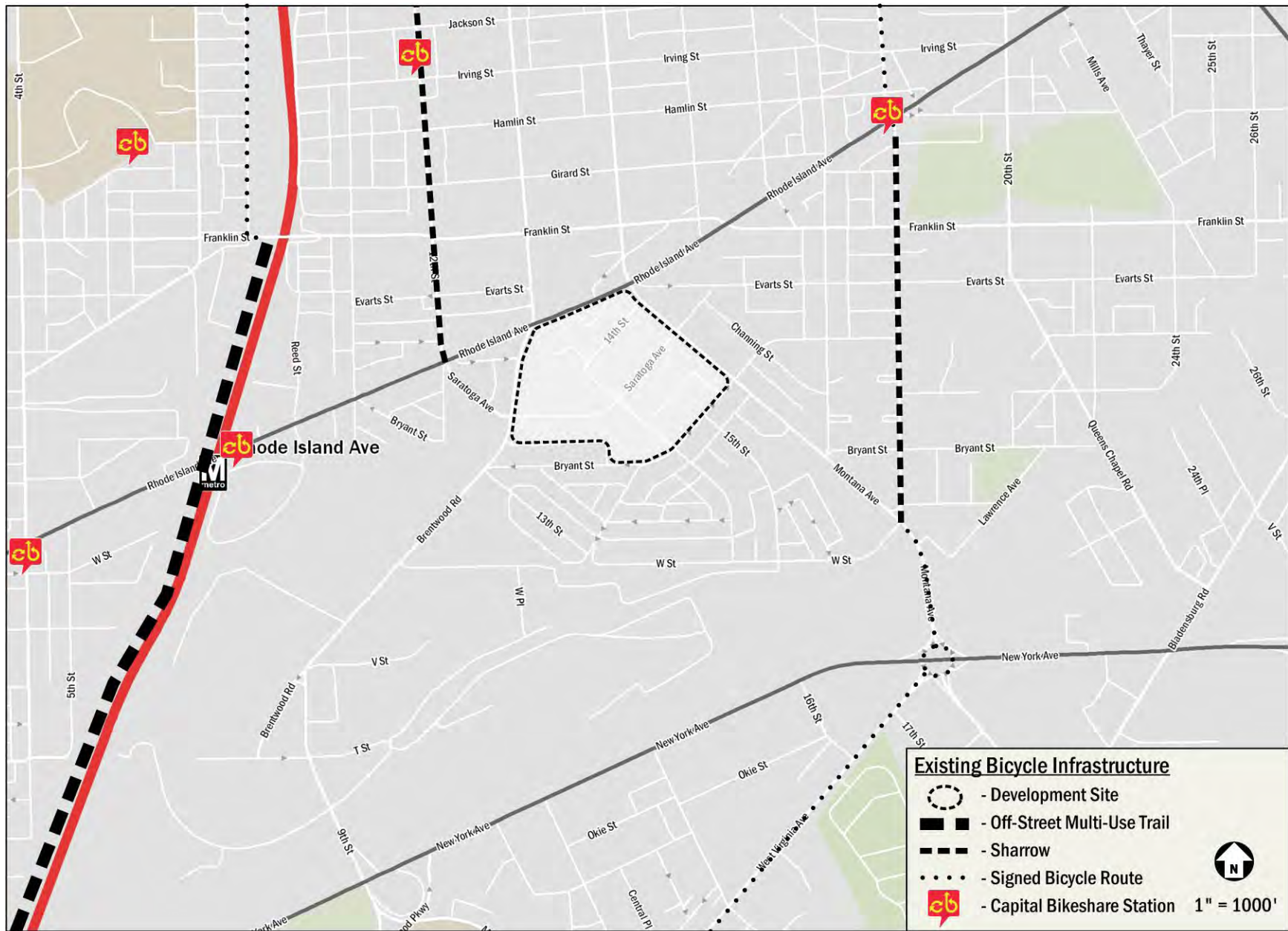


Figure 33: Existing Bicycle Facilities

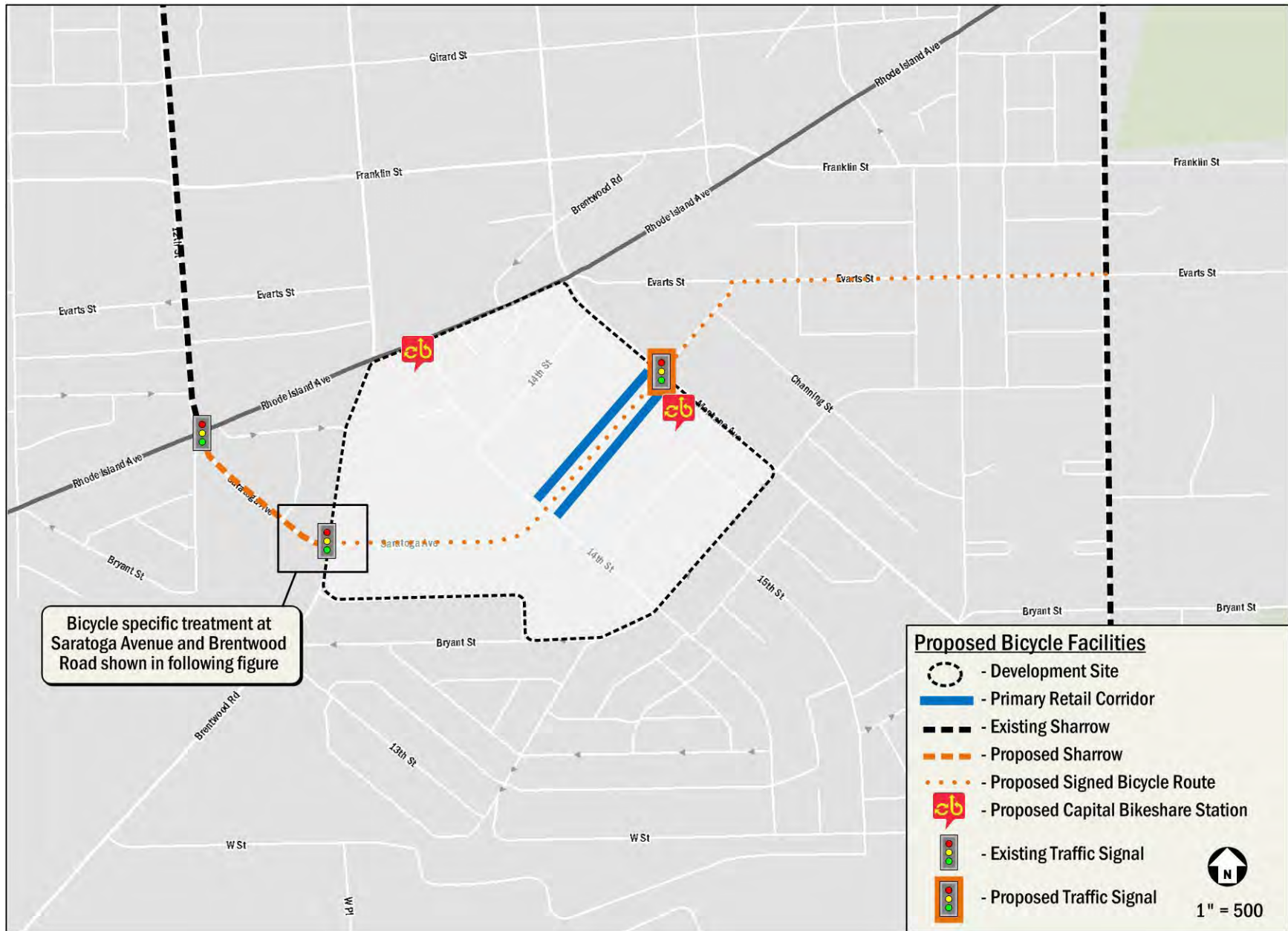


Figure 34: Proposed Bicycle Facilities

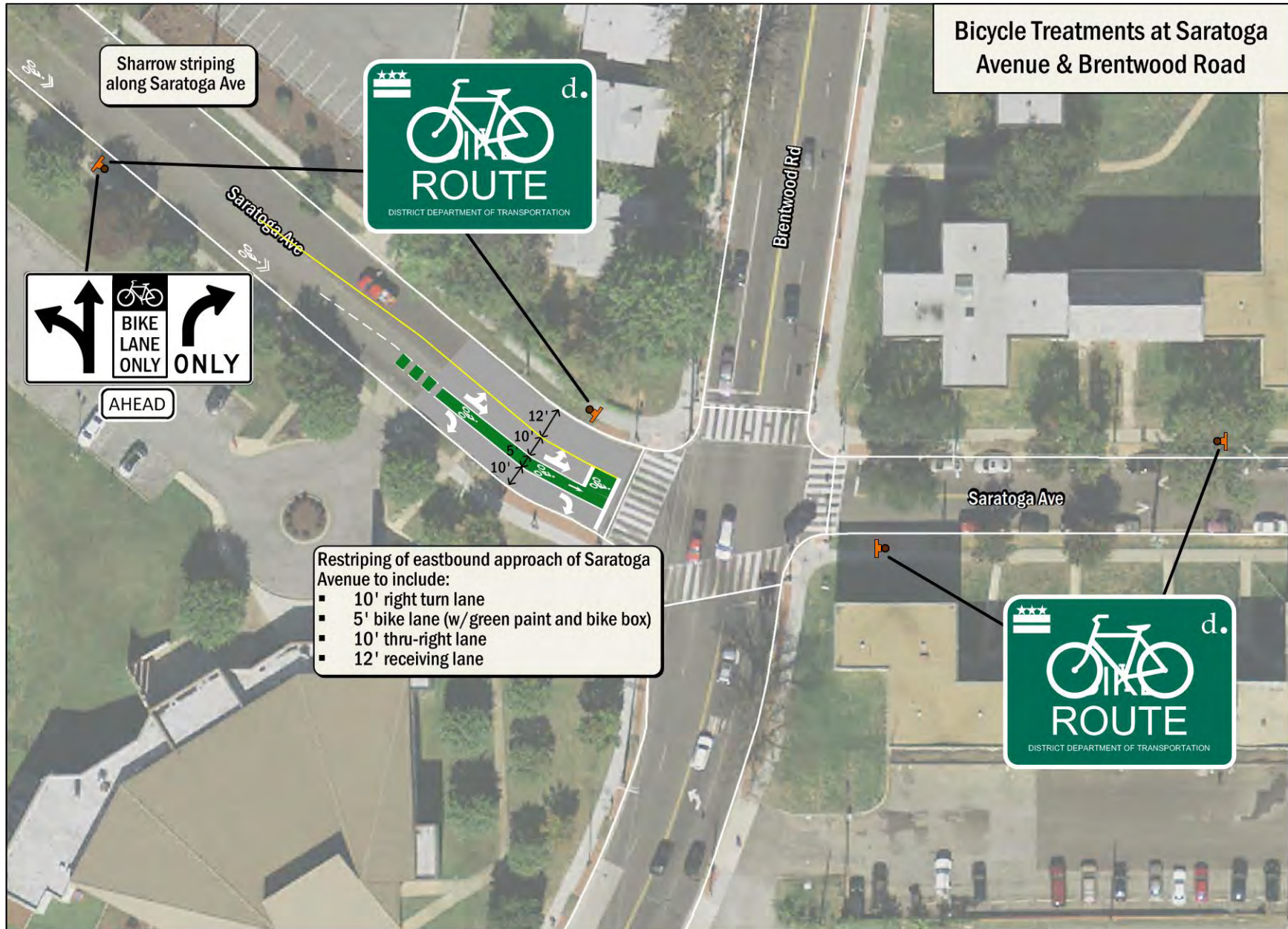


Figure 35: Bicycle Treatments at Saratoga Avenue & Brentwood Road



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 2011 to 2013 for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections, the crash rate is measure in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 6.

According to the Institute of Transportation Engineer's *Transportation Impact Analysis for Site Development*, a crash

rate of 1.0 or higher is an indication that further study is required. Seven intersections in this study area meet this criterion (as shown in red in Table 6 and detailed in Table 7). The Brookland Manor 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. Additionally, the crash data does not provide detailed location information. In some cases, the crashes were located near the intersections and not necessarily within the intersection.

For these seven intersections, the crash type information from the DDOT crash data was reviewed to see if there is 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

Table 6: Intersection Crash Rates (2011 to 2013)

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
Rhode Island Ave & Reed St/Washington Pl NE	76	6	0	2.12
Rhode Island Ave & 10th St/Bryant St NE	33	0	0	0.43
Rhode Island Ave & 12th St NE	36	0	0	0.38
Rhode Island Ave & Brentwood Rd/13th St NE	24	2	0	0.66
Rhode Island Ave & Shopping Center/Brentwood Rd NE	65	3	0	0.87
Rhode Island Ave & Montana Ave/14th St NE	48	2	0	0.52
Rhode Island Ave & 15th St NE	10	0	0	0.42
Rhode Island Ave & Franklin St NE	6	0	0	0.20
Rhode Island Ave & 17th St NE	13	1	0	0.21
Rhode Island Ave & 18th St NE	21	2	0	0.73
Franklin St & 12th St NE	21	2	0	0.98
Franklin St & 13th St NE	17	1	0	0.91
Franklin St & 14th St NE	17	1	0	1.16
Brentwood Rd & Bryant St/13th Ave NE (Roundabout)	39	5	0	0.64
Brentwood Rd & Saratoga Ave NE	30	0	0	1.26
Brentwood Rd & Douglas St NE	2	0	0	0.17
Montana Ave & 14th St NE	7	0	0	0.59
Montana Ave & Saratoga Ave NE	12	1	0	0.96
Montana Ave & Downing St/Douglas St NE	20	0	0	1.68
Montana Ave & Bryant St/17th St NE	18	0	0	0.66
Montana Ave & W St/18th St NE	33	1	0	1.85
Saratoga Ave & 14th St NE	10	1	0	3.57
Downing St/Bryant St & 14th St NE	3	1	0	1.88
Downing St & 15th St NE	1	0	0	0.88

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



represented. However, some summaries of crash data can be used to develop general trends or eliminate some possible causes. Table 7 contains a breakdown of crash types reported for the seven intersections with a crash rate over 1.0 per MEV.

POTENTIAL IMPACTS

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

- Rhode Island Ave & Reed Street/Washington Place NE**
 This intersection was found to have a crash rate of 2.12 crashes per MEV over the course of the 3-year study period. The majority of the crashes at this intersection were rear end and side swiped vehicles. These are likely due to the lack of an exclusive left turn lane along the eastbound approach of Rhode Island Avenue. Those traveling through the intersection may rear end or side swipe vehicles waiting to turn left. In addition the presence of an exclusive eastbound left turn phase without the presence of a left turn lane may result in additional confusion at the intersection.

Additionally, a high number of pedestrian crashes were observed at this intersection. The Rhode Island Avenue

Metrorail Station pick-up/drop-off and a large shopping center are accessible from this intersection therefore high vehicular and pedestrian volumes are observed. Due to the high vehicular volumes, the northbound approach requires three inbound lanes and four outbound lanes, resulting in long crossing distances for pedestrians.

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.

- Franklin Street & 14th Street NE**
 This intersection was found to have a crash rate of 1.16 crashes per MEV over the course of the 3-year study period. No specific crash type shows prevalence here with all crash types occurring one to three times over the study period. No conclusive reasoning can be drawn as to why an elevated crash rate is observed at this intersection. That said, no improvements are recommended as part of the PUD.
- Brentwood Road & Saratoga Avenue NE**
 This intersection was found to have a crash rate of 1.26 crashes per MEV over the course of the 3-year study

Table 7: High Crash Rate Intersections by Crash Type

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Non-Collision	Under/Over Ride	Unspecified	Total
Rhode Island Ave & Reed St/ Washington Pl NE	2.12	4 5%	9 12%	4 5%	22 29%	18 24%	1 1%	4 5%	3 4%	0 0%	6 8%	1 1%	1 1%	0 0%	3 4%	76
Franklin St & 14th St NE	1.16	3 18%	3 18%	0 0%	3 18%	3 18%	1 6%	1 6%	0 0%	0 0%	1 6%	0 0%	0 0%	0 0%	2 12%	17
Brentwood Rd & Saratoga Ave NE	1.26	1 3%	0 0%	3 10%	9 30%	6 20%	1 3%	6 20%	2 7%	0 0%	0 0%	2 7%	0 0%	0 0%	0 0%	30
Montana Ave & Downing St/Douglas St NE	1.68	7 35%	0 0%	1 5%	4 20%	2 10%	0 0%	2 10%	1 5%	0 0%	0 0%	1 5%	0 0%	0 0%	2 10%	20
Montana Ave & W St/18th St NE	1.85	2 6%	3 9%	0 0%	6 18%	13 39%	1 3%	1 3%	3 9%	0 0%	1 3%	1 3%	1 3%	0 0%	1 3%	33
Saratoga Ave & 14th St NE	3.57	1 10%	0 0%	0 0%	1 10%	5 50%	0 0%	1 10%	0 0%	0 0%	1 10%	0 0%	0 0%	0 0%	1 10%	10
Downing St/Bryant St & 14th St NE	1.88	0 0%	0 0%	0 0%	0 0%	2 67%	0 0%	0 0%	0 0%	0 0%	1 33%	0 0%	0 0%	0 0%	0 0%	3



period. The majority of crashes at this intersection were rear end, side swiped vehicles, and parked vehicles. Similar to the previous intersection, this intersection observes a high amount of northbound left turns and eastbound right turns. For the intersection to operate acceptably an exclusive left turn lane is required; however there is no room for a pocket lane. Therefore one of the northbound through lanes along Brentwood Road is signed and striped as a left turn lane leading up to the intersection. At most other intersections along Brentwood Road, the northbound approach has two lanes that can be used for through moving vehicles. The transition of a through lane to left turn lane midway between two intersections is atypical and likely leads to vehicles slowing down quickly or changing lanes last minute which can result in rear end and side swipe crashes. The crashes involving parked vehicles likely occur along the westbound approach of Saratoga Avenue. This approach has parking on both sides with narrow travel lanes that could result in crashes with parked vehicles.

Although most issues discussed at this intersection will not be improved as part of the PUD, curb extensions will be placed along the eastern side of Brentwood Road. The curb extensions serve to improve pedestrian safety and may result in fewer crashes with parked vehicles/

- Montana Ave & Downing Street/Douglas Street NE
This intersection was found to have a crash rate of 1.68 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were right angle crashes. This intersection is two-way stop-controlled where Montana Avenue traffic does not stop. Montana Avenue observes relatively high vehicular traffic, therefore it is likely that right angle crashes occur when a vehicle traveling along Downing Street takes too small of a gap to cross Montana Avenue. Parking along Montana Avenue may also create difficult sight lines for those traveling along the side streets.

Although no direct changes will be made to this intersection, the development will be installing a signal at the intersection of Saratoga Avenue and Montana Avenue. It is likely that some existing traffic will shift over to Saratoga Avenue to take advantage of the signal. Less traffic at this intersection along the side streets may reduce the number of crashes observed.

- Montana Ave & W Street/18th Street NE
This intersection was found to have a crash rate of 1.85 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. Some approaches at this intersection, particularly W Street and Montana Avenue southbound have one wide approach lane that may result in through vehicles trying to pass turning vehicles. Often times this can lead to rear end or side swipe crashes. Rear end crashes are also more likely at signalized intersections.

This analysis suggests that the southbound approach of Montana Avenue be striped as a through-left and a through-right lane. Currently the approach is one lane with room for two and has two receiving lanes at the opposite end of the intersection. Officially striping the southbound approach as two lanes may relieve some confusion at the intersection and reduce crash rates.

- Saratoga Ave & 14th Street NE
This intersection was found to have a crash rate of 3.57 vehicles per MEV over the course of the 3-year study period. The majority of the crashes at this intersection were side swiped vehicles. Side swipe crashes tend to be more prevalent in areas with a significant presence of on-street parking, which is the case for all approach roadways.

Some modifications will be made to this intersection as part of the PUD. Curb extensions will be constructed at all corners of the intersection which will improve pedestrian safety while creating a greater degree of separation between parked cars and travel lanes.

- Downing Street/Bryant Street & 14th Street NE
This intersection was found to have a crash rate of 1.88 vehicles per MEV over the course of the 3-year study period. The majority of crashes at this intersection were side swiped vehicles; however, only 3 crashes total were recorded over the study period. Therefore, the high crash rate at this location is more likely due to the low volume observed.

As part of the PUD, this intersection will be converted from a T-intersection to a traditional 4-legged intersection. During this conversion, some measures will be taken to increase safety such as implementing improved pedestrian crossings.



SUMMARY AND CONCLUSIONS

This report presents the findings of a Transportation Impact Study (TIS) for the Brookland Manor Planned Unit Development (PUD). The purpose of this study is to evaluate whether the PUD will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, three background conditions, and four future conditions. This report concludes that **the PUD will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements are implemented, and all mitigation measures are incorporated into the PUD application.

Proposed PUD

The Brookland Manor site is currently the site of an apartment complex and a strip commercial shopping center located at the intersection of Rhode Island Avenue and Montana Avenue NE. The site is generally bound by Rhode Island Avenue, NE to the north, Montana Avenue, NE to the east, Downing Street, NE/14th Street, NE/Saratoga Avenue, NE to the south, and Brentwood Road, NE to the west.

The PUD application, which is for Stage 1 approval only, calls for the redevelopment of the site with residential and commercial/retail uses and an improved street grid. It contains 2,215 residential units and 200,680 square feet of retail space over 8 'blocks'.

The approximately 2,200 residential units will include multi-family buildings, senior housing, two-over-two buildings, and row-houses. The project will include a mix of for-sale and rental residential units.

The PUD also includes approximately 200,000 square feet of updated and enhanced retail space. In addition to a full sized grocery store of approximately 56,000 square feet, the project will have ground-floor retail uses ringing Rhode Island, Montana, and Saratoga Avenues, NE, as well as the community green.

There are several significant transportation improvements incorporated into the plan. The PUD Master Plan takes advantage of the significant size of the project to greatly enhance the street network. Not only will the project add more roads to the site, it lays out the roads in a fashion that provides more connectivity for drivers, pedestrians and cyclists. First, a

new '15th Street Extended' will connect all of the way through the site from Downing Street to Rhode Island Avenue. Second, 14th Street will be extended through the site to Rhode Island Avenue as a pedestrian connection, providing a second access point on Rhode Island Avenue. Finally, the PUD Master Plan includes a new alley network that provides quality access to parking facilities and loading docks.

Analysis Findings and Recommendations

The following report reviews the transportation elements of the PUD, supplementing material provided in the Site Plan Package that accompanied the Zoning Commission Application. The analyses contained in the report are based on industry and District guidelines and the report's assumptions and methodologies were detailed and discussed with the District Department of Transportation (DDOT), and were only performed in concurrence with the study scope from DDOT.

The following summarizes the report's recommended mitigation measures for the project, which with DDOT concurrence would become commitments in the PUD's Zoning Order:

- Install a traffic signal at the intersection of Saratoga Avenue and Montana Avenue (for Phase 2)
- Incorporate 15th Street extended as the fourth leg of the intersection of Rhode Island Avenue with Brentwood Road (for Phase 2). During the Stage 2 application for Phase 2, work with DDOT and WMATA to relocate the bus stop, determine the need for separate right and left turn lanes on 15th Street extended, and determine if a left turn lane from Rhode Island Avenue onto 15th Street extended is necessary.
- Install lane marking and striping changes at two intersections: Rhode Island Avenue and Montana Avenue, and 18th Street and Montana Avenue (for Phase 2)
- Install lane markings, striping, and signing improvements as needed to establish an official bike route between 12th Street and 18th Street through the site (for Phase 2).
- Coordinate with DDOT during Stage 2 PUD applications on the following:
 - Amount and size of loading facilities
 - Maneuvering analyses of trucks to and from loading facilities
 - Amount of off-street parking (this may require an inventory and occupancy count of on-street facilities)



to help determine the appropriate amount of parking and potential spillover impacts)

- Layout of internal streets, including curbside management
- Transportation Demand Management plans for each building
- Amount of secure off-street bicycle parking in each building
- Locations and amount of on-street bicycle racks
- Locations for Capital Bikeshare stations